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FOR FIRST TIME ACCREDIDATION OF UNDER GRADUATE ENGINEERING PROGRAM (TIER-II)

(ELECTRICAL AND ELECTRONICS ENGINEERING)

IES COLLEGE OF TECHNOLOGY, BHOPAL (0177)

Kalkheda, Ratibad Main Road,

Bhopal-462044, Madhya Pradesh, India

2020-2021

SAR Contents

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IES COLLEGE OF TECHNOLOGY

Electrical and Electronics Engineering

Part A: Institutional Information

1 Name and Address of the Institution

IES COLLEGE OF TECHNOLOGY, IES CAMPUS KALKHEDA RATIBAD MAIN ROAD, BHOPAL (M.P.) 462044

2 Name and Address of Affiliating University

RAJIV GANDHI PROUDYOGIKI VISHWAVIDYALAYA, BHOPAL

3 Year of establishment of the Institution:

2007

4 Type of the Institution:

University	Autonomous
Deemed University	√ **Affiliated**
Government Aided	

5 Ownership Status:

Central Government	Trust
State Government	Society
Government Aided	Section25Company
√**Self financing**	Any Other (Please Specify)

6 Other Academic Institutions of the Trust/Society/Company etc., if any:

Name of Institutions	Year of Establishment	Programs of Study	Location
IES PUBLIC SCHOOL, BHOPAL	2014	HIGHER SECONDARY SCHOOL(CBSE)	BHOPAL
IES INSTITUTE OF PHARMACY,BHOPAL	2017	PHARMACY	BHOPAL
IES UNIVERSITY BHOPAL	2019	EDUCATION, NURSING, PARAMEDICAL, ENGG. etc	BHOPAL

7 Details of all the programs being offered by the institution under consideration:

Name of Program	Program Applied level	Start of year	Year of AICTE approval	Initial Intake	Intake Increase	Current Intake	Accreditation status	From	To	Program for consideration	Program for Duration
Electrical and Electronics Engineering	UG	2007	2007	60	Yes	120	Applying first time	--	--	Yes	4
Power Systems	PG	2013	2013	18	No	18	Eligible but not applied	--	--	No	2

8 Programs to be considered for Accreditation vide this application:

S No	Level	Discipline	Program
1	Under Graduate	Engineering & Technology	Computer Science & Engg.
2	Under Graduate	Engineering &Technology	Electrical & Electronics Engg.
3	Under Graduate	Engineering &Technology	Electronics & Communication Engg.

4	Under Graduate	Engineering &Technology	Mechanical Engg.

9 Total number of employees in the institution

A. Regular*Employees (Faculty and Staff):

Items	2020-21		2019-20		2018-19		2017-18	
	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX
Faculty in Engineering (Male)	96	96	83	83	80	80	85	85
Faculty in Engineering (Female)	16	16	20	20	22	22	22	22
Faculty in Maths, Science & Humanities (Male)	22	22	22	22	21	21	17	17
Faculty in Maths, Science & Humanities (Female)	23	23	21	21	19	19	20	20
Non-teaching staff (Male)	44	44	45	45	46	46	46	46
Non-teaching staff (Female)	05	05	05	05	05	05	05	05

B. Contractual*Employees (Faculty and Staff):

Items	2020-21		2019-20		2018-19		2017-18	
	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX
Faculty in Engineering(Male)	04	04	08	08	04	04	03	03
Faculty in Engineering (Female)	0	0	0	0	0	0	0	0
Faculty in Maths, Science & Humanities (Male)	0	0	0	0	0	0	0	0
Faculty in Maths, Science & Humanities (Female)	0	0	0	0	0	0	0	0
Non-teaching staff (Male)	0	0	0	0	0	0	0	0
Non-teaching staff (Female)	0	0	0	0	0	0	0	0

10 Total number of Engineering Students:

Engineering and Technology-UG	√ **Shift1**	Shift2
Engineering and Technology-PG	√ **Shift1**	Shift2
Engineering and Technology- Polytechnic	Shift1	√**Shift2**
MBA	√**Shift1**	Shift2
MCA	Shift1	Shift2

Engineering and Technology- UGShift-1

Items	2020-21	2019-20	2018-19	2017-18
Total no. of Boys	481	630	615	624
Total no. of Girls	23	23	44	36
Total	**504**	**653**	**659**	**660**

Engineering and Technology- PG Shift-1

Items	2020-21	2019-20	2018-19	2017-18
Total no. of Boys	43	29	40	38
Total no. of Girls	9	8	11	5
Total	**52**	**37**	**51**	**43**

Engineering and Technology- Polytechnic Shift-2

Items	2020-21	2019-20	2018-19	2017-18

Total no. of Boys	137	200	234	293
Total no. of Girls	1	6	5	7
Total	**138**	**206**	**239**	**300**

Engineering and Technology- MBA Shift-1

Items	**2020-21**	**2019-20**	**2018-19**	**2017-18**
Total no. of Boys	119	113	34	37
Total no. of Girls	61	67	26	23
Total	**180**	**180**	**60**	**60**

11 Vision of the Institution:

To develop as a reputed technical institution by imparting quality education coupled with human values for ensuring the overall personality development of engineering students

Mission of the Institution:

M1: To provide the best facilities, environment, and infrastructure for the achievement of objectives.

M2: To ensure the availability of intellectual assets in terms of qualified faculty committed to the cause of developing competent engineers and managers.

M3: To put in dedicated efforts for inculcating human values in the students coupled with overall personality development.

M4: To provide value-added courses and projects through Industry-Institute interactions for effective learning and better career opportunities

M5: To tie up with Industries and Institutions for developing innovative and entrepreneurial kills of students.

12 Contact Information of the Head of the Institution and NBA coordinator, if designated:

Head of the Institution	
Name	Dr. Gyanendra Kumar Pandey
Designation	Principal
Mobile No.	9285009752
Email ID	iesbpl@gmail.com

NBA Coordinator, If Designated

Name	Dr.Pallavee Bhatnagar
Designation	HOD, Department Electrical and Electronics Engg.
Mobile No.	9229251477
Email ID	nba.coordinator@iesbpl.ac.in

Criterion 1	Vision, Mission and Program Educational Objectives	60

1.1. State the Vision and Mission of the Department and Institute (5)

A. Availability of Vision and Mission statements of the department

Vision of the Institute

"To develop as a reputed technical institution by imparting quality education coupled with human values for ensuring the overall personality development of engineering students".

Mission of the Institute:

M-1: To provide the best facilities, environment, and infrastructure for the achievement of objectives.

M-2: To ensure the availability of intellectual assets in terms of qualified faculty committed to the cause of developing competent engineers and managers.

M-3: To put in dedicated efforts for inculcating human values in the students coupled with overall personality development.

M-4: To provide value-added courses and projects through Industry-Institute interactions for effective learning and better career opportunities.

M-5: To tie-up with Industries and Institutions for developing innovative and entrepreneurial skills of students.

Vision of the Department

To develop technically sound and competent technocrats with professional ethics in the field of Electrical and Electronics Engineering

Mission of the Department:

M-1. To provide appropriate facilities and environment for the effective teaching-learning process.

M-2. To ensure the availability of intellectual assets in terms of qualified faculty committed to developing competent students.

M-3. To enhance the technical skills of students for a practical approach through workshops, expert lectures and Industry-Institute interactions.

M-4. To organize extra-curricular and co-curricular activities for positive contribution to society.

M-5. To prepare the students for a professional career and higher studies through quality education in Electrical and Electronics Engineering.

B and C. Consistency of the Department statements with the Institute statements

Table 1.1: Justification of mapping of Institute vision with Department Vision

	Vision of the department: To develop technically sound and competent technocrats with professional ethics in the field of electrical and electronics engineering.	**Justification:**
Vision of the Institute: To develop as a reputed technical institution by imparting quality education coupled with human values for ensuring the overall personality development of engineering students.	**Consistency: High**	• Quality technical education • Professional ethics • Competent education

Table 1.2: Justification of mapping of Institute Mission with department Mission

Justification of mapping of Institute Mission with department Mission					
Mission of the institute ///Mission of the Department	**To provide appropriate facilities and environment for effective teaching learning process.**	**To ensure availability of intellectual assets in terms of qualified faculty committed to developing competent students.**	**To enhance the technical skills students for a practical approach through workshops, expert lectures and Industry Institute interactions.**	**To organize extra-curricular and co-curricular activities for positive contribution to society.**	**To prepare the students for a professional career and high studies through quality education in electrical and electronics engineering.**
To provide the best facilities, environment, and infrastructure for the achievement of objectives.	**High** (good quality facilities/ best facilities, effective teaching learning process/ achievement of objectives)	**Medium** (best faculties/ facilities, competent engineers /objectives)	**High** (best facilities/ through workshops, expert lectures and Industry Institute interactions, Technical skills/achievement of objectives)	**Medium** (provide the best facilities, environment / To organize extra-curricular and co-curricular activities, achievement of objectives / positive contribution to society)	**High** (provide the best facilities, environment / **t**hrough quality education in electrical and electronics engineering, achievement of objectives/ competent for higher studies and entrepreneur skills)
To ensure the availability of intellectual assets in terms of qualified faculty committed to the cause of developing	**High** (Provide intellectual assets/ facilities and environment, developing competent engineers and	**High** (Provide intellectual assets/ facilities and environment , qualified faculty / qualified faculty, developing competent engineers and managers	**High** (availability of intellectual assets / through workshops, expert lectures and Industry Institute interactions, develop	**Medium** (the availability of intellectual assets / organize extra-curricular and co-curricular activities,	**Medium** (availability of intellectual assets/ quality education in electrical and electronics engineering , developing competent

competent engineers and managers.	managers/ for effective teaching learning process)	/developing competent students)	competent engineers and managers / enhance the technical skills students)	developing competent engineers and managers/ positive contribution to society)	engineers and managers/ professional career and high studies)
To put in dedicated efforts for inculcating human values in the students coupled with overall personality development	**High** (Dedicated efforts / provide appropriate facilities, inculcating human values / effective teaching learning process.)	**High** (dedicated efforts / best faculties, overall personality development / developing competent students)	**High** (dedicated efforts / through workshops, expert lectures and Industry Institute interactions. overall personality development / enhance the technical skills)	**Medium** (dedicated efforts/ organize extra-curricular and co-curricular activities, overall personality development / positive contribution to society)	**Medium** (dedicated efforts / quality education in electrical and electronics engineering, overall personality development / competent for higher studies and entrepreneur skills)
To provide value added courses and project through industry-institute interaction for effective learning and better career opportunity.	**High** (provide value added courses and project / good quality facilities, effective learning and better career opportunity/ effective teaching learning process)	**High** (provide value added courses and project/ best faculties , effective learning and better career opportunity / competent engineers)	**High** (provide value added courses and project through industry-institute interaction / through workshops, expert lectures and Industry Institute interactions , effective learning and better career opportunity / enhance the	**Low** (provide value added courses and project through industry-institute interaction /organize extra-curricular and co-curricular activities)	**Medium** (provide value added courses and project through industry-institute interaction /quality education in electrical and electronics engineering, effective learning and better career opportunity/ professional career and high studies)

			technical skills students for a practical approach)		
To tie up with industry and institution for developing innovative and entrepreneurial skills of students.	**Medium** (tie up with industry and institution / appropriate facilities, developing innovative and entrepreneurial skills/ effective teaching learning process)	**Low** (developing innovative and entrepreneurial skills of students /developing competent students)	**High** (tie up with industry and institution / practical approach through workshops, expert lectures and Industry Institute interactions, developing innovative and entrepreneurial skills of students/ enhance the technical skills students for a practical approach)	**Medium** (tie up with industry and institution/ organize extra-curricular and co-curricular activities, developing innovative and entrepreneurial skills of students/ positive contribution to society)	**Medium** (tie up with industry and institution/ through quality education in electrical and electronics engineering, developing innovative and entrepreneurial skills of students/ professional career and high studies)

1.2. State the Program Educational Objectives (5)

A. Listing of the Program Educational Objectives of the program.

PEO-1. Work as an Electrical and Electronics engineering professional in core and software industries by applying theoretical and practical knowledge.

PEO-2. Apply competency in Electrical and Electronics engineering to become an entrepreneur or pursue higher studies or research.

PEO-3. Provide solutions for resolving Electrical and Electronics engineering problems with a sense of societal, environmental and ethical responsibility.

1.3 Indicate where the Vision, Mission and PEOs are published and disseminated among stakeholders (10).

The vision and mission are exclusively explained to the newly enrolled students and their parents during orientation program. The alumni are updated about the Mission and Vision during alumni interaction. The statements are communicated to the industry/employers through introductory presentation during industrial visits, placement drives and other industry-institute interactions. Faculty and staff members recruited newly are also informed and explained about Mission and Vision and PEOs at the time of orientation program. In addition, the dissemination of PEOs to various stakeholders is also done through faculty meetings and Department Academic Advisory Committee meeting. Various platforms where Vision & Mission and PEOs are disseminated are given as under:-

- Web-site of the institute
- News letters published by the institute: **QUEST**
- Admission brochure of the institute
- Notice board of the Institute
- Handbook of the Institute
- Display boards
- Classrooms & labs
- Seminar hall
- Staff rooms
- Course file of the Faculty
- HOD Office
- Department Library
- Placement Office

Table 1.3: The Vision and Mission and PEOs are published

Particulars	Internal Stake Holders	External Stake Holders
Web-site of the institution (https://www.icot.co.in/)	✓	✓
News Letters published by the Institution: QUEST	✓	✓
Admission brochure of the Institution	✓	✓
Handbook of the Institution	✓	

Table 1.4: The Vision & Mission and PEOs are disseminated at:

S.No.	Where published/disseminated	Target stake holders
1	Institute website	Students, parents, faculty; alumni, Industry, Management.
2	Annual Functions	Students, parents, faculty, alumni, industry.
3	Prospectus	Management, Governing Body Members, faculty, students and parents
4	Display boards:	Students, Faculty, Parents, Management
5	Department main corridor, notice board, HOD cabin,	Students, Faculty, Parents, Industry, Alumni, Employers, Management, Governing Body Members, , Department Advisory
6	Principal room, Faculty rooms, Laboratories, Seminar hall.	Students, Parents, Faculty,

1.4 State the process for defining the Vision and Mission of the Department, and PEOs of the program (25)

A. Description of process involved in defining the Vision, Mission of the Department

The department established Vision and Mission through consultative process involving stakeholders, faculty, industry persons and many other relevant areas considering scope and growth of the college, future societal needs & also following points in view:

1. Vision and Mission of the institute
2. Need of industry and society
3. Changing technical environment
4. Requirement of academia
5. NBA - Program Outcomes
6. Recruiters and Employers
7. Stakeholders/Management
8. Parents, Alumni
9. Guest speakers of industry experts
10. Brainstorming sessions in faculty meetings
11. Students and staff
12. Periodic review of vision, mission and PEOs are prepared through the suggestion from faculty meetings.

Following process adopted in developing departmental Vision and Mission statements:

Step 1: Vision and Mission of the institution were taken as the guiding base.

Step 2: A detailed survey was conducted on various college websites & salient points like Vision & Mission of the institute, need of industry and society, & changing technical environment etc. were also given consideration.

Step 3: Through discussions & deliberations with internal stakeholders, the department drafted its first stage of Vision and Mission and sent it to external stake holders for their views/ opinions.

Step 4: The feedback from all stake holders was obtained and given due consideration.

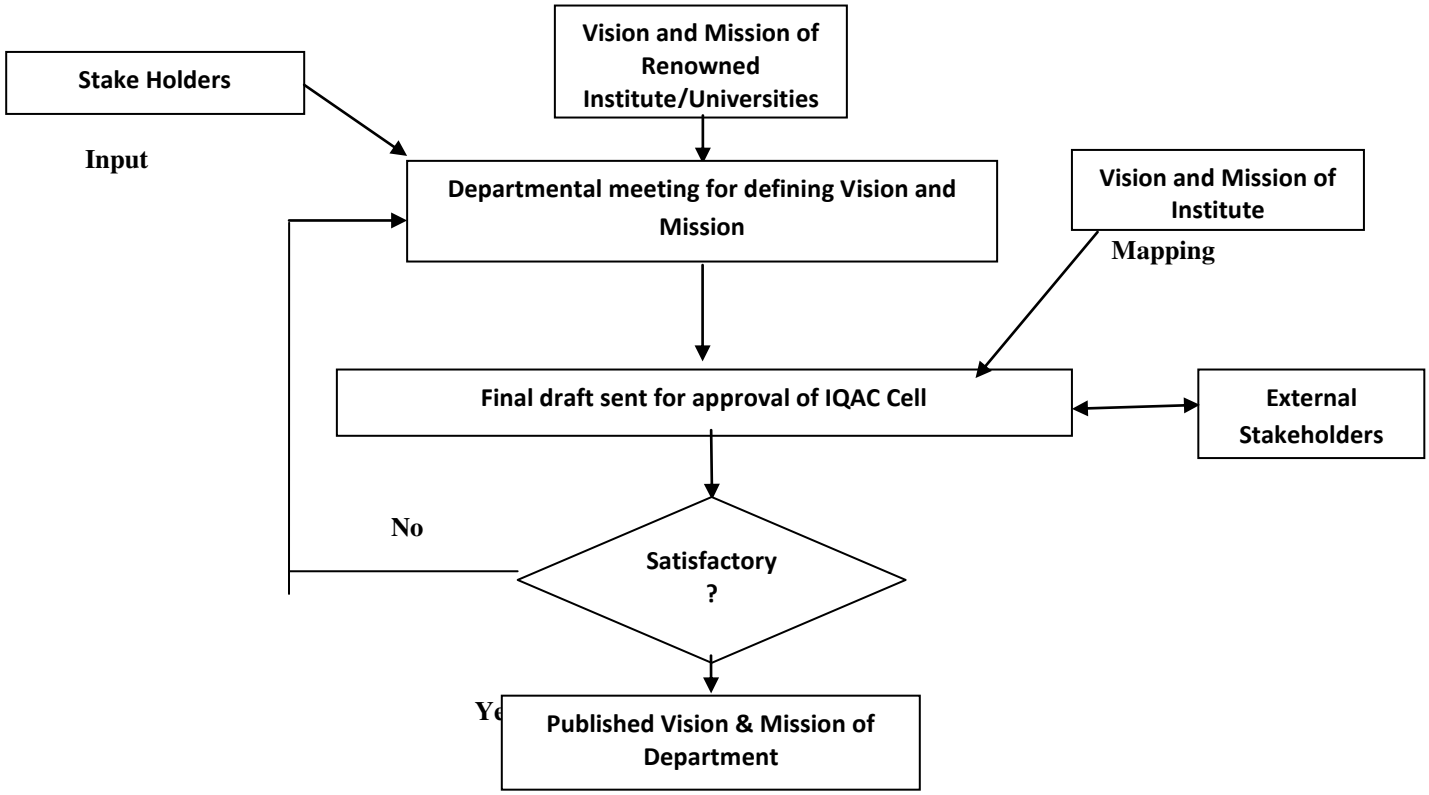


Fig 1.1: Establishing Vision and Mission

Step 5: The views were analyzed and reviewed to check the consistency with the vision and mission of the institution as a whole; the departmental faculty developed and improved the departmental Vision and Mission.

Step 6: Departmental Academic Advisory Committee proposd the Vision & Mission statements to IQAC

Step 7: IQAC endorsed the final vision and mission statements.

B. Description of process involved in defining the PEOs of the program.

The program educational objectives (PEOs) were formulated / reviewed through a consultative process among faculty members, alumni representatives, Industry experts, Training experts and Departmental Academic Advisory Committee.

The PEOs are established through the following steps:

Step-1: Program outcomes from NBA as well as Vision and Mission of the Institute and Department were taken as guidelines for consultation with various stakeholders.

Step-2: All documents relating to the program were reviewed. These include instructional material, which is collected for all the courses. The outcomes in all courses were listed for the program and graduate attributes were taken into account.

Step-3: The inputs from all stake holders were collected and draft of PEOs was prepared and circulated among all stake holders for feedback.

Step-4: In the light of current status of the institute, teaching-learning environment, and based on the review of feedback, PEOs were formulated by the staff and sent to Departmental Academic Advisory Committee. The proposed PEOs were reviewed and recommended at the institution level to IQAC committee.

Step-5: After approval by the IQAC, the PEOs were finalized & given wide publicity.

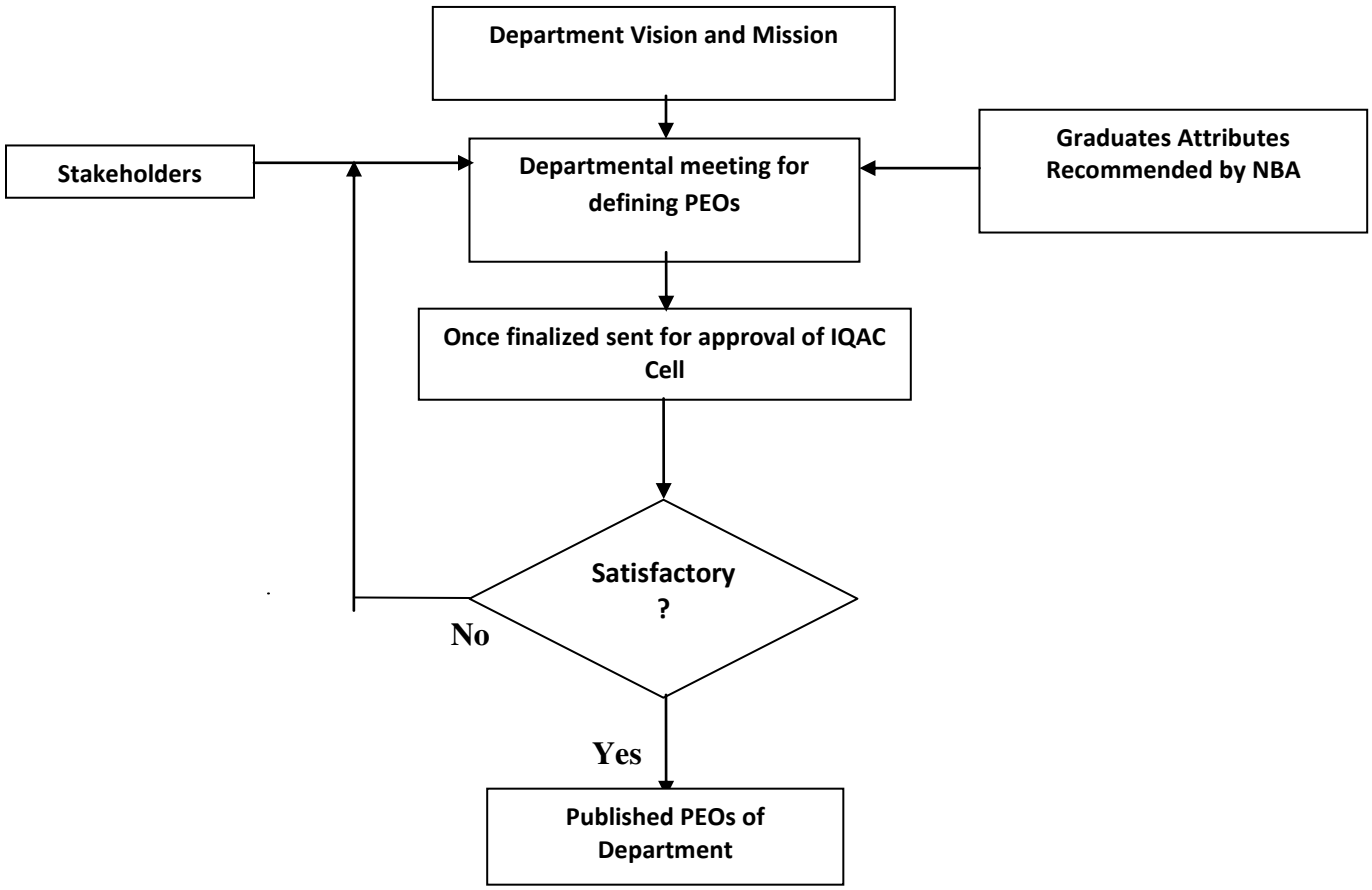


Fig.1.2. Establishing PEOs

1.5 Establish consistency of PEOs with Mission of the Department (15)

A. Preparation of a matrix of PEOs and elements of Mission statement.

Table: 1.5 Mapping of PEOs with Mission of the Department

PEOs	M1	M2	M3	M4	M5
PEO1	3	3	3	2	2
PEO2	2	2	-	2	3
PEO3	3	1	2	3	2

Slight (Low):1 Moderate (Medium): Substantial (High):3

B. Justification of co-relation parameters of the above matrix.

Table: 1.6 Justifications of Mapping of PEOs with Mission of the Department

PEOs	M1	M2	M3	M4	M5
	3	**3**	**3**	**2**	**2**
PEO1	M1 provide strong correlation with PEO1 as inculcating practical and fundamental knowledge of electrical and electronics engineering with effective teaching learning process through the use of modern teaching process, remedial & extra classes, extra lab hours, tutorial sessions, and conduction of various engineering activities to develop professionals.	M2 strongly support to achieve PEO1, as the objective can be achieved by incorporating fundamentals skills of the existing discipline through best faculties, electrical engineering set ups, and infrastructure.	M3 supports PEO1 substantially as the student enhances their technical skills by participation in workshops, seminars, visits, and expert lectures for socio-electric related problems to solve complex problems.	Industry based training programs, preparations for placements, -mock interviews, aptitude sessions, group discussions, workshops, industry visits, expert talks, personality development classes, online certifications, activities through student technical clubs aims at developing software skills as required by the industries/companies.	M5 aims at achieving PEO1 through the use of real time examples on electric flow simulation problems & mini projects, contests on programming, tech-fests, innovative projects, and industry trainings thereby making leading software professionals.
	2	**2**	**-**	**2**	**3**

PEO2	M1 supports PEO2 to orient students to contribute in research and development through career oriented value addition programs like technical contests, tech-fests, innovative projects, real world projects and industry trainings in the department.	M2 focuses on imparting strong fundamental and practical knowledge through advanced learning process of analog, digital and signal processing by inculcating a scientific temper in practical science via conduction of additional labs, hands-on sessions on technical concepts, class room presentations, major and minor projects.	-	Students develop the skills of solving complex engineering problems through Simulation and other software's and signal processing applications by applying the knowledge of basic sciences, engineering mathematics and engineering fundamentals in various areas and entrepreneurship qualities.	M5 aims at inculcating professionalism, ethicality, team-work and leadership qualities with the skills developed in the students in their course of study with research oriented qualities to pursue higher studies or become entrepreneur
PEO3	**3**	**1**	**2**	**3**	**2**
	M1 supports PEO3 as the students develop the skills to solve real life electrical and electronics problems related to environment	A competitive environment is created in the classroom by experienced faculties which bring about inquisitives in	Live demonstration of various electrical systems, hardware and software's help the students to	Extra-curricular and co-curricular activities based on industry based training programs, aptitude sessions, group discussions, workshops, industry visits, expert talks,	M5 supports PEO3 in developing skills in multi-disciplinary work environment, good interpersonal skills as a leader in a team in appreciation of professional ethics and

	and societal context.	the students.	solve real life problems such as hybrid EVs which can be beneficial for environmental and social context.	personality development classes, online certifications, activities through student technical clubs aims at developing skills with problem solving approach with sense of environmental and ethical responsibility.	societal responsibilities

Criterion 2	Program Curriculum and Teaching Learning Processes	120

2.1 Program Curriculum and Teaching Learning Processes

2.1.1 State the Process used to identify extent of compliance of university curriculum for attaining the Program Outcomes and Program Specific Outcomes as mentioned in annexure l. Also mention the identified curriculum gap, if any

Program Curriculum:

The college is affiliated to Rajiv Gandhi Proudyogiki Vishwavidyalaya, (RGPV) Bhopal and curriculum of the Department is framed as per university guidelines. The curriculum comprises of Basic Sciences, Humanities and Social Sciences including Engineering Sciences, Professional core and elective subjects, Project work and industrial training related to the field.

Basic Sciences and Humanities:

The stream includes courses like Engineering Mathematics, Engineering Physics, Engineering Chemistry, professional ethics and Environmental studies

Basic Engineering Courses:

The stream include courses like Basic electronics, Basic electrical engineering, Programming in C, Computer aided engineering drawing, Elements of mechanical engineering and Elements of civil engineering. These courses provide the fundamental knowledge on all engineering disciplines.

Professional Core Courses:

The stream include courses like Power Electronic Devices and Circuits, Switchgear and Protection, Electro Magnetic Field Theory, Electrical Machine-I, Electrical Machine-II, Network Analysis, Power System-II, Electronic Instrumentation, Microprocessor and Microcontrollers, Control Systems etc. Project work and technical seminars are included in final year to provide opportunity for students to develop understanding of the inter relationship between courses, develop and demonstrate higher order skills, and to apply the gained knowledge

Management Courses:

The stream includes courses like Management and Entrepreneurship. These are essential to create awareness on managerial & entrepreneurial skills, finance management, project management and quality control techniques.

Elective Courses:

The stream includes courses like Energy Conservation and Management, Electrical and Electronic Material, Entrepreneurship, Utilization of Electrical Energy, Digital Signal Processing, IPR (Intellectual Property Rights) etc.

As per the R.G.P.V Bhopal regulations, the first year Bachelor of Engineering (BE) course is on Grading System (GS) (Academic year 2017-18) system and II, III and IV years' Bachelor of Engineering (BE) courses are on CBGS system / BE Grading system (as shown in Table: 2.1 to table 2.3). Total semesters under consideration are eight (08). The contents of each theory subject are well defined and the experiments are specified for each laboratory. The university included assignments and quizzes. These are scientific in nature and aimed at supplementing the gaps in the syllabus. Although it is difficult to identify gaps, however each faculty has thoroughly understood the needs of the students and identified the gaps and attempted to fill them with relevant teaching-learning methods, to further strengthen the program educational objectives (PEO's) and program outcomes (PO's). Subjects are mapped with (POs), Programme Specific Outcomes (PSOs) and gaps are identified. The process to fill the gap after identifying the same and feedback from various stakeholders like students, alumni, parents, industry, and academia by departmental academic advisory committee. Thereafter contents are identified and taught along with university syllabus in order to fill the gap to update knowledge and thus prepare students with knowledge, skills and abilities expected in current scenario of industry, research & academia. These are then referred to IQAC committee. Such an effort allows the college to be branded and stakeholders would appreciate the needs. Thus the college attempted to rise above the benchmarking level. Each subject is dealt against the (POs) envisaged by NBA.

Program Educational Objectives (PEOs)

- **PEO-1.** Work as an Electrical and Electronics Engineering professional in core and software industries by applying theoretical and practical knowledge.
- **PEO-2.** Apply competency in Electrical and Electronics Engineering to become an entrepreneur or pursue higher studies or research.
- **PEO-3.** Provide solutions for resolving Electrical and Electronics Engineering problems with a sense of societal, environmental and ethical responsibility

Program Specific Outcomes (PSOs)

A graduate of the Electrical and Electronics Engineering Program will demonstrate:

PSO-1: Apply Mathematics, transformation methods, simulation tools etc. to solve practical problems in the field of Electrical / Electronic Circuits and Networks.

PSO-2 Analyze and design Electronic devices, Control System, Instrumentation and Power System by using mathematics and simulation techniques and implement in Power Electronics Drives and Electrical Machines.

PSO-3 Design and develop cost effective and appropriate system engineering solutions applying the software and hardware tools with consideration for safety, environment and society.

Program Outcomes (POs)

PO1: Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

PO2: Problem analysis: Identify, formulate, research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

PO3: Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

PO4: Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

PO5: Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.

PO6: The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

PO7: Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

PO8: Ethics: Apply ethical principles and commit to professional ethics and

responsibilities and norms of the engineering practice.

PO9: Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

PO10: Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

PO11: Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

PO12: Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Following process is adopted to identify extent of compliance of the University curriculum for attaining the Program Outcomes (POs) and Program Specific Outcomes (PSOs):

- Define Program Specific Outcomes (PSOs)
- Define Course Outcomes for each subject.
- Map each COs with POs and PSOs.
- Categorize entire Curriculum into Core Courses, Science & Humanities, Inter Disciplinary Projects / Lab Practices; Map each category with POs and PSOs.
- Feedback given by recruiters in campus placements and by prospective employers.
- Inputs given by Principal/Management in Departmental academic advisory meetings.
- Feedback given by industry experts visiting for guest lecture / technical fests/ workshops/ other events organized by the Department from time to time.
- Feedback by visiting expert members during Departmental Academic Advisory Committee meetings and during expert lectures to the students.
- Feedback given by faculty members handling the courses
- Feedback given by alumni.

The feedback obtained as above is reviewed in Departmental Academic Advisory meetings in particular and the curricular gaps are identified

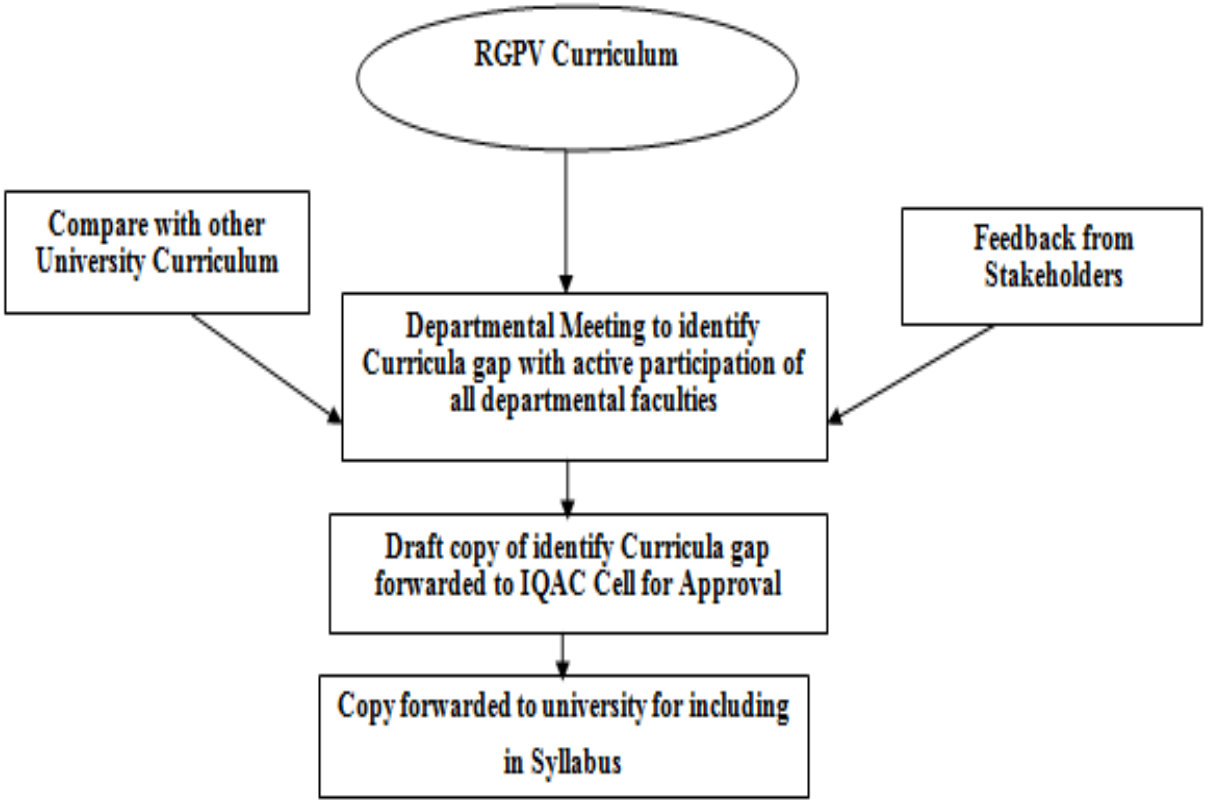


Figure 2.1 Curriculum gap identify process

Various Streams of program curriculum are shown in the table below:

Table: 2.1: B.E. (CBCS) (1st, 2nd, 3rd and 4th Semester)

B.E. (CBCS) (1st, 2nd , 3rd and 4th Semester)			
Program Curriculum Grouping based on Course Component	**Number of subjects**	**PO**	**PSO**
Basic Sciences & Humanities	13	1,2,3,4, 5.6,7,8,9,10,11, 12	1,2,3
Basic Engineering Courses	8	1,2,3,5,6,7,9,12	1,2,3
Professional Core Courses	9	1,2,3,5,12	1,2,3
Management Courses	-	-	-
Elective Courses	-	-	-
All/Total	**30**	1,2,3,5.6,7,8,9,10,11, 12	1,2,3

Table: 2.2: B.E. (CBGS) (5th, 6th, 7th and 8th Semester)

B.E. (CBGS) (5th, 6th, 7th and 8th Semester)			
Program Curriculum Grouping based on Course Component	**Number of subjects**	**PO**	**PSO**
Basic Sciences & Humanities	3	1,2,3,4,6, 12	1,2,3
Basic Engineering Courses	-	-	-
Professional Core Courses	19	1,2,3,4,5,6,7,8,9,10,11,12	1,2,3
Management Courses	2	1,2,3,4,5,6,7,8,9,10,11,12	1,2,3
Elective Courses	6	1,2,3,4,6,8,9,10,11,12	1,2,3
All/Total	30	1,2,3,4,5,6,7,8,9,10,11,12	1,2,3

Table: 2.3.A. BE-Electrical and Electronics Engineering (Grading) (1st, 2nd 3rd, 4th, 5th, 6th, 7th and 8thSemester)

BE-Electrical And Electronics Engineering (Grading) (1st , 2nd 3rd , 4th , 5th , 6th , 7th and 8thSemester)			
Program Curriculum Grouping based on Course Component	**Number of subjects**	**POs**	**PSO**
Basic Sciences & Humanities	9	1,2,5,6,7,8,9,10,11,12	1,2
Basic Engineering Courses	6	1,2,3,4,5,6,7,8,9,10,11,12	1,2
Professional Core Courses	24	1,2,3,4,5,6,7,8,11,12	1,2,3
Management Courses			
Elective Courses	4	1,2,3,5,6,7,8,9,10,12	1,2,3
Project, Seminar & Lab Practices	16	2,3,7,9,10,11,12	1,2,3
All/Total	56	1,2,3,4,5,6,7,8,9,10,11,12	1,2,3

Table: 2.3.B. Evaluation Sheet (Analysis of Course components)

Department of Electrical and Electronics Engineering																	
Evaluation Sheet (Analysis of Course components)																	
Batch: 2015-2019 Batch [B.E. CBCS (Choice Based Credit System)] [1st, 2nd, 3rd and 4th SEM]																	
S.No.	**Program Curriculum Grouping based on Course Component**	**Subject Code**	**Subject Name**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
1	**Basic Sciences & Humanities**	MA110	Maths-I	1.2	1.8	3.0	1.0	-	1.0	1.0	-	-	-	1.0	1.0	1.2	1.0	1.0
2		PH110	Physics	1.4	1.0	-	-	1.0	-	-	-	1.0	-	-	1.0	1.0	1.0	1.0
3		MA111	Maths-II	2.4	1.8	-	-	-	1.0	-	-	1.0	-	-	1.3	1.1	1.0	1.3
4		CY110	Chemistry	2.0	1.0	3.0	-	1.0	1.3	1.3	-	1.3	-	-	1.0	1.4	1.3	1.7
5		ME113P	Manufacturing practices	2.6	2.4	1.0	-	1.0	1.5	-	1.0	1.6	3.0	-	1.6	1.0	1.0	1.0
6		HU112P	Rural outreach	1.6	2.4	-	-	-	-	-	-	-	-	-	1.0	1.0	1.0	1.0
7		ML 110P	Environmental Sciences	2.4	2.1	-	-	0.5	0.5	-	-	0.8	-	-	1.0	1.0	-	1.0
8		MA220	Maths-III	2.2	2.2	3.0	-	1.0	1.0	-	-	1.5	-	-	1.0	1.6	1.0	1.0
9		HU221	Idea Generation	2.6	2.8	1.0	-	-	1.0	1.0	1.3	1.8	1.5	-	1.0	1.0	2.0	1.0
10		HU110	English	2.8	1.0	2.0	-	1.0	-	-	-	-	-	-	1.0	2.4	1.2	
11		HU220	Communication Skills	2.1	0.7	1.0	-	1.0	-	-	-	1.0	-	-	1.0	1.6	1.1	0.5
12		HU 111P	Communication	1.6	1.6	1.0	1.0	1.7	1.0	1.0	1.0	1.0	1.0	1.0	1.4	1.2	1.3	1.4
13		ES220T	Material	2.8	1.0	1.7	-	-			-	-	-	-	1.0	2.2	1.2	

			Sciences															
1		ME111	Engg. Graphics	2.2	2.2	-	-	-	1.7	1.0	-	-	-	-	1.3	1.1		1.0
2		CE110	Engg Mechanics	2.4	2.0	-	-	-	1.0	1.0	-	-	-	-	1.5	1.0	1.0	1.0
3		EC111	Fundamentals of Electronics Engg.	2.2	1.9	-	-	1.0	1.0	-	-	1.5	-	-	1.0	1.6	1.3	1.0
4	**Basic Engineering Courses**	ME112	Concepts in engg. Design	1.8	1.6	-	-	0.2	0.2	-	-	0.6	-	-	0.6	1.6	0.6	0.6
5		EE110	Introduction to Electrical Engg.	2.2	1.5	3.0	-	1.0	1.0	-	-	1.5	-	-	1.0	1.6	1.0	1.0
6		ES221T	System Engg.	2.0	1.4	-	-	1.0	1.0	-	-	1.5	-	-	1.0	1.6	1.0	1.0
7		ME114	Fundamentals of ME	2.0	2.4	3.0	-	1.0	1.0	-	-	1.5	-	-	1.0	1.4	1.0	1.0
8		CS110P	Computer programming	2.8	2.0	2.0	-	-	-	-	-	-	-	-	1.0	2.2	1.2	1.5
1		EX 221	EMI	2.6	1.0	-	-	1.7	-	-	-	-	-	-	1.5	2.4	1.2	-
2		EX 222	NW Analysis	2.3	1.9	2.3	-	-	-	-	-	1.3	-	-	1.1	2.0	1.2	-
3		EX 223	Analog Electronics	2.4	1.1	1.8	-	-	-	-	-	-	-	-	1.1	2.0	1.2	1.7
4	**Professional Core Courses**	EX 224	Signals & Systems	2.0	2.2	-	-	1.0	-	-	-	-	-	-	1.0	2.4	1.2	
5		EX 225	Electrical Machine-I	2.8	1.2	-	-	-	-	-	-	-	-	-	1.0	2.2	1.2	
6		EX 226		2.5		1.8	-	-	-	-	-	-	-	-	1.0	2.2	1.2	1.5

			DELD															
7		EX 227	Power System-I	2.7	1.8	1.5	-	-	-	-	-	-	-	-	1.0	2.2	1.8	
8		EX 228	Control systems	2.8	1.5	1.3	-	-	-	-	-	-	-	-	1.0	2.4	1.2	
9		EX 229	Residential Load Simulation Lab	2.8	1.0	1.7	-	2.0	-	-	-	1.0	-	-	1.0	2.2	1.2	1.4
Batch: 2015-2019 Batch [B.E. CBGS (Credit Based Grading System)] [5th, 6th, 7th and 8th SEM]																		
1	**Basic Sciences & Humanities**	EX-5008P	Innovative Thinking	2.0		1.8	1.0	-	1.0	-	-	-	-	-	1.0	1.0	2.2	1.5
2		EX-6007 P	Creativity and Entrepreneurship development	2.0		-	-	-	1.3	-	-	-	-	-	1.0	1.4	1.9	1.1
3		EX-6008 P	Startup / Inductrial lectures	2.0	2.0	1.9	1.0	-	1.0	-	-	-	-	-	1.0	1.9	1.7	1.3
1	**Professional Core Courses**	EX-5001	EMT	2.0	2.0	-	1.0	-	1.0	-	-	-	-	-	1.0	1.6	1.9	1.5
2		EX-5002	Electrical Machine-II	2.0		1.8	1.0	-	1.0	-	-	-	-	-	1.0	1.8	1.6	1.2
3		EX-5003	Switchgear and Protection	2.0	2.0	1.8	1.0	-	1.0	-	2.0	-	2.0	-	1.0	1.8	1.4	1.2
4		EX-5004	PED&C	2.0		1.8	1.0	-	1.0	-	2.0	-	2.2	2.2	1.0	1.4	1.3	1.2
5		EX-6001	CE	2.0	2.0	1.8	1.0	-	1.0	-	-	2.0	2.0	-	1.0	1.6	1.7	1.0
6		EX-6002	PS-II	2.8	1.8	1.0	-	-	-	-	-	-	-	-	1.0	2.2	2.4	2.0

7		EX-6003	MP & MC	2.6	2.0	1.8	-	-	-	-	-	-	-	-	1.0	2.4	2.1	
8		EX-6004	EI	2.7	2.0	2.0	-	-	-	-	-	-	-	-	1.0	2.3	2.0	1.8
9		EX-7001	Computer Network	1.9	2.0	-	-	-	-	-	-	-	-	-	1.0	2.0	2.0	1.6
10		EX-7002	Electric Drives	2.4	2.5	3.0	2.0	-	2.0	2.0	-	-	-	-	1.0	2.2	2.4	1.4
11		EX-7003	Computer application to power system	2.2	2.0	2.3	-	1.0	2.0	-	-	-	1.0	-	1.0	2.2	2.6	1.0
12		EX-7006	Project-I	3.0	2.0	1.5	-	-	-	-	-	-	-	1.2	1.0	2.0	2.2	1.0
13		EX-7007	Industrial Training (2 weeks)	1.2	1.6	2.0	1.5	1.0	1.0	1.0	1.3	1.5	1.5	1.0	1.6	1.0	1.0	1.8
14		EX-8001	Computer aided design of EM	2.7	1.5	1.7	-	-	-	-	-	-	-	-	1.0	2.0	2.4	1.4
15		EX-8002	Power quality problem & mitigation Techniques	3.0	1.0	1.5	-	-	-	-	-	-	-	-	1.0	1.9	2.0	1.5
16		EX-8005P	Project-II	2.5	1.8	-	-	1.5	-	-	-	-	-	-	1.0	1.9	2.2	2.0
17		EX-5006P	SW/Simulation lab	3.0	2.0	-	-	-	2.0	-	-	-	-	-	1.0	2.0	2.0	1.6

18		EX-6006 P	SW/Simulation lab-II	3.0	2.0	-	-	-	-	-	-	-	-	-	1.0	2.2	1.6	1.0
19		EX-8006P	Departmental choice	2.6	2.6	3.0	-	1.5	-	-	-	1.0	-	-	1.5	2.6	1.8	1.0
1	**Management Courses**	EX-5007P	Management skill development	1.6	2.4	1.0	1.0	1.0	1.0	1.3	1.8	1.0	1.3	1.4	1.6	1.8	1.4	1.0
2		EX 8007P	Group Discussion	2.9	1.8	2.2	-	-		-	-	-	-	-	1.0	2.1	2.1	2.3
1	**Elective Courses**	EX-5005	(Elective-I)	2.9	2.0	-	-	-	1.8	-	-	-	-	-	1.0	2.1	2.1	2.0
2		EX6005	(Elective-II)	3.0	1.3	2.0	-	-	2.0	-	-	-	-	-	1.0	2.2	2.0	
3		EX-7004	Elective-III	3.0	1.5	2.0	-	-		-	-	-	-	-	1.0	2.0	2.6	2.7
4		EX-7005	Elective-IV	2.0		2.4	-	-	2.0	-	1.0	2.4	2.6	2.4	1.6	1.8	2.3	2.5
5		EX-8003	Elective-V	3.0	1.0	1.4	-	-	1.0	-	-	2.0	-	1.8	1.8	1.8	1.6	1.4
6		EX-8004	Elective-VI	1.0	1.6	-	1.6	-	1.0	-	1.0	2.0	2.0	-	1.0	1.0	1.5	1.0

B. List of curricular gaps for the attainment of defined POs and PSOs

The courses and the course contents prescribed in the curriculum are mapped to the relevant POs and PSOs through individual course outcomes (COs). Curriculum gaps are identified through consolidation of average CO – PO/PSO mapping of all courses. The identified curricular gaps are as listed below in **Table: 2.4**.

Table: 2.4 .A. Curricular Gaps (2020-2021)

Gap No.	Gap Identified	Relevance to	
		POs	PSOs
Gap 1	More skills required about writing and publishing research paper	1,2,4,5,10,12	1,2,3
Gap 2	Skills required about practical PCB designing, latest languages and software	1,3,5,11,12	1,2,3
Gap 3	Lack awareness about linkage between social media and professional aspects	5,6,8,9,12	1
Gap 4	Require to develop entrepreneur skills	8,9,11	1,2

Table: 2.4 .B. Curricular Gaps (2019-2020)

Gap No.	Gap Identified	Relevance to	
		POs	PSOs
Gap 1	Need emphasis on development of the fundamentals of power electronics and electrical machines for practical implementation.	1,6,7,12	1,3
Gap 2	Need to create awareness about new innovations and technologies, energy sources and their practical applications like solar power generation, wind energy, electric vehicles.	1,6,7,12	1,3
Gap 3	Need of enhancing knowledge of Arduino system, embedded systems	1,2,3,5,7,8,11,12	1,2,3
Gap 4	Lack awareness of new technologies like wireless technology and Bluetooth communication	1,3,5,10,12	1,2,3
Gap5	Require to develop entrepreneur skills	1,2,4,5,8,9	1,2

Table: 2.4 .C. Curricular Gaps (2018-2019)

Gap No.	Gaps Identified	Relevance to	
		POs	PSOs

Gap1	Inadequate ability to apply theory to practical problems	1,2,3,4,5	1,2,3
Gap2	Courses/ topics not covered in the RGPV curriculum	1,2,3,6,9	1,2,3
Gap3	Exposure to Equipment and software currently used in the industry	3,4,5,	1,2,3
Gap4	Skill based Training	2,3,4,5	2
Gap5	Inadequate communication skills	10	-
Gap6	Quantitative & Verbal Aptitude classes	1,2	1
Gap7	Campus Recruitment Training Classes by T&P Cell	1,2,10	2,3
Gap8	Lack of entrepreneurship skills	1,2,3,6,9, 11,12	1,2,3
Gap9	Low percentage of selections in PSUs and GATE	1,2,3	1,2,3

2.1.2 State the delivery details of the content beyond the syllabus for the attainment of POs and PSOs (10)

Table 2.5 A. Details of events to bridge the gap for the content beyond the syllabus (CAY-2020-21)

S. No	Gap	Action Taken	Date	Recourse person with Designation	% of Student	Relevance of POs, PSOs
1.	**Gap 1** (More skills required about writing and publishing research paper)	Webinar Career Guidance higher studies and research in Electrical engineering	26/6/2021	Dr. Pallavee Bhatnagar (HOD, Department Electrical & Electronics Engineering. IES college of Technology Bhopal)	35	POs – 1,2,4,5,10,12 PSOs – 1, 2,3
2	**Gap 1** (More skills required about writing and publishing research paper)	Expert Talk Talk:"IEEE Sight Orientation Program"	19/05/2021	Dr. Hussain F Mahdi (Lecturer, College of Engineering, University of Diyala, Iraq) Dr. Aarti Karande, (Chair, IEEE Sight Bombay Pratham Chapter)	30	POs – 1,2,4,5,10,12 PSOs – 1, 2,3
3	**Gap 3** (Lack awareness about	Webinar “Creating LinkdIn Profiles"	21/12/2020	Dr.Jinal Shah (Assistant Professor, NMIMS university Mumbai)	45	POs –5,6,8,9,10 PSOs – 1,

	linkage between social media and professional aspects)					
4.	**Gap 4** (Require to develop entrepreneur skills)	"Seminar on 7 lessons on business leadership".	16/02/2021	Mr. Fabian Schroeder (Alliance Manager at Swisscom Schweiz AG. Zurich, Switzerland)	46	PO-8,9,11 PSO-1,2
5.	**Gap 3** (Lack awareness about linkage between social media and professional aspects)	Alumni Talk" Corporate Expectations from Professional Students"	2/1/2021	Mr. Mayank Bajpeyi Head, HR and administration, Panasonic energy India company Ltd, Pithampur, Indore	40	POs –5,6,8,9,10 PSOs – 1,
6	**Gap3** (Lack awareness about linkage between social media and professional aspects)	Live National Webinar & Expert talk on: "Green Communication: A Futuristic Concept".	31/12/2020	Dr. Abhishek Bhatt (Dept. of E & TC, College of Engineering Pune)	36	POs –5,6,8,9,10 PSOs – 1,
7	**Gap 1** (Insufficient knowledge about how to write and publish the Research Paper)	Writing and Publishing Scientific Research Papers in SCI Journals- A	2/11/2020	Dr. P. Pal Pandian , Christ Bangalore and Er. Kishor Puruswani (Director HR, IES College of Technology	25	POs – 1,2,4,5,10,12 PSOs – 1, 2,3

		Framework.		Bhopal)		
8	**Gap 2** (Skills required about practical PCB designing, latest languages and software)	National Head – Campus Hiring | Talent Acquisition |Wipro Ltd.,	3/10/2020	Mr. Lavanam Amballa (National Head – Campus Hiring | Talent Acquisition |Wipro Ltd.)	25	POs –1,3,5,11,12 PSO-123
9	**Gap 4** (Require to develop entrepreneur skills)	Live National Webinar Top 10 Business ideas (How to achieve your start up dream)	5 Sept.2020	Yogesh Khakre (COO, B-Nest & CS BSDCL)	60	PO-8,9,11 PSO-1,2
10	**Gap 4** (Require to develop entrepreneur skills)	Live National Webinar Start up& Entrepreneurial opportunities post covid	25 June 2020	Dr. Omkar Rai (DG, STPI, New Delhi)	50	PO 1,2,4,5,8,9,10,11 PSO 2,3

Table 2.5 B. Details of events to bridge the gap for the content beyond the syllabus (CAY 2019-20)

S. No	Gap	Action Taken	Date-month-year	Recourse person with Designation	% of Student	Relevance of POs, PSOs
1	**Gap 1** (Need emphasis on development of the fundamentals of power electronics and electrical machines for practical implementation.)	Expert Lecture Transmission & Distribution of Electrical Energy	21-01-2020	Dr. A.M. Shandilya, (Rtd. Prof., EE Dept., MANIT Bhopal)	75	PO -1,6,7,12 PSO 1,3
2	**Gap 3** (Need of enhancing knowledge of Arduino system, embedded systems)	In-house Training Arduino System	19-30 Dec 2019	Mr. Abhigyanam (IndEyes Infotech Pvt Ltd)	55	PO-1,2,3,5,7,8,11,12 PSO -1,2,3
3	**Gap 1** (Need emphasis on development of the fundamentals of power electronics and electrical machines for practical implementation.)	Industrial visit 33/11KV Substation and 11/.4 KV Distribution Transformer – Demo & Live and Small transfer	04/03/2020 to 05/03/2020	Power Distribution Training Centre, Bhopal	90	PO -1,6,7,12 PSO 1,3

		repair units				
4	**Gap 2** (Need to create awareness about new innovations and technologies, energy sources and their practical applications like solar power generation, wind energy, electric vehicles.)	Expert Lecture Solar Power and Inverter for energy savings	13 Sept. 2019	Nickhill S Kaushik (PCRA, GOI. Bhopal)	80	PO -1,6,7,12 PSO-1,3
5	**Gap 3** (Need of enhancing knowledge of Arduino system, embedded systems)	Short Term Training Program (STTP)Cyber Security & Ethical Hacking	30 Jan. 2020 to 01/02/2020 (3 days)	UIT RGPV, Bhopal	10	PO 1,2,3,5,7,8,11,12 PSO 2,3
6	**Gap5** (Require to develop entrepreneur skills)	TEQIP-3 RGPV industry 4.0 future skills	21-22Jan 2020(2 Days)	Mr. Rajeev Kumar (Member secretary, AICTE India)		PO-1,2,4,5,8,9 PSO-1,2

Table 2.5 C. Details of events to bridge the gap for the content beyond the syllabus (CAY 2018-19)

S. No.	Gap Identified	Action taken	Date	Resource Person	% Of Students	Relevance to POs, PSOs
1	**Gap 1** (Inadequate ability to apply theory to practical problems) And **Gap 9** (Low percentage of selections in PSUs and GATE)	Industrial visit in CPRI	19/09/ 2018	Mr.Janrao G Des (EO II Himanshu Roy Des. EOH)	**25**	POs – 1,2,3,4,5 PSOs – 1, 2,3
2	**Gap 2** (Courses/ topics not covered in the RGPV curriculum) And **Gap 9** (Low percentage of selections in PSUs and GATE)	Registration for various courses NPTEL	3/12/2018	Mr. Rahul Malviya (Assistant Professor IES College of Technology Bhopal)	**36**	POs – 1,2,3,6,9 PSOs – 1,2,3
3	**Gap 2** (Courses/ topics not covered in the RGPV curriculum)	Under Swachhta Bharat Mission NCC Celebrated Swachhta Pakhwada 15 days Program in which day wise activities	15/09/2018 to 02/10/2018	Mr.Akhilesh Dwivedi (NCC Caretaker) Mr. Sarthak NGO representative.	1	POs – 1,2,3,6,9 PSOs – 1,2,3

		are scheduled like Cleanliness drive, Awareness Rally etc.				
4	**Gap 2** (Courses/ topics not covered in the RGPV curriculum)	Enrolment of Students done once in year under the supervision of NCC Unit 1MP-CTR Bhopal	14/08/2018	Mr.Akhilesh Dwivedi (NCC Caretaker), Sub S D Pandey, (JCO, Sub R P Chavan NCO)	5	POs – 1,2,3,6,9 PSOs – 1,2,3
5	**Gap 4** (Skill based Training)	Hands on training on C Language	21-12-2018 to 3-1-2019	Mr. AbhigyanamGiri (IndEyes Infotech Pvt. Ltd. Bhopal)	35	POs – 4,5,6
6	Gap 4 (Skill based Training)	Hands on training on MATLAB	29/12/2018 to 13/01/2019	Mr. AbhigyanamGiri (IndEyes Infotech Pvt. Ltd. Bhopal)	75	POs – 1,2,4,5,6,10,12 PSOs – 1, 2,3
7	**Gap 3** (Exposure to Equipment and software currently used in the industry) **Gap 4** (Skill based Training)	Industrial visit CRISP, Bhopal VLSI lab, PLC, MATLAB, instrumentation lab	13/02/ 2019	CRISP, Bhopal Mr Anant Thakur (Assistant Professor. IES college of Technology Bhopal)	80	POs – 1,2,4,5,6,10,12 PSOs – 1, 2
8	**Gap 8** (Lack of entrepreneurship skills)	Expert Lecture on Start-ups	16-2-2019	Prof. Thillai Ranjan, (Professor.IIT Madras)	78	POs –6,9,10,12

9	**Gap 2** (Courses/ topics not covered in the RGPV curriculum)	NCC 'B' Certificate Examination at NCC Unit 1 MP CTR Bhopal	23-24/02/2019	Col. O P Mishra (Commanding Officer. 1 MP CTR)	4	POs – 1,2,3,6,9 PSOs – 1,2,3
10	**Gap 2** (Courses/ topics not covered in the RGPV curriculum)	NCC 'C' Certificate Examination at NCC Unit 1 MP CTR Bhopal	19-20/02/2019	Col. O P Mishra (Commanding Officer. 1 MP CTR)	1	POs – 1,2,3,6,9 PSOs – 1,2,3
11	**Gap 2** (Courses/ topics not covered in the RGPV curriculum)	Combined Annual Training Camp activity of NCC.	14–23/06/ 2019	Mr. Akhilesh Dwivedi (Associate NCC Officer) & Col. N P Semalti, (Commanding Officer1 MPCTR Bhopal)	1	POs – 1,2,3,6,9 PSOs – 1,2,3
12	**Gap 1** (Inadequate ability to apply theory to practical problems) **Gap 2** (Courses/ topics not covered in the RGPV curriculum) **Gap 9** (Low percentage of selections in PSUs and GATE)	Registration for NPTEL students	2/04/2019	Ms. Poonam Khatarkar (Assistant Professor) IES College of Technology Bhopal)	62	POs – 1,2,3,4,5,6,9 PSOs – 1, 2,3
13	**Gap 8** (Lack of entrepreneurship skills)	Entrepreneurship Workshop MPCON Under the Sponsorship of NSTEBD	27-29/09/ 2018	Dr.G.S. Jarial (Advisor MPCON & Director)	25	POs –6,9,10,12

14	**Gap 8** (Lack of entrepreneurship skills)	Entrepreneurship Seminar: Dr.Nirali Pandit- EDII	22/01/2019	Dr.Nirali Pandit EDII	35	POs –6,9,10,12
15	**Gap 2** (Courses/ topics not covered in the RGPV curriculum)	Session on "Chase Your Dream" - Civil Services	12/02/2019	Mr.Mrinal Chattarjee (UPSC CS 2017 AIR-334)	70	POs – 1,2,3,6,9, 11, 12 PSOs – 1,2,3
16	**Gap 8** (Lack of entrepreneurship skills)	Expert Talk on Start Up	19/03/2020	Mr. Rajeev Agrawal (CEO M/S Ananya Package P. Ltd.)	25	POs –6,9,10,12
17	**Gap 2** (Courses/ topics not covered in the RGPV curriculum)	Monday special Assembly Yuva Sansad	11/02/2019	Mr. Rahul Malviya (Assistant Professor) IES college of technology bhopal	75	POs –6,9
18	**Gap 2** (Courses/ topics not covered in the RGPV curriculum)	Monday special Assembly Incredible India	18/02/2019	Mr. Rahul Malviya (Assistant Professor) IES college of technology bhopal	70	POs –6,9
19	**Gap 8** (Lack of entrepreneurship skills)	Monday special Assembly Basant _Panchami	22/01/2019	Ms. Poonam Khatartkar (Assistant Professor) IES college of technology bhopal	70	POs –6,9

20	**Gap 2** (Courses/ topics not covered in the RGPV curriculum)	Monday special Assembly National Army_Day	15/01/2019	Mr.Akhilesh Dwivedi (NCC Caretaker) IES College of Technology bhopal	67	POs –6,9
21	**Gap 8** (Lack of entrepreneurship skills)	Technical contest	30/03/19	TCS-EngiNX	40	POs – 1,2,3,6,9,11,12 PSOs – 1,2,3

A. Steps taken to get identified gaps included in the curriculum

The department has initiated the following measures to bridge the identified curricular gaps.

- **Guest lecturers:** More Experts from industry and academia are invited to deliver lectures on the latest trends and thrust areas.
- **Technical talk:** Students are kept updated about the advances in technologies through technical seminars.
- **Workshops:** The department has taken initiative for students, wherein they are encouraged to participate in hands-on workshops, thereby enhancing their application skills.
- **Communication classes:** Communication classes are included in the timetable on regular basis. And number of activities in the co-curricular activities for motivating them like role play, skit, Monday special assembly etc is also included.
- **Industrial visits:** Visits to industries of repute are organized to keep the students abreast with practical knowledge.
- **Internships:** Students are encouraged to take-up short-term internships/ summer trainings in industries and in-house also to understand industry practices
- **NPTEL video lectures:** NPTEL lectures both for faculties and students are included on regular basis.
- **Co-curricular activities:** More Co-curricular activities are included like Tech-fest: quiz, various competitions like rangoli, robotics, lan gamming etc.
- **University consideration**: As department follow RGPV Curriculum we have communicated RGPV through letter about the identified gaps and suggested inclusion of certain topics and subjects also.

  In process for adopting teaching and learning process as per outcome based education, in addition to the activities proposed to bridge the gap, the university is also requested to add some changes in the curriculum. In order to attain the Programme Outcomes (POs) and Programme Specific Outcome (PSOs) of all the years at Under Graduate level in Engineering, we have already adopted some of the changes in Course curriculum of B. E./ B. Tech.(EC, EXE, CE, CSE and ME)of all the years prescribed by RGPV, Bhopal. The details of identified gaps in curriculum were enclosed with letter for university consideration and were requested to do the necessary process for the approval of the course content in the Course curriculum of under graduate course in Engineering as per RGPV, Bhopal ordinance.

Table: 2.6. Curricular Gaps Identified and communicated to RGPV University through letter:

Branch	S.N	Subject	Course Beyond Syllabus	Sem	Curriculum gap	Justification	POs/PSOs
EC	1	Antenna and wave propagation	5G Antennas	VI	Hands on 5G Communication Antenna like massive mm wave antenna array	Recent communication technology adopted 5G Technology and needed students should be aware about 5G Antennas	PO1, PO2, PO3, PO4, PO5, PO6, PO8, PO12
	2	Electronics and circuits	Electronics tool and PCB Design	III & IV	Hand on tools and PCB Design part should be included	As per industry requirements hand on electronics tools and PCB Design part should be included	PO1, PO2, PO3, PO4, PO5, PO6, PO8, PO12
	3	Image Processing	Realistic application of Image processing	V & II	Realistic application of Image processing Subject should be included in curriculum	Image processing is often viewed as arbitrarily manipulating an image to achieve an aesthetic standard or to support a preferred reality. However, image processing is more accurately defined as a means of translation between the human visual system and digital imaging devices.	PO1, PO2, PO3, PO4, PO5, PO6, PO8, PO12
ME	4	Mecha-tronics	Robotics automation	III & IV	Robotics automation should be incorporate	Robotics Process Automation allows organizations to automate task just like a human being was doing them across application and systems. The main goal of Robotics process automation process to replace repetitive and boring clerical task performed by humans, with a virtual workforce.	PO1, PO2, PO3, PO4, PO5, PO6, PO8, PO12
	5	Nano		V	Nano Materials	As per industrial automation, students	PO1, PO2, PO3,

		Materials			should be incorporate in syllabus of iv sem	should be aware about Nano materials and their uses	PO4, PO5, PO6, PO8, PO12
	6	Tool design	Automation tools of Mechanical engineering	VI	Hand on in tool designs	As per industrial automation, students should be aware about Automation tools and their uses	PO1, PO2, PO3, PO4, PO5, PO6, PO8, PO12
CSE	7	Machine Learning	Hands on Machine learning	VI	Hands on advance software	As per industry requirement, student should be able to work on new platform.	PO1, PO2, PO3, PO4, PO5, PO6, PO8, PO12
	8	Artificial Intelligence	HANDS ON PROLOG	VII	Hands on PROLOG	As per industry requirement, student should be able to work on new platform.	PO1, PO2, PO3, PO4, PO5, PO6, PO8, PO12
	9	Fuzzy neural Network	Practical Implementation on MATLAB	V	Hands on MATLAB	As per industry requirement, student should be able to work on new platform.	PO1, PO2, PO3, PO4, PO5, PO6, PO8, PO12
	10	Natural Language Processing	Hands on python	VII	Hands on advance tool	As per industry requirement, student should be able to work on new platform.	PO1, PO2, PO3, PO4, PO5, PO6, PO8, PO12
	11	Knowledge Based System	Hands on PROLOG	VIII	Incorporated with PROLOG	As per industry requirement, student should be able to work on new platform.	PO1, PO2, PO3, PO4, PO5, PO6, PO8, PO12
EX	12	Electrical Vehicles	Electrical Vehicles	VI	Electric Vehicles should be incorporate in syllabus of VI Sem as an Elective	Student should be able to upgrade the knowledge as per new and upcoming technology.	PO1, PO2, PO3, PO4, PO5, PO6, PO8, PO12
	13	Artificial Intelligence application	Application of Artificial Intelligence in Electrical Engineering	VII	Artificial Intelligence application in Electrical Engineering should be incorporate in	As per industry requirement, student should be able to upgrade the knowledge as per new and upcoming technology.	PO1, PO2, PO3, PO4, PO5, PO6, PO8, PO12

					syllabus of VII Sem		
CE	14	MX Road Software	Application in Design of Road Profile	VII	Software for 3D modeling construction driven engineering	As per current Industrial requirement need of time saving modeling tool for construction and design road profile designing should be taught to the student.	PO1, PO2, PO3, PO4, PO5, PO6, PO8, PO12

The activities, identified in the Department for overcoming the curricular gaps so as to attain POs and PSOs, are illustrated in Table: 2.7

Table: 2.7. Major Activities identified in the department according to the curricular gaps relevant to POs and PSOs

S. No.	Activities in place in the Department to overcome the Curricular gaps	Nature of curricular gap									Relevance to POs/ PSOs
		1	2	3	4	5	6	7	8	9	
1	Additional course “English lab”		√			√		√	√		PO10, PSO2
2	Quantitative & Verbal Aptitude classes for III year students		√				√	√		√	PO1, PO2,PO10,PSO3
3	Campus Recruitment Training Classes by T&P Cell		√			√	√	√	√	√	PO1, PO2, PO10, PSO3
4	Organizing Workshops/Guest Lectures/Symposia for students	√	√	√	√	√			√		All POs and PSOs
5	Student seminars on recent technologies	√	√	√	√	√			√	√	PO2 to PO7, PO10 to PO12, All PSOs

6	Student participation in Workshops/Symposia at other institutes	√	√	√	√	√			√	√	PO2 to PO7, PO10 to PO12, All PSOs
7	Industrial visits	√	√	√	√				√		All POs, All PSOs
8	Coverage of Topics beyond curriculum by faculty in each subject	√	√	√						√	PO2-PO7, PO10- PO12, All PSOs
9	Faculty seminars on topics from research journals	√	√	√	√	√			√		PO2-PO7, PO10, PO12, All PSOs
10	Student participation in technical contests	√	√	√	√					√	All POs, All PSOs
11	Student Club activities					√			√		PO6,PO7,PO8,PO9,PO10
12	Games and Sports events								√		PO6,PO7,PO8,PO9,PO10
13	Project work with recent technologies	√	√	√	√				√		PO2 to PO7
14	Faculty participation in FDPs/STTPs/Conferences	√	√	√	√				√		PO2 to PO7, PO10 to PO12, All PSOs
15	Faculty Research & Consultancy	√	√	√	√				√		PO1,PO2,PO3,PO4,PO6,PO7, ALL PSOs
16	Use of Internet by students for browsing journals, NPTEL courses, e-books and other Google resources	√	√	√	√				√	√	PO1,PO2,PO3,PO4 , ALL PSOs
17	NSS programs								√		PO6,PO7,PO8,PO9
18	Pedagogical initiatives by faculty	√	√	√	√				√		PO1,PO2,PO3,PO4, ALL PSOs
19	Special classes in GATE		√						√		PO1,PO2,PO3,PO4, ALL PSOs

2.2 Teaching-Learning Processes (100)

2.2.1 Describe Processes followed to improve quality of Teaching & Learning (25)

The Teaching and Learning process is given foremost importance in the department. The initiatives for Quality improvement in teaching and learning are achieved through a well defined system of an academic components and procedures which are explained as follows:

A. Well defined Academic Calendar and Adherence to Academic Calendar
B. Improved and Innovative Instruction Methods/ Pedagogy
C. Implementation of Mentor teaching-learning system: Methodology to support weak students and encourage bright students
D. Initiatives and Implementation of improving quality of class room teaching
E. Initiatives and Implementation of improving quality of Laboratory Experiments
F. Student feedback of teaching learning process and action taken
G. Initiatives and Implementation of learning through Co-curricular activities.

A. Well defined Academic Calendar and Adherence to Academic Calendar

Institutional calendar is prepared and aligned with academic calendar of RGPV. In addition to events proposed by the college in academic calendar, department introduces many other events and activities that are beneficial in overall development of the students. The academic calendar is implemented as per schedule with respect to commencement of classes, Mid-I and Mid-II examinations, Last working day, End semester exams (theory) and End semester exams (Practical) in each semester/year. In addition co-curricular and extra-curricular activities like FDPs, guest lectures, workshop/symposia, industrial visits Tech-fest, technical competitions, cultural, sports etc., are also implemented by the faculty members under the review and guidance of the HoD and Departmental Academics Advisory Committee. Academic Calendar for July-December 2020 is as shown below

ACADEMIC CALENDER
BE/B.TECH ODD SEMESTER
SESSION:2020-2021 (JULY-DEC 2020)

S.NO	NAME OF ACTIVITY	SCHEDULE DATE 3rd /5th/7th Sem
1	Commencement of Academic Session	6th August 2020
2	End of Teaching	28th Nov 2020
Assignments:-		
3	1st Assignment Submission	17th to 21st August 2020
4	2nd Assignment Submission	1st to 5th Sept.2020
5	3rd Assignment Submission	17th to 22nd Sept.2020
6	4th Assignment Submission	12th to 16 oct. 2020
7	5th Assignment Submission	2nd to 7th Nov. 2020
Internal Examination:		
8	Mid Semester-1	12th to 16th Oct.2020
9	Mid semester II	23rd to 27th Nov. 2020
	Institute Events: Orientation	Presentation of Internship from 1st day
10	Motivational Lecture	Every Monday in week
11	Visit	Industrail Visit according to Dept Activity
12	External Exmintation	Accoding to RGPV
13	Theory Examination	Accoding to RGPV
14	**Holiday:** 1.Rakashabandhan	3 Aug.2020
	2..Independance Day	15th Aug 2020
	3.Dashera	25th Oct. 2020
	4.Deepawali	12th to 18th Nov. 2020
	5.Gurunanak Jayanti	30th Nov.2020
15	**Sem Break**	15 days after RGPV Examination
16	**ACADEMIC WORKING DAYS**	
	Month	**Working days**
	July	0
	August	16
	September	22
	October	19
	November	14
	Total	71

PRINCIPAL
(ICOT)

Principal
IES College of Technology
Bhopal

HEAD OF DEPARTMENT
(ICOT)
W.e.f.: 6th August 2020

IES COLLEGE OF TECHNOLOGY BHOPAL

In the beginning of every academic session, the academic calendar is framed and issued to the faculty members and students. An academic calendar is framed based on the discussions with the Controller of Examinations, Department Heads, club coordinator and other decision-making authorities.

Subject allotment is done well in advance for the staff to prepare lesson plans, and hard/soft copies of the lecture notes. Lesson plan with course outcomes are prepared by the faculty handling the subject before commencement of the semester and is duly approved by the Head of the department and made available to the students. Execution of lesson plan has been documented in the academic file to ensure coverage of syllabus, monitored by Head of the department.

Subjects allotment/ Workload:

Faculty is offered with preferred courses. Considering their options, the Head of the department will allot the course for the individual faculty and the workload is finalized. Faculty members are given choice to give options 1, 2, 3... etc. for subject's allotment. Mostly faculty will be allotted one subject of their 1st choice. The second subject is also given as per the choice of the faculty, subject to the needs of the Department.

Time Table:

Structured time table will also have an impact in proper planning of work. A well- organized timetable basically helps the faculty to take control of the day from one hour to the next. Time table consists mainly of four domains: students, faculty, timing and venue.

Course File:

All faculty members prepare course file after subject allotment for the course that they handle. Department Vision, Mission statements, timetable, syllabus, lesson plan, subject notes, record of attendance, Analyze the performance of students, previous year University question papers, Assignment Question papers, laboratory experiments etc.

Quality Lecture notes

Faculty members prepare/update lecture notes, ppt, e-boards, video lectures etc. for allotted subjects by consulting various prescribed text books, Question banks of previous examinations, relevant NPTEL courses and other e-resources from Google.

Lesson Plan

Lesson plans are prepared by faculty members, based on the Academic calendar, syllabus and weekly load, which is reviewed and approved by HoD.

Instruction Delivery

Faculty members take classes as per time table and lesson plan, duly compensating for lost classes due to leaves, unexpected holidays, and following various teaching-learning techniques, methods etc.

B. Improved and Innovative Instructional Methods/ Pedagogy

Apart from basic teaching requirements, the Department has adopted various initiatives to improve instructional pedagogy methods for the attainment of POs. The faculty members are oriented towards Outcome based Education (OBE) and are actively utilizing the OBE to cater the learning need of students by innovative methods. The faculty of department adopts various innovative Teaching & Learning methodologies to create the best learning environment for students. These methodologies include traditional black board teaching, presentations, video lecturing, collaborative learning methods etc. as given below.

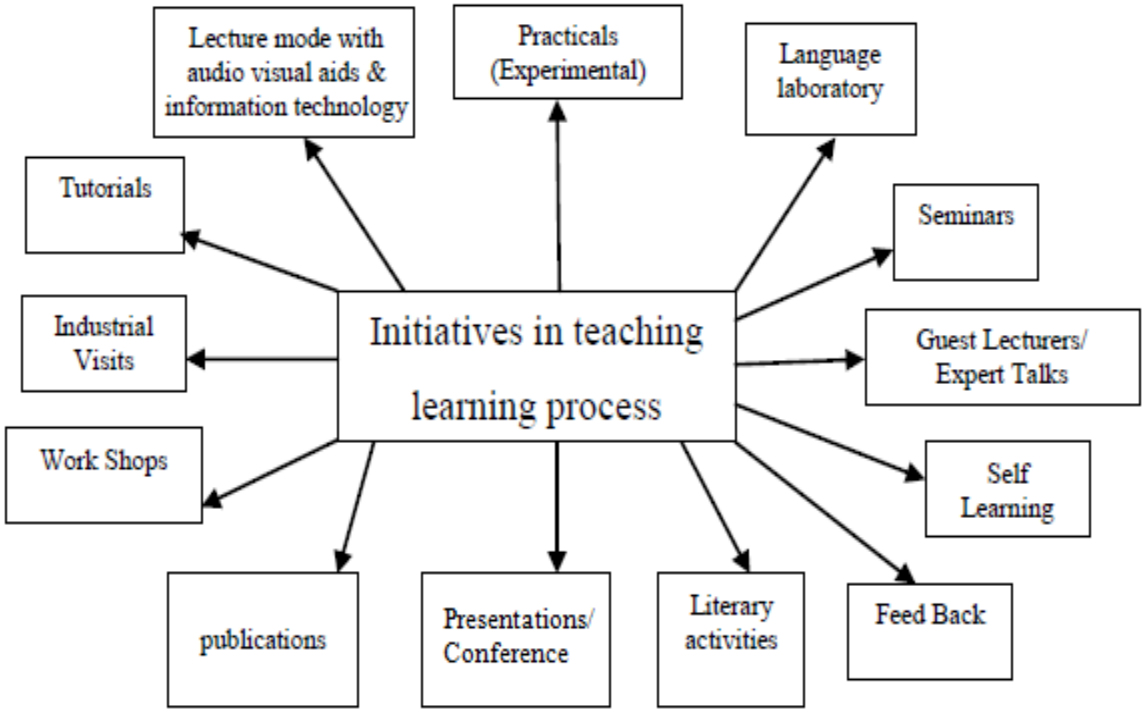


Fig 2.2: Different initiates in teaching and learning process.

1. **Improved/Innovative Classroom Teaching learning method**

- The faculty use chalk and board and audio-visual aids in teaching.
- Students are encouraged to actively interact during the lecture hour by getting the doubts clarified.

- Further, students are also encouraged to give seminars/presentations relevant to the subjects which add to their presentation and communication skills.
- Revising the topics covered in the previous class through simple questions and answers at the beginning of each class
- Repeating important points in each class
- Conducting Tutorial sessions for problematic contents.
- Revision of syllabus before examinations
- Identifying uniqueness of each student, understanding the variations among students
- Equal attention on the student, his strengths and limitations, along with the subject matter
- Effective counselling based on the student's individual social and financial background.
- Motivating students to set multiple career goals to sustain their interest in the learning process.
- Assigning complex design problems individually to enhance the problem skills of students
- Giving assignments to the students on topics beyond curriculum.

2. Improvement through Project-based learning

During pre-final year, the students are encouraged to carry out minor projects and in the final year major projects are executed under the guidance of faculty. The aim of project based learning is:

- Exposing students to real world through Examples
- Presenting the real life engineering problems.
- Implementing the solutions of engineering problems using models and charts for better subject understanding.
- Providing exposure to real world of Engineering by taking students to industrial visits.
- Building entrepreneurship skills

3. Improvement through Computer-assisted learning

The department is equipped with sufficient number of computers, LCD projectors, internet facility, application software and system software which are effectively used for teaching and learning.

- e-boards
- Faculty members are making effective use of ***virtual labs*** for effective teaching.
- Use of e-resources.
- Using electronic presentations (PPT) on difficult topics for better understanding.
- Use of e-learning - resources from **National Programme on Technology Enhanced Learning** (NPTEL).
- Presenting videos which show the recent technologies.
- PPT is incorporated as an item in Course Plan in all subjects wherever relevant
- The **Google classroom** is an innovative tool which is very effectively used in our campus for every course. Faculty members add all students to it before commencement of every semester for every course. They also upload course plans, course materials, video lectures, question banks etc. It helps the students to come prepared to the class. The tools in the Google class room facilitate online assessment of students, which can be used to measure the outcomes of each course.

4. **Guest Lectures**

   Guest lectures are organized by industry, academic experts and by alumini which provide industry exposure, entrepreneurship skills and exposure for higher studies to the students beyond the class room learning and curriculum. The details are provided in Sec.2.1.2

5. **Students Participation in Workshops/symposia**

Students are encouraged to participate in workshops and technical symposia organized by IES and various engineering colleges including IITs and NITs etc. This adds to the knowledge and enhances their knowledge, aptitude and communication skills. The details are provided in Sec.2.1.2.

6. **Special Classes**: - Communication skill classes are organized for the students, news paper distribution, through print /soft copy and online test is conducted for placement preparation.

7. **Expert classes**: - T&P classes are organized, Experts lectures from industry and academia are invited to deliver lectures on the latest trends and thrust areas to improve the employability of students.

8. **Collaborative Learning**: **-** Through collaborative learning students are exposed to learn various topics and hands-on experience under different laboratories, related to program curriculum as depicted in table: 2.8.

Table: 2.8. Collaborative learning

S. No.	COURSE	ASSOCIATED LAB
SEM - I		
1	Engineering Chemistry	Chemistry lab
2	Basic electrical & electronics engg.	Basic electrical & electronics engg.lab
SEM - II		
3	Engineering Physics	Physics lab
4	Basic mechanical engg.	Basic mechanical engg. lab
SEM - III		
5	Network Analysis	Network Lab
6	Analog Electronics	Analog Electronics **Lab**
SEM - IV		
7	Digital Electronics logic design	Digital Electronics logic design **Lab**
8	Electrical Machine -1	Electrical Machine lab
SEM - V		
9	Electrical Machine -II	Electrical Machine Lab
10	Power electronics devices and circuits	Power electronics Lab
SEM - VI		
11	Microprocessor & micro controller	Microprocessor & micro controller Lab
12	Switchgear & Protection	Switchgear & Protection lab
SEM - VII		
13	Computer application in power system	Computer application in power system Lab
14	Electrical Drive	Electrical Drives Lab
SEM - VIII		
15	Computer aided design of electrical machine	Computer aided design of electrical machine Lab
16	Major Project	Project Lab

Impact analysis of Initiatives and Implementation of Improving Quality of Teaching and Learning

The following are the positive outcomes observed after adopting the innovative TLP:

- Improved attendance of students for every class.
- Active participation of students in OBE (Outcome Based Education) activities.
- New view points and new project ideas are derived in class.
- Better bonding between students and faculty.
- Appreciation from the parents.
- Better outcome in terms of projects.

C. Implementation of Mentor teaching-learning system: Methodology to support slow learner students and encourage bright students

Department adopts Mentor Teaching Learning system to support slow learner and bright students equally. Mentoring is to support and encourage students to manage their own learning in order that they may maximize their potential, develop their skills, improve their performance and become the person they want to be. Mentoring is a powerful personal development and empowerment tool. It is an effective way of helping students to progress in their careers and is becoming increasing popular as its potential is realized. Faculty members are assigned with the responsibility of mentorship. Each mentor is allotted with 20-30 students. In first year, students on the basis of their percentage are grouped into two categories: students below 50% marks in 12^{th} board are classified as weaker students and students above 50% as brighter students. From second year onwards the students who secure less than 5-CGPA in their Continuous Assessment or with more than 3 backlogs are identified and considered as academically weak students. Others are considered as academically bright students. Slow learner students are given counselling for their career guidance. Bright students are encouraged to take up new challenges time to time. The parents are also informed about the progress report like result, attendance and performance of the students. The students needing improvement are groomed not only for improving academic performance, but also given opportunity to showcase their skills through events, competitions etc and this helps to improve academic performance also.

1. Assistance for slow learner students:

- Mentors from time to time follow their progress and counsel them to attend the classes
- Subject handling Faculty members conduct remedial classes.

- Faculty members inculcate theoretical concepts through model specimen/charts/ video lectures/ online lectures.
- Remedial classes are conducted for slow learner students
- Confidence is boosted by motivating them to participate in sports, NCC, NSS and other activities.

2. Encouraging bright students

- Students securing First and Second rank in end semester examination are awarded with certificate.
- Student securing 100% attendances are also awarded by certificate.
- Students are motivated for attending workshops, seminars, and technical contests.
- Students are encouraged to undergo internships

Impact analysis of Initiatives and Implementation of Mentor Teaching-Learning system

- Based on the extra care/ initiatives taken for weak students their academic performance improves.
- Based on the action taken, not only the academic performance is improved but they are also selected by the recruiters.
- Students participated in various activities and performed outstandingly in various national level technical and non technical contests
- Improvement is seen in assessment of weaker students.

D. Initiatives and Implementation of improving quality of class room teaching

Teaching-Learning process is crucial part of outcome based education and implements/employs as the set of activities engaging with students to enable them to acquire the knowledge, skills and attitudes.

The basic and primary activities adopted at IES College of technology for the Teaching Learning basis consists of:

1. Providing Infrastructure, E-boards, projectors, well equipped labs /Procurement of Equipments
2. Faculty Recruitment
3. Academic calendar/Adherence to Academic calendar

- Subjects allotment
- Time Table
- Course File
- Quality lecture notes
- Lesson Plan
- Instruction Delivery

4. Continuous Evaluation
5. Review of Syllabus Coverage
6. End Semester Exams, class tests, unit tests, presentations, quiz etc.
7. Results Analysis
8. Assessment of CO-PO Attainment/Action for unattained COs/POs/PSOs
9. Faculty Annual Appraisal

Institution develops and deploys action plans for effective Outcomes Based Education (OBE) implementation in following manner:-

1. Providing Infrastructure/Procurement of Equipments

The resources needed for Teaching-Learning process are met by suitable Budget. Quality equipment is procured by the Department. Similarly the infrastructure requirements of the Department are also proposed by the Department and provided/ approved by the IQAC

2. **Faculty Recruitment**

Effective Teaching-Learning process requires qualified and competent faculty members. Eligible and qualified candidates are selected through proper selection process.

3. Academic calendar/Adherence to Academic calendar

Institutional calendar is prepared and aligned with academic calendar of RGPV as described in detail in section A of 2.2.1

4. Continuous Evaluation

This consists of Mid Semester exams and Assignments for theory courses and viva voce, evaluation and internal lab exam for Laboratory courses.

5. Review of Syllabus Coverage

HOD reviews the coverage of syllabus on a regular basis in faculty meetings. Class review meetings with regular students of the class along with class faculty is organized before each Mid semester examination

6. End Semester Exams

These are conducted as per the Academic calendar.

7. Results Analysis

Analysis of Results is done by concerned faculties.

8. Assessment of CO-PO Attainment/Action for unattained COs/POs/PSOs

The procedure for assessment of CO-PO attainment has been evolved over a period of time in the Department. CO and PO attainment is done by the concerned subject faculty and action plan for unattained POs/PSOs is drafted.

9. Faculty Annual Appraisal

Faculty members submit appraisal of their performance annually, in a prescribed format, which is further reviewed by HOD and Principal for appraisal/ corrective action.

E. Initiatives and Implementation of improving quality of Laboratory Experiments

- Faculty members of respective subjects prepare lab manual before commencement of semester.
- The practical are conducted as per university scheme.
- Every batch consists of around 30 students. Each batch is further split into smaller batches of 2 to 4 students per team.
- Lab manuals are given to students before start of the experiment.
- Students perform the experiments under the guidance of the staff, so that doubts if any related to the experiments can be clarified in the lab itself.
- Viva voce is conducted at the end of every experiment to check the students' understanding level
- The student writes complete experiment along with observation results and these are checked by faculty.
- Virtual labs are also included
- The college organizes intra and inter-college contests (Tech Fest), to encourage students to demonstrate their Practical and programming skills.

Continuous Assessment in the Laboratory

- Observation notebooks are maintained by the students in which they record the values related to their experiments.

- Calculation is done based on the observation made which is checked and by concerned faculties.
- Viva questions are asked to check the understanding level of the students
- Marks are awarded based on the level of understanding of each experiment.
- Student records the experiment in the record note book and submits it to the concerned faculty.
- Rubrics are used for continuous assessment of students in each lab class.

Lab Performance Evaluation Rubric

Student Name: ---------- Enrollment Number: ----------

Evaluation Date: ----------

S.N	Method of Evaluation	Rubrics	Exceeds expectation(3)	Meets expectation(2)	Doesn't meet expectation(0-1)	Marks
1	Conduction of Experiments (Hardware)	Lab Participation	Student demonstrates an accurate understanding of the lab objectives and concepts. The student can correctly answer questions and if appropriate, can explain concepts to fellow classmates. Student is eager to participate and assists when needed.	Student arrives on time to lab, but may be unprepared. Answers to questions are basic and superficial suggesting that concepts are not fully grasped.	Student tardiness or unpreparedness makes it impossible to fully participate. If able to participate, Student has difficulty explaining key lab concepts. OR Student was absent from lab	
2		Equipment connection	Student has made correct equipment/component	Student needed guidance to make	Student was unable to make	

			connections as per standard circuit diagrams.	correct equipment/component connections as per standard circuit diagrams.	correct equipment/ Component connections as per standard circuit diagrams.	
3		Data Recording/ Collection	Student has correctly measured the relevant parameters	Student has performed incorrect measurement of relevant parameters	Student was unable to identify /measure relevant parameters	
4		Results	Accurate results have been achieved	The achieved results are not accurate but are within tolerance range	No results are achieved OR The achieved results are meaningless	
5		Troubleshooting	Student has ability to detect and correct the errors	Student can detect the error but unable to correct it	Student was unable to detect the error	
6	Conduction of Experiments (Hardware)	Lab Report	Student demonstrates an accurate understanding of the lab objectives and concepts. Questions are answered completely and correctly. Graphs are neat, creative and include complete titles and accurate units. Errors, if any are minimal	Student has a basic knowledge of content, but may lack some understanding of some concepts. Questions are answered fairly well and/or graphs could have been done more neatly, accurately or with more complete information.	Student has problems with both the graphs and the answers. Student appears to have not fully grasped the lab content and the graph(s) possess multiple errors. OR Student turns in lab report late or the report is so incomplete	
7	Ethics	Safety	Student carefully observes the safety rules and procedures during practical work	Student observes safety rules and procedures with minor deviation during	Student does not care about safety rules during practical work.	

				practical work		
8		Punctuality	Student was on time and stay till the completion of task	Student was on time but wasted time outside the work place during the experiment.	Student was not on time and left class before time.	
9		Workplace Clearance	The student uses the equipment responsibly and clears the leftovers at the work place on completion of lab work	The student has shown responsibility towards using the equipment while he didn't care about the cleanliness of work place	The student has shown irresponsibility using the equipment and didn't clear the leftovers at the workplace on completion of lab work	
10	Team Work	Research & gather information	Student has collected a great deal of information which goes beyond the basics.	Student has collected basic information related the topic.	Student has not collected any information that relates to the topic	
11		Fulfil team role's duties	Student has performed the duties assigned and actively assisted others.	Student has shown limited performance in the duties that are assigned	Student has not performed any duties of assigned team role.	
12		Listen to other teammates	Consistently listens and responds to other appropriately	Usually doing most of the talking rarely allowed others to speak.	Student shows an assertive behaviour and was unable to show respect towards other teammates.	
13	Conduction of Experiments (Software)	Familiarity with software	Student has full command on the basic tools of the software.	Student has limited command on the basic tools of the software.	Student has no idea how to use the basic tools of the software.	
14		Simulation	Has applied all the steps in	Some steps are	Student has no	

		Steps	correct sequence to obtain the results.	followed but not in proper sequence	idea regarding the steps to be followed to perform simulation	
15		Coding Skills	The code is completely functional and responds correctly producing the correct outputs.	The Code is correct with regard to syntax but required output is not correct.	The code has several syntax errors. Important parts of code are missing.	
16	Conduction of Experiments (Software)	Schematic of the Circuit	Schematic of circuit/board is made with proper connections/wiring.	Schematic of circuit/board is made with only basic proper connections/wiring	Schematic of circuit/board is made with only basic connections/wiring and has several errors.	

Impact analysis for the Initiatives and Implementation of Improving Quality of Laboratory Experiments

- The completion of the experiments by the students is ensured.
- Improvement in analytical abilities of students thus improves their skills.
- The students are encouraged to result better in university practical examination.
- Improvement in analytical abilities of students which helps in their placements.
- Simulating environment make students to learn other programming languages.
- Stimulate the problem solving approach to real time engineering problems.

F. Student feedback of teaching learning process and action taken

Feedback is taken from students on the effectiveness of teaching and subject learning twice during the semester. Initially, feedback is taken from representative students and selected students those having attendance more than 90 % from each class by HoD / senior faculty member after 15 to 20 days of commencement of classes. If students are facing difficulty in any subject, the concerned faculty member is informed of the same. Necessary guidance and support is given by HoD and another senior subject faculty member. This consists of asking the faculty member to give a mock class in presence of HoD and another senior

subject faculty, giving guidelines for improvement, reviewing the lecture notes and offering necessary support in the subject. At the end of the semester the feedback is again taken from students in that subject for necessary action. In extreme cases, where the faculty member is unable to improve up to the minimum desired standard, action is taken accordingly. The feedback is summarized and communicated to all faculty members. This feedback is considered part of Annual Performance Appraisal of the faculty member.

G. Initiatives and Implementation of learning through Co-curricular and extra-curricular activities

Various technical and nontechnical events are organized under community development through intra and inter college tech fests like poster presentation, models, tech rangoli fests, essay writing, presentation, quiz, robotics, web design, Lan gamming etc as per the table given below. Apart from indoor and outdoor sports activities, College fest etc. are conducted during academic year. Students participate in various activities and achieve distinctions as under

Table: 2.9. Students Achievements at National Level/E learning:

Contest	Project	Name of student	Prize	Year	PO & PSO
NPTEL Course on Control Engineering	NPTEL Course on Control Engineering	Salman Khan	Successfully completed the course with 40 % score	2018-2019	PO 1,2,3,4,6,12, PSO 1,3
NPTEL Course on Basic Electric Circuits	NPTEL Course on Basic Electric Circuits	Avinash Patel	Successfully completed the course with 57 % score	2019-2020	PO 1,2,3,4,6,12, PSO 1,3
NPTEL Course on Basic Electric Circuits	NPTEL Course on Basic Electric Circuits	Ashutosh Prashant	Successfully completed the course with 64% score	2019-2020	PO 1,2,3,4,6,12, PSO 1,3
NPTEL Course on problem solving through programming in C	NPTEL Course on problem solving through programming in C	Manish kumar Thapa	Successfully completed the course with 48 % score	2019-2020	PO 1,2,3,4,6 PSO 1
NPTEL Course on Network Analysis	NPTEL Course on Network Analysis	Avinash Patel	Successfully completed the course with 90%	2019-2020	PO 1,2,3,4,6,12, PSO 1,3
NPTEL Course on Control Engineering	NPTEL Course on Control Engineering	Ashutosh Prashant	Successfully completed the course with 53% score	2019-2020	PO 1,2,3,4,6,12, PSO 1,3

NPTEL Course on Network Analysis	NPTEL Course on Network Analysis	Kishan Kumar	Successfully completed the course with 86%	2019-2020	PO 1,2,3,4,6,12, PSO 1,3
NPTEL Course on Network Analysis	NPTEL Course on Network Analysis	Ashutosh Prashant	Successfully completed the course with 90%	2019-2020	PO 1,2,3,4,6,12, PSO 1,3
NPTEL Course on Network Analysis	NPTEL Course on Network Analysis	Dheeraj Singh	Successfully completed the course with 93%	2019-2020	PO 1,2,3,4,6,12, PSO 1,3
NPTEL Course on Control Engineering	NPTEL Course on Control Engineering	Ramsunder	Successfully completed the course with 56 % score	2020-2021	PO 1,2,3,4,6,12, PSO 1,3

Extra-curricular activities

Table: 2.10. Student's participation at National/State /city level Technical Event/E learning

S. No.	Name of Students	Technical Events	Year	Organized By	Result	PO & PSO
1	Md Abrar	NPTEL Course	2020-21	Swayam Central	Participated	PO 1,2,3,4,6,12, PSO 1,3
2	Sonali kumari	NPTEL Course	2020-21	Swayam Central	Participated	PO 1,2,3,4,6,12, PSO 1,3
3	Praful Thakur	NPTEL Course	2020-2021	Swayam Central	Participated	PO 1,2,3,4,6,12, PSO 1,3
4	K Praveen	NPTEL Course	2020-2021	Swayam Central	Participated	PO 1,2,3,4,6,12, PSO 1,3
5	Md Javed Akhtar	NPTEL Course	2020-21	Swayam Central	Participated	PO 1,2,3,4,6,12, PSO 1,3
6	Abhijit kumar	NPTEL Course	2020-21	Swayam Central	Participated	PO 1,2,3,4,6,12, PSO 1,3
7	Krishana Kumar	NPTEL Course	2020-21	Swayam Central	Participated	PO 1,2,3,4,6,10,12, PSO 1,3
8	Ashutosh Prashant	NPTEL Course	2020-2021	Swayam Central	Participated	PO 1,2,3,4,6,10,12, PSO 1,3
9	Ashutosh Prashant	NPTEL Course	2019-2020	Swayam Central	Participated	PO 1,2,3,4,6,10,12, PSO 1,3

10	Avinash Patel	NPTEL Course	2019-2020	Swayam Central	Participated	PO 1,2,3,4,6,10,12, PSO 1,3
11	Kritika Sharma	Tech fest	2018-19	IIT Delhi	Participated	PO 1,2,3,4,5,8,9,11,12 PSO 1,3
12	ShrutikaSawade	Tech fest	2018-19	IIT Delhi	Participated	PO 1,2,3,4,5,8,9,11,12 PSO 1,3
13	Mukul kumar	KPIT sparkle 2018	2018-19	RGPV	Participated	PO 1,2,4,12 PSO -
14	Abrar ali	KPIT sparkle 2018	2018-19	RGPV	Participated	PO 1,2,4,12 PSO -
15	Abhishek kumar	Vigyan Mela	2018-19	RGPV	Participated	PO 1,3,4,5,8,9,10,11,12 PSO 1,2,3
16	Amit kusingh	Vigyan Mela	2018-19	RGPV	Participated	PO 1,3,4,5,8,9,10,11,12 PSO 1,2,3
17	Brijesh Rajput	Vigyan Mela	2018-19	RGPV	Participated	PO 1,3,4,5,8,9,10,11,12 PSO 1,2,3
18	Anurag kumar	Vigyan Mela	2018-19	RGPV	Participated	PO 1,3,4,5,8,9,10,11,12 PSO 1,2,3
19	Junaid Quamar	Vigyan Mela	2018-19	RGPV	Participated	PO 1,3,4,5,8,9,10,11,12 PSO 1,2,3
20	Mukul kumar	Vigyan Mela	2018-19	RGPV	Participated	PO 1,3,4,5,8,9,10,11,12 PSO 1,2,3
21	Faizan Ali	Vigyan Mela	2018-19	RGPV	Participated	PO 1,3,4,5,8,9,10,11,12 PSO 1,2,3

Table: 2.11. Student's Participation in Inter and Intra College Activities/NCC/NSS

S. No.	NCC Activity	Details	Date	Resource Person	No. Of Students	PO, PSO
1	CATC-XIII Camp at 1MP-CTR Bhopal	CATC-XIII Camp at 1MP-CTR Bhopal	08/02/21 to 12/02/21	CO & PI Staff of 1MP-CTR Bhopal	3	PO 6,7,9,12, PSO3
2.	CATC-XX Camp at 1MP-CTR Bhopal	CATC-XX Camp at 1MP-CTR Bhopal	15/02/21 to 17/02/21	CO & PI Staff of 1MP-CTR Bhopal	1	PO 6,7,910,1112, PSO3
3	Army Attachment Camp Gwalior	Attachment of NCC Cadets with regular Army Unit	4/9/17 to 20/9/2017	Gwalior military Station	1	PO 6,7,9,10,12, PSO3
4	NCC 'B' Certificate Examination 2017-18	NCC 'B' Certificate Examination at NCC Unit 1 MP CTR Bhopal	20-21/02/ 2018	Under Supervision of Col. O P Mishra (Commanding Officer) 1 MP CTR	3	PO6,7,8,9,12, PSO 3
5	NCC 'C' Certificate Examination 2017-18	NCC 'C' Certificate Examination at NCC Unit 1 MP CTR Bhopal	27-28/2/ 2018	Under Supervision of Col. O P Mishra (Commanding Officer) 1 MP CTR	3	PO 6,7,8,9,12 PSO 3
6	International yoga day	10 Cadets of IES College Participated in Yoga Day program of Chief minister at Lal Parade ground	6/6/2018	Mr. Akhilesh Dwivedi (NCC Caretaker), R S Dhumketi (PI Staff)	3	PO 6,7,8,9,12 PSO 3
7	Combined Annual	Combined Annual Training Camp is	10 - 19/06/2018	under 2 MP Air Squadron	2	PO 6,7,8,9,10, 12

	Training Camp	Compulsory activity of NCC. Each cadet attend at least 1 NCC Camp				PSO 3
8	Enrollment of NCC 2018 (Selection Process)	Enrollment of Students done once in year under the supervision of NCC Unit 1MP-CTR Bhopal (To maintain the enrolled strength 50)	14/08/2018	Mr. Akhilesh Dwivedi (NCC Caretaker), Sub S D Pandey, JCO, Sub R P Chavan NCO	5	PO 6,7,8,9,10, 12 PSO 3
9	Swachhta Pakhwada	Under Swachhta Bharat Mission NCC Celebrated SwachhtaPakhwada 15 days Program in which day wise activities are scheduled like Cleanliness drive, Awareness Rally etc.	15/9/2018 - 02/10/ 2018	Mr. Akhilesh Dwivedi (NCC Caretaker), Sarthak NGO representative.	1	PO 6,7,8,9,10, 12 PSO 3
10	NCC 'B' Certificate Examination 2018-19	NCC 'B' Certificate Examination at NCC Unit 1 MP CTR Bhopal	23-24/02/ 2019	Under Supervision of Col. O P Mishra (Commanding Officer) 1 MP CTR	4	PO 6,7,8,9,10, 12 PSO 3
11	Enrollment of NCC 2019 (Selection	Enrollment of Students done once in year under the supervision of NCC	12/8/2019	Mr. AkshayVarkale (NCC Incharge) & PI	1	PO 6,7,8,9,10, 12 PSO 3

	Process)	Unit 1MP-CTR Bhopal (To maintain the enrolled strength 50)		Staff		
12	No Plastic Awareness Campaign	Under Unnat Bharat Abhiyaan the NCC & NSS Volunteers team of IES College of Technology organized No Plastic Awareness Campaign at adopted village BerkhediVzyaft	16/09/2019	Mr. Akhilesh Dwivedi (NCC Caretaker), Prof. R C Maheshwari	6	PO 6,7,8,9,10, 12 PSO 3
13	Combined Annual Training Camp at BIST Bhopal	Combined Annual Training Camp is Compulsory activity of NCC. Each cadet attend at least 1 NCC Camp	14 - 23/06/ 2019	Mr. Akhilesh Dwivedi (Associate NCC Officer) & 1MPCTR Bhopal (Col. N P Semalti, Commanding Officer)	1	PO 6,7,8,9,10, 12 PSO 3
14	Firing Practice	Firing by .22 Rifle at firing range Sukhi Sewaniya Bhopal	13-14/12/ 2019	Mr. Akhilesh Dwivedi (Associate NCC Officer) & NCC Unit - 1MPCTR Bhopal (Col. N P Semalti, Commanding Officer)	4	PO 6,7,8,9,10, 12 PSO 3

15	NCC 'B' Certificate Examination 2019-20	NCC 'B' Certificate Examination at NCC Unit 1 MP CTR Bhopal	18 - 19/02/ 2020	Under Supervision of Col. N P semalti (Commanding Officer) 1 MP CTR	6	PO 6,7,8,9,10, 12 PSO 3
16	NCC 'C' Certificate Examination 2019-20	NCC 'C' Certificate Examination at NCC Unit 1 MP CTR Bhopal	25 - 26 /02/ 2020	Under Supervision of Col. N P Semalti (Commanding Officer) 1 MP CTR	3	PO 6,7,8,9,10, 12 PSO 3
17	Enrollment of NCC 2020 (Selection Process)	Enrollment of Students done once in year under the supervision of NCC Unit 1MP-CTR Bhopal (To maintain the enrolled strength 50)	13/08/2020	Mr. Akhilesh Dwivedi (Associate NCC Officer) & 1MPCTR Bhopal (Col. N P Semalti, Commanding Officer)	5	PO 6,7,8,9,10, 12 PSO 3
18	Online Inauguration Ceremony of National Constitution Day	Organized by Ministry of Defence & Youth and sports ministry at Directorate NCC (MP&CG) Chief Guest : Rajnath Singh (Defence Minister) & Guest of Honour : Kiran Rijiju (Youth & Sports Minister)	18/11/2020	Mr. Akhilesh Dwivedi (Associate NCC Officer) & ADG NCC Directorate Bhopal (MP&CG)	1	PO 6,7,8,9,10, 12 PSO 3

19	Online Webinar on National Constitution Day	Online Webinar on National Constitution Day, Expert ; Justice Alok Verma (Judge High Court	26/11/2020	Mr. Akhilesh Dwivedi (Associate NCC Officer) & Senior Faculty Member of IES College of Technology	6	PO 6,7,8,9,10, 12 PSO 3

Impact analysis of Initiatives and Implementation of learning through Co-curricular and Extra-curricular activities

- Students learn to work in team
- Professional and ethical learning
- Learn to apply their knowledge for Societal and environmental cause
- Helps in boosting confidence, improving communication, widening ones scope of knowledge
- Develop certain hobbies or skills, learning manners.
- Self Discipline, confidence building, leadership quality

2.2.2 Quality of internal semester Question papers, Assignments and Evaluation (20)

A. Process for internal semester question paper setting and evaluation and effective process implementation

The assessments are designed in a relevant manner in order to ensure that the learner achieves the intended learning outcomes. Thus, the evaluation of assessment tasks with regards to both content and form is necessary. Our Institution has well-defined guidelines for question paper setting and preparing key points for answers with mark distribution. While setting question papers the following guidelines are kept in mind and strictly adhered to enhance quality.

The department conducts two internal assessment tests in one semester before appearing in the final exam for each course. This procedure enhances the confidence level for the students to prepare for the end term exam and also provides a better understanding in the respective course.

- The department conducts two mid semester tests in one semester for maximum of 20 marks each.

- Mid semester-I covers Forty percent coverage of COs and remaining 60% is covered in mid semester -II
- Duration of the test is two hours and question papers are set in such manner that it makes the students to learn time management.
- The question papers are prepared based on course outcomes. Each question is mapped with the corresponding course outcome.
- While setting the question paper previous university exam papers are taken into consideration.
- The HoD / exam coordinator review the Mid semester examination question paper for validation with respect to COs and Bloom's taxonomy of learning objectives before submission to the exam section.
- If any question paper is not satisfying, then it is not accepted and resent to the faculty for improving the quality of questions level.
- Marks are recorded in the exam cell after valuation and are finally considered for calculation of internal marks.
- Valued answer scripts are shared with the students.

Students affix their signature on the answer script after scrutiny.

- These answers booklets are evaluated by the Head of the Department or by senior professors.
- Average of the two assessments marks is chosen in mid semester examination (MSE) at the time of awarding internal marks

Evaluation Process of Question paper setting

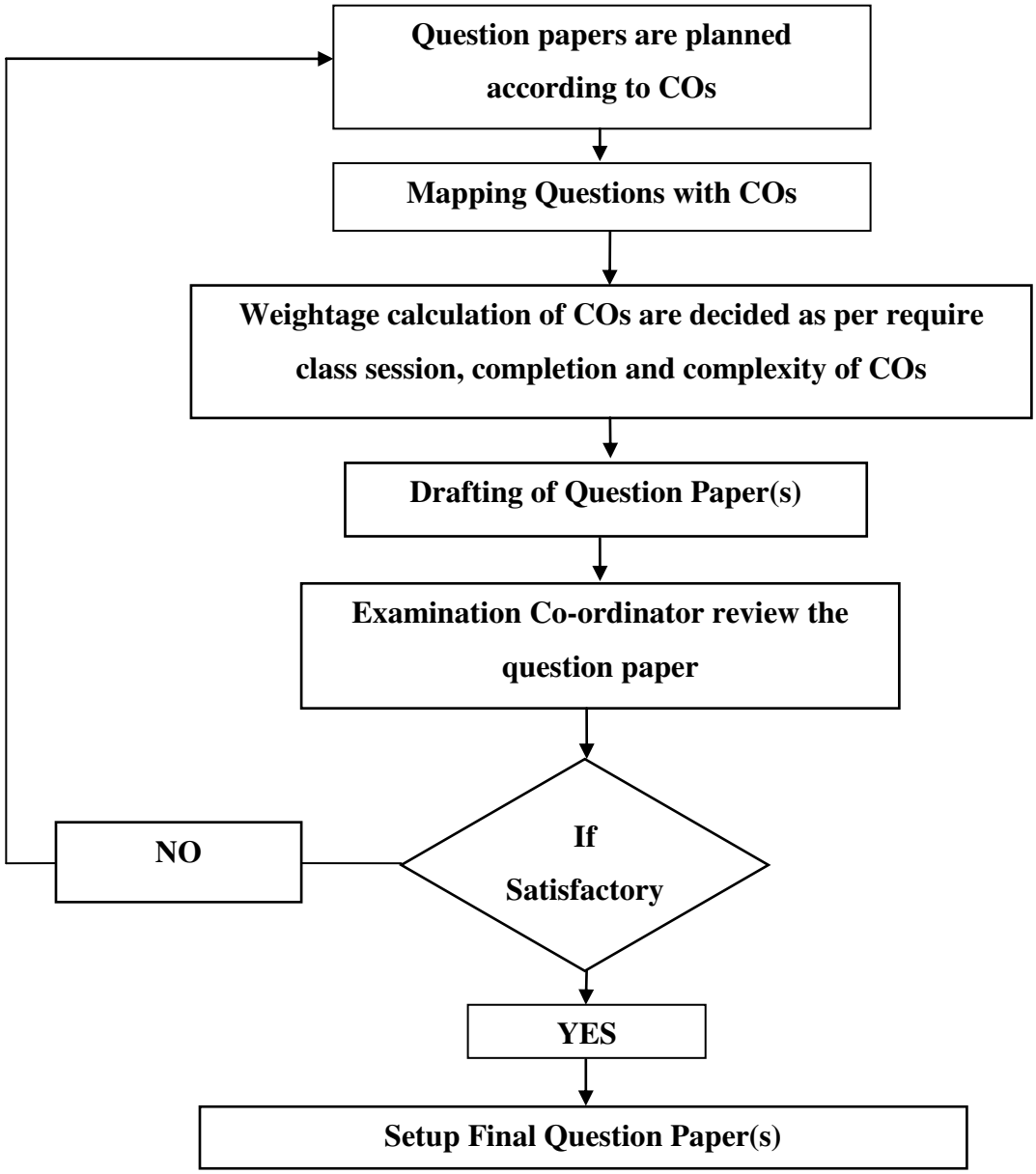


Fig. 2.3 Evaluation Process of Question paper setting

B. Process to ensure questions from outcomes/ learning levels perspective

- Direct attainment of COs is determined from the performances of students in 30% of Internal Evaluation (IE) and 70% of Semester End Examination (SEE)
- For assessment of Mid Semester Examination marks, two mid semesters are conducted and final marks is consider as an average of two mid marks, Mid semester _I covers Forty percent coverage of COs and remaining 60% is covered in mid semester -II
- First Mid Semester Examination includes four to six questions with respect to COs
- Second Mid Semester Examination includes four to six questions with respect to COs.
- The examination section reviews the Mid semester exam question paper on the above basis and the report is submitted to HoD for further action.
- If any question paper is not satisfying, then it is not accepted and resent to the faculty for improving the quality of questions level.

C. Evidences of COs coverage in class test/mid-term tests

Total No. of Questions: 05 **Enrolment No. _____**

IES COLLEGE OF TECHNOLOGY, BHOPAL

Electrical and Electronics Engineering department

ASSIGNMENT-I

Branch/Semester	**EX/ Vth**	**Session**	**2019-2020**
Name of Faculty			
Subject	**Electrical machine-II**	**Sub Code**	**EX - 501**
Date of Submission			

Course Outcome

C501.1: Demonstrate the construction and working principle of DC and synchronous machine.

C501.2: Analyze the effect of armature reaction and the process of commutation.

C501.3: Apply voltage regulation parallel operation of alternators to electrical machine

C501.4: Classify the two reaction theory and synchronization of the synchronous machine.

C501.5: Determine the different parameter of three phase of V & inverted V curve

Q.1	**List and explain the different parts of a dc machine and state the function of each part.**	**4**	**C501.1**
Q.2	**Derive the emf equations of a dc machine.**	**4**	**C501.1**

Q.3	**Illustrate the methods used for improving commutation in dc machine?**	**4**	**C501.1**
Q.4	**Explain the cross magnetization and demagnetization effects of armature reaction in a dc machine.**	**4**	**C501.1**
Q.5	**Demonstrate why it necessary to insert resistance in the armature circuit of d.c. motors at the time of starting? Describe with a neat sketch the working principle of a shunt motor starter and explain how its safety devices work?**	**4**	**C501.1**

Total No. of Questions: 04 **Enrolment No. _____**

IES COLLEGE OF TECHNOLOGY, BHOPAL

MID SEMESTER EXAMINATION- I

Session 2019-20

Branch :	**Electrical and Electronics**		
Semester:	**V**		**Max. Marks: 40**
Subject :	**Electrical machine-II**	**Sub Code: EX 501**	**Time: 2Hrs**

Course Outcome

C501.1: Demonstrate the construction and working principle of DC and synchronous machine.

C501.2: Analyze the effect of armature reaction and the process of commutation.

C501.3: Apply voltage regulation parallel operation of alternators to electrical machine

C501.4: Classify the two reaction theory and synchronization of the synchronous machine.

C501.5: Determine the different parameter of three phase of V & inverted V curve.

Question No.	Question	Marks	CO Mapping
	UNIT I		
1(A)	**Illustrate the different parts of a dc machine and state the function of each part.**	**10**	**C501.1**
1(B)	**Derive the emf equations of a dc machine**	**10**	**C501.1**
	UNIT II		

2(A)	**Explain the operation of a three point starter with the help of a neat diagram.**	**10**	**C501.2**
2(B)	**Classify the methods of speed control of a dc motor**	**10**	**C501.2**

Total No. of Questions: 06 **Enrolment No. _____**

IES COLLEGE OF TECHNOLOGY, BHOPAL

MID SEMESTER EXAMINATION- II

Session 2019-20

Branch :	**Electrical and Electronics**		
Semester:	**V**		**Max. Marks: 60**
Subject :	**Electrical Machine-II**	**Sub Code: Ex 501**	**Time: 2Hrs**

Course Outcome

C501.1: Demonstrate the construction and working principle of DC and synchronous machine.
C501.2: Analyze the effect of armature reaction and the process of commutation.
C501.3: Apply voltage regulation parallel operation of alternators to electrical machine
C501.4: Classify the two reaction theory and synchronization of the synchronous machine
C501.5: Determine the different parameter of three phase of V & inverted V curve.

Question No.	Question	Marks	CO Mapping
	UNIT III		
1(A)	With the help of a neat diagram, describe the main parts of an alternator with their functions.	10	C501.3
1(B)	Derive e.m.f. equation for an alternator.	10	C501.3
	UNIT IV		
2(A)	Derive the synchronizing power? Derive equation for synchronizing power of cylindrical rotor alternator	10	C501.4

2(B)	Demonstrate the necessity of parallel operation of alternators? Explain the condition necessary for parallel operation of alternators.	10	C501.4
	UNIT V		
3(A)	Explain the effect of damper winding in an alternators	10	C501.5
3(B)	Explain that a synchronous motor has no net starting torque. Analyze different methods of starting synchronous motor.	10	C501.5

D. Quality of Assignments and its relevance to COs

- For assessment of assignment three to five assignments are given and each assignment includes three to five questions with respect to concern COs.
- The questions framed in the assignments are taken from multiple sources (previous question papers, text books, etc).
- Mapping is done for all questions of the assignment with the CO's of the course.
- The assignments are evaluated within two weeks after submission and the valued assignments are returned to the students for their scrutiny and improvement.
- Assignment issue and submission dates are mentioned in academic calendar and announced by the respective faculty members.
- Assignment questions are prepared as per COs, Bloom's Taxonomy process and previous years' university question papers.
- In order to bridge the gap in university curriculum, sometimes students are also given assignments beyond syllabus.
- Sample copies of checked assignments are analyzed by the HoD

Evaluation of assignments:

The assignments are assigned to the students to cover the important concepts in a particular subject. Assignments are vital in the process of learning and continuous evaluation of a student. It is the mode of active learning in opposition to passive receiving of knowledge. Strategies include brief question and answer or in depth reading of advanced topic or a topic in syllabus. Writing assignment, seminars and PPT presentation enhance the teaching learning process. Subject in charge finalizes the modes of assignment and the time frame for the assignments.

The Formative assessments and Summative assessments are used to evaluate the student's performance to achieve the targets. The Rubrics are designed to judge performance indicators and shared with the faculty of department. This helps faculty to understand against which

parameter they should be judged for their own assessment. These rubrics can be used by students in revising, and judging their own work and progress.

- Assignments are used as a tool for practice.
- Assignments are given to the students before the start of any unit and submission date is fix mostly after the completion of unit.
- Assignments are displayed on notice boards or given through Google class rooms.
- Students who submit assignment on time will usually see higher grades than students who miss the deadline.
- Doing assignments is a compulsory academic activity.
- Assignments are checked within two weeks after submission by students
- Marks are recorded in the exam cell after valuation and are finally considered for calculation of internal marks.
- Evaluation of assignments are done as under

Table 2.12 Evaluation of Assignments and Allocation of Marks

A. Evaluation Components (Grading System)*

S. No	COMPONENT	MARKS	
I	INTERNAL ASSESSMENTS		**30**
1	**Mid Semester Tests**	**20**	
2	**Quiz/ Assignment**	**10**	
II	END SEMESTER EXAMINATION		**70**
TOTAL			100

B. Evaluation Components (CBCS)*

S. No	COMPONENT	MARKS	
I	INTERNAL ASSESSMENTS		**40**
1	**Mid Semester Test**	**30**	
2	**Quiz/ Assignment**	**10**	

II	END SEMESTER EXAMINATION	**60**
TOTAL		100

C. Evaluation Components (CBGS)*

S. No	COMPONENT	MARKS	
I	INTERNAL ASSESSMENTS		**30**
1	**Mid Semester Test**	**20**	
2	**Quiz/ Assignment**	**10**	
II	END SEMESTER EXAMINATION		**70**
TOTAL			100

Impact analysis of initiative of improving the quality of internal semester Question papers, Assignments and Evaluation

- Results are observed in end- semester examination and in overall performance of students according to the POs, COs and PSO.
- Stimulating environment make students to plan their study for better performance.
- At the end of every semester the feedback form from the students give feedback for the course taught this feedback given by students help the department to judge effectiveness of course taught in achieving POs.
- The Formative assessments and Summative assessments help the students to overcome his/her difficulties and achieved the outcome of course and program.

2.2.3 Quality of student projects (25)

A. Identification of projects and allocation methodology to faculty members

At the end of seventh semester and at the beginning of eighth semester HoD/ project coordinator addresses the students about how to choose the project domain. The students are also encouraged to do projects in industries and are guided to choose projects that are creative, innovative and offering solution to real world problems. Projects are selected based

on various considerations like application, product and research. Factors such as environment, safety, ethics and cost are also taken into account for choosing the topic.

Each Project to be carried out by a group of students of the department is selected by matching with department Vision & Mission, POs and PSOs and mandated to make project based on University based curriculum. Faculty member can supervise at most 3 projects in an academic year. However, as a special case HODs can permit a faculty member to supervise more than projects.

The group size preferably made is 3 to 5 students. Formation of student group is done in such a way so that they can get the knowledge related to their field and fulfil industry scenario. After formation of group any left out student is randomly attached to any group. Students are provided with brief idea of various fields for selecting project ideas. The list of previous year projects is displayed at notice board which ensures no repetition of project work and also encourages students to improve the previous works. The faculties encourage the students to carry out projects and support is provided with all necessary software, hardware & finance. The faculties encourage students to participate in project exhibitions. The aim of such activities is to provide common platform to exhibit their innovations and work towards excellence in latest technology.

B. Course Outcomes for Student Projects

The quality of student projects is ensured and assured through the achievement of the well articulated Course outcomes, as given in Table 2.13. All student project works consider the factors such as environment, safety, ethics, cost and standards. This is ensured through proper instruction by the Project guides as well as through Project reviews, where focus is on attainment of COs.

Table: 2.13 Course Outcomes for student Projects

CO No.	Course Outcomes for student Projects	Relevance to POs/PSOs	
		POs	PSOs
CL8005.1	Demonstrate a technical knowhow of selected project.	1, 2, 3	1
CL8005.2	Demonstrate problem identification, formulation and solution.	4, 5, 10	2

CL8005.3	Design engineering solutions to complex problems utilizing a systems approach.	6, 7	3
CL8005.4	Develop an environment friendly engineering project with social benefits	8, 9, 11, 12	-
CL8005.5	Identify software and hardware techniques to make the prototype of the project.	1,2,3,5,9	1

C. Process for monitoring and evaluation

Guide will give ideas and suggestions for conceptualisation and development of projects. Based on the given ideas, students will start their project work. To ensure proper conduction of each project, progress of each project is monitored regularly on a continuous basis by the supervisor and also by HOD. The process is carried out as per following steps:

Step1: Interaction with supervisor

1. Students select area of work based on their area of interest.
2. The maximum limit of the group size can vary from 3 to 5.
3. Students are allowed to select faculty members based on their specialization.
4. Mapping process is carried out between student team and faculty members' specialization.

Step2: Project identification

1. The Projects may be selected to the area based on industrial visits and training.
2. The new ideas of work can be identified by expert lectures, seminars, industrial visits; workshops were conducted by the faculty members association and professional societies.
3. On each area of project students perform the literature review.
4. Finally, project methodology is confirmed based on literature review.

Step3: Monitoring mechanism:

1. The student's has to show their report to the concerned supervisor periodically.
2. After conducting primary review and further more reviews are conducted.
3. A brief viva voice examination on project work is conducted before the end semester examination.
4. The students should give a power point presentation during the review.
5. Review panel consists of supervisor and faculty experts.

6. A project team will submit the project report in the prescribed format
7. Students prepared the power point slides and report based on the guidelines.
8. An end semester project viva voice is conducted with the panel of internal and external examiners.
9. The external examiner from other institution / university is appointed by the RGPV.

Step4: Demonstration of prototypes:

1. The students will demonstrate the working prototype models during the project review and end semester examination.
2. Enhancing relevance of the project: Outcomes of the projects are encouraged to publish as a paper in conference / journals.

D. Evaluation of Project and Process to assess individual and team performance

Assessment of individual or team performance is based on

1. Innovative ideas
2. Literature Survey
3. Knowledge about the working model
4. Application of tools and software
5. File report
6. Group activity
7. Question & answers
8. Presentation skill and Team work
9. Oral Presentation & working condition of the model
10. Fabrication & Testing
11. Society Application

- A project coordinator appointed by the Head of the department who is responsible for planning, scheduling and execution of all the activities related to the student project work.
- Project progress is assessed after each class. of their respective guide and senior
- The project seminar should be given by all the project team members according to the division of project.
- Each student in the project team is assessed to their skill set to deliver the seminar,

explain the concept and way to make project assess team to understand their work.

- Each individual and team performance is purely based on this project seminar presentation and the viva voice and progress work they show to their guide.

Project Work Evaluation Rubrics

Student Name: ---------- **Enrolment Number: ----------**

Evaluation Date: ----------

Evaluation Parameters	Max. Marks	Rubric Parameters	Level of Achievement				
			Excellent (9-10)	**Very Good (7-8)**	**Good (5-6)**	**Average (3-4)**	**Poor (1-2)**
Attendance	**10**	Continuity	85% above Attendance	70-85% Attendance	60-70% Attendance	40-60% Attendance	40% Below Attendance
Design Methodology	**20**	Conceptual design, Division of problem into modules, Selection of design Framework.	Properly followed & Properly Justified	Properly Followed & Justified Partially	Properly followed & Not Justified	Partially Followed and Partially justified	Not followed and Not justified
Implementation	**20**	Design Circuit Model, Algorithm, Coding	Properly Followed & Properly implemented	Properly Followed & Implemented Partially	Properly followed & Not implemented	Partially Followed and Partially implemented	Not followed and Not implemented
Presentation	***10***	Preparation of Slides, Presentation Consistency	Relevant and consistent	Relevant & partially consistent	Partially relevant & consistent	Partially relevant & partially consistent	Not relevant & inconsistent
Demonstration	**10**	Hardware & Software modules, Working and results	Properly demonstrated & Properly Justified Results	Properly Demonstrated & Partially Justified Results	Partially demonstrated & Justified	Partially demonstrated and Partially Justified	Not demonstrated and no justification
Viva	**10**	Handling Questions	Answered all questions with proper justification	Answered 80% questions	Answered 60% questions	Answered 40% question	Answered 20% questions

Project Report	**20**	Contain of Report	**Excellent**	**Very Good**	**Good**	**Average**	**Poor**

Table: 2.14 Major Projects (2020-21)

IES College of Technology, Bhopal(0177)					
Department of Electrical & Electronics Engineering					
EX 8th SEM Major Project Session June 2019-20					
Major Project				**BATCH: 2016-20**	**(2020-21)**
Group No	**Roll No.**	**Group Member**	**Project Name**	**Project Guide**	**Relevance to POs**
1	0177EX161018	Anu Kumar Sah	Solar Vehicle	Mr.Rahul Malviya	PO1,PO2,PO9, PO12
	0177EX161020	Anuj Kumar Upadhyay			
	0177EX161055	Majid Ali			
	0177EX161089	Rana Kumar			
	0177EX161035	Bikash Kumar			
	0177EX161047	Indal Kumar Ravi			
2	0177EX161091	Ravi Pratap Singh	GSM Based Home Appliance	Mr.Ajit Kumar Mishra	PO1, PO2, PO3, PO6, PO9,PO12
	0177EX161087	Raja Babu			
3	0177EX161015	Amit Kumar Ranjan	Speedometer	Mr. Saurabh Mishra	PO1, PO2, PO3, PO6, PO9,PO12
	0177EX161036	Bikram Kumar Jha			
	0177EX161022	Anwar Husain			
	0177EX161060	Md Khursheed Alam			
	0177EX161026	Arshad Hussain			

4	0177EX161017	Anand Kumar Singh	Electrical Vehicle in India	Mr.Sandeep Pandey	PO2, PO3, PO4, PO5, PO6, PO9,PO12
	0177EX161090	Ravi Prakash Nagar			
	0177EX161021	Anup Kumar Singh			
	0177EX161031	Ashutosh Verma			
5	0177EX161076	Nilesh Singh	Thyristor Used Cycloconvertor	Mr. Shyam K. Chandani	PO2, PO3, PO4, PO5, PO6, PO9,PO12
	0177EX161092	Sachin Kumar			
	0177EX161062	Md Nafish Alam			
	0177EX161119	Vishwjeet Kumar			
	0177EX161109	Tanay Gupta			

Table: 2.15 Major Projects (2019-20)

IES College of Technology, Bhopal(0177)					
Department of Electrical & Electronics Engineering					
EX 8th SEM Major Project Session June 2018-19					
Major Project				**BATCH: 2015-19**	**2019-2020**
Group No	**Roll No.**	**Group Member**	**Project Name**	**Project Guide**	**Pos-**
1	0177EX151007	Ajay Kumar Saket	PC Based Electric Load Control	Ms.Poonam Khatarkar	1,2,3,4,5,7,9,10,11, 12
	0177EX151021	Arjun Kumar Ray			
	0177EX151044	Gaurav Anand			
	0177EX151016	Anshu Kumari			
2	0177EX151013	Amit Kumar Singh	Smart Helmet	Mr.Kumar Prabhakar	1,2,3,4,5,6,9,11,12
	0177EX151033	Brijesh Rajpoot			
	0177EX151005	Abhishek Kumar			
	0177EX151018	Anurag Kumar Singh			
2	0177EX151022	Arvind Kumar Kushwaha	Bidirectional Speed Control DC Motor	Dr. B.M Gupta	1,2,3,4,5,10,11,12
	0177EX151089	Prince Kumar Yadav			
	0177EX151102	Subhas Kumar			
4	0177EX151004	Abhimanyu Kumar	Auto Phase selection for single phase load from three phase supply	Mr.Vijay K Singore	1,2,3,4,5,10,11,12
	0177EX151041	Dhirendra kumar			
	0177EX151012	Amit Kumar Saini			
	0177EX151057	Krishna kant singh			
	0177EX151059	Manish Kumar			

5	0177EX151052	Junaid Quamar	Fingerprint based Voting machine using AT mega328p Microcontroller	Mr.Manish Agrawal	1,2,3,4,5,6,8,9,10,11,12
	0177EX151043	Faizan Ali			
	0177EX151076	Mukul Kumar			
	0177EX151108	Shamik Mishra			
	0177EX151072	Md. Abrar Ali			

Table: 2.16 Major Projects (2018-19)

IES College of Technology, Bhopal					
EX 8th SEM MAJOR PROJECT					
BATCH-2014-2018					SESSION-2018-19
Group No	**Roll No**	**Group Member**	**Project Name**	**Project Guide**	**POs/PSOs**
1	0177EX141010	Mr. Gaurav Mishra	Solar Refrigerator using Peltier effect	Mr.Anant Thakur	1,2,3,4,5,6,9,11,12
	0177EX141004	Mr.Ajay Kumar			
	0177EX141006	Mr. Arun Kumar			
	0177EX141036	Mr. Swarendra Kumar			
2	0177EX141017	Mr. Manish Kumar Singh	Ultra Sonic Autonomous Breaking System	Mr. Kumar Prabhakar	1,2,3,4,5,6,9,11,12
	0177EX141037	Mr. Upnesh Kumar			
	0177EX141014	Mr. Krishnedra Kumar Yadav			
	0177EX141023	Mr. Rahul Kumar			
	0177EX141028	Mr. Ruby Singh			
3	0177EX141020	Mr. Neha Kumari	Road Power Generation	Mr. Tarun Agarwal	1,2,3,4,5,6,9,11,12
	0177EX141021	Mr. Nikhil Bhatt			
	0177EX141026	Mr. Ravi Kumar Nayak			
	0177EX141030	Mr. Santosh Kumar			
	0177EX141025	Mr. Rakesh Raman			
4	0177EX141007	Mr. Ashutosh Kumar Pandey	Wireless Stepper Motor Control	Mr. Anant Thakur	1,2,3,4,5,6,9,11,12
	0177EX141011	Mr. Gatum Kumar Thakur			
	0177EX141034	Mr. Shashank Tripathi			

Impact analysis

- The project work of the student will develop discipline and interdisciplinary skill of the students
- New innovative ideas floated by students form the basis of their projects and improved understanding.

- Knowledge on various aspects of project management and finance were developed.
- Improved individual and teamwork skills.
- Enhance skill of Implementation and application of the project for Environment and Society benefits.
- Improvement in document preparation and presentation skills.
- Design and development of the project also improved lifelong learning and ethics.

2.2.4 Initiatives related to industry interaction (15)

Industry institute interaction is effected through

A. MOUs with industries
B. Industrial visits by students
C. Guest lectures by industry experts
D. Workshops
E. Representation of industry experts in IQAC
F. Representation of industry experts in Department Academic Advisory committee (DAAC)
G. Student Project works with involvement of industry

A. MOUs with industries

To build up interaction with industries and to keep our students updated with the latest trends in their field, our Institute has signed a number of MOUs with different industries and organizations which are detailed as under:

Table: 2.17 Tie-ups / MOU'

S No	Year	Company Name
1.	April 2021	Association of All Industries
2.	February 2021	Smart City Bhopal
3.	January 2020	HLBS Tech (P) Ltd
4.	February 2020	Confederation of Indian Industry (CII)
5.	November 2020	AIC RNTU
6.	January 2019	Artech
7.	August 2018	Red Hat
8.	March 2018	BMA
9.	June 2018	NASSCOM

10.	January 2018	VASPL Initiatives P.ltd
11.	April 2017	COEP Pune
12.	December 2016	CII-Education Excellence Forum
13.	January 2016	Microsoft Innovation Centre (MIC)
14.	October 2015	CII_YI
15.	January 2011	Remote Centre Programs (IIT, Bombay)

B. Industrial visits

Industrial visits are conducted which enable students to integrate theory and practical knowledge. Industrial visit has its own importance in a career of a student who is pursuing a professional degree. It is considered as a part of college curriculum. Industrial visits provide students an insight regarding internal working of companies. We know theoretical knowledge is not enough for making a good professional career. With an aim to go beyond academics, industrial visit provides student a practical perspective on the world of work. It provides students with an opportunity to learn practically through interaction, working methods and employment practices.

Table: 2.18 Industrial visits

S. No.	Industry & place	Date	Outcome
1	CPRI,BHOPAL	19/09/2018	Student experienced the working of Transformer unit & machine section centre in general and how relate testing process on high & medium voltage switchgear, transformers and other allied equipment process is possible,
2	Rambul rubber industry, Ferrotech Engineers, Capri paints	27/01/2018	The Industrial Visit focuses on preparing the participants to learn about the day-to-day workings of a particular industry and understand its operational issues.
3	Industrial visit at Sukhi Sewaniyan Substation (400 KV)	21/02/2018	To enhance their practical knowledge towards transformers& other switchgear instruments .this visit gives practical and better understanding of subjects to students and update their knowledge.

4	Industrial Visit to Central Power Research Institute (CPRI), Bhopal	03/05/2017	Relay Applications& Testing of Electrical equipments
5	Industrial Visit to Central Power Research Institute (CPRI), Bhopal	08/03/2016	Student Visited Energy meter testing lab Calibration laboratory 1500MVA, Short circuit lab LT, HT fuses and circuit breaker.
6	IIM Ahmadabad	20/08/2015	Student visited business school and learn Entrepreneurship
7	MPKVVL, Govindpura Bhopal	30/09/2014	Student visited transformer manufacturing, Testing, substation model 33/11kv
8.	Tawa Dam power plant	06/03/2013	Student visited hydroelectric power plant, dam construction Working of turbine, generator

C. Guest lectures

The Guest lectures are organised with eminent persons from industries and reputed Institutions. They are invited for updating student's knowledge for latest developments in industry and also in their respective fields. Guest lectures are organized by industry experts who provide industry exposure to the students beyond the class room learning and curriculum

Table: 2.19 Expert lectures organized by the Department:

S. No.	Resource Person	Topics	Date	PO and PSO
1	Nikhil S Kaushik (PCRA,GOI) BHOPAL	Solar Power Plant & Inverters	13/09/2019	POs-1,2,4,5,6,10,12 PSOs – 1, 2
2	Mr Rajendra Tare (SGSITS Indore Ex professor)	Application of power Electronics	23/09/2017	POs-1,2,4,5,6,10,12 PSOs – 1, 2

3	Mr Nilesh kaushik (Consultant large corporate for automation solar and wind turbine)	Power quality and harmonics	8/02/2018	POs- 1,2,4,5,6,12 PSOs – 1, 2

Table 2.20 Professional societies/ chapters and organizing engineering events (5)

S. No.	Year	Professional societies/ chapters
1	CAY (2019-20)	IEEE, IETE, CII, VIGYAN BHARTI, NPTEL Local Chapter
2	CAY (2018-19)	IEEE, IETE, CII, VIGYAN BHARTI
3	CAY (2017-18)	IEEE, IETE, CII, VIGYAN BHARTI

Table 2.21 Expert lectures / Expert talks conducted under different Chapter including list of resource persons:

S. No.	Theme	Dates	Resource Persons	PO/PSO
1	Expert Talk: Angel Investment/ VC Funding Opportunity for Early Stage Entrepreneurs	23/05/2021	Ms. Amruta Shingvekar General Manager, VASPL Initiatives	POs- 11, 12
2.	Expert Talk:"IEEE Sight Orientation Program"	19/05/2021	Dr. Hussain F Mahdi,Lecturer, College of Engineering, University of Diyala, Iraq and Dr. Aarti Karande, Chair, IEEE Sight Bombay Pratham Chapter	POs – 1,3,4,8,9,10,12 PSOs – 1,3

3	Expert Talk"Professional In You"	14/05/2021	Mr.Ajay Tyagi, Founder CEO, Valt consulting pvt. Ltd.	POs – 1,3,4,8,9,10,12 PSOs – 1,3
4	IEEE Expert talk on “How to write an effective technical paper for the IEEE”	13/2/2021	Mr. Pratik Baheti,Vice Chair, Activity planning & management, TPAC IEEE Bombay Section	PO-1,2,4,5,10,12 PSO-1,2,3
5	IEEE CSI IETE Expert talk on “ARTIFICIAL INTELLIGENCE IN GAMING AND ROBOTICS”	12/2/2021	Dr. Surendra Raghuwanshi, Assitant Professor,Data Science ML –AI Researcher, SATI Vidisha	PO 1,2,4,5,8,9,10,11 PSO 2,3
6	Session on" Startup and Incubation”	9/1/2021	Shri Sumit Kumar Founder & CEO, Acupace Technologies Pvt. Ltd.	PO 1,4,5,8,910,11,12 PSO 2,3
7	Live National Expert talk on: “Things should know by innovators about IP”	20/01/2021	Mr. Parag M More, IPR Consultant and advisor	PO 1,2,3,5
8	Expert talk on “Entrepreneurship Activity Fund Supports Available for Incubates”.	8/1/2021	Shri Kishore Kumar Tolani Financial Literacy Counsellor Bank of India, Bhopal.	PO 1,2,9,10,11

9	Live National Webinar & Expert talk on: "Green Communication: A Futuristic Concept".	31/12/2020	Dr. Abhishek Bhatt Dept. of E & TC, College of Engineering Pune, Pune.	Po 1,6,7 PSO 1,2,3
10	Expert talk on "Know Your IEEE: Activity & advantages" Live National Webinar Organized by: IES IEEE STUDENT BRANCH	29/12/2020	Shri Saurabh J. Soni Secretary IEEE Bombay Section CS Chapter	PO-1,2,4,5,10,12 PSO-1,2,3
11	Expert talk on Writing and publishing scientific research paper in SCI Journals-A Frame work	02-11-2020	Dr. P Pal Pandian, Professor, Christ University, Bhopal	PO-1,2,4,5,10,12 PSO-1,2,3
12	Expert talk on Importance of motivation in present scenario	20-07-2020	Prof. Ajeet Angral, Consultant PMSSS J &K	PO 5,6,7,12 PSO 2,3
13	Expert Lecture on " Transmission& Distribution of Electrical Energy"	21-01-2020	Dr. A.M. Shandilya, Rtd. Prof., EE Dept., MANIT Bhopal	PO 1,6,7,12 PSO 2,3
14	In-house Training on Arduino System	19-30/12/2019	Mr. Abhigyanam Giri IndEyes Infotech Pvt Ltd.	PO 1,2,3,5,7,8,11,12 PSO 2,3
15	In-house Training on Embedded System	2-14/6/2018	Mr. Abhigyanam Giri IndEyes Infotech Pvt Ltd.	PO 1,2,3,4,5,12 PSo 2,3
16	Workshop on " Emotional Intelligence"	17-18/04/2018	Shri Vinay Partale, AICTE	Po 12 PSo
17	Expert lecture on "Signal and System"	4-02-2018	Mr. Rakesh Talrega, GATE 9th Rankers	PO 1,2,3,5,8 PSO 1,2

18	Workshop on PCB Designing and Robotics	15 to 26/11/2017	Mr. Abhigyanam Giri Ind Eyes Pvt. Ltd. Bhopal	PO 1,2,3,4,5,12 PSO 2,3

Fig. 2.4 Expert Lectures on solar power plant and inverter by Nikhil S Kaushik (PCRA, GOI) BHOPAL @ IES College of Technology Bhopal

D. Workshops:

Several workshops are conducted to improvise students in different aspects such as

- Workshops on Entrepreneurship development skills.
- Workshop on PCB Design, Robotics, Go cart etc.
- Workshops on recent ongoing Engineering related topics

Table 2.22 Following Webinar & Workshop have been conducted

S. No.	Organized event under society	Place of Activity	Level of event	Duration/ Days of Activity	Outcome of Program
1	Webinar Students Dilemma: Employment or Entrepreneurship? Live National Webinar	ICOT Bhopal	College Level	15/02/2021	PO7,PO9,PO12
2	Webinar Organization Readiness to Re-skills and Up-skills Campus Talent	ICOT Bhopal	College level	8/11/2020	PO1,PO2PO9,PO12
3	Workshop on IOT and machine learning with its applications	UIT RGPV Bhopal	State level	27-28/03/2019	PO1,PO8,PO9,PO10
4	Solar Lamp Workshop	MANIT	National	02/10/2019	PO2, PO3, PO12
5	Job Opportunities in post Covid-19 Scenario and Challenges thereafter	ICOT Bhopal	National	20/06/2020	PO3,PO6,PO9,PO12
6	Transformation in education Challenges & Opportunities in post covid 19	ICOT Bhopal	National	18/06/ 2020	PO4,PO7,PO11,PO12
7	Innovation of effective teaching	ICOT Bhopal	College level	17/02/2020	PO2,PO8,PO10

	and research methodology				
8	TEQIIP Workshop Placement Prepration	ICOT Bhopal	College level	06-07/09/2019	PO3,PO8,PO9,PO12
9	Session on international study on UK & US	ICOT Bhopal	College level	19-20/08/2019	PO 6,PO8,PO7,PO12
10	Workshop on Python	ICOT Bhopal	College level	22/6/2019	PO 2,PO4,PO6,PO12
11	Emotional intelligence	ICOT Bhopal	College level	17-18/04/2018	PO1,PO5,PO6,PO7
12	Entrepreneurship Awareness training	ICOT Bhopal	College level	11-13/01/2018	PO1,PO5,PO11,PO12

Fig. 2.5 Industrial Visit of BSNL (Bharat Sanchar Nigam Ltd.) & PDTC (Power Distribution Training Centre) Bhopal

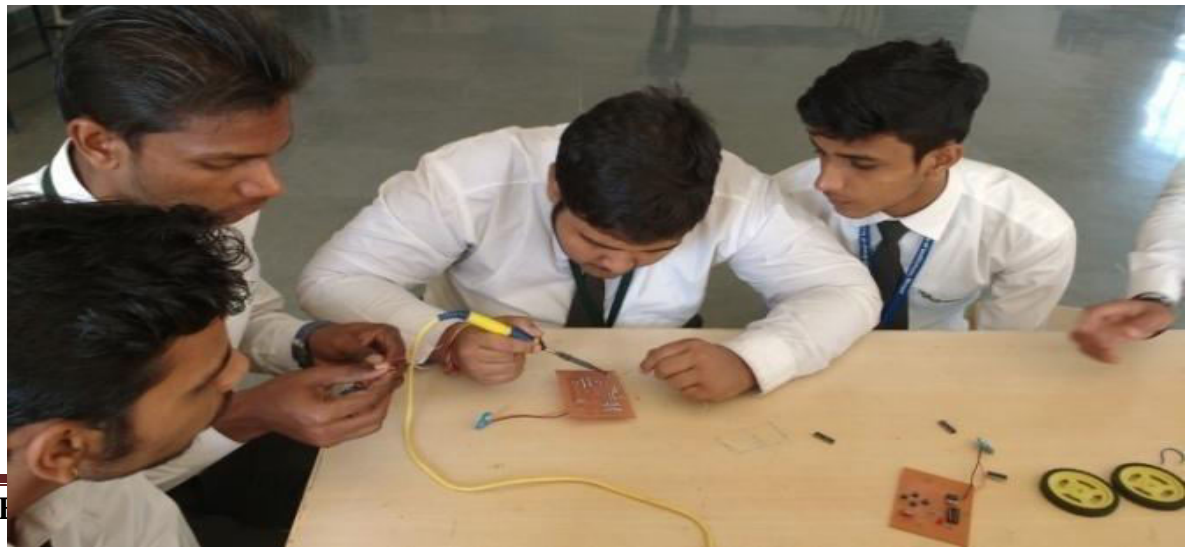


Fig. 2.5 PCB Design Training Session @ IES College of Technology

Fig. 2.6 Industrial Visit of CPRI (Central Power Research Institute) & CRISP Bhopal

Impact analysis of Initiatives related to industry interaction

- New innovative ideas from students form the basis of some projects.
- Students gained from this exposure to incorporate an entrepreneurial spirit and project based thinking.

- Skills or abilities of students improved.
- Knowledge on various aspects of project management was developed.
- Confidence level of the students was boosted.
- Improved teamwork spirit.
- Implementation and deployment of the project for social benefits.
- Document preparation and presentation.
- Opportunities to showcase their project work in project exhibition.
- Students picked up what they learnt at the workshops to implement their own mini project and also final year projects.

2.2.5 Initiatives related to industry internship/summer training (15)

A. Industry supported Laboratories

Institute has tie-ups/ MOUs with different industries as mentioned in section 2.2.4 for training/visits/ workshops etc. The Electrical and Electronics engineering department has supported laboratories with the following industries:

1. Red-Hat

2. IIT Bombay

3. Indeyes Pvt. Ltd. Bhopal

B. Industrial training / summer training

Provided to the students after 4th and 6th Semester helps the student's in gaining knowledge. It also allows them to gain practical knowledge, to work on real world problem and develops confidence in them. The students are encouraged to take up internship programs during their semester break. Faculty members give their guidance, suggestions scope and contact details for an internship. Department helps the students by interacting with the industry experts, provides recommendation letters and other necessary supports. The alumni coordinator constantly interacts with those alumni who are working in the industries and request them to provide necessary guidelines and supports to their junior. The internship is the one of the process to develop domain specified and domain independent skill of program outcomes. The internship is play major role to overcome the gap between curriculum and industry needs.

This will enable the students

- To gain hands-on experience in implementing whatever they have learnt in their curriculum.
- To train themselves on the state of the art equipments and standards used by the industries.
- To present themselves as complete professionals when they go for placements.

Table: 2.23 Curriculum based Industrial Training:

S. No.	Academic Year	Industry / Institute	From	To
1	2019-20	Abyssal Pearl Info web Pvt. Ltd., Bhopal	17.06.2019	01.07.2019
2	2019-20	MATLAB training ZSS International (FZ Industrial training)	03.06.2020	03.07.2020
3	2019-20	Sofcon India Pvt. Ltd.	01.07.2019	30.07.2019
4	2019-20	Technical Training Centre, Diesel Locomotive Works, Varanasi	20.03.2020	10.04.2020
5	2019-20	MATLAB training ZSS International (FZ Industrial training	1.06.2019	15.06.2019
6	2019-20	CRISP, Bhopal	18.06.2018	05.07.2017
7	2019-20	SOFCON, Bhopal	09.07.2019	09.08.2019
8	2019-20	Skyfi Labs	01.07.2019	30.07.2019
9	2019-20	INDEYES, Bhopal	25.05.2019	10.06.2019
10	2019-20	SOFCON, Bhopal	01.01.2019	15.01.2019

11	2019-20	INDEYES, Bhopal	29.12.2018	13.01.2019
12	2018-19	INDEYES, Bhopal	25.12.2018	03.01.2019
13	2018-19	INTERNSHALA Trainings	16.08.2018	27.09.2018
14	2018-19	Abyssal Pearl Infowel Pvt ltd	10.08.2018	10.09.2018
15	2018-19	NSDC National Skill Development Corporation	01.08.2018	30.08.2018
16	2018-19	BHEL Bhopal	16.07.2018	28.07.2018
17	2019-20	RamaSoft IT Training Centre, Bhopal	15.07.2018	30.09.2018
18	2018-19	BHEL, Bhopal	05.07.2018	18.07.2018
19	2018-19	CRISP Bhopal	19.06.2018	09.07.2018
20	2018-19	SOFTCON, Bhopal	15.06.2018	15.07.2018
21	2018-19	Indian Railway Technical Training Centre Varanasi-221004	14.06.2018	11.07.2018
22	2018-19	Purvanchal Vidhyut Vitran Nigam ltd Ghazipur	01.06.2018	30.06.2018
23	2018-19	Geeta Info System software and education service Bhopal	01.06.2018	01.07.2018
24	2018-19	FZ Industrial Training Bhopal	01.06.2018	30.06.2018

Impact Analysis of Initiatives related to industry internship/summer training

- Students are exposed to real time practical experience of the concepts studied in the classrooms and realized the practical importance of the subjects.
- Industrial visit creates more interest in the subjects.
- Students are inspired to do hard work and get placed in such industries.
- Students were exposed to the industry standards and workplace culture.
- Students learn professional and ethical behaviour
- Students can correlate the theoretical knowledge and its practical implementation

D. Student feedback on initiative

Students going for internships are instructed before going to prepare a detailed report on the training and submit it to the HOD after completion of the training also Department organises a presentation of all the students where each and every student gives a power point presentation on the internship. The students are asked to fill feedback forms also for the same.

CRITERION 3	Course Outcomes and Program Outcomes	120

3. Course Outcomes and Program Outcomes

3.1. Establish the correlation between the courses and the Program Outcomes (POs) and Program Specific Outcomes (PSOs) (20)

A. Program Outcomes (POs)

Engineering Graduates will be able to:

PO1: Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

PO2: Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

PO3:Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

PO4:Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

PO5:Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.

PO6: The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

PO7: Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

PO8: Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

PO9: Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

PO10: Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

PO11: Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

PO12: Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

B. Program Specific Outcomes (PSOs) :

The graduates of the department will attain:

PSO 1: Apply Mathematics, transformation methods, simulation tools etc. to solve practical problems in the field of Electrical / ElectronicCircuits and Networks.

PSO2: Analyze and design Electronic devices, Control System, Instrumentation and Power System by using mathematics and simulation techniques and implement in Power Electronics Drives and Electrical Machines.

PSO3: Design and develop cost effective and appropriate system engineering solutions applying the software and hardware tools with consideration for safety, environment and society.

3.1.1. Course Outcomes (COs) (SAR should include course outcomes of one course from each semester of study, however, should be prepared for all courses and made available as evidence, if asked) (05)

Table 3.1 Course Outcomes (COs)

Subject & Code	BE 3rd Semester
EX-3002 Electrical Measurements and Measuring Instrumentation	**Students will be able to:** **C3002.1:** Analyze the measuring instruments, their construction, operation and characteristics. **C3002.2:** Demonstrate the concepts of instruments for measurement of voltage and current. **C3002.3:** Examine the suitable method for measurement of power using of CT & PT. **C3002.4:** Classify suitable methods for measurement of resistance, inductance and capacitance. **C3002.5**: Analyze the B H curve and hysteresis loop in a magnetic circuit.
Subject & Code	**BE 4thSemester**
EX-4002 Electrical Machine-I	**Students will be able to:** **C4002.1**: Demonstrate the construction and their parameters of single and three phase transformers **C4002.2:** Analyze the inter connections and vector grouping of 3 phase transformer **C4002.3:** Illustrate the working principle, equivalent circuit and the characteristic of the three phase induction motor **C4002.4:** Apply the concept of Starting, controlling and braking in single and three phase induction motor **C4002.5**: Evaluate the performance of servo motors, single phase and linear induction motor.
Subject & Code	**BE 5thSemester**
EX-5002 Electrical Machine-II	**Students will be able to:** **C5002.1:** Demonstrate the construction and working principle of DC and synchronous machine. **C5002.2:** Analyze the effect of armature reaction and the process of commutation. **C5002.3:** Apply voltage regulation parallel operation of alternators to electrical machine **C5002.4:** Classify the two reaction theory and synchronization of the synchronous machine. **C5002.5:** Determine the different parameter of three phase of V & inverted V curve.
Subject & Code	**BE 6th Semester**
EX 6002 Power System-II	**Students will be able to:** **C6002.1:** Analyze problems associated with modern interconnected power Systems, transfer capacities and pricing of energy. **C6002.2:** Develop appropriate mathematical models for load flow issues. **C6002.3:** Classify the faults in MW Frequency control **C6002.4:** Demonstrate the concept MVAR Voltage control.

	Analyze the method of improving transient stability by using Eulers method and RungaKutta method.
Subject & Code	**BE 7th Semester**
EX 7002 Electric Drives	**Students will be able to:** **C7002.1**: Examine various applications of Electric drives. **C7002.2:** Classify types of electric drives systems. **C7002.3**:Test the concepts of electrical machines with electric drives **C7002.4:** Classify types of motor drive for efficient conversion and control of electric power. **C7002.5**: Analysis the performance and speed control characteristics of three phase induction motor.
Subject & Code	**BE 8th Semester**
EX-8002 Power quality Problems and mitigation Techniques	**Students will be able to:** **C8002.1:** Demonstrate concepts and basic principles of power quality. **C8002.2:** Identify the causes of power quality problems and relate them to equipment. **C8002.3:** Classify the solutions of problems in power quality. **C8002.4:** Estimate the voltage sag performance and able to monitoring the sags. **C8002.5:** Analyze the harmonics distortion and controlling of harmonics.

3.1.2. CO-PO matrices of courses selected in 3.1.1 (six matrices to be mentioned; one per semester from 3rd to 8th semester) (05)

- **CO-PO matrices of courses**

Academic Year 2016-2020: CO-PO Mapping

Table 3.2 Academic Year 2016-2020: CO-PO Mapping

Subject & Code	BE 3rd Semester
EX-3002 Electrical Measurements and Measuring Instrumentation	**Students will be able to:** **C3002.1:** Analyze the measuring instruments, their construction, operation and characteristics. **C3002.2:** Demonstrate the concepts of instruments for measurement of voltage and current. **C3002.3:** Examine the suitable method for measurement of power using of CT & PT. **C3002.4:** Classify suitable methods for measurement of resistance, inductance and capacitance. **C3002.5**: Analyze the B H curve and hysteresis loop in a magnetic circuit.

COS	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
C3002.1	3	1	1	1	2	-	-	-	-	-	-	2
C3002.2	3	1	1	-	2	-	-	-	-	-	-	1
C3002.3	2	1	1	-	-	-	-	-	-	-	1	1
C3002.4	2	1	1	-	-	-	-	-	-	-	1	1
C3002.5	2	1	-	-	-	-	-	-	-	-	-	-
Sum	**12**	**5**	**4**	**1**	**4**	**-**	**-**	**-**	**-**	**-**	**2**	**5**
Average	**2.4**	**1**	**1**	**1**	**2**	**-**	**-**	**-**	**-**	**-**	**1**	**1.25**

Subject & Code	BE 4th Semester
EX-4002 Electrical Machine-I	**Students will be able to:** **C4002.1**: Demonstrate the construction and their parameters of single and three phase transformers **C4002.2:** Analyze the inter connections and vector grouping of 3 phase transformer **C4002.3:** Illustrate the working principle, equivalent circuit and the characteristic of the three phase induction motor **C4002.4:** Apply the concept of Starting, controlling and braking in single and three phase induction motor **C4002.5**: Evaluate the performance of servo motors, single phase and linear induction motor.

COS	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
C4002.1	3	1	-	-	-	-	-	-	-	-	-	1
C4002.2	2	2	-	-	-	-	-	-	-	-	-	
C4002.3	3	1	-	-	-	-	-	-	-	-	-	1
C4002.4	3	2	-	-	-	-	-	-	-	-	-	
C4002.5	3	1	-	-	-	-	-	-	-	-	-	
Sum	14	7	-	-	-	-	-	-	-	-	-	2
Average	2.8	1.4	-	-	-	-	-	-	-	-	-	1

Subject & Code	BE 5th Semester
EX-5002 Electrical Machine-II	**Students will be able to:** **C5002.1:** Demonstrate the construction and working principle of DC and synchronous machine. **C5002.2:** Analyze the effect of armature reaction and the process of commutation. **C5002.3:** Apply voltage regulation parallel operation of alternators to electrical machine **C5002.4:** Classify the two reaction theory and synchronization of the synchronous machine. **C5002.5:** Determine the different parameter of three phase of V & inverted V curve.

COS	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
C5002.1	2	-	2	-	-	2	-	-	-	-	-	1

C5002.2	**2**	**-**	**-**	**-**	**-**	**2**	**-**	**-**	**-**	**-**	**-**	**1**
C5002.3	**2**	**-**	**1**	**-**	**-**	**1**	**-**	**-**	**-**	**-**	**-**	**1**
C5002.4	**2**	**-**	**-**	**-**	**-**	**1**	**-**	**-**	**-**	**-**	**-**	**1**
C5002.5	**2**	**-**	**-**	**-**	**-**	**2**	**-**	**-**	**-**	**-**	**-**	**1**
Sum	**10**	**-**	**3**	**-**	**-**	**8**	**-**	**-**	**-**	**-**	**-**	**5**
Average	**2**	**-**	**1.5**	**-**	**-**	**1.6**	**-**	**-**	**-**	**-**	**-**	**1**

Subject & Code	**BE 6th Semester**
EX 6002 **Power System-II**	**Students will be able to:** **C6002.1:** Analyze problems associated with modern interconnected power Systems, transfer capacities and pricing of energy. **C6002.2:** Develop appropriate mathematical models for load flow issues. **C6002.3:** Classify the faults in MW Frequency control **C6002.4:** Demonstrate the concept MVAR Voltage control. Analyze the method of improving transient stability by using Eulers method and RungaKutta method.

COS	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
C6002.1	**3**	**3**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**1**
C6002.2	**2**	**2**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**1**
C6002.3	**3**	**3**		**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**1**

C6002.4	**3**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**1**
C6002.5	**3**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**1**
Sum	**14**	**10**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**5**
Average	**2.8**	**2.5**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**1**

Subject & Code	**BE 7th Semester**
EX 7002 **Electric Drives**	**Students will be able to:** **C7002.1**: Examine various applications of Electric drives. **C7002.2:** Classify types of electric drives systems. **C7002.3**:Test the concepts of electrical machines with electric drives **C7002.4:** Classify types of motor drive for efficient conversion and control of electric power. **C7002.5**: Analysis the performance and speed control characteristics of three phase induction motor.

COS	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
C7002.1	**3**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**1**
C7002.2	**3**	**1**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**1**
C7002.3	**3**	**1**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**1**
C7002.4	**3**	**-**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**1**
C7002.5	**3**	**-**	**1**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**1**
Sum	**15**	**2**	**3**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**5**

Average	**3**	**1**	**1.5**	**.**	**.**	**.**	**.**	**.**	**.**	**.**	**.**	**1**

Subject & Code	BE 8th Semester
EX-8002 Power quality Problems and mitigation Techniques	**Students will be able to:** **C8002.1:** Demonstrate concepts and basic principles of power quality. **C8002.2:** Identify the causes of power quality problems and relate them to equipment. **C8002.3:** Classify the solutions of problems in power quality. **C8002.4:** Estimate the voltage sag performance and able to monitoring the sags. **C8002.5:** Analyze the harmonics distortion and controlling of harmonics.

COS	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
C8002.1	**3**		**1**	**2**	**-**	**2**	**-**	**-**	**-**	**-**	**-**	**1**
C8002.2	**3**	**2**	**2**	**2**	**-**	**2**	**-**	**-**	**-**	**-**	**-**	**1**
C8002.3	**2**	**3**	**1**	**2**	**-**	**2**	**-**	**-**	**-**	**-**	**-**	**1**
C8002.4	**3**	**2**	**2**	**2**	**-**	**2**	**-**	**-**	**-**	**-**	**-**	**1**
C8002.5	**3**	**2**	**2**	**2**	**-**	**2**	**-**	**-**	**-**	**-**	**-**	**1**
Sum	**14**	**9**	**8**	**10**	**-**	**10**	**.**	**.**	**.**	**.**	**.**	**5**
Average	**2.8**	**2.3**	**1.6**	**2**	**-**	**2**	**.**	**.**	**.**	**.**	**.**	**1**

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High)

B. CO-PSOs matrices of courses selected in 3.1.1 (six matrices to be mentioned; one per semester from 3rd to 8th semester)

CO-PSO MAPPING (2016-2020)

Table 3.3: Academic Year 2016-2020: CO-PSO Mapping

Subject Name /Code	COs	PSO1	PSO2	PSO3
EX-3002 Electrical Measurements and Measuring Instrumentation	C3002.1	2	1	-
	C3002.2	3	1	-
	C3002.3	2	2	-
	C3002.4	3	1	-
	C3002.5	2	1	-
Sum		12	6	-
Average		2.4	1.2	-

Subject Name /Code	COs	PSO1	PSO2	PSO3
EX-4002 Electrical Machine-I	C4002.1	2	1	-
	C4002.2	3	1	-
	C4002.3	2	2	-
	C4002.4	2	1	-

	C4002.5	2	1	-
Sum		11	6	-
Average		2.2	1.2	-

Subject Name /Code	PSO1	PSO2	PSO3
EX-5002 Electrical Machine-II	1	2	-
	1	2	1
	2	1	2
	1	2	1
	1	2	1
Sum	6	9	5
Average	1.2	1.8	1.25

Subject Name /Code	PSO1	PSO2	PSO3
EX 6002 Power System-II	2	3	-
	3	2	-
	2	3	-
	2	1	-

	3	2	-
Sum	12	11	-
Average	2.4	2.2	-

Subject Name /Code	PSO1	PSO2	PSO3
EX 7002 Electric Drives	3	2	-
	2	2	-
	3	2	-
	2	2	-
	3	2	-
Sum	13	10	-
Average	2.6	2	-

Subject Name /Code	PSO1	PSO2	PSO3
EX-8002 Power quality Problems and	2	2	-
	2	3	2
	2	2	2
	3	2	2
	2	2	-

Sum	**11**	**11**	**6**
Average	**2.2**	**2.2**	**2**

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High)

3.1.3 Program level course-PO matrix of all courses including first year courses (10)

Table 3.4: Academic Year 2016-2020: CO-PO Mapping Average

IES COLLEGE OF TECHNOLOGY BHOPAL													
DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING													
CO-PO MAPPING AVERAGE SHEET(Batch 2016-20)													
SEM.	Subject code	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
I	MA 110	1.2	1.8	3	1	-	1	1	-	-	-	1	1
	CE110	2.2	2.2	-	-	-	1.6	1	-	-	-	-	1.25
	ME 111	2.4	2	-	-	-	1	1	-	-	-	-	1.5
	PH110	1.4	1	-	-	1	-	-	-	1.1	-	-	1.1
	HU110	2.4	1.8	-	-	-	1	-	-	1	-	-	1.3
	ML110P	2.4	1.8	-	-	-	1	-	-	1	-	-	1.3
	EE110P	2.2	2	-	-	1	1	-	-	1.5	-	-	-
	HU111P	2.4	1.8	-	-	-	1	-	-	1	-	-	1.3
II	EC111	2.2	1.5	3	-	1	1	-	-	1.5	-	-	1
	ME112	2	1.4	-	-	1	1	-	-	1.5	-	-	1
	CY110	2.4	2.1	-	-	1	1	-	-	1.5	-	-	1
	ME113P	2.2	2.2	3	-	1	1	-	-	1.5	-	-	1
	CS110 P	2	2.4	3	-	1	1	-	-	1.5	-	-	1
	HU112P	2.6	2.8	1	-	-	1	1	1.3	1.8	1.5	-	1
	MA111	1.6	2.4	-	-	-	-	-	-	-	-	-	1
	ME114	1.5	1.5	2.6	1	1	1.25	1	-	1.1	1	-	1.2
III	BE 3001T	2.8	1	2	-	1	-	-	-	-	-	-	1
	EX3002	2.6	1	1	1	1.6	-	-	-	1	-	1	1.5
	EX3003	2.3	1.9	2.3	1	1	1	-	-	1.3	-		1.1
	EX3004	2.4	1.1	1.75	-	-	-	-	-	1.2	-	-	1.1
	EX3005T	2	2.2	-	-	1	-	-	-	-	-	-	1
	EX3006P	2	1.3	1	-	1.2	-	-	-	-	-	-	1.4
	EX3007P	2.6	2.8	1	-	-	1	1	1.3	1.8	1.5	-	1
	EX3008P	1	3	-	-	1	-	-	-	1	-	-	1
IV	ES3001	1.8	1.3	1	-	-	1.2	2	1	-	-	-	1
	EX 4002	2.8	1.2	-	-	-	-	-	-	1	-	-	1
	EX4003	2.5	2	1.75	-	-	-	-	-	1	-	-	1

	EX4004	2.8	1.5	1.33	-	2	-	-	-	1	-	-	1
	EX4005	2.6	1.6	2	-	-	-	-	-	-	-	-	-
	EX4006P	2.2	2	2	-	1	-	-	-	-	-	-	1.2
	EX4007	1	2	3	-	1.3	-	-	-	-	-	-	2
	EX 4008	1	-	-	-	1	1.25	1	2.6	1.6	1	1	1.2
V	EX 5001T	2	-	1.8	1	-	1	-	-	-	-	-	1
	EX 5002	2	-	1.5	1	-	1.3	-	-	-	-	-	1
	EX 5003	2	2	1.9	1	-	1	-	-	-	-	2	1
	EX 5004	2	2	1.8	1	-	1	-	-	-	-	-	1
	EX 5005	2	-	1.8	1	-	1	-	-	-	-	-	1
	EX 5006P	2	2	1.8	1	-	1	-	2	-	2	-	1
	EX 5007P	2	-	1.8	1	-	1	-	2	-	2.2	2	1
	EX 5008P	2	2	-	-	-	-	-	-	2	-	-	1
VI	EX 6001	2.8	1.75	2	-	-	-	-	-	-	-	-	1
	EX 6002	2.6	2	1.83	-	1.2	-	-	-	1	-	-	1
	EX 6003	2.7	2	2	-	1	-	-	-	1	-	-	1
	EX 6004	1.9	1.95	0.2	-	1	2	-	-	1	-	-	1
	EX 6005	2.4	2.5	3	2	-	2	2	-	-	-	-	1
	EX 6006P	2.2	2	2.25	-	1	2	-	-	-	1	-	1
	EX 6007	3	2	1.5	-	-	-	-	-	-	-	1.2	1
	EX 6008	1.2	1.6	2	1.5	1	1	1	1.25	1.5	1.5	1	1.6
VII	EX 7001	2.7	1.5	1.67	-	2	-	-	-	1	-	-	1
	EX 7002	3	1	1.5	-	-	-	-	-	-	-	-	1
	EX 7003	2.5	1.5	2.4	-	1.5	2	-	-	-	-	-	1
	EX 7004	3	2	-	-	-	2	-	-	-	-	-	1
	EX 7005	3	2	-	-	-	-	-	-	-	-	-	1
	7006P	2.6	2.6	3	-	1.5	-	-	-	1	-	-	1.5
	EX 7007	1.6	2.4	1	1	1	1	1.3	1.75	1	1.25	1.4	1.6
VIII	EX 8001	2.9	1.75	2.2	-	1.4	2	-	-	1	-	-	1
	EX 8002	2.9	2.03	1.6	2	-	1.8	-	-	2	-	-	1
	EX 8003	3	1.3	2	-	-	2	-	-	-	-	-	1
	EX 8004	3	1.5	2	-	-	-	-	-	-	-	-	1
	EX 8005P	2	-	2.4	-	-	2	-	1	2.4	2.6	2.4	1.6
	EX 8006P	1	2	1.6	-	-	-	-	-	2.2	-	-	1
	EX 8007P	1	1.6	-	1.6	-	1	-	1	2	2	-	1

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High)

Program level course-PSOs matrix of all courses including first year courses

Table 3.4: Academic Year 2016-2020: CO-PSO Mapping Average

IES COLLEGE OF TECHNOLOGY BHOPAL				
DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING				
PSO MAPPING AVERAGE SHEET(Batch 2016-2020)				
SEMESTER	**Subject code**	**PSO1**	**PSO2**	**PSO3**
I	MA 110	1.2	1	1
	CE110	1.1	1	1
	ME 111	1	1	1
	PH110	1	1	1
	HU110	1.1	1	1.2
	ML110P	1	1	1
	EE110P	1.6	1.2	1
	HU111P	1	1	1
II	EC111	1.6	1	1
	ME112	1.6	1	1
	CY110	1	-	1
	ME113P	1.6	1	1
	CS110 P	1.4	1	1
	HU112P	1	2	1
	MA111	1	1	1
	ME114	1	1	1
III	EX 3001T	2.4	1.2	-
	EX 3002	2.4	1.2	1.6
	EX 3003	2	1.2	1.4
	EX 3004	2	1.2	1.7
	EX 3005T	2.4	1.2	-
	EX 3006P	2	1.2	1.4
	EX 3007P	1.2	1	1
	EX 3008P	1.2	1	1
IV	ES3001	2.2	1.2	1
	EX 4002	2.2	1.2	1.4
	EX 4003	2.2	1.2	1.4
	EX 4004	2.4	1.2	1.4
	EX 4005	2.4	1.4	-
	EX 4006P	2.2	1.2	1.4
	EX 4007	1.3	1.5	1.5

	EX 4008	1	1	1
V	EX 5001T	1	2.2	1.5
	EX 5002	1.3	1.9	1.125
	EX 5003	2	1.7	1.3
	EX 5004	1.5	2	1.2
	EX 5005	1.8	1.6	1.2
	EX 5006P	1.8	1.4	1.2
	EX 5007P	1.4	1.25	1.2
	EX 5008P	1.6	1.7	1
VI	EX 6001	2.2	2.4	2
	EX 6002	2.4	2.1	3
	EX 6003	2.3	2	1.7
	EX 6004	2	2	1.6
	EX 6005	2.2	2.4	1.4
	EX 6006P	2.2	2.6	1
	EX 6007	2	2.2	1
	EX 6008	1	1	1.7
VII	EX 7001	2	2.4	1.3
	EX 7002	2.6	2	2
	EX 7003	1.7	2	1.8
	EX 7004	2	2	1.6
	EX 7005	2.2	1.6	1
	EX 7006P	2.6	1.8	1
	EX 7007	1.8	1.4	1
VIII	EX 8001	2.1	2.1	2.3
	EX 8002	2.1	2.1	2
	EX 8003	2.2	2	-
	EX 8004	2	2.6	2.6
	EX 8005P	1.7	2.2	2.5
	EX 8006P	1	1	1
	EX 8007P	1	1.5	1

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High)

3.2 Attainment of Course Outcomes (50)

3.2.1 Describe the assessment processes used to gather the data upon which the evaluation of Course Outcome is based (10)

In the Outcome Based Education (OBE) assessment is done through one or more processes (carried out by the institution) that identify, collect, and prepare data to evaluate the achievement of course outcomes (CO's).

Course Outcomes (CO's) Assessment Processes:-

Evaluation Tool as per University Examination:

Evaluation Components (Grading System)*

Table 3.5: Evaluation Components (Grading System)

S. No	COMPONENT	MARKS	
I	INTERNAL ASSESSMENTS		30
1	Mid Semester Tests	20	
2	Quiz/ Assignment	10	
II	END SEMESTER EXAMINATION		70
TOTAL			100

Table 3.6: Evaluation Components (CBCS)*

S. No	COMPONENT	MARKS	
I	INTERNAL ASSESSMENTS		40
1	Mid Semester Test	30	
2	Quiz/ Assignment	10	
II	END SEMESTER EXAMINATION		60
TOTAL			100

Table 3.7: Evaluation Components (CBGS)*

S. No	COMPONENT	MARKS	
I	INTERNAL ASSESSMENTS		30
1	Mid Semester Test	20	
2	Quiz/ Assignment	10	
II	END SEMESTER EXAMINATION		70
TOTAL			100

Assessment tools are categorized into two methods to assess the course outcomes as:

Direct methods and indirect methods:

Formative and Summative assessments are used for evaluation of the internal and external marks in a theory and practical subjects, based on Mid Semester examination, unit tests, assignments, seminar, group discussions, self study , tutorials, internal viva and end semester exams. Students are awarded internal and external marks on the basis of the performance in the above-noted criteria. Projects and internal reviews are conducted and evaluated for judging the level of student's standard.

To know the learning status of the students, assignments are given. At the end of the semester examinations are conducted by the affiliated University- RGPV Bhopal.

A. Direct Assessment Methods

Table 3.8: Direct Assessment Methods

S.No	Assessment Processes	Method Description
1.	Internal Assessment Test, Assignments ,Quizzes, Internal Viva	Formative and summative assessment are used for evaluation of the internal and external marks in a theory and practical subjects, based on Mid Semester examination, unit tests assignments, seminar, group discussion, self study and tutorials generally conducted in between and completion of course. An improvement test is conducted for those students who score very less marks in internal assessments before the end of the semester to

		give an opportunity to such students to improve their internal Assessment Marks. It is a metric to continuously assess the attainment of course outcomes. Average of the two Mid Semester marks, assignment marks and tutorials are taken as Internal Assessment Marks for the relevant subject.
2.	Theory / Practical Semester Examination.	Semester examinations are conducted by the affiliating University RGPV Bhopal and the metric to assess whether all the course outcomes are attained or not are framed by the course owner. Semester Examination is more focused on attainment of course outcomes and uses descriptive exam pattern
3.	Seminar, Presentations, Project assessment	The Internal Assessment marks of projects and seminars in the final year are based on the evaluation at the end of 8th semester by a committee consisting of Head of the concerned Department and two senior faculty members of the Department, one of whom is the project / seminar guide.
4.	Project Work Viva-voice	Viva-voice examination of project work is conducted batch-wise.

B. Indirect Assessment Methods

In indirect assessment methods ask the stack holders to reflect own learning. They assess the opinions or thoughts about the graduate's knowledge or skills and their valued by different stakeholders.

Table 3.9: Indirect Assessment Methods

S. No	Indirect Assessment Method	Method Description
1	Alumni: Survey Questionnaire	Collect variety of information about program Satisfaction and college from the Alumni students
2	Exit Feedback: Survey	Collect variety of information about the course

	Questionnaire	and program satisfaction, facilities etc. of college from the final year students.
3	Parent: Survey Questionnaire	Collect variety of information about program satisfaction and college from parents.
4	Employer's Feedback Form	Collect variety of information about the graduates' skills, capabilities and opportunities.
5	Student Feedback (About OBE)	Collect variety of information about outcome based education in teaching and learning process.

Table 3.10: Indirect Assessment Tools

Method of Assessment	**Source For Data Collection**	**Setting of Target**	**Data Assessment**
Internal/External Evaluation	Evaluation Data	Target Set with respect to previous results analysis and internal assessment	End of the Semester
Course Exit Survey	Survey Report	Target Set with reference to previous survey report and internal assessment	End of the Year
Program Exit Survey			
Alumni Survey			

Table 3.11: PO Assessment Tools

POs	Skill to be Demonstrated	Assessment Tools
PO 1	**Engineering knowledge:**	• Internal/External Evaluation as per University exam. • Project work/Lab Experiments • Mentoring, Core software skills • Technical Events/Workshop/Conferences/Seminar/ Group discussion/Social activities • Course Exit Survey/Program Exit Survey • Industrial Visit/Industrial Training • Alumni Feedback/Student Feedback/Employer Feedback • Course Beyond syllabus • Add on course assessment • Project based and Problem based learning
PO 2	**Problem analysis**	• Internal/External Evaluation as per University exam. • Project work/Lab Experiments • Mentoring, Core software skills • Technical/Events/Workshop/Conferences/Seminar/ Group discussion/Social Activities • Course Exit Survey/Program Exit Survey • Industrial Visit/Industrial Training • Alumni Feedback/Student Feedback/Employer Feedback • Course Beyond syllabus • Add on course assessment • Project based and Problem based learning
PO 3	**Design/development of solutions:**	• Internal/External Evaluation as per University exam. • Project work/Lab Experiments • Mentoring, Core software skills • Technical/Events/Workshop/Conferences/Seminar/ Group discussion/Social Activities • Course Exit Survey/Program Exit Survey

		• Industrial Visit/Industrial Training • Alumni Feedback/Student Feedback/Employer Feedback • Course Beyond syllabus • Add on course assessment • Project based and Problem based learning
PO 4	**Conduct investigations of complex problems:**	• Internal/External Evaluation as per University exam. • Project work/Lab Experiments • Mentoring, Core software skills • Technical/Events/Workshop/Conferences/Seminar/ Group discussion/Social Activities • Course Exit Survey/Program Exit Survey • Industrial Visit/Industrial Training • Alumni Feedback/Student Feedback/Employer Feedback • Course Beyond syllabus • Add on course assessment • Project based and Problem based learning
PO 5	**Modern tool usage:**	• Internal/External Evaluation as per University exam. • Project work/Lab Experiments • Mentoring, Core software skills • Technical/Events/Workshop/conferences/Seminar/ Group discussion/Social Activities • Course Exit Survey/Program Exit Survey • Industrial Visit/Industrial Training • Alumni Feedback/Student Feedback/Employer Feedback • Course Beyond syllabus • Add on course assessment • Project based and Problem based learning
PO 6	**Engineer and society**	• Internal/External Evaluation as per University exam. • Project work/Lab Experiments • Mentoring, Core software skills

		• Technical/Events/Workshop/Conferences/Seminar/ Group discussion/Social Activities • Course Exit Survey/Program Exit Survey • Industrial Visit/Industrial Training • Alumni Feedback/Student Feedback/Employer Feedback • Course Beyond syllabus • Add on course assessment • Project base and Problem base learning
PO 7	**Environment and sustainability**	• Internal/External Evaluation as per University exam. • Project work/Lab Experiments • Mentoring, Core software skills • Technical/Events/Workshop/conferences/Seminar/ Group discussion/Social Activities • Course Exit Survey/Program Exit Survey • Industrial Visit/Industrial Training • Alumni Feedback/Student Feedback/Employer Feedback • Course Beyond syllabus • Add on course assessment • Project based and Problem based learning
PO 8	**Ethics**	• Internal/External Evaluation as per University exam. • Project work/Lab Experiments • Mentoring, Core software skills • Technical/Events/Workshop/conferences/Seminar/ Group discussion/Social Activities • Course Exit Survey/Program Exit Survey • Industrial Visit/Industrial Training • Course Beyond syllabus • Add on course assessment • Alumni Feedback/Student Feedback/Employer Feedback • Project based and Problem based learning

PO 9	**Individual and team work**	• Internal/External Evaluation as per University exam. • Project work/Lab Experiments • Mentoring, Core software skills • Technical/Events/Workshop/conferences/Seminar/ Group discussion/Social Activities • Course Exit Survey/Program Exit Survey • Industrial Visit/Industrial Training • Alumni Feedback/Student Feedback/Employer Feedback • Course Beyond syllabus • Add on course assessment • Project based and Problem based learning
PO 10	**Communication**	• Internal/External Evaluation as per University exam. • Project work/Lab Experiments • Mentoring, Core software skills • Technical/Events/Workshop/conferences/Seminar/ Group discussion/Social Activities • Course Exit Survey/Program Exit Survey • Industrial Visit/Industrial Training • Alumni Feedback/Student Feedback/Employer Feedback • Course Beyond syllabus • Add on course assessment • Project based and Problem based learning
PO 11	**Project management and finance**	• Internal/External Evaluation as per University exam. • Project work/Lab Experiments • Mentoring, Core software skills • Technical/Events/Workshop/conferences/Seminar/ Group discussion/Social Activities • Course Exit Survey/Program Exit Survey • Industrial Visit/Industrial Training • Alumni Feedback/Student Feedback/Employer Feedback

		• Course Beyond syllabus • Add on course assessment • Project based and Problem based learning
PO 12	**Lifelong learning**	• Internal/External Evaluation as per University exam. • Project work/Lab Experiments • Mentoring, Core software skills • Technical/Events/Workshop/conferences/Seminar/ Group discussion/Social Activities • Course Exit Survey/Program Exit Survey • Industrial Visit/Industrial Training • Alumni Feedback/Student Feedback/Employer Feedback • Course Beyond syllabus • Add on course assessment • Project based and Problem based learning

- The assessment process used to evaluate course outcome is mainly assessment with weightage of 80% (direct assessment) and 20% to course exit survey (indirect assessment).
- Assignments are given to improve the internal examination results.
- The IQAC committee verify all evaluation process at the starting of semester.

Evaluation Process of Question paper setting

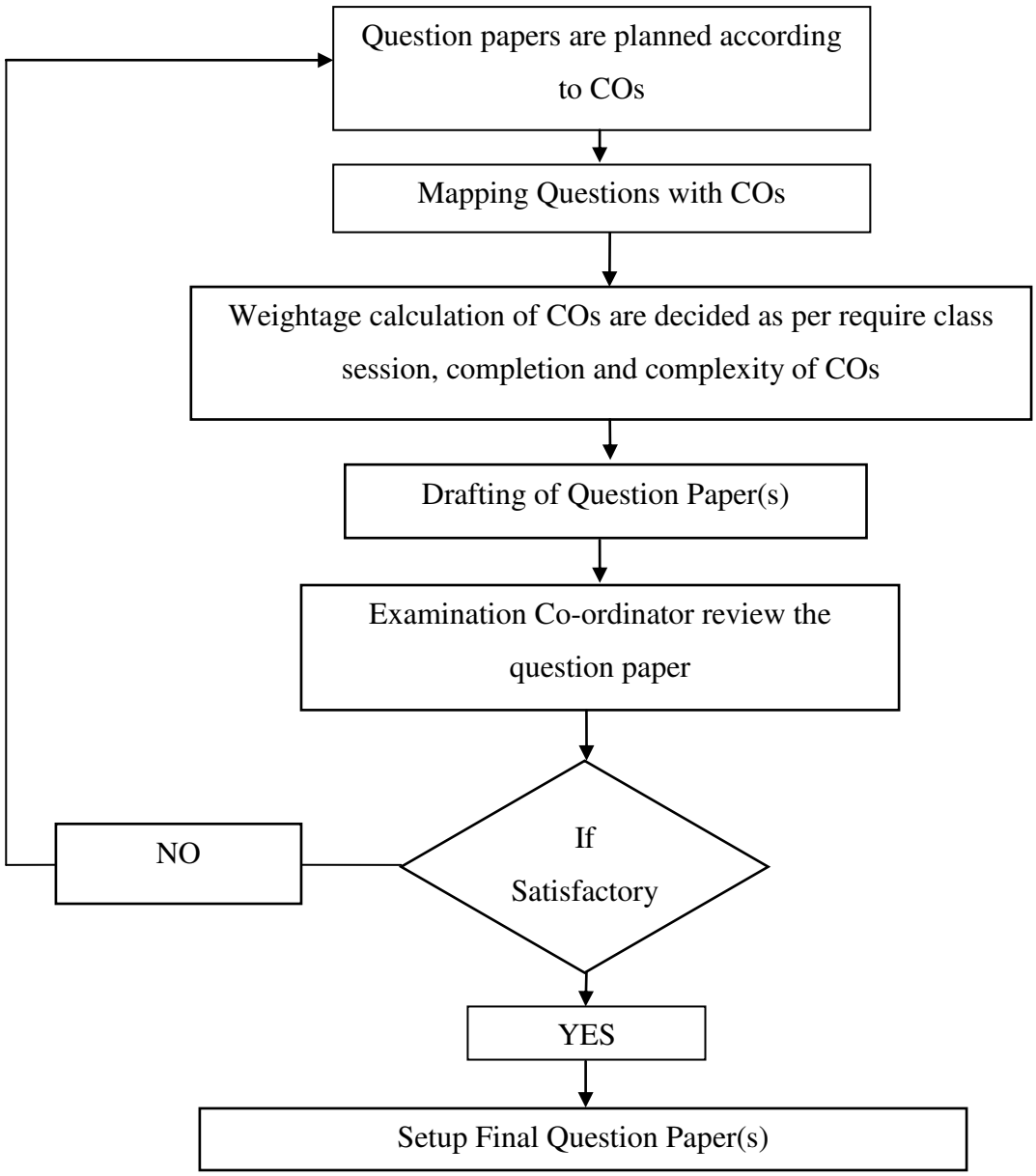


Fig. 3.1 Evaluation process

3.2.2 Record the attainment of Course Outcomes of all courses with respect to set attainment levels (40)

A. Setting of Target

Target of the course outcome has decided as per

- Average end semester marks
- Subject internal Assessment Average Marks
- Class session require for completion of course outcome

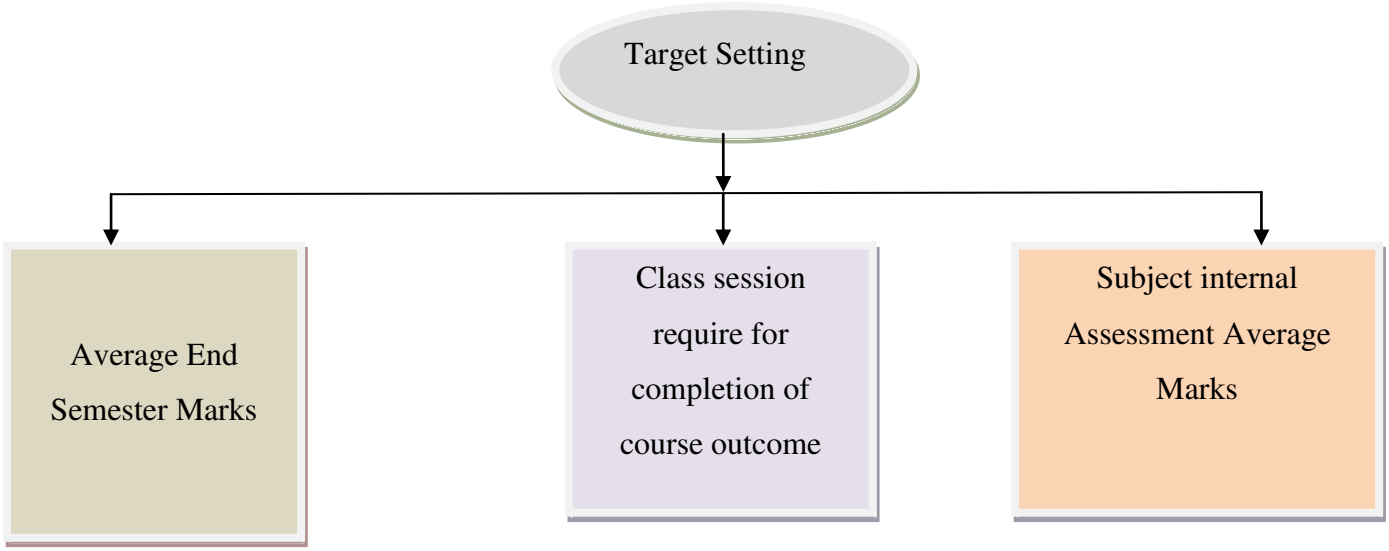
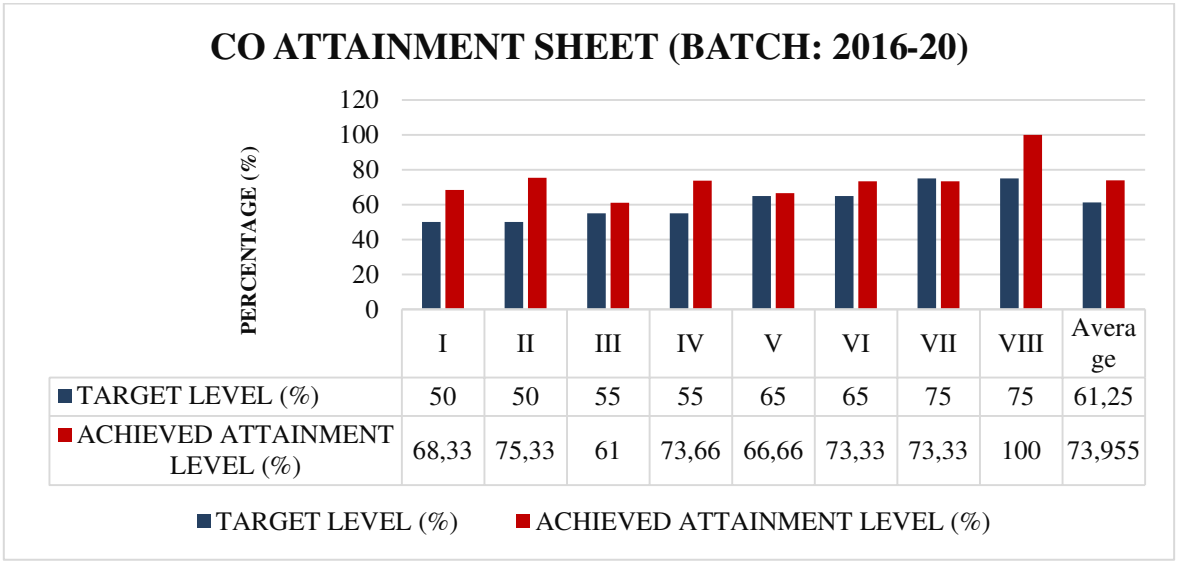


Fig. 3.2 Process of target setting

B. CO-ATTAINMENT (2016-20 Batch)



	I	II	III	IV	V	VI	VII	VIII	Average
TARGET LEVEL (%)	50	50	55	55	65	65	75	75	61,25
ACHIEVED ATTAINMENT LEVEL (%)	68,33	75,33	61	73,66	66,66	73,33	73,33	100	73,955

Fig. 3.3 CO-Attainment: Academic year 2016-2020

Table 3.12: CO Attainment (Batch: 2016-2020)

CO Attainment (Batch: 2016-2020)		
SEMESTER	**TARGET (%)**	**ACHIEVED (%)**
I	50	68.33
II	50	75.33
III	55	61
IV	55	73.66
V	65	66.66
VI	65	73.33
VII	75	73.33
VIII	75	100
Average	**61.25**	**73.95**

Table 3.13: CO Evaluation (Batch: 2016-2020)

IES College of Technology, Bhopal [0177]							
Department Electrical & Electronics Engineering Semester: 1st Semester 2016-2020 Batch							
COURSE OUTCOME EVALUATION							
I SEMESTER							
S.no	**Subject Name / Code**	**CO**	**Target Level**	**Achieved Theory Attainment Level**	**Achieved Practical Attainment Level**	**Achieved Attainment Level**	**Difference**
1	**Mathematics-I**	**CMA110.1**	**1**	**0.90**	**-**	**0.90**	**-0.10**

	(MA110)	CMA110.2	1	0.90	-	0.90	-0.10
		CMA110.3	1	0.90	-	0.90	-0.10
		CMA110.4	1	0.90	-	0.90	-0.10
		CMA110.5	1	0.90	-	0.90	-0.10
2	Engineering Mechanics (CE110)	CCE110.1	1	0.90	3.00	1.95	0.95
		CCE110.2	1	0.90	3.00	1.95	0.95
		CCE110.3	1	0.90	3.00	1.95	0.95
		CCE110.4	1	0.90	3.00	1.95	0.95
		CCE110.5	1	0.90	3.00	1.95	0.95
3	Engineering Graphics (ME111)	CME111.1	1.2	0.90	-	0.90	-0.30
		CME111.2	1.2	0.90	-	0.90	-0.30
		CME111.3	1.2	0.90	-	0.90	-0.30
		CME111.4	1.2	0.90	-	0.90	-0.30
		CME111.5	1.2	0.90	-	0.90	-0.30
4	Physics (PH110)	CPH110.1	1.1	0.90	3.00	1.95	0.85
		CPH110.2	1.1	0.90	3.00	1.95	0.85
		CPH110.3	1.1	0.90	3.00	1.95	0.85
		CPH110.4	1.1	0.90	3.00	1.95	0.85
		CPH110.5	1.1	0.90	2.20	1.55	0.45

5	English (HU110)	CHU110.1	1.2	0.90	2.20	1.55	0.35
		CHU110.2	1.2	0.90	3.00	1.95	0.75
		CHU110.3	1.2	0.90	3.00	1.95	0.75
		CHU110.4	1.2	0.90	3.00	1.95	0.75
		CHU110.5	1.2	0.90	3.00	1.95	0.75
6	Environmental Sciences (ML110)	CML110.1	2.2	-	3.00	3.00	0.80
		CML110.2	2.2	-	3.00	3.00	0.80
		CML110.3	2.2	-	3.00	3.00	0.80
		CML110.4	2.2	-	3.00	3.00	0.80
		CML110.5	2.2	-	3.00	3.00	0.80
7	Introduction to Electrical Engineering (EE110)	CEE110.1	2.3	-	3.00	3.00	0.70
		CEE110.2	2.3	-	3.00	3.00	0.70
		CEE110.3	2.3	-	3.00	3.00	0.70
		CEE110.4	2.3	-	3.00	3.00	0.70
		CEE110.5	2.3	-	3.00	3.00	0.70
8	Communication (HU111P)	CHU111.1	2.3	-	3.00	3.00	0.70
		CHU111.2	2.3	-	2.60	2.60	0.30
		CHU111.3	2.3	-	3.00	3.00	0.70
		CHU111.4	2.3	-	3.00	3.00	0.70

		CHU111.5	2.3	-	3.00	3.00	0.70
Average			1.5	-	-	2.05125	-

Target Level	Achieved Attainment Level
50%	68.33%

IES College of Technology, Bhopal [0177]

Department Electrical & Electronics Engineering Semester: II Semester 2016-2020 Batch

COURSE OUTCOME EVALUATION

II SEMESTER

S.NO	Subject Name / Code	CO	Target Level	Achieved Theory Attainment Level	Achieved Practical Attainment Level	Achieved Attainment Level	Difference
1	(EC111)	CEC111.1	1	2.30	3.00	2.65	1.65
		CEC111.2	1	2.30	3.00	2.65	1.65
		CEC111.3	1	2.30	1.80	2.05	1.05
		CEC111.4	1	2.30	3.00	2.65	1.65
		CEC111.5	1	2.30	1.80	2.05	1.05

2	(ME112)	CME112.1	1.1	2.30	-	2.30	1.20
		CME112.2	1.1	2.30	-	2.30	1.20
		CME112.3	1.1	2.30	-	2.30	1.20
		CME112.4	1.1	2.30	-	2.30	1.20
		CME112.5	1.1	2.30	-	2.30	1.20
3	(CY110)	CCY110.1	1.2	0.90	3.00	1.95	0.75
		CCY110.2	1.2	0.90	3.00	1.95	0.75
		CCY110.3	1.2	0.90	3.00	1.95	0.75
		CCY110.4	1.2	0.90	1.80	1.35	0.15
		CCY110.5	1.2	0.90	2.60	1.75	0.55
4	(MA111)	CMA111.1	1.1	0.90	-	0.90	-0.20
		CMA111.2	1.1	0.90	-	0.90	-0.20
		CMA111.3	1.1	0.90	-	0.90	-0.20
		CMA111.4	1.1	0.90	-	0.90	-0.20
		CMA111.5	1.1	0.90	-	0.90	-0.20
5	(ME114)	CME114.1	1.2	0.90	3.00	1.95	0.75
		CME114.2	1.2	0.90	3.00	1.95	0.75

		CME114.3	1.2	0.90	2.60	1.75	0.55
		CME114.4	1.2	0.90	1.80	1.35	0.15
		CME114.5	1.2	0.90	2.20	1.55	0.35
6	(ME113P)	CME113.1	2.2	-	3.00	3.00	0.80
		CME113.2	2.2	-	3.00	3.00	0.80
		CME113.3	2.2	-	3.00	3.00	0.80
		CME113.4	2.2	-	3.00	3.00	0.80
		CME113.5	2.2	-	3.00	3.00	0.80
7	(CS110P)	CCS110.1	2.2	-	3.00	3.00	0.80
		CCS110.2	2.2	-	3.00	3.00	0.80
		CCS110.3	2.2	-	3.00	3.00	0.80
		CCS110.4	2.2	-	3.00	3.00	0.80
		CCS110.5	2.2	-	3.00	3.00	0.80
8	(HU112P)	CHU112.1	2.3	-	3.00	3.00	0.70
		CHU112.2	2.3	-	3.00	3.00	0.70
		CHU112.3	2.3	-	3.00	3.00	0.70
		CHU112.4	2.3	-	3.00	3.00	0.70

		CHU112.5	2.3	-	3.00	3.00	0.70
Average			1.5	-	-	2.26	-

Target Level	Achieved Attainment Level
50%	75.33%

IES College of Technology, Bhopal [0177]

Department Electrical & Electronics Engineering Semester: IIIRD Semester 2016-2020 Batch

COURSE OUTCOME EVALUATION

IIIrd SEMESTER

S.NO	Subject Name / Code	CO	Target Level	Achieved Theory Attainment Level	Achieved Practical Attainment Level	Achieved Attainment Level	Difference
1	Mathematics-III (BE-3001)	BE3001.1	1.1	0.60	-	0.60	-0.50
		BE3001.2	1.1	0.90	-	0.90	-0.20
		BE3001.3	1.1	0.90	-	0.90	-0.20
		BE3001.4	1.1	0.90	-	0.90	-0.20
		BE3001.5	1.1	0.30	-	0.30	-0.80

2	Electrical Measurement and Instrumentation (EX-3002)	EX3002.1	1.2	0.90	2.60	1.75	0.55
		EX3002.2	1.2	0.90	3.00	1.95	0.75
		EX 3002.3	1.2	0.90	2.20	1.55	0.35
		EX 3002.4	1.2	0.90	3.00	1.95	0.75
		EX3002.5	1.2	0.90	1.80	1.35	0.15
3	Network Analysis (EX-3003)	EX3003.1	1.2	0.90	1.80	1.35	0.15
		EX3003.2	1.2	0.90	1.80	1.35	0.15
		EX3003.3	1.2	0.90	3.00	1.95	0.75
		EX3003.4	1.2	0.90	3.00	1.95	0.75
		EX3003.5	1.2	0.90	3.00	1.95	0.75
4	Analog Electronics (EX-3004)	EX3004.1	1.1	0.90	3.00	1.95	0.85
		EX3004.2	1.1	0.90	1.80	1.35	0.25
		EX3004.3	1.1	0.90	3.00	1.95	0.85
		EX3004.4	1.1	0.90	3.00	1.95	0.85
		EX3004.5	1.1	0.90	3.00	1.95	0.85
5	Signals and Systems (EX-3005)	EX3005.1	1.3	0.90	-	0.90	-0.40
		EX3005.2	1.3	0.90	-	0.90	-0.40

		EX3005.3	1.3	0.90	-	0.90	-0.40
		EX3005.4	1.3	0.90	-	0.90	-0.40
		EX3005.5	1.3	0.90	-	0.90	-0.40
6	Computer Programming-I (JAVA) (EX-3006)	EX3006.1	2.4	-	3.00	3.00	0.60
		EX3006.2	2.4	-	3.00	3.00	0.60
		EX3006.3	2.4	-	3.00	3.00	0.60
		EX3006.4	2.4	-	3.00	3.00	0.60
		EX3006.5	2.4	-	3.00	3.00	0.60
7	Rural Outreach (Internal Assessment) (EX-3007)	EX3007.1	2.4	-	3.00	3.00	0.60
		EX3007.2	2.4	-	3.00	3.00	0.60
		EX3007.3	2.4	-	3.00	3.00	0.60
		EX3007.4	2.4	-	3.00	3.00	0.60
		EX3007.5	2.4	-	3.00	3.00	0.60
8	NSS/NCC/Social Work (Internal Assessment) (EX-3008)	EX3008.1	2.5	-	1.80	1.80	-0.70
		EX3008.2	2.5	-	1.80	1.80	-0.70
		EX3008.3	2.5	-	1.80	1.80	-0.70
		EX3008.4	2.5	-	1.80	1.80	-0.70

		EX3008.5	2.5	-	1.80	1.80	-0.70
Average			1.650	-	-	1.83	-

Target Level	Achieved Attainment Level
55%	61.00%

IES College of Technology, Bhopal [0177]

Department Electrical & Electronics Engineering Semester: IV Semester 2016-2020 Batch

COURSE OUTCOME EVALUATION

IV SEMESTER

S.NO	Subject Name / Code	CO	Target Level	Achieved Theory Attainment Level	Achieved Practical Attainment Level	Achieved Attainment Level	Difference
1	Energy, Environment, Ecology & Society (ES3001)	CES3001.1	1.2	3	-	3	1.80
		CES3001.2	1.2	3	-	3	1.80
		CES3001.3	1.2	3	-	3	1.80
		CES3001.4	1.2	3	-	3	1.80
		CES3001.5	1.2	3	-	3	1.80

2	Electrical Machine-I Ex 4002	CEX4002.1	1.2	0.9	1.8	1.35	0.15
		CEX4002.2	1.2	0.9	1.8	1.35	0.15
		CEX4002.3	1.2	0.9	2.6	1.75	0.55
		CEX4002.4	1.2	0.9	2.6	1.75	0.55
		CEX4002.5	1.2	0.9	1.8	1.35	0.15
3	Digital Electronics Logic Design Ex 4003	CEX4003.1	1.2	0.9	1.8	1.35	0.15
		CEX4003.2	1.2	0.9	3	1.95	0.75
		CEX4003.3	1.2	0.9	3	1.95	0.75
		CEX4003.4	1.2	0.9	1.8	1.35	0.15
		CEX4003.5	1.2	0.9	1.8	1.35	0.15
4	Control Systems Ex 4004	CEX4004.1	1.1	0.9	3	1.95	0.85
		CEX4004.2	1.1	0.9	3	1.95	0.85
		CEX4004.3	1.1	0.9	1.8	1.35	0.25
		CEX4004.4	1.1	0.9	3	1.95	0.85
		CEX4004.5	1.1	0.9	1.8	1.35	0.25
5	Power System -I Ex 4005	CEX4005.1	1.2	1.6	-	1.6	0.40
		CEX4005.2	1.2	1.6	-	1.6	0.40
		CEX4005.3	1.2	1.6	-	1.6	0.40
		CEX4005.4	1.2	1.6	-	1.6	0.40

		CEX4005.5	1.2	1.6	-	1.6	0.40
6	Computer programming-II	CEX4006.1	2.3	-	1.8	1.8	-0.50
		CEX4006.2	2.3	-	1.8	1.8	-0.50
		CEX4006.3	2.3	-	3	3	0.70
		CEX4006.4	2.3	-	3	3	0.70
		CEX4006.5	2.3	-	1.8	1.8	-0.50
7	Programming Tools (Departmental Choice) (Internal Assessment)	CEX4007.1	2.4	-	3	3	0.60
		CEX4007.2	2.4	-	3	3	0.60
		CEX4007.3	2.4	-	3	3	0.60
		CEX4007.4	2.4	-	3	3	0.60
		CEX4007.5	2.4	-	3	3	0.60
8	Professional Ethics (Internal Assessment)	CEX4008.1	2.6	-	3	3	0.40
		CEX4008.2	2.6	-	3	3	0.40
		CEX4008.3	2.6	-	3	3	0.40
		CEX4008.4	2.6	-	3	3	0.40
		CEX4008.5	2.6	-	3	3	0.40
Average			1.65	-	-	2.211	-
Target Level		Achieved Attainment Level					

55%	**73.66%**

IES College of Technology, Bhopal [0177]							
Department Electrical & Electronics Engineering Semester: V Semester 2016-2020 Batch							
COURSE OUTCOME EVALUATION							
V SEMESTER							
S.NO	**Subject Name / Code**	**CO**	**Target Level**	**Achieved Theory Attainment Level**	**Achieved Practical Attainment Level**	**Achieved Attainment Level**	**Difference**
1	**Electro Magnetic Field Theory EX 5001**	**CEX5001.1**	**1.3**	**0.9**	**-**	**0.9**	**-0.40**
		CEX5001.2	**1.3**	**0.6**	**-**	**0.6**	**-0.70**
		CEX5001.3	**1.3**	**0.9**	**-**	**0.9**	**-0.40**
		CEX5001.4	**1.3**	**0.9**	**-**	**0.9**	**-0.40**
		CEX5001.5	**1.3**	**0.6**	**-**	**0.6**	**-0.70**
2	**Electrical Machine-II EX 5002**	**CEX 5002.1**	**1.4**	**0.3**	**3**	**1.65**	**0.25**
		CEX 5002.2	**1.4**	**0.9**	**2.6**	**1.75**	**0.35**
		CEX 5002.3	**1.4**	**0.9**	**2.2**	**1.55**	**0.15**
		CEX 5002.4	**1.4**	**0.6**	**2.2**	**1.4**	**0.00**

		CEX 5002.5	1.4	0.9	1.8	1.35	-0.05
3	Switchgear and Protection EX 5003	CEX5003.1	1.4	0.9	3	1.95	0.55
		CEX5003.2	1.4	0.6	2.6	1.6	0.20
		CEX5003.3	1.4	0.9	2.2	1.55	0.15
		CEX5003.4	1.4	0.9	1.8	1.35	-0.05
		CEX5003.5	1.4	0.6	2.2	1.4	0.00
4	Power Electronic Devices and Circuits EX5004	CEX5004.1	1.6	0.6	3	1.8	0.20
		CEX5004.2	1.6	0.9	2.6	1.75	0.15
		CEX5004.3	1.6	0.6	1.8	1.2	-0.40
		CEX5004.4	1.6	0.9	2.2	1.55	-0.05
		CEX5004.5	1.6	0.9	2.2	1.55	-0.05
5	Energy Conservation and Management EX 5005	CEX5005.1	1.9	2	-	2	0.10
		CEX5005.2	1.9	2.3	-	2.3	0.40
		CEX5005.3	1.9	2	-	2	0.10
		CEX5005.4	1.9	2.3	-	2.3	0.40
		CEX5005.5	1.9	2.3	-	2.3	0.40
6	Software / Simulation Lab-I EX 5006 P	CEX5006.1	2.2	-	2.6	2.6	0.40
		CEX5006.2	2.2	-	2.6	2.6	0.40
		CEX5006.3	2.2	-	2.2	2.2	0.00

Record of all CO Attainment							
		CEX5006.4	2.2	-	2.2	2.2	0.00
		CEX5006.5	2.2	-	2.2	2.2	0.00
7	Management Skill Development ** (Internal Assessment) EX 5007	CEX5007.1	2.8	-	3	3	0.20
		CEX5007.2	2.8	-	3	3	0.20
		CEX5007.3	2.8	-	3	3	0.20
		CEX5007.4	2.8	-	3	3	0.20
		CEX5007.5	2.8	-	3	3	0.20
8	Innovative Thinking** (Internal Assessment)	CEX5008.1	3	-	3	3	0.00
		CEX5008.2	3	-	3	3	0.00
		CEX5008.3	3	-	3	3	0.00
		CEX5008.4	3	-	3	3	0.00
		CEX5008.5	3	-	3	3	0.00
Average			1.95	-	-	2	-

Target Level	Achieved Attainment Level
65%	66.66%

IES College of Technology, Bhopal [0177]

Department Electrical & Electronics Engineering Semester: 6th Semester 2016-2020 Batch (BE CBCS & CBGS)

6th SEMESTER

S.NO	Subject Name / Code	CO	Target Level	Achieved Theory Attainment Level	Achieved Practical Attainment Level	Achieved Attainment Level	Difference
1	Communication Engineering Ex 6001	CEX6001.1	1.1	2.3	-	2.3	1.20
		CEX6001.2	1.1	2.3	-	2.3	1.20
		CEX6001.3	1.1	2.3	-	2.3	1.20
		CEX6001.4	1.1	2.3	-	2.3	1.20
		CEX6001.5	1.1	1.7	-	1.7	0.60
2	Power System-II Ex 6002	CEX6002.1	1.2	0.9	2.6	1.8	0.55
		CEX6002.2	1.2	0.9	3	2.0	0.75
		CEX6002.3	1.2	0.9	2.6	1.8	0.55
		CEX6002.4	1.2	0.3	3	1.7	0.45
		CEX6002.5	1.2	0.9	2.2	1.6	0.35
3	Microprocessor and Microcontrollers Ex6003	CEX6003.1	1.3	0.9	2.2	1.6	0.25
		CEX6003.2	1.3	0.9	3	2.0	0.65
		CEX6003.3	1.3	0.9	2.2	1.6	0.25
		CEX6003.4	1.3	0.3	3	1.7	0.35

		CEX6003.5	1.3	0.6	2.2	1.4	0.10
4	Electronic Instrumentation Ex6004	CEX6004.1	1.5	2.3	3	2.7	1.15
		CEX6004.2	1.5	2.3	3	2.7	1.15
		CEX6004.3	1.5	2.3	2.6	2.5	0.95
		CEX6004.4	1.5	2.3	3	2.7	1.15
		CEX6004.5	1.5	1.4	2.2	1.8	0.30
5	Utilization of Electrical Energy Ex 6005	CEX6005.1	2.1	1.6	-	1.6	-0.50
		CEX6005.2	2.1	1.6	-	1.6	-0.50
		CEX6005.3	2.1	1.6	-	1.6	-0.50
		CEX6005.4	2.1	1	-	1.0	-1.10
		CEX6005.5	2.1	1.3	-	1.3	-0.80
6	Software / Simulation Lab-I EX 6006 P	CEX6006.1	2.4	-	2.2	2.2	-0.20
		CEX6006.2	2.4	-	3	3.0	0.60
		CEX6006.3	2.4	-	2.6	2.6	0.20
		CEX6006.4	2.4	-	3	3.0	0.60
		CEX6006.5	2.4	-	2.2	2.2	-0.20
7	Creativity and Entrepreneurship Development** Ex 6007	CEX6007.1	3	-	3	3.0	0.00
		CEX6007.2	3	-	3	3.0	0.00
		CEX6007.3	3	-	3	3.0	0.00

		CEX6007.4	3	-	3	3.0	0.00
		CEX6007.5	3	-	3	3.0	0.00
8	Startup / Industrial Lectures ** Ex 6008	CEX6008.1	3	-	3	3.0	0.00
		CEX6008.2	3	-	3	3.0	0.00
		CEX6008.3	3	-	3	3.0	0.00
		CEX6008.4	3	-	3	3.0	0.00
		CEX6008.5	3	-	3	3.0	0.00
Average			1.95	-	-	2.2	-

Target Level	Achieved Attainment Level
65%	73.33%

Record of all CO Attainment
IES College of Technology, Bhopal [0177]
Department Electrical & Electronics Engineering Semester: VII- Semester 2016-2020 Batch
VII- SEMESTER

S.NO	Subject Name / Code	CO	Target Level	Achieved Theory Attainment Level	Achieved Practical Attainment Level	Achieved Attainment Level	Difference
1	Computer Network EX 7001	CEX 7001.1	1.7	1.6	3	2.3	0.60
		CEX 7001.2	1.7	1.3	3	2.2	0.45
		CEX 7001.3	1.7	1.6	3	2.3	0.60
		CEX 7001.4	1.7	1.3	3	2.2	0.45
		CEX 7001.5	1.7	1.6	3	2.3	0.60
2	Electric Drive EX-7002	CEX7002.1	2	2.3	3	2.7	0.65
		CEX7002.2	2	1.7	2.6	2.2	0.15
		CEX7002.3	2	2	1.8	1.9	-0.10
		CEX7002.4	2	2	1.8	1.9	-0.10
		CEX7002.5	2	2.3	1.8	2.1	0.05
3	Computer Application to PowerSystem Ex 7003	CEX7003.1	2.1	1.6	3	2.3	0.20
		CEX7003.2	2.1	1.6	3	2.3	0.20
		CEX7003.3	2.1	1.3	1.8	1.6	-0.55
		CEX7003.4	2.1	1.6	1.8	1.7	-0.40
		CEX7003.5	2.1	1.6	1.8	1.7	-0.40

4	High Voltage Engineering EX 7004	CEX 7004.1	2.32	3	-	3.0	0.68
		CEX 7004.2	2.32	3	-	3.0	0.68
		CEX 7004.3	2.32	3	-	3.0	0.68
		CEX 7004.4	2.32	3	-	3.0	0.68
		CEX 7004.5	2.32	3	-	3.0	0.68
5	EHVAC/DC Transmission EX 7005	CEX 7005.1	1.6	0.9	-	0.9	-0.70
		CEX 7005.2	1.6	0.9	-	0.9	-0.70
		CEX 7005.3	1.6	0.9	-	0.9	-0.70
		CEX 7005.4	1.6	0.9	-	0.9	-0.70
		CEX 7005.5	1.6	0.3	-	0.3	-1.30
6	Project -I	CEX 7006.1	3	-	2.6	2.6	-0.40
		CEX 7006.2	3	-	3	3.0	0.00
		CEX 7006.3	3	-	3	3.0	0.00
		CEX 7006.4	3	-	3	3.0	0.00
		CEX 7006.5	3	-	3	3.0	0.00
7	Industrial Training (Two weeks)	CEX 7007.1	3	-	3	3.0	0.00
		CEX 7007.2	3	-	3	3.0	0.00
		CEX 7007.3	3	-	1.8	1.8	-1.20

		CEX 7007.4	3	-	1.8	1.8	-1.20
		CEX 7007.5	3	-	1.8	1.8	-1.20
Average			2.25	-	-	2.2	-

Target Level	Achieved Attainment Level
75%	73.33%

Record of all CO Attainment							
IES College of Technology, Bhopal [0177]							
Department Electrical & Electronics Engineering Semester: 8th Semester 2016-2020 Batch							
8th SEMESTER							
S.NO	Subject Name / Code	CO	Target Level	Achieved Theory Attainment Level	Achieved Practical Attainment Level	Achieved Attainment Level	Difference
1	Ex 8001 Computer-Aided Design ofElectrical machine	CEX8001.1	1.2	3	3	3.0	1.80
		CEX8001.2	1.2	3	2.3	2.7	1.47
		CEX8001.3	1.2	3	3	3.0	1.80

		CEX8001.4	1.2	3	3	3.0	1.80
		CEX8001.5	1.2	3	3	3.0	1.80
2	Ex 8002 Power quality Problems and mitigation Techniques	CEX8002.1	2	3	3	3.0	1.00
		CEX8002.2	2	3	3	3.0	1.00
		CEX8002.3	2	3	2.0	2.5	0.51
		CEX8002.4	2	3	3	3.0	1.00
		CEX8002.5	2	3	2.34	2.7	0.67
3	Ex 8003 Special Machine	CEX8003.1	2.1	3	-	3.0	0.90
		CEX8003.2	2.1	3	-	3.0	0.90
		CEX8003.3	2.1	3	-	3.0	0.90
		CEX8003.4	2.1	3	-	3.0	0.90
		CEX8003.5	2.1	3	-	3.0	0.90
4	Ex 8004 Power Electronics Converters for Renewable Energy	CEX8004.1	2	3	-	3.0	1.00
		CEX8004.2	2	3	-	3.0	1.00
		CEX8004.3	2	3	-	3.0	1.00
		CEX8004.4	2	3	-	3.0	1.00
		CEX8004.5	2	3	-	3.0	1.00
5	Ex 8005 P Project-II	CEX8005.1	3	-	3	3.0	0.00
		CEX8005.2	3	-	3	3.0	0.00

		CEX8005.3	3	-	3	3.0	0.00
		CEX8005.4	3	-	3	3.0	0.00
		CEX8005.5	3	-	3	3.0	0.00
6	Ex 8006 P (Internal Assessment)	CEX8006.1	2.45	-	3	3.0	0.55
		CEX8006.2	2.45	-	3	3.0	0.55
		CEX8006.3	2.45	-	3	3.0	0.55
		CEX8006.4	2.45	-	3	3.0	0.55
		CEX8006.5	2.45	-	3	3.0	0.55
7	Ex 8007 Group Discussion	CEX8007.1	3	-	3	3.0	0.00
		CEX8007.2	3	-	3	3.0	0.00
		CEX8007.3	3	-	3	3.0	0.00
		CEX8007.4	3	-	3	3.0	0.00
		CEX8007.5	3	-	3	3.0	0.00
Average			2.25	-	-	3.0	-

Target Level	Achieved Attainment Level
75%	100.00%

3.3 Attainment of Program Outcomes and Program Specific Outcomes (50)

3.3.1 Describe assessment tools and processes used for measuring the attainment of each of the Program Outcomes and Program Specific Outcomes (10)

A. Program Outcomes (PO's) Assessment Tools:

Assessment tools are categorized into direct and indirect methods to assess the Program Specific outcomes, Program outcomes and course outcomes.

- Direct attainment of COs is determined from the performances of students in 30% of Internal Evaluation (IE) and 70% of Semester End Examination (SEE)
- 30% of Internal Evaluation (IE) is calculated from 67% of Mid Semester Examination and 33% of Assignment/theory quizzes.
- For assessment of Mid Semester Examination marks, two mid semester are conducted and final marks is consider as an average of two mid marks.
- First Mid Semester Examination includes four questions with respect to 40% Coverage of COs.
- Second Mid semester Examination includes six questions with respect to remaining 60% Coverage of COs.
- For assessment of assignment four to five assignments are given and each assignment includes three to five questions with respect to concern COs.
- For practical COs attainment is determined from the performances of students in 40% of Internal Evaluation (IE) and 60% of End Semester Examination (SEE).
- Direct method enables faculty to judge student's knowledge and skills from their performance in the continuous assessment tests, end–semester examinations, presentations, and classroom assignments etc. These methods provide a sample of what students know and/or can do and provide strong evidence of extent of student-learning.
- Under Indirect methods such as surveys and interviews stakeholders are asked to reflect on students learning. They express their opinions or thoughts about the graduates' knowledge, skills and similar information is collected through different stakeholders.

The process of attainment has described in flow chart

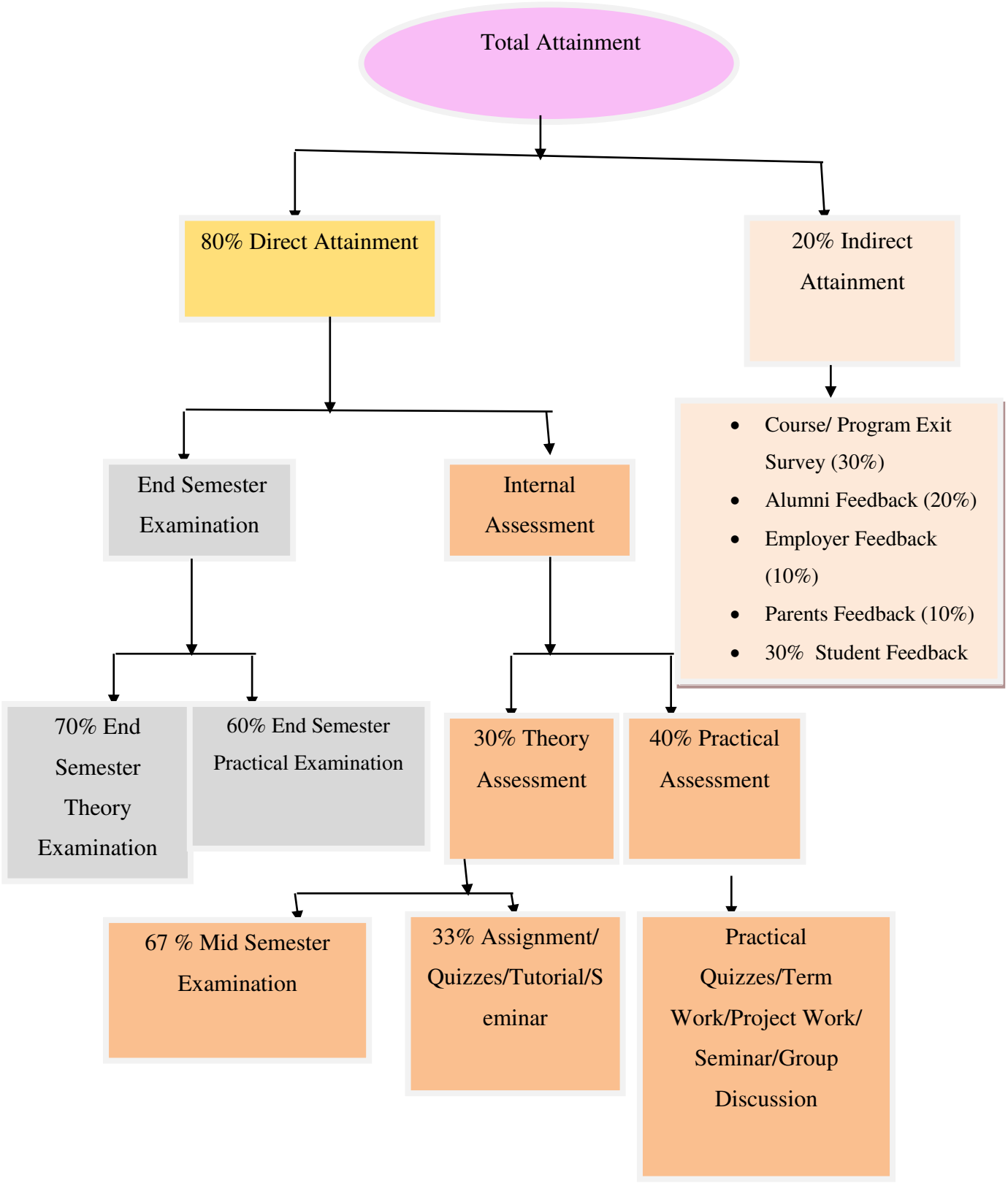


Fig.3.4 Flow chart of attainment calculation

Use of Rubrics for Evaluation and Assessment of PO's

- The Course/ Program outcomes are difficult to measure e.g. assessment of critical thinking, creativity, analytical skills, and problem solving etc. Hence the department has adopted criterion referenced rubrics to assess the POs and Cos, wherever appropriate. The Rubric criteria are either developed by department faculty or sometimes even with consultation with students and distributed among concerned before an assignment, project or test.
- Rubrics are used for both formative and summative assessment of students. Same rubric is used for assessing an outcome so that the faculty is able to assess student progress and maintain the record of the same for each student.
- The rubrics are shared with students before being evaluated so that they are aware of the performance criteria and their weightage.

Rubrics Details

Table 3.14: Internal& External Evaluation Rubrics (Theory Subject)

Rubrics	
External Evaluation	If 80% students achieve marks above 50 % marks then attained level is 3
	If 70% students achieve marks above 50% marks then attained level is 2
	If 60% students achieve marks above 50 % marks then attained level is 1
Internal Evaluation	If 80% students achieve marks above 60% marks then attained level is 3
	If 70% students achieve marks above 60% marks then attained level is 2
	If 60% students achieve marks above 60% marks then attained level is 1

Lab Performance Evaluation Rubric

Student Name: ---------- **Enrollment Number: ----------**

Evaluation Date: ----------

S. N	Method of Evaluation	Rubrics	Exceeds expectation(3)	Meets expectation(2)	Doesn't meet expectation(0-1)	Marks
1	Conduction of Experiments (Hardware)	Lab Participation	Student demonstrates an accurate understanding of the lab objectives and concepts. The student can correctly answer questions and if appropriate, can explain concepts to fellow classmates. Student is eager to participate and assists when needed.	Student arrives on time to lab, but may be unprepared. Answers to questions are basic and superficial suggesting that concepts are not fully grasped.	Student tardiness or unpreparedness makes it impossible to fully participate. If able to participate, Student has difficulty explaining key lab concepts. OR Student was absent from lab	.
2		Equipment connection	Student has made correct equipment/component connections as per standard circuit diagrams.	Student needed guidance to make correct equipment/component connections as per standard circuit diagrams.	Student was unable to make correct equipment/ Component connections as per standard circuit diagrams.	
3		Data Recording/ Collection	Student has correctly measured the relevant parameters	Student has performed incorrect measurement of relevant parameters	Student was unable to identify /measure relevant parameters	
4		Results	Accurate results have been achieved	The achieved results are not accurate but are within tolerance	No results are achieved OR The achieved results	

				range	are meaningless	
5		Troubleshooting	Student has ability to detect and correct the errors	Student can detect the error but unable to correct it	Student was unable to detect the error	
6	Conduction of Experiments (Hardware)	Lab Report	Student demonstrates an accurate understanding of the lab objectives and concepts. Questions are answered completely and correctly. Graphs are neat, creative and include complete titles and accurate units. Errors, if any are minimal	Student has a basic knowledge of content, but may lack some understanding of some concepts. Questions are answered fairly well and/or graphs could have been done more neatly, accurately or with more complete information.	Student has problems with both the graphs and the answers. Student appears to have not fully grasped the lab content and the graph(s) possess multiple errors. OR Student turns in lab report late or the report is incomplete	
7	Ethics	Safety	Student carefully observes the safety rules and procedures during practical work	Student observes safety rules and procedures with minor deviation during practical work	Student does not care about safety rules during practical work.	
8	Ethics	Punctuality	Student was on time and stayed till the completion of task	Student was on time but wasted time outside the work place during the experiment.	Student was not on time and left class before time.	
9	Ethics	Workplace Clearance	The student uses the equipment responsibly and clears the leftovers at the work place on completion of lab work	The student has shown responsibility towards using the equipment while he didn't care about the cleanliness of work place	The student has shown irresponsibility using the equipment and didn't clear the leftovers at the workplace on completion of lab work	

10	Team Work	Research & gather information	Student has collected a great deal of information which goes beyond the basics.	Student has collected basic information related the topic.	Student has not collected any information that relates to the topic	
11		Fulfil team role's duties	Student has performed the duties assigned and actively assisted others.	Student has shown limited performance in the duties that are assigned	Student has not performed any duties of assigned team role.	
12		Listen to other teammates	Consistently listens and responds to other appropriately	Usually doing most of the talking rarely allowed others to speak.	Student shows an assertive behaviour and was unable to show respect towards other teammates.	
13	Conduction of Experiments (Software)	Familiarity with software	Student has full command on the basic tools of the software.	Student has limited command on the basic tools of the software.	Student has no idea how to use the basic tools of the software.	
14		Simulation Steps	Has applied all the steps in correct sequence to obtain the results.	Some steps are followed but not in proper sequence	Student has no idea regarding the steps to be followed to perform simulation	
15		Coding Skills	The code is completely functional and responds correctly producing the correct outputs.	The Code is correct with regard to syntax but required output is not correct.	The code has several syntax errors. Important parts of code are missing.	
16	Conduction of Experiments (Software)	Schematic of the Circuit	Schematic of circuit/board is made with proper connections/wiring.	Schematic of circuit/board is made with only basic proper connections/wiring	Schematic of circuit/board is made with only basic connections/wiring and has several errors.	
Total Marks						

Project Work Evaluation Rubrics

Student Name: ---------- **Enrollment Number: ---**

Evaluation Date: ----------

Evaluation Parameters	Max. Marks	Rubric Parameters	Level of Achievement				
			Excellent (9-10)	Very Good (7-8)	Good (5-6)	Average (3-4)	Poor (1-2)
Attendance	10	Continuity	85% above Attendance	70-85% Attendance	60-70% Attendance	40-60% Attendance	40% Below Attendance
Design Methodology	20	Conceptual design, Division of problem into modules, Selection of design Framework.	Properly followed & Properly Justified	Properly Followed & Justified Partially	Properly followed & Not Justified	Partially Followed and Partially justified	Not followed and Not justified
Implementation	20	Design Circuit Model, Algorithm, Coding	Properly Followed & Properly implemented	Properly Followed & Implemented Partially	Properly followed & Not implemented	Partially Followed and Partially implemented	Not followed and Not implemented
Presentation	10	Preparation of Slides, Presentation Consistency	Relevant and consistent	Relevant & partially consistent	Partially relevant & consistent	Partially relevant & partially consistent	Not relevant & inconsistent
Demonstration	10	Hardware & Software modules, Working and results	Properly demonstrated & Properly Justified Results	Properly Demonstrated & Partially Justified Results	Partially demonstrated & Justified	Partially demonstrated and Partially Justified	Not demonstrated and no justification
Viva	10	Handling Questions	Answered all questions with proper justification	Answered 80% questions	Answered 60% questions	Answered 40% question	Answered 20% questions

Project Report	20	Contain of Report	Excellent	Very Good	Good	Average	Poor

Seminar

- For the seminar, the student shall collect the information on a specialized topic and prepare a technical report, showing his understanding of the topic, and submit it to the department. It will be evaluated by the departmental committee consisting of head of the department.
- The seminar report shall be evaluated for 50 marks. There will be no external examination for the seminar. The committee evaluates seminar based on following parameters.

Table 3.15: Seminar assessment Tool

Assessment Tool	
Internal Assessment	**Presentation**
	Viva-voce

- **Presentation:** The content, quality of the presentation and communication skill is assessed by the evaluation committee.
- **Viva-voce:** At the end of the presentation, the assessment panel and the peer group ask questions and seek clarifications on specific issues related to the seminar. The effectiveness of the student's response to these queries is assessed.

SEMINAR EVALUATION RUBRIC

- **Student Presenter: _____**
- **Evaluator Date: ----------**

Evaluate the student's presentation				
Evaluation Parameters	**Outstanding(4)**	**Admirable(3)**	**Average(2)**	**Inadequate(1)**
Knowledge and Content	**Outstanding**	**Admirable**	**Average**	**Inadequate**
Organization of presentation	Information presented as interesting story in logical, easy to follow sequence	Information presented in logical sequence; easy to follow	Most of information presented in sequence	Hard to follow; sequence of information jumpy
Background content	Material sufficient for clear understanding ANDexceptionally presented	Material sufficient for clear understanding ANDeffectively presented	Material sufficient for clear understanding Butnot clearly presented	Material not clearly related to topic OR background dominated seminar
Methods	Sufficient for understanding and exceptionally presented	Sufficient for understanding and effectively presented	Sufficient for understanding but not clearly presented	Methods too brief or insufficient for adequate understanding
Results (figures, graphs, tables, etc.)	All figures clear	Most figures clear	Majority of figures clear	Some figures hard to read
Contribution of work	Significance exceptionally well explained	Significance explained	Significance mentioned	Significance not mentioned or just hinted. Reasonably explained
Knowledge of subject	Demonstrated full knowledge; answered all questions with	At ease; answered all questions but failed to	At ease with information; answered most questions	Does not have grasp of information; answered only

	elaboration	elaborate		rudimentary questions
Presentation Skills	All appropriately formatted	Most appropriately formatted	Majority appropriately formatted	Some explanations lacking
Graphics (use of PowerPoint)	Uses graphics that explain and reinforce text and presentation	Uses graphics that explain text and presentation	Uses graphics that relate to text and presentation	Uses graphics that rarely support text and presentation

Table 3.16: Rubrics for evaluation of indirect assessment

Internal Evaluation	If 60% Parents are giving above 60% attained level is 3
	If 50% Parents are giving above 60% then attained level 2
	If 40% Parents achieve marks above 60% marks then attained level is 1

Internal Evaluation	If 60% Alumni are giving above 60% attained level is 3
	If 50% Alumni are giving above 60% then attained level 2
	If 40% Alumni achieve marks above 60% marks then attained level is 1

Internal Evaluation	If 60% Students are giving above 60% attained level is 3
	If 50% Students are giving above 60% then attained level 2
	If 40% Students achieve marks above 60% marks then attained level is 1

Internal Evaluation	If 60% Employer are giving above 60% attained level is 3
	If 50% Employer are giving above 60% then attained level 2
	If 40% Employer achieve marks above 60% marks then attained level is 1

3.3.2 Provide results of evaluation of each PO & PSO (40)

Table 3.17 (A): PO attainment analysis batch wise

IES COLLEGE OF TECHNOLOGY BHOPAL						
Department of Electrical and Electronics Engineering						
PO attainment analysis batch wise						
	2014-18 Batch		2015-19 Batch		2016-20 Batch	
POs	Target value	Total Achieved value	Target value	Total Achieved value	Target value	Total Achieved value
PO1	2.3	2.1	2.3	2.1	2.2	2.2
PO2	2.1	2.1	2.2	2.1	2.2	2.2
PO3	2	2.2	2	2	2	2.2
PO4	1.8	2.3	1.8	2.1	1.9	1.9
PO5	2	2.2	2.2	2	2.2	2.3
PO6	1.8	2.2	2	1.9	2	2.3
PO7	1.9	1.9	2	1.6	2	2
PO8	1.8	2	2	2.3	2.1	2.7
PO9	2.1	2.1	2.3	1.7	2.3	2.5
PO10	2	2.3	2.2	2.3	2.2	2.57
PO11	1.6	2.4	2.1	2.1	2.1	2.1
PO12	2	2	2.2	2.1	2.2	2.1

Average	**1.95**	**2.0**	**2.1**	**2.03**	**2.1**	**2.25**
Percentage	**65**	**67**	**70**	**68**	**70**	**75**

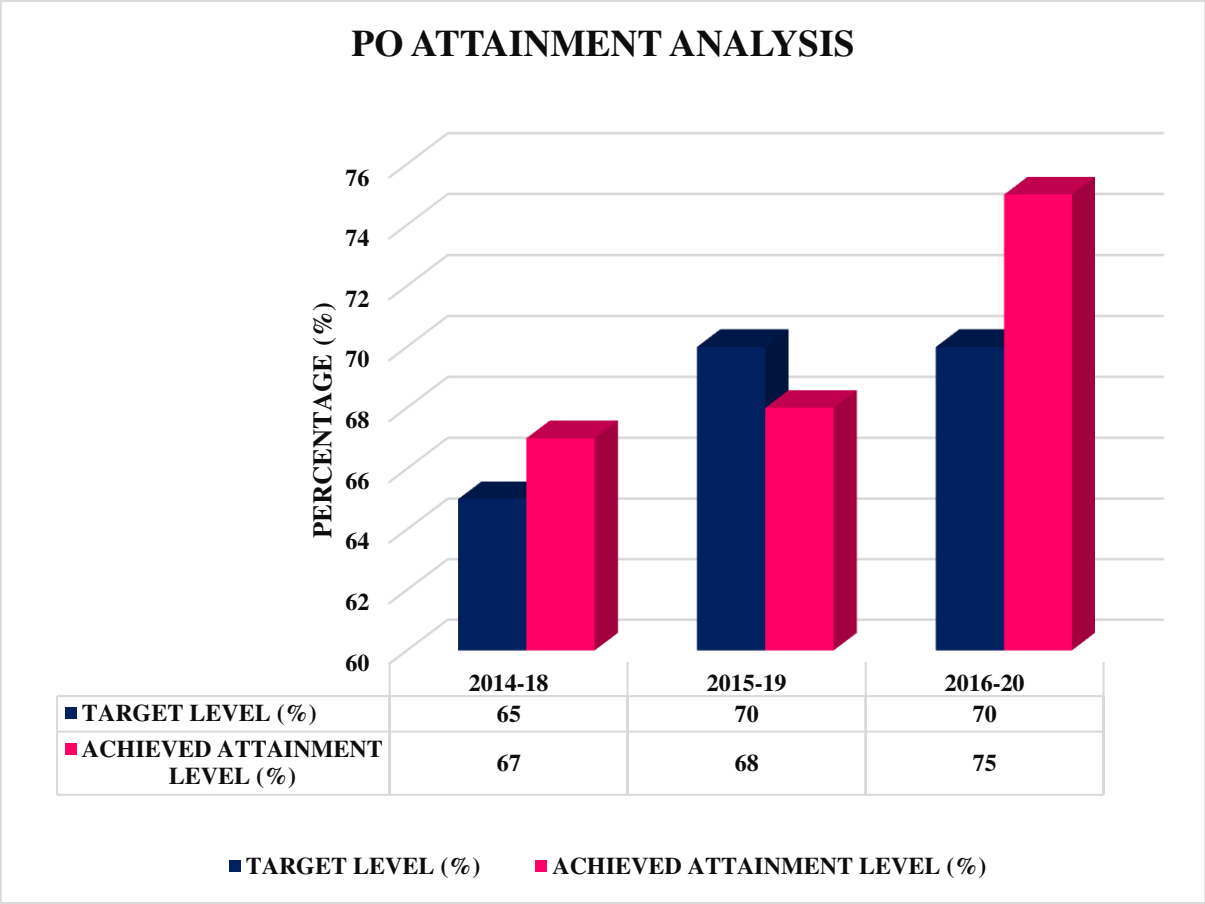


Fig. 3.5 (A) Batch wise PO attainment analysis

Table 3.17 (B) PSO attainment analysis

IES COLLEGE OF TECHNOLOGY BHOPAL						
Department of Electrical and Electronics Engineering						
PSO attainment analysis batch wise						
	2014-18 Batch		**2015-19 Batch**		**2016-20 Batch**	
PSOs	**Target value**	**Total Achieved value**	**Target value**	**Total Achieved value**	**Target value**	**Total Achieved value**
PSO1	2.2	2.1	2.3	2.2	2.3	2.2
PSO2	1.7	2.1	2	2.1	2	2.2
PSO3	2	2	2.1	2.3	2.1	2.3
Average	**1.95**	**2.06**	**2.1**	**2.2**	**2.1**	**2.233**
Percentage	**65.00%**	**68.66%**	**70.00%**	**73.33%**	**70.00%**	**74.4%**

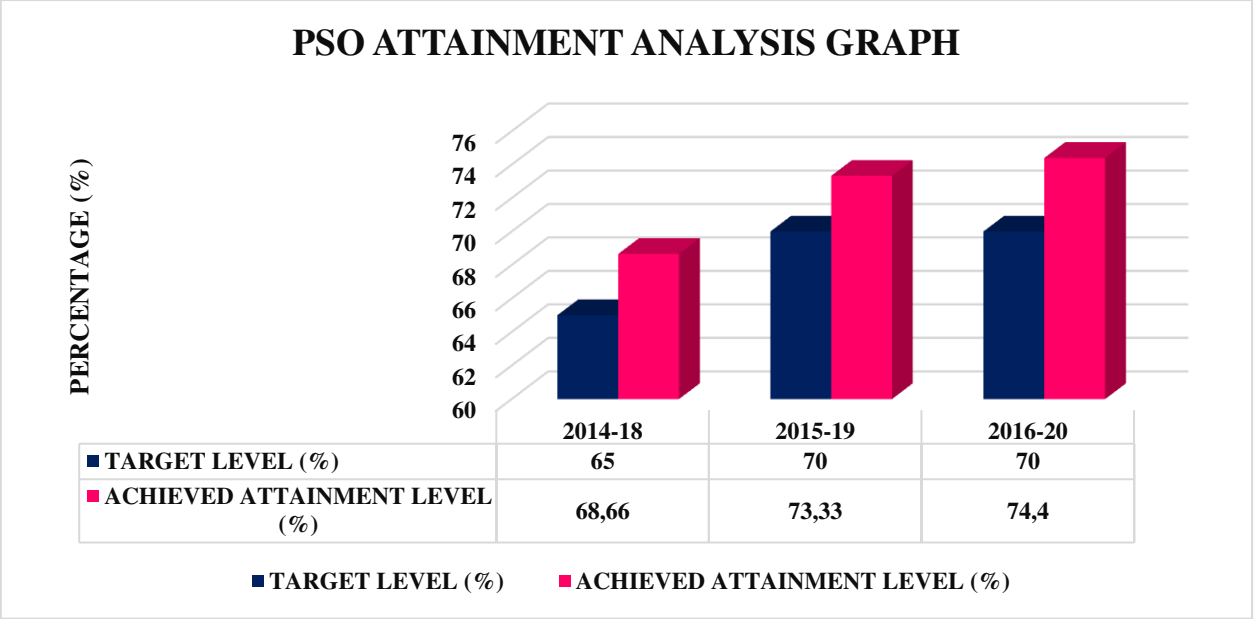


Fig. 3.5 (B) Batch wise PSO attainment analysis

Table 3.18: PO attainment batch: 2016-2020

IES College of Technology Bhopal														
Department of Electrical and Electronics Engineering : 2016-20 Batch														
PO- Attainment- 2016-2020 (2020-21)														
S.no	**Semester**	**Subject Code**	**Subject Name**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
1	I	MA110	Mathematic	0.9	0.9	0.9	0.9	-	0.9	0.9	-	-	-	0.9	0.9
2		CE110	Engineering Mechanics	2.0	2.0	-	-	-	2.0	2.0	-	-	-	-	2.0

3		ME111	Engineering Graphics	0.9	0.9	-	-		0.9	0.9	-	-	-	-	0.9
4		PH110	Physics	1.8	1.9	-	-	3.0	-	-	-	2.0	-	-	1.9
5		HU110	English	1.9	1.9	-	-	-	2.0	-	-	1.6	-	-	2.0
6		ML110P	Environmental Science	3.0	3.0	-	-	-	3.0	-	-	3.0	-	-	3.0
7		EE110P	Introduction to Electrical Engineering	3.0	3.0	-	-	3.0	3.0	-	-	3.0	-	-	
8		HU111P	Communication	2.9	2.9	-	-	-	2.6		-	3.0	-	-	2.8
9		EC-111	Fundamental of Electronics Engineering	2.5	2.5	2.1	-	2.3	2.3	-	-	2.3	-	-	2.4
10		ME112	Concepts of Engineering Design	2.3	2.3	-	-	2.3	2.3	-	-	2.3	-	-	2.3
11		CY110	Chemistry	1.8	1.8	-	-	2.6	2.6	-	-	3.0	-	-	1.9
12		ME113L	Manufacturing Practices	3.0	3.0	3.0	-	3.0	3.0	-	-	3.0	-	-	3.0
13		CS110L	Computer Programming	3.0	3.0	3.0	-	3.0	3.0	-	-	3.0	-	-	3.0
S.no		**Subject Code**	**Subject Name**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
14		HU112L	Rural Outreach	3.0	3.0	3.0	-	-	3.0	3.0	3.0	3.0	3.0	-	3.0
15		MA 111	Mathematics-II	0.9	0.9	-	-	-	-	-	-	-	-	-	0.9
16	II	ME114	Fundamentals of Mechanical Engineering	1.7	1.8	0.9	0.9	0.9	0.9	0.9	-	1.7	0.9	-	0.9
17		BE-3001	Mathematics-III	0.8	0.7	0.8	-	0.6	-	-	-	-	-	-	0.8
18	III	EX-3002	Electrical Measurements and Instrumentation	1.7	1.7	0.9	0.9	1.7	-	-	-	2.5	-	0.9	1.8

19		EX-3003	Network Analysis	1.7	1.7	1.6	2.2	0.9	0.9	-	-	1.7	-	-	1.7
20		EX-3004	Analog Electronics	1.9	1.4	2.0	-	-	-	-	-	2.8	-	-	1.8
21		EX-3005	Signals and Systems	0.9	0.9	-	-	0.9	-	-	-	-	-	-	0.9
22		EX-3006 P	Computer Programming-I (Java)	3.0	3.0	3.0	-	3.0	-	-	-	-	-	-	3.0
23		EX-3007	Rural Outreach (Internal Assessment)	3.0	3.0	3.0	-	-	3.0	3.0	3.0	3.0	3.0	-	3.0
24		EX-3008	NSS/NCC/Socialwork	3.0	3.0	-		3.0			-	3.0	-	-	3.0
25		ES 3001	EEES	3.0	3.0	3.0			3.0	3.0	3.0	-	-	-	3.0
26		Ex 4002	Electrical machine-I	1.5	1.6	-	-	-	-	-	-	2.1	-	-	1.5
27		Ex4003	DELD	1.6	0.9	1.7	-	-	-	-	-	2.3	-	-	1.6
28		Ex 4004	Control System	1.7	2.0	1.6	-	2.2	-	-	-	2.5	-	-	1.7
29		Ex 4005	Power System-I	1.6	1.6	1.6	-		-	-	-	-	-	-	
30		Ex 4006	Computer programing	2.2	2.4	2.6	-	2.3	-	-	-	-	-	-	2.2
S.no		**Subject Code**	**Subject Name**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
31		Ex 4007	Programming Tools (Departmental Choice)	3.0	3.0	3.0	-	3.0	-	-	-	-	-	-	3.0
32	IV	Ex 4008	Professional Ethics (Internal Assessment)	3.0	-	-	-	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
33		Ex5001	EMT	0.8	-	0.8	0.8	-	0.8	-	-	-	-	-	0.8
34		Ex 5002	Electrical Machine -II	1.5	-	0.5	2.4	-	1.5	-	-	-	-	-	1.5
35	V	Ex5003	Switchgear andProtection	1.6	1.6	1.5	1.6	-	1.6	-	-	-	-	0.8	1.6

36		Ex 5004	Power Electronic Devices and Circuits	1.6	0.8	0.8	1.6	-	1.6	-	-	-	-	-	1.6
37		Ex 5005	Energy Conservation and Management	2.2	-	2.2	2.2	-	2.2	-	-	-	-	-	2.2
38		EX-5006P	Software / Simulation Lab-I	2.4	2.4	2.4	2.4	-	2.4	-	2.4	-	2.4	-	2.4
39		Ex 5007P	Management Skill Development ** (Internal Assessment)	3.0	-	3.0	3.0	-	3.0	-	3.0	-	3.0	3.0	3.0
40		EX-5008P	Innovative Thinking** (Internal Assessment)	3.0	3.0	-	-	-	-	-	-	3.0	-	-	3.0
41		Ex6001	Communication Engineering	2.2	2.1	2.0	-	-	-	-	-	-	-	-	2.2
S.no		**Subject Code**	**Subject Name**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
42		Ex 6002	Power System-II	1.7	1.8	1.8	-	2.6	-		-	2.7	-	-	1.7
43		Ex 6003	Microprocessor & Microcontroller	1.6	1.6	1.5	-	2.5	-	-	-	2.5	-	-	1.6
44		Ex 6004	Electronic Instrumentation	2.5	2.4	2.3	-	2.7	2.1	-	-	2.6	-	-	2.4
45		Ex 6005	Utilization of Electrical Energy	1.4	1.5	1.6	1.3	-	1.4	1.3	-	-	-	-	1.4
46	VI	Ex 6006 P	Software Simulation	2.6	2.6	2.6	-	2.6	2.6		-	-	2.6	-	2.6

47		Ex 6007 P	(Creativity and Entrepreneurship	3.0	3.0	3.0	-	-	-	-	-	-	-	3.0	3.0
48		Ex 6008P	Startup / Industrial Lectures	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
49		EX7001	Computer Network	2.3	2.3	2.2	-	1.6	-	-	-	3.0	-	-	2.2
50		Ex 7002	Electric Drives	2.1	2.0	2.0	-	-	-	-	-	-	-	-	2.1
51		Ex 7003	Computer Application to Power System	1.9	1.5	2.4	-	1.9	2.3	-	-	-	-	-	1.9
52		Ex 7004	High Voltage Engineering	3.0	3.0	-	-	-	3.0	-	-	-	-	-	3.0
53		Ex 7005	EHV AC DC	0.8	0.8	-	-	-	-	-	-	-	-	-	0.8
54		Ex 7006 P	Major Project	2.9	2.9	3.0	-	3.0	-	-	-	3.0	-	-	2.9
55	VII	Ex 7007P	Industrial Training	2.4	2.2	3.0	1.8	2.6	2.6	2.3	2.5	2.4	2.5	2.1	2.1
S.no	**Semester**	**Subject Code**	**Subject Name**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
56		Ex 8001	Computer-Aided Design of Electrical machine	2.9	2.9	2.9	-	3.0	3.0	-	-	2.9	-	-	2.9
57		Ex 8002	Power quality Problems and mitigation Techniques	2.8	2.8	3.0	3.0	-	2.8	-	-	2.7	-	-	2.8
58		Ex 8003	Special Machine	3.0	3.0	3.0	-	-	3.0	-	-	-	-	-	3.0
59	VIII	Ex8004	Power Electronics Converters for Renewable Energy	3.0	3.0	3.0	-	-	-	-	-	-	-	-	3.0

60		Ex 8005	Project-II	3.0		3.0	-	-	3.0	-	3.0	3.0	3.0	3.0	3.0
61		Ex8006	(Internal Assessment)	3.0	3.0	3.0	-	-	-	-	-	3.0	-	-	3.0
62		Ex 8007	Group Discussion	3.0	3.0	-	3.0	-	3.0	-	3.0	3.0	3.0	-	3.0
Direct Attainment				**2.2**	**2.2**	**2.2**	**1.9**	**2.4**	**2.3**	**2.1**	**2.9**	**2.7**	**2.7**	**2.2**	**2.2**
Indirect Attainment				**2.3**	**2.4**	**2.4**	**2.2**	**2.2**	**2.2**	**2.4**	**2.1**	**2.1**	**2.2**	**2.0**	**2.1**
Attainment achieved				**2.2**	**2.2**	**2.2**	**1.9**	**2.3**	**2.3**	**2.0**	**2.7**	**2.5**	**2.57**	**2.1**	**2.1**
%Attainment achieved				**73.33**	**73.33**	**73.33**	**63.33**	**76.67**	**76.67**	**66.67**	**90.00**	**83.33**	**85.67**	**70.00**	**70.00**
Target level				**2.2**	**2.2**	**2.0**	**1.9**	**2.2**	**2.0**	**2.0**	**2.1**	**2.3**	**2.2**	**2.1**	**2.2**
% Target				**73.33**	**73.33**	**66.67**	**63.33**	**73.33**	**66.67**	**66.67**	**70.00**	**76.67**	**73.33**	**70.00**	**73.33**
Overall total achieved attainment				**75%**											
Overall set target average				**70%**											

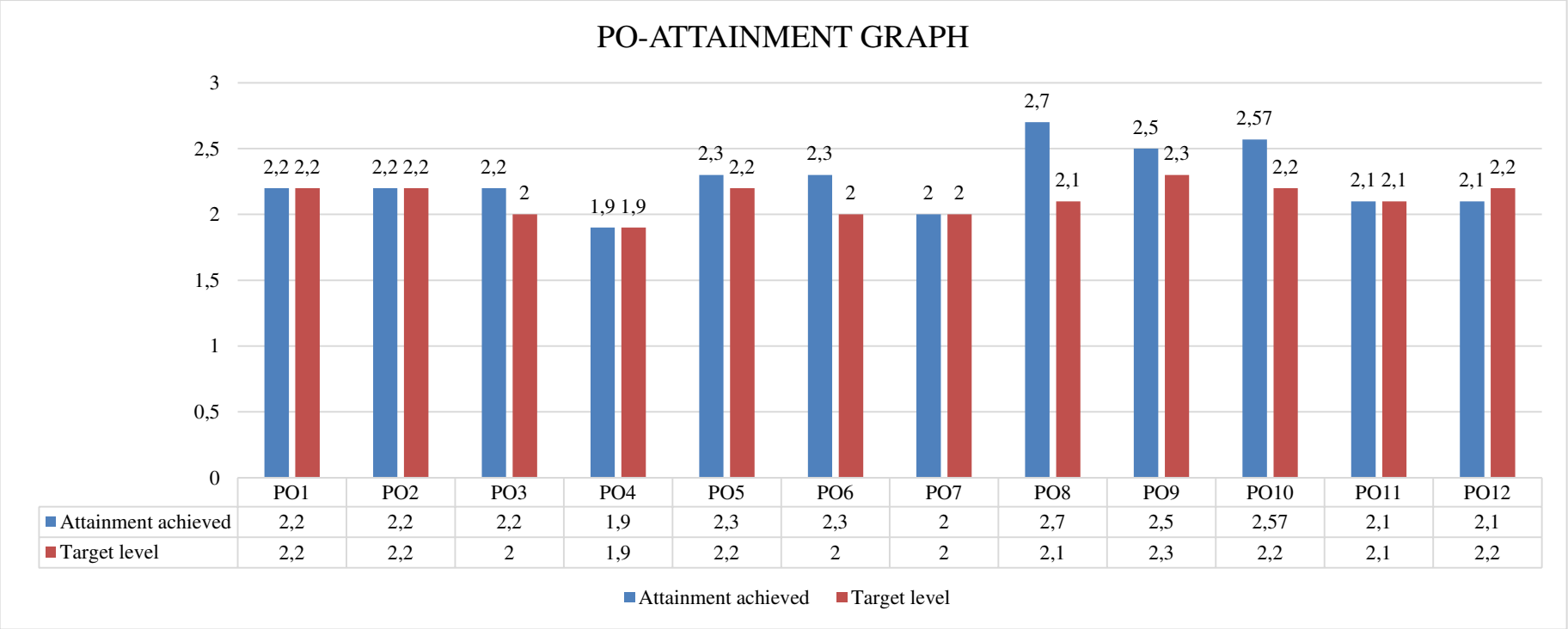


Fig. 3.6CO-PO Attainment graph: 2016-2020 batch

Table 3.18: PSO attainment batch: 2016-2020

IES College of Technology Bhopal						
Department of Electrical and Electronics Engineering : 2016-20 Batch						
PSO- Attainment- 2016-2020 (2020-21)						
S.no	**Semester**	**Subject Code**	**Subject Name**	**PSO1**	**PSO2**	**PSO3**
1	I	MA110	Mathematics	0.9	0.9	0.9
2		CE110	Engineering Mechanics	2.0	3.0	2.0
3		ME111	Engineering Graphics	0.9	0.9	0.9
4		PH110	Physics	1.9	1.8	1.8
5		HU110	English	1.9	2.0	1.8
6		ML110P	Environmental Science	3.0	3.0	3.0
7		EE110P	Introduction to Electrical Engineering	3.0	3.0	3.0
8		HU111P	Communication	2.9	3.0	3.0
9	II	EC-111	Fundamental of Electronics Engineering	2.3	2.7	2.7
10		ME112	Concepts of Engineering Design	2.3	2.3	2.3
11		CY110	Chemistry	1.8	-	1.7
12		ME113L	Manufacturing Practices	3.0	3.0	3.0
13		CS110L	Computer Programming	3.0	3.0	3.0
14		HU112L	Rural Outreach	3.0	3.0	3.0

S.no		Subject Code	Subject Name	PSO1	PSO2	PSO3
15		MA 111	Mathematics-II	0.9	0.9	0.9
16		ME114	Fundamentals of Mechanical Engineering	1.8	2.0	1.7
17		BE-3001	Mathematics-III	0.7	0.8	-
18		EX-3002	Electrical Measurements and Instrumentation	1.8	1.7	2.4
19		EX-3003	Network Analysis	1.7	1.8	2.5
20		EX-3004	Analog Electronics	1.8	1.9	1.9
21		EX-3005	Signals and Systems	0.9	0.9	-
22		EX-3006 P	Computer Programming-I (Java)	3.0	3.0	3.0
23		EX-3007	Rural Outreach (Internal Assessment)	3.0	3.0	3.0
24	III	EX-3008	NSS/NCC/Social work	3.0	3.0	3.0
25		Es 3001	EEES	3.0	3.0	3.0
26		Ex 4002	Electrical machine-I	1.5	1.6	2.1
27		Ex4003	DELD	1.6	1.7	1.6
28		Ex 4004	Control System	1.7	1.7	2.7
29		Ex 4005	Power System-I	1.6	1.6	-
30		Ex 4006	Computer programing	2.2	2.4	2.5
31	IV	Ex 4007	Programming Tools (Departmental Choice)	3.0	3.0	3.0

S.no		Subject Code	Subject Name	PSO1	PSO2	PSO3
32		Ex 4008	Professional Ethics (Internal Assessment)	3.0	3.0	3.0
33		Ex5001	EMT	0.8	0.8	0.8
34		Ex 5002	Electrical Machine -II	1.4	1.5	1.4
35		Ex5003	Switchgear and Protection	1.6	1.6	1.5
36		Ex 5004	Power Electronic Devices and Circuits	1.4	1.6	1.5
37		Ex 5005	Energy Conservation and Management	2.1	2.2	2.2
38		EX-5006P	Software / Simulation Lab-I	2.4	2.4	2.3
39		Ex 5007P	Management Skill Development ** (Internal Assessment)	3.0	3.0	3.0
40	V	EX-5008P	Innovative Thinking** (Internal Assessment)	3.0	3.0	3.0
41		Ex6001	Communication Engineering	2.2	2.2	1.7
42		Ex 6002	Power System-II	1.8	1.8	2.4
43		Ex 6003	Microprocessor & Microcontroller	1.6	1.6	1.7
44		Ex 6004	Electronic Instrumentation	2.5	2.6	2.4
45	VI	Ex 6005	Utilization of Electrical Energy	1.5	1.5	1.5

S.no		Subject Code	Subject Name	PSO1	PSO2	PSO3
46		Ex 6006 P	Software Simulation	2.6	2.6	2.6
47		Ex 6007 P	(Creativity and Entrepreneurship	3.0	3.0	3.0
48		Ex 6008P	Startup / Industrial Lectures	3.0	3.0	3.0
49		EX7001	Computer Network	2.2	2.2	2.3
50		Ex 7002	Electric Drives	2.1	2.1	2.2
51		Ex 7003	Computer Application to Power System	1.9	2.0	2.0
52		Ex 7004	High Voltage Engineering	3.0	3.0	3.0
53		Ex 7005	EHV AC DC	0.8	0.8	0.9
54		Ex 7006 P	Major Project	2.9	3.0	3.0
55	VII	Ex 7007P	Industrial Training	2.5	2.3	2.4
56		Ex 8001	Computer-Aided Design of Electrical machine	2.9	2.9	2.9
57		Ex 8002	Power quality Problems and mitigation Techniques	2.9	2.8	2.8
58		Ex 8003	Special Machine	3.0	3.0	
59		Ex8004	Power Electronics Converters for Renewable Energy	3.0	3.0	3.0
60	VIII	Ex 8005	Project-II	3.0	3.0	3.0

S.no		Subject Code	Subject Name	PSO1	PSO2	PSO3
61		Ex8006	(Internal Assessment)	3.0	3.0	3.0
62		Ex 8007	Group Discussion	3.0	3.0	3.0
Direct Attainment				**2.2**	**2.3**	**2.3**
Indirect Attainment				**2.3**	**2.3**	**2.4**
Attainment achieved				**2.2**	**2.2**	**2.3**
%Attainment achieved				**73.33**	**73.33**	**76.67**
Target level				**2.3**	**2**	**2.1**
% Target				**76.67**	**66.67**	**70.00**
Overall total achieved attainment				**74.4%**		
Overall set target average				**70%**		

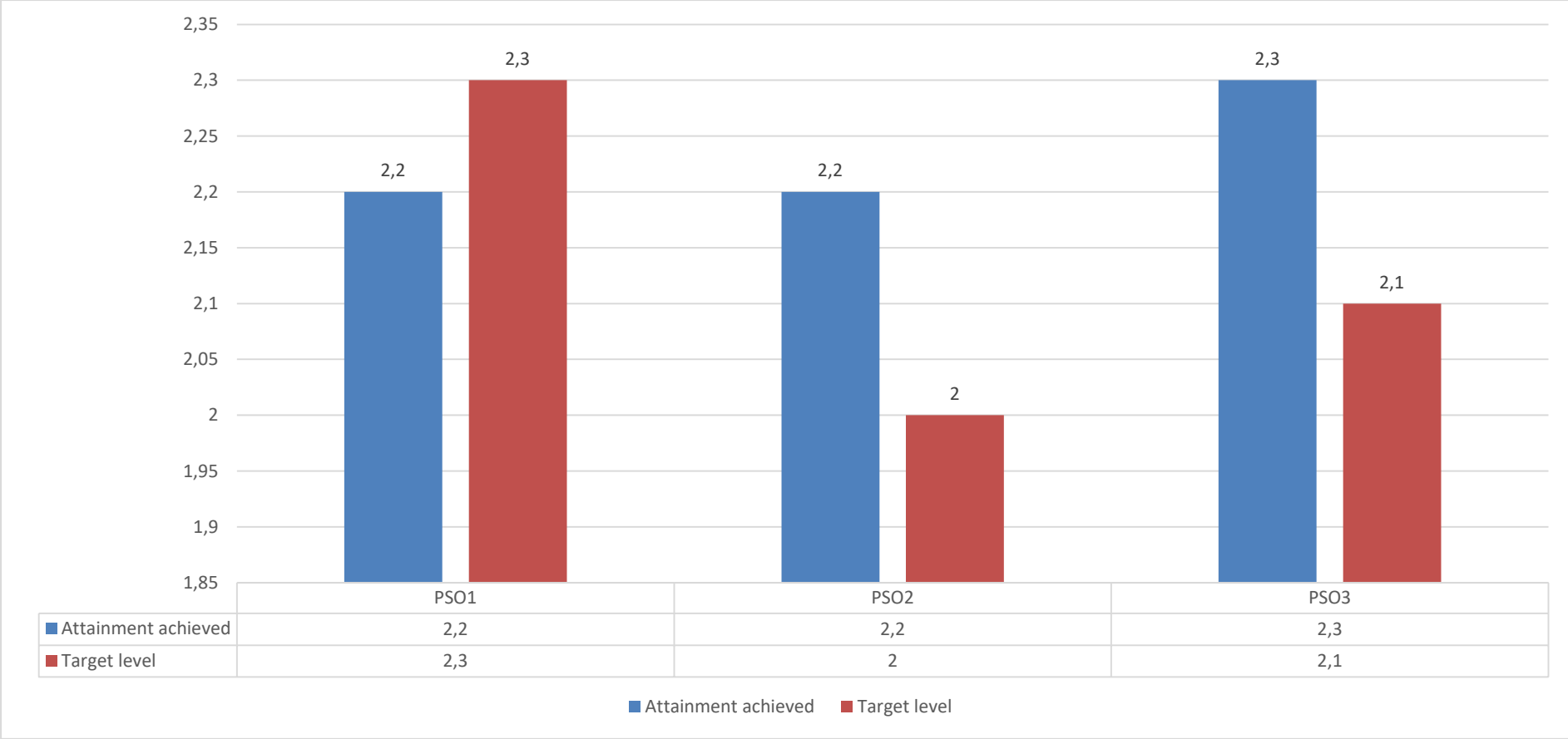


Fig. 3.7 CO-PSO Attainment graph: 2016-2020 batch

CRITERION 4	Students' Performance EX	150

CRITERION-4 Students' Performance (150)

Table: 4.1 Student Admission data

Item (Information to be provided cumulatively for all the shifts with explicit headings, wherever applicable)	CAY (2020-21)	CAYm1 (2019-20)	CAY*m*2 (2018-19)	CAY*m*3 (2017-18)	CAYm4 (2016-17)	CAYm5 (2015-16)	CAYm6 2014-15)
Sanctioned intake of the program (*N*)	120	120	120	120	120	120	120
Total number of students admitted in first year *minus* number of students migrated to other programs/institutions plus no. of students migrated to this program (*N*1)	79	105	91	106	105	103	32
Number of students admitted in 2nd year in the same batch via lateral entry (*N*2)	-	27	21	10	07	02	00
Separate division (*N3)*	-	-	-	-	-	-	-
Total number of students admitted in the Program (*N*1 + *N*2 + N3)	79	132	112	116	112	105	32

CAY – Current Academic Year
CAYm1- Current Academic Year minus1= Current Assessment Year
CAYm2 - Current Academic Year minus2=Current Assessment Year minus 1
LYG – Last Year Graduate minus 1
LYGm1 – Last Year Graduate minus 1
LYGm2 – Last Year Graduate minus 2

Note: * (As per govt. Norms 10% seats filled by lateral entry)
** (As per govt. Norms 1st year vacant seats filled by lateral entry)
*** (As per AICTE Norms 05% seats are to be filled by TFW over and above the sanction intake)

Table: 4.2 Students who have successfully graduated without backlogs

Year of entry	*N*1 + *N*2 + N3 (As defined above)	Number of students who have successfully graduated without backlogs in any semester/year of study (Without Backlog means no compartment or failures in any semester/year of study)			
		I Year	II Year	III Year	IV Year
CAY (2020-2021)	79	-	-	-	-
CAY*m*1 (2019-2020)	132	47	-	-	-
CAY*m*2(2018-2019)	112	43	56	-	-
CAY*m*3 (2017-2018)	116	23	23	23	-
CAY*m*4(LYG) (2016-2017)	112	46	17	17	16
CAY*m*5 (LYG*m*1) (2015-2016)	105	17	08	05	05
CAY*m*6 (LYG*m*2) (2014-2015)	32	11	05	04	04

(N1+N2+N3) – Left Student = Total

Note: *Latest Year Batch and CAY*m*1, CAY*m*2, CAY*m*3, CAY*m*1 4 and CAY*m*5 respectively.

Table: 4.3 Students who have successfully graduated

Year of entry	*N*1 + *N*2 + N3 (As defined above)	Number of students who have successfully graduated			
		I Year	II Year	III Year	IV Year
CAY (2020-2021)	79	-	-	-	-
CAYm1 (2019-2020)	132	100	-	-	-
CAY*m*2 (2018-2019)	112	88	106	-	-
CAY*m*3 (2017-2018)	116	80	86	85	-
CAY*m*4 (LYG) (2016-2017)	112	85	92	90	82
CAY*m*5 (LYG*m*1) (2015-2016)	105	88	83	80	80
CAY*m*6 (LYG*m*2) (2014-2015)	32	24	23	22	22

4.1. Enrolment Ratio (20)

Enrolment Ratio= N1/N

Table: 4.4 Enrolment Ratio

Year	N1	N	Enrolment Ratio= N1/N	Percentage
2020-2021	79	120	0.658	65.83
2019-2020	105	120	0.875	87.5
2018-2019	91	120	0.758	75.83
Average			0.763	76.38
Marks			16	

4.2 Success Rate in the stipulated period of the program (40)

4.2.1 Success rate without backlogs in any semester/year of study (25)

SI= (Number of students who have graduated from the program without backlog)/ (Number of students admitted in the first year of that batch and admitted in 2nd year via lateral entry and separate division, if applicable)

Average SI = Mean of Success Index (SI) for past three batches

Success rate without backlogs in any year of study = 25 × Average SI

Table: 4.5 Success rate without backlog

Item	Latest Year of Graduation, LYG (2016-17)	Latest Year of Graduation minus 1, LYGm1 (2015-16)	Latest Year of Graduation minus 2,LYGm2 (2014-15)
Number of students admitted in the corresponding First Year + admitted in 2nd year via lateral entry and separate division, if applicable X	112	105	32
Number of students who have graduated without backlogs in the stipulated period Y	16	05	04
Success Index (SI) = Y/X	0.142	0.05	0.125
Average SI	0.105		

Success rate without backlogs in any year of study = 25 0.105=2.64*

4.2.2 Success rate with backlog in stipulated period of study (15)

SI= (Number of students who graduated from the program in the stipulated period of course duration)/ (Number of students admitted in the first year of that batch and admitted in 2nd year via lateral entry and separate division, if applicable)
Average SI = mean of Success Index (SI) for past three batches

Success rate = 15 × Average SI

Table: 4.6 Success Rate with backlog

Item	LYG(2016-17)	LYGm1(2015-16)	LYGm2 (2014-15)
Number of students admitted in the corresponding First Year + admitted in 2nd year via lateral entry and separate division, if applicable	112	105	32
Number of students who have graduated with backlog in the stipulated period	82	80	22
Success Index	0.732	0.76	0.69
Average Success Index	0.727		

Success rate = 15 0.727 = 10.9*

Note: If 100% students clear without any backlog then also total marks scored will be 40 as both 4.2.1 & 4.2.2 will be applicable simultaneously.

4.3 Academic Performance in Third Year (15)

Table: 4.7 A. Academic Performances in Third Year

Academic Performance	CAYm3 (2017-18)	LYG (2016-17)	LYGm1 (2015-16)
Mean of CGPA or Mean Percentage of all successful students (X)	7.14	7.0	6.71
Total no. of successful students (Y)	85	90	80
Total no. of students appeared in the examination (Z)	86	92	83

API = x* (Y/Z)	7.05	6.85	6.47
Average API = (AP1 + AP2 + AP3)/3	6.79		

*Academic Performance Level =1.5*6.79 =10.185*

Table: 4.7 B. Academic Performance in second Year

Academic Performance	CAYm2 2018-19	CAYm3 (2017-18)	LYG (2016-17)
Mean of CGPA or Mean Percentage of all successful students (X)	6.89	6.85	7.10
Total no. of successful students (Y)	106	86	92
Total no. of students appeared in the examination (Z)	109	90	92
API = x* (Y/Z)	6.70	6.13	6.95
Average API = (AP1 + AP2 + AP3)/3	6.59		

Academic Performance Level = 1.5 * 6.59 = 9.89

4.5 Placement, Higher Studies and Entrepreneurship (40)

Assessment Points = 40 × average placement

Table: 4.8 Academic Performance in second Year

Item	LYG 2016-2017	LYGm1 (2015-16)	LYGm2 (2014-15)
Total No of Final Year Students(N)	82	80.00	22.00
No of students placed in the companies or government sector(X)	56	53.00	14.00
No of students admitted to higher studies with valid qualifying scores (GATE or equivalent State or National Level tests, GRE, GMAT etc.) (Y)	1.00	1.00	0.00
No of students turned entrepreneur in engineering/technology (Z)	1.00	0.00	1.00
x + y + z =	58	54	15
Placement Index [(X+Y+Z)/N] :	0.70	**0.68**	**0.68**
Average placement= (P1 + P2 + P3)/3=		**0.69**	

Assessment Points = 40 × average placement

Assessment Points = 40 *0.69 = 27.46

4.5a.Provide the placement data in the below mentioned format with the name of the program and the assessment year:

Table 4.9

EX ICOT					
S.No	Enroll No	Name	Company	Reference No	Package
1	0177EX161005	AFJAL ANSARI	Asahi India Galss Ltd.	7-Dec-19	1.8
2	0177EX161006	AJAY KUMAR PANDIT	Millennium Semiconductors	17-Feb-20	3
3	0177EX161007	AJEET KUMAR PATEL	Topper Technologies	13-Nov-19	6
4	0177EX161013	AMANDEEP KUMAR	Epic Research	16-Jul-20	2.75
5	0177EX161014	AMIT KUMAR	Millennium Semiconductors	17-Feb-20	3
6	0177EX161017	ANAND KUMAR SINGH	Kreativen Technologies	#537	2.4
7	0177EX161018	ANU KUMAR SAH	Ceasfire	27-Jul-20	4.5
8	0177EX161020	ANUJ KUMAR UPADHYAY	IT Solutions	20-Jan-20	2.5
9	0177EX161021	ANUP KUMAR SINGH	Asahi India Galss Ltd.	7-Dec-19	1.8
10	0177EX161026	ARSHAD HUSSAIN (H)	Topper Technologies	13-Nov-19	6
11	0177EX161027	ARVIND KUMAR	Ceasfire	27-Jul-20	4.5
12	0177EX161035	BIKASH KUMAR	Epic Research	16-Jul-20	2.75
13	0177EX161036	BIKRAM KUMAR JHA (H)	Millennium Semiconductors	17-Feb-20	3
14	0177EX161038	BINOD KUMAR VERMA	Asahi India Galss Ltd.	7-Dec-19	1.8
15	0177EX161041	DEEPAK KUMAR YADAV	Millennium Semiconductors	17-Feb-20	3
16	0177EX161047	INDAL KUMAR RAVI	Topper Technologies	13-Nov-19	6
17	0177EX161048	INDRAJEET GIRI	Kreativen Technologies	#538	2.4
18	0177EX161051	KRITIKA GARHWAL	Ceasfire	27-Jul-20	4.5
19	0177EX161058	MD ASIF	Asahi India Galss Ltd.	7-Dec-19	1.8
20	0177EX161059	MD DANISH AURANGZEB	Topper Technologies	13-Nov-19	6
21	0177EX161060	MD KHURSHEED ALAM	Millennium Semiconductors	17-Feb-20	3
22	0177EX161062	MD NAFISH ALAM	Epic Research	16-Jul-20	2.75
23	0177EX161063	MD SHAHABUDDIN	Ceasfire	27-Jul-20	4.5
24	0177EX161066	MD SHAHWAZ SHAMSH	Kreativen Technologies	#539	2.4
25	0177EX161067	MD TASHKEEL AHMAD	Millennium Semiconductors	17-Feb-20	3
26	0177EX161071	MUKESH KUMAR RAM	Ceasfire	27-Jul-20	4.5
27	0177EX161073	NAJMUS SAQUIB	Epic Research	16-Jul-20	2.75
28	0177EX161075	NAYAN GARHWAL	KPIT	12-Jun-21	3.6
29	0177EX161076	NILESH SINGH	Asahi India Galss Ltd.	7-Dec-19	1.8
30	0177EX161077	NIRAJ KUMAR	Millennium Semiconductors	17-Feb-20	3
31	0177EX161080	PRAKASH SAHU	Topper Technologies	13-Nov-19	6
32	0177EX161081	PRAMOD YADAV	Ceasfire	27-Jul-20	4.5
33	0177EX161082	RAHUL ANAND	HLBS	26-Aug-20	3.25
34	0177EX161085	RAHUL SINGH	Millennium Semiconductors	17-Feb-20	3
35	0177EX161087	RAJA BABU	Adonai	12-Aug-20	2.75

36	0177EX161088	RAM PRAVESH	Kreativen Technologies	#540	2.4
37	0177EX161089	RANA KUMAR	Ceasfire	27-Jul-20	4.5
38	0177EX161091	RAVI PRATAP SINGH	KPIT	12-Jun-21	3.6
39	0177EX161095	SATISH KUMAR SHARMA	Asahi India Galss Ltd.	7-Dec-19	1.8
40	0177EX161098	SHAHBAZ ANSARI	DXC technology	21-Jun-20	4
41	0177EX161100	SHRUTIKA SAWADE	Mphasis	MPHTH2020-0360	3.25
42	0177EX161103	SUJEET KUMAR DUBEY	Ceasfire	27-Jul-20	4.5
43	0177EX161105	SUMIT SHENDE	HLBS	26-Aug-20	3.25
44	0177EX161106	SURAJ KUMAR HELA	Millennium Semiconductors	17-Feb-20	3
45	0177EX161109	TANAY GUPTA	IT Solutions	20-Jan-20	2.5
46	0177EX161114	VIKASH KUMAR SHARMA	Millennium Semiconductors	17-Feb-20	3
47	0177EX161116	VINIT KUMAR	HLBS	26-Aug-20	3.25
48	0177EX161117	VISHNU VISHWAKARMA	Ceasfire	27-Jul-20	4.5
49	0177EX161119	VISHWJEET KUMAR	DXC technology	21-Jun-20	4
50	0177EX161120	VIVEK CHAUHAN	Millennium Semiconductors	17-Feb-20	3
51	0177EC161102	SHUBHAM KUMAR	DXC technology	21-Jun-20	4
52	0177EC161106	SURAJ KUMAR SINGH	KPIT	12-Jun-21	3.6
53	0177EX173D02	PARWEJ ALAM	Asahi India Galss Ltd.	7-Dec-19	1.8
54	0177EX173D05	PUSPRAJ SINGH	Adonai	12-Aug-20	2.75
55	0177EX173D06	SANJAY KUMAR	HLBS	26-Aug-20	3.25
56	0526EC161032	PAWAN KUMAR	Ceasfire	27-Jul-20	4.5

4.6 Professional Activities (20)

Table 4.10 (A) Professional societies/ chapters and organizing engineering events (5)

S.NO.	Year	Professional societies/ chapters
1	CAY (2019-20)	IEEE, CII, IETE, VIGYAN BHARTI, NPTEL Local Chapter
2	CAYm1 (2018-19)	IEEE, CII, IETE, VIGYAN BHARTI
3	CAYm2 (2017-18)	IEEE, CII, IETE, VIGYAN BHARTI

Table 4.10 (B) Expert lectures / Expert talks conducted under Chapters including list of resource persons:

S. No.	Theme	Dates	Resource Persons	PO/PSO
1	Expert Talk: Angel Investment/ VC Funding Opportunity for Early Stage Entrepreneurs	23/05/2021	Ms. Amruta Shingvekar General Manager, VASPL Initiatives	POs- 11, 12
2.	Expert Talk:"IEEE Sight Orientation Program"	19/05/2021	Dr. Hussain F Mahdi,Lecturer, College of Engineering, University of Diyala, Iraq and Dr. Aarti Karande, Chair, IEEE Sight Bombay Pratham Chapter	POs – 1,3,4,8,9,10,12 PSOs – 1,3
3	Expert Talk"Professional In You"	14/05/2021	Mr.Ajay Tyagi, Founder CEO, Valt consulting pvt. Ltd.	POs – 1,3,4,8,9,10,12 PSOs – 1,3
4	IEEE Expert talk on “How to write an effective technical paper for the IEEE”	13/2/2021	Mr. Pratik Baheti,Vice Chair, Activity planning & management, TPAC IEEE Bombay Section	PO-1,2,4,5,10,12 PSO-1,2,3
5	IEEE CSI IETE Expert talk on “ARTIFICIAL INTELLIGENCE IN GAMING AND ROBOTICS”	12/2/2021	Dr. Sandeep Raghuwanshi, Assistant Professor,Data Science ML –AI Researcher, SATI Vidisha	PO 1,2,4,5,8,9,10,11 PSO 2,3
6	Session on" Startup and Incubation”	9/1/2021	Shri Sumit Kumar Founder & CEO, Acupace Technologies Pvt. Ltd.	PO 1,4,5,8,910,11,12 PSO 2,3

7	Live National Expert talk on: "Things should know by innovators about IP"	20/01/2021	Mr. Parag M More, IPR Consultant and advisor	PO 1,2,3,5
8	Expert talk on "Entrepreneurship Activity Fund Supports Available for Incubates".	8/1/2021	Shri Kishore Kumar Tolani Financial Literacy Counsellor Bank of India, Bhopal.	PO 1,2,9,10,11
9	Live National Webinar & Expert talk on: "Green Communication: A Futuristic Concept".	31/12/2020	Dr. Abhishek Bhatt Dept. of E & TC, College of Engineering Pune, Pune.	Po 1,6,7 PSO 1,2,3
10	Expert talk on "Know Your IEEE: Activity & advantages" Live National Webinar Organized by: IES IEEE STUDENT BRANCH	29/12/2020	Shri Saurabh J. Soni Secretary IEEE Bombay Section CS Chapter	PO-1,2,4,5,10,12 PSO-1,2,3
11	Expert talk on Writing and publishing scientific research paper in SCI Journals-A Frame work	02-11-2020	Dr. P Pal Pandian, Professor, Christ University, Bhopal	PO-1,2,4,5,10,12 PSO-1,2,3
12	Expert talk on Importance of motivation in present scenario	20-07-2020	Prof. Ajeet Angral, Consultant PMSSS J &K	PO 5,6,7,12 PSO 2,3
13	Expert Lecture on " Transmission& Distribution of Electrical Energy"	21-01-2020	Dr. A.M. Shandilya, Rtd. Prof., EE Dept., MANIT Bhopal	PO 1,6,7,12 PSO 2,3
14	In-house Training on Arduino System	19-30/12/2019	Mr. Abhigyanam Giri IndEyes Infotech Pvt Ltd.	PO 1,2,3,5,7,8,11,12 PSO 2,3
15	In-house Training on Embedded System	2-14/6/2018	Mr. Abhigyanam Giri IndEyes Infotech Pvt Ltd.	PO 1,2,3,4,5,12 PSo 2,3

16	Workshop on " Emotional Intelligence"	17-18/04/2018	Shri Vinay Partale, AICTE	Po 12 PSo
17	Expert lecture on "Signal and System"	4-02-2018	Mr. Rakesh Talrega, GATE 9th Rankers	PO 1,2,3,5,8 PSO 1,2
18	Workshop on PCB Designing and Robotics	15 to 26/11/2017	Mr. Abhigyanam Giri Ind Eyes Pvt. Ltd. Bhopal	PO 1,2,3,4,5,12 PSO 2,3

Table 4.10 (C) Following Webinar & Workshop have been conducted under the societies / chapters

S.No.	Organized event under society	Place of Activity	Level of event	Duration/ Days of Activity	Outcome of Program
1	Alumni Talk" Corporate Expectations from Professional Students"	ICOT Bhopal	College level	02-01-2021	PO2, PO3, PO12
2	Expert talk on "Entrepreneurship Activity Fund Supports Available for Incubates".	ICOT Bhopal	College level	08-01-2021	PO1,PO8,PO9,PO11, PSO1
3	Preparation for service selection board interview and tips	ICOT Bhopal	College level	07-11-2020	PO2,PO8,PO10
4	Workshop on IOT and Its applications	UIT RGPV Bhopal	State level	26-30/03/2019	PO1,PO8,PO9,PO10
5	Solar Lamp Workshop	MANIT	National	02/10/2019	PO2, PO3, PO12,PSO1
6	Job Opportunities in post Covid-19 Scenario and Challenges thereafter	ICOT Bhopal	National	20/06/2020	PO3,PO6,PO9,PO12, PSO3
7	Transformation in education Challenges & Opportunities in post covid 19	ICOT Bhopal	National	18/06/ 2020	PO4,PO7,PO11,PO12

8	Innovation of effective teaching and research methodology	ICOT Bhopal	College level	17/02/2020	PO2,PO8,PO10
9	TEQIIP Workshop Placement Preparation	ICOT Bhopal	College level	06-07/09/2019	PO3,PO8,PO9,PO12
10	Session on international study on UK & US	ICOT Bhopal	College level	19-20/08/2019	PO6,PO8,PO7,PO12
11	Workshop on Python	ICOT Bhopal	College level	22/6/2019	PO2,PO4,PO6,PO12

Table 4.10 (D) NPTEL Certifications

Sn.	Enrollment	Students Name	Course
1	0177EX171099	Salman khan	Control Engineering
2	0177EX171044	Manish Thapa	Problem Solving through Programming in C
3	0177EX181017	Ashutosh Prashant	Basic Electrical Circuit
4	0177EX181021	Avinash Patel	Basic Electrical Circuit

4.6.2 Publication of technical magazines, newsletters, etc. (5)

(The Institute shall list the publications mentioned earlier along with the names of the editors, publishers, etc.)

QUEST is college Newsletter published and is being circulated among faculty, students and parents.

Table 4.11 (A) Editorial Board for news letter:

S. No.	Academic Year	Name of The Newsletter	Name of editors	Name of Publishers
1	2020-21	QUEST	Chief Editor: 1. Dr. Sunita Singh, Director, IES group of institutions, Bhopal Student Editors:	IES College of Technology,

			1. Tanya Sharma (CSE) 2. Pulkit Prakash (EC) 3. Priya Patel (EX) 4. Jayshankar Chouhan (ME) 5. Shilpy Maithli (CE)	Bhopal

4.6.3 Participation in inter-institute events by students of the program of study (10)

(The Department shall provide a table indicating those publications, which received awards in the events/conferences organized by other institutes.)

Table 4.12 (A) Participation in Inter-Institute Events by Students

S. No.	Name of Students	Event	Date	Organized by	Event outcomes	PO/POs
1	Amit Kumar Abhishek Kumar Anurag Kumar Brajesh Kumar	Vigyan Mela	Feb 2019	(Vigyan Bharti MPCST)	Certificate	PO1,PO9, PO10,PO12
2	Manish Thapa	KPIT Sparkle	March 2019	KPIT, Pune	Certificate	PO1,PO5,PO6 ,PO9, PO10,PO12
3	Jitendra Ahirwar	3 Days STTP on Cyber Security & Ethical Hacking	30 Jan 2019 - 01 Feb 2020	UIT- RGPV TEQIP - III	Certificate	PO1,PO9, PO10,PO12
4	Keshav Ahirwar					
5	Lalit					
6	Ashish Raj					
7	Md Attaullah					
8	Abhishek Kumar	Workshop on Wireless Communication	15-09-2019	Indeyes Infotech Pvt. Ltd	Certificate	PO1,PO5,PO6 ,PO9, PO10,PO12
9	Charitra Prakash					
10	Ashish Raj					
11	Manish Kumar Thapa					
12	Lalit					
13	Jitendra Ahirwar					

14	Raj Kumar Singh	Industrial Training on Amazon Web Services Training	15-01-2019 to 03-02-2019	WebTek Lab Pvt. Ltd.	Certificate	PO1,PO5,PO6 ,PO9, PO10,PO12
15	Ram Prakash					
16	Prem Prakash Mourya					
17	Md Attaullah					
18	Jitendra Ahirwar	Workshop on Matlab	May 2019	Indeyes Infotech Pvt. Ltd	Certificate	PO1,PO3,PO5 ,PO6,PO9, PO10,PO12
19	Keshav Ahirwar					
20	Lalit					
21	Abhishek Kumar					
22	Md. Ayaz akhtar					
23	Manish Kumar Thapa					
24	Md Attaullah					
25	Priya Patel					
26	Shashi Alpana					
27	Aishwary Masih					
28	Ayushi Pareriya					
29	Raj Kumar Singh					
30	Rahul Kumar					

Table 4.12 (B) Participation in Inter-Institute Sports Events by Students

S.No.	Name of Students	Tournament	Year	Organized By	Result
1.	Indrajeet Singh	Nodal RGPV Cricket Tournament	2015, 2016, 2017	Radharaman College (RGPV) Bhopal	Participated
2.	Suraj Kumar Hela	Nodal RGPV Football	2019	RGPV Bhopal	Participated
3.	Suraj Kumar	Nodal RGPV Badminton	2019	RGPV Bhopal	First runner-up

	Hela				
4.	Buland Akhtar	Nodal RGPV Football	2018	ICOT/ RGPV Bhopal	Participated
5.	Buland Akhtar	Nodal RGPV Swimming	2019	Prakash Tarun Pushkar RGPV Bhopal	First Position
6.	Buland Akhtar	State RGPV Swimming	2019	RGPV Bhopal	Second Position
7.	Ankush Kumar	Nodal RGPV Football	2018	ICOT/ RGPV Bhopal	Participated
8.	Priya Patel	Nodal RGPV Netball	2019	ICOT/ RGPV Bhopal	Participated
9.	Munna Kumar Kushwaha	Nodal RGPV Kabaddi	2019	RGPV Bhopal	Participated

Table 4.12 (C) Detail of NCC:

Sn.	Regimental No.	Name	Completed Certificate
1	MPSD16A1106	Ashutosh Kumar	NCC B & C Certificate Completed
2	MPSD16A1108	Dheeraj Kumar Raj	NCC B & C Certificate Completed
3	MPSD18A110908	Buland Akhtar	NCC B & C Certificate Completed
4	MPSD18A110912	Lalit	NCC B & C Certificate Completed
5	MPSD18A110914	Munna Kumar Kushwaha	NCC B & C Certificate Completed
6	MPSD18A110917	Raj Kumar Singh	NCC B & C Certificate Completed
7	MPSD19A110903	Saad –Al- Miran	NCC ‘B’ Certificate Completed

Criterion 5	Faculty Information and contributions	200

FACULTY INFORMATION AND CONTRIBUTIONS (200)

FACULTY INFORMATION (ELECTRICAL AND ELECTRONICS ENGINEERING)

YEAR 2020-2021

S.No.	Name	PAN No	Qualification	Area of Specialization	Designation	Date of Joining	Date on which Designated as Professor/ Associate Professor	Currently Associated (Y/N)	Nature of Association (Regular/Contract/ Adjunct)	If contractual mention Full time or Part time	Date of Leaving (In case Currently Associated is "No")
1.	Dr. ARUN SHANDILYA	ADAPS8093E	PHD	Electrical	Professor	01/7/2019	-	Y	Regular	-	-
2.	Dr. PALLAVEE BHATNAGAR	AGGPB3351B	PHD	Power Electronics	Professor	02/07/18	-	Y	Regular	-	-
3.	Dr. BRAJESH MOHAN GUPTA	ALMPG8331M	PHD	Electrical Engineering	Associate Professor	01/07/2019	-	Y	Regular	-	-
4.	Ms. JYOTI	AJKPG7553	M.TECH	HEE	Asst	18/09/20	-	Y	Regular	-	-

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	BANSAL	K			Professor	17					
5.	Mr. AKHILESH DWIVEDI	BJLPD6277P	M.TECH	EX	Asst Professor	09/01/2014	-	Y	Regular	-	-
6.	Ms. POONAM KHATARKAR	BEKPK3380J	M.TECH	Power Electronics	Asst Professor	11/9/2017	-	Y	Regular	-	-
7.	Mr. SANDEEP PANDEY	APLPP3192A	M.TECH	Electrical And Electronics Eng	Asst Professor	23/12/2011	-	Y	Regular	-	-
8.	Mr. SHYAM KUMAR CHANDNANI	AIIPC0876G	M.TECH	Electrical and Electronics Eng	Asst Professor	10/1/2019	-	Y	Regular	-	-
9.	SAURABH MISHRA	ALZPM8413F	M.TECH	Energy	Asst Professor	01/08/2012	-	Y	Regular	-	-
10.	Mr .AJIT KUMAR MISHRA	BBRPM8272M	M.TECH	Electrical & Electronics Engg	Asst Professor	23/06/2012	-	Y	Regular	-	-
11.	VIJAY ANAND BHARTI	AQZPB4726F	M.TECH	Electrical & Electronics Engg	Asst Professor	01/07/2019	-	Y	Regular	-	10/05/2021
12.	Mr. ANANT	AJQPT3766	M.TECH	Power	Asst	22/03/20		Y	Regular	-	-

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	THAKUR	P		Electronics	Professor	16					
13.	MR. RAHUL MALVIYA	BGEPM0146G	M.TECH	Power Electronics	Asst Professor	31/07/2016	-	Y	Regular	-	-
14.	Ms. NAMRATA SHRIVASTAVA	CTVPS8684J	M.TECH	Power Electronics	Asst Professor	04/03/2020	-	Y	Regular	-	-
15.	Mr. MANISH AGARWAL	AJTPA3841R	M.TECH	EX	Asst Professor	09/08/2017		Y	Regular	-	-
16.	Ms. PRATIBHA ACHINTYA	BIQPA5980F	M.TECH	EX	Asst Professor	17/08/2020		Y	Regular	-	-
17.	Mr. RAHUL MISHRA	AYSPM8693B	M. TECH	EX	Asst Prof	01/7/2019		Y			
18.	Mr. ANAND MANI	BVVPM9973Q	M. TECH	Power System	Asst Professor	08/09/2020		Y	Regular		
19.	Mr. AVINASH KUMAR RAI	BSJPR6659C	M. TECH	Power Electronics	Asst Professor	01/08/2020		Y	Regular		
20.	Ms. VIDHI RAWAT	AIJPR8238C	M. TECH	Instrumentation and Control	Asst Professor	01/08/2020		Y	Regular	-	-
21.	MR PANKAJ MANDVE	BAAPM7337M	M. TECH	Control Systems	Asst Professor	01/08/2020		Y	Regular	-	-

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22.	Ms. ABHILASHA OMANA KUTTAN	CPLPK7666G	M. TECH	Power Electronics	Asst Professor	01/08/2020		Y	Regular	-	-
23.	Mr. J P SHARMA	APYPS1286D	M.TECH	Electrical & Electronics Engg	Adjunct (Regular)	01/07/2020	-	Y	Adjunct (Regular)	-	-
24.	Dr. GYANENDRA KUMAR PANDEY	AAEPP1348J	ME/M. Tech and PhD	Electrical & Electronics Engg	Professor	22/12/2016		Y	Regular	-	-
PG FACULTY LIST											
25.	Dr. SANDEEP KUMAR	AHXPK7482J	PHD		Professor	08/07/2019	-	Y	Regular		
26.	ANOOP KUMAR	AVCPK6842M	M.TECH	Electrical &Electronics Engg	Asst Professor	10/5/2013	-	Y	Regular	-	-
27.	VIKAS MOHAN	AWCPM3257D	M.TECH	Electrical & Electronics Engg	Asst Professor	8/5/2013	-	Y	Regular	-	-

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5.1 Student-Faculty Ratio (SFR) (20)

No. of UG Programs in the Department (n): 01

No. of PG Programs in the Department (m): 01

No. of Students in UG 2nd Year= **422**

No. of Students in UG 3rd Year= **402**

No. of Students in UG 4th Year= **381**

No. of Students in PG 1st Year= **54**

No. of Students in PG 2nd Year= **54**

No. of Students = **Sanctioned Intake + Actual admitted lateral entry students**

No. of Students = Sanctioned Intake + Actual admitted lateral entry students

(The above data to be provided considering all the UG and PG programs of the department)

S = Number of Students in the Department = UG1 + UG2 +… +UGn + PG1 + …PGn

F = Total Number of Faculty Members in the Department (excluding first year faculty)

F = No. of faculty = (a + b – c) for every assessment year

Student Teacher Ratio (STR) = S / F

Table 5.1 Student-Faculty Ratio (SFR)

EX DEPTT			
Year	**CAY - 2020-21**	**CAYm1 - 2019-20**	**CAYm2- 2018-19**
u1.1	120+ 27=147	120+23=143	120+12=132
u1.2	120+23=143	120+12=132	120+07=127
u1.3	120+12=132	120+07=127	120+02=122
UG1	**422**	**402**	**381**
p1.1	18	18	18
p1.2	18	18	18
PG1	36	36	36
Total No. of Students in the	**458**	**438**	**417**

Department (S)			
No. of Faculty in the Department (F)	26	24	25
Student Faculty Ratio (SFR)	**17.61**	**18.25**	**16.68**
Average SFR	**17.51**		

Assessment SFR- 16

Note: Marks to be given proportionally from a maximum of 20 to a minimum of 10 for average SFR between 15:1 to 25:1, and zero for average SFR higher than 25:1. Marks distribution is given as below:

< = 15 - 20 Marks

< = 17 - 18 Marks

< = 19 - 16 Marks

< = 21 - 14 Marks

< = 23 - 12 Marks

< = 25 - 10 Marks

> 25.0 - 0 Marks

The entire faculty whether regular or contractual (except Part-Time), will be considered. The contractual faculty (doing away with the terminology of visiting/adjunct faculty, whatsoever) who have taught for 2 consecutive semesters in the corresponding academic year on full time basis shall be considered for the purpose of calculation in the Faculty Student Ratio. However, following will be ensured in case of contractual faculty:

1. Shall have the AICTE prescribed qualifications and experience.

2. Shall be appointed on full time basis and worked for consecutive two semesters during the particular academic year under consideration.

3. Should have gone through an appropriate process of selection and the he records of the same shall be made available to the visiting team during NBA visit.

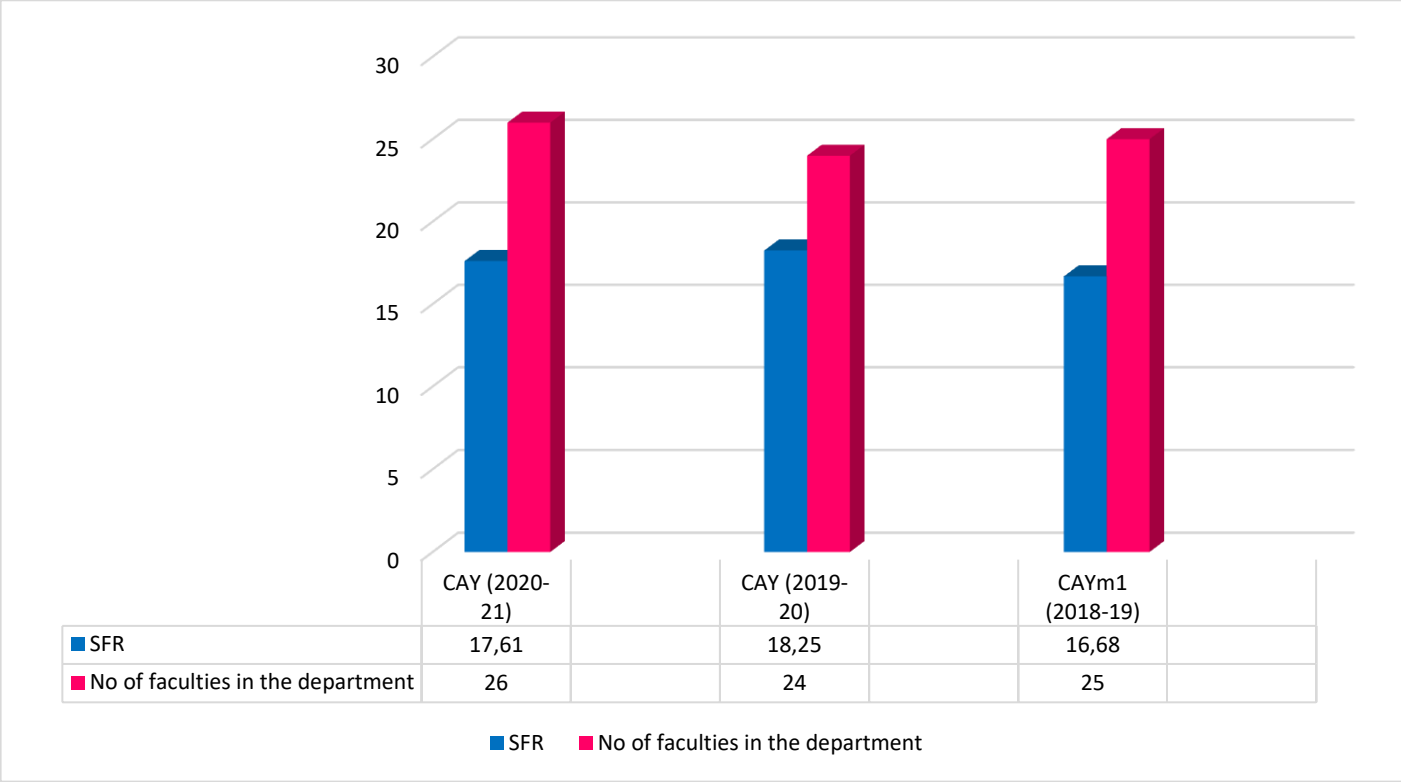


Fig. 5.1: Student Faculty Ratio

5.1.1. Provide the information about the regular and contractual faculty as per the format mentioned below

Table 5.2 Faculty Information

	Total number of regular faculty in the department	Total number of contractual faculty in the department
CAY (2020-21)	26	00
CAYm1(2019-20)	24	00
CAYm2 (2018-19)	25	00

5.2. Faculty Cadre Proportion (25)

The reference Faculty cadre proportion is 1(F1):2(F2):6(F3)

F1: Number of Professors required=1/9 x Number of Faculty required to comply with 20:1 Student-Faculty ratio based on no. of students (N) as per 5.1

F2: Number of Associate Professors required=2/9 x Number of Faculty required to comply with 15:1Student-Faculty ratio based on no. of students (N) as per 5.1

F3: Number of Assistant Professors required=6/9 x Number of Faculty required to comply with 15:1Student-Faculty ratio based on no. of students (N) as per 5.1

Table 5.3 Faculty Cadre

Year	Professors		Associate Professors		Assistant Professors	
	Required (F1)	**Available (AF1)**	**Required (F2)**	**Available (AF2)**	**Required (F3)**	**Available (AF3)**
CAY (2020-21)	**2.5**	**4**	**5**	**1**	**15**	**21**
CAY$m1$ (2019-20)	2	4	4	00	14	20
CAY$m2$ (2018-19)	2	4	4	00	13	21
Average Numbers	**RF1= 2.16**	**AF1=4**	**RF2=4.33**	**AF2=0.33**	**RF3= 14**	**AF3= 20.66**

$$\boldsymbol{Cadre\ Ratio} = \left[\left[\frac{AF1}{RF1}\right] + \left[\frac{AF2*.6}{RF2}\right] + \left[\frac{AF3*.4}{RF3}\right]\right] * \mathbf{12.5 = 31.06}$$

If AF1 = AF2= 0 then zero marks, Maximum marks to be limited if it exceeds 25

Example: Intake = 60 (i.e. total no. of students= 180); Required number of Faculty: 9; RF1= 1,

RF2=2 and RF3=6

Case 1: AF1/RF1= 1; AF2/RF2 = 1; AF3/RF3 = 1; Cadre proportion marks = (1+0.6+0.4) x 12.5 = 25

Case 2: AF1/RF1= 1; AF2/RF2 = 3/2; AF3/RF3 = 5/6; Cadre proportion marks = (1+0.9+0.3) x 12.5 = limited to 25

Case 3: AF1/RF1=0; AF2/RF2=1/2; AF3/RF3=8/6; Cadre proportion marks = (0+0.3+0.53) x 12.5= 10.4

Marks obtained: 25

5.3 Faculty Qualification (25)

FQ =2.5 x [(10X +4Y)/F)] where x is no. of regular faculty with PhD, Y is no. of regular faculty with M.Tech. F is no. of regular faculty required to comply 20:1 Faculty Student ratio (no. of faculty and no. of students required are to be calculated as per 5.1)

Table 5.4 Faculty Qualification

Year	X	Y	F	FQ =2.5 x [(10X +4Y)/F)]
CAY (2020-21)	5	21	22.9=458/20	14.62
CAY*m*1 (2019-20)	4	20	21.00=438/20	14.29
CAY*m*2 (2018-19)	4	21	20.00=417/20	15.50
Average assessment				**14.80**

Average Assessment: 14.80

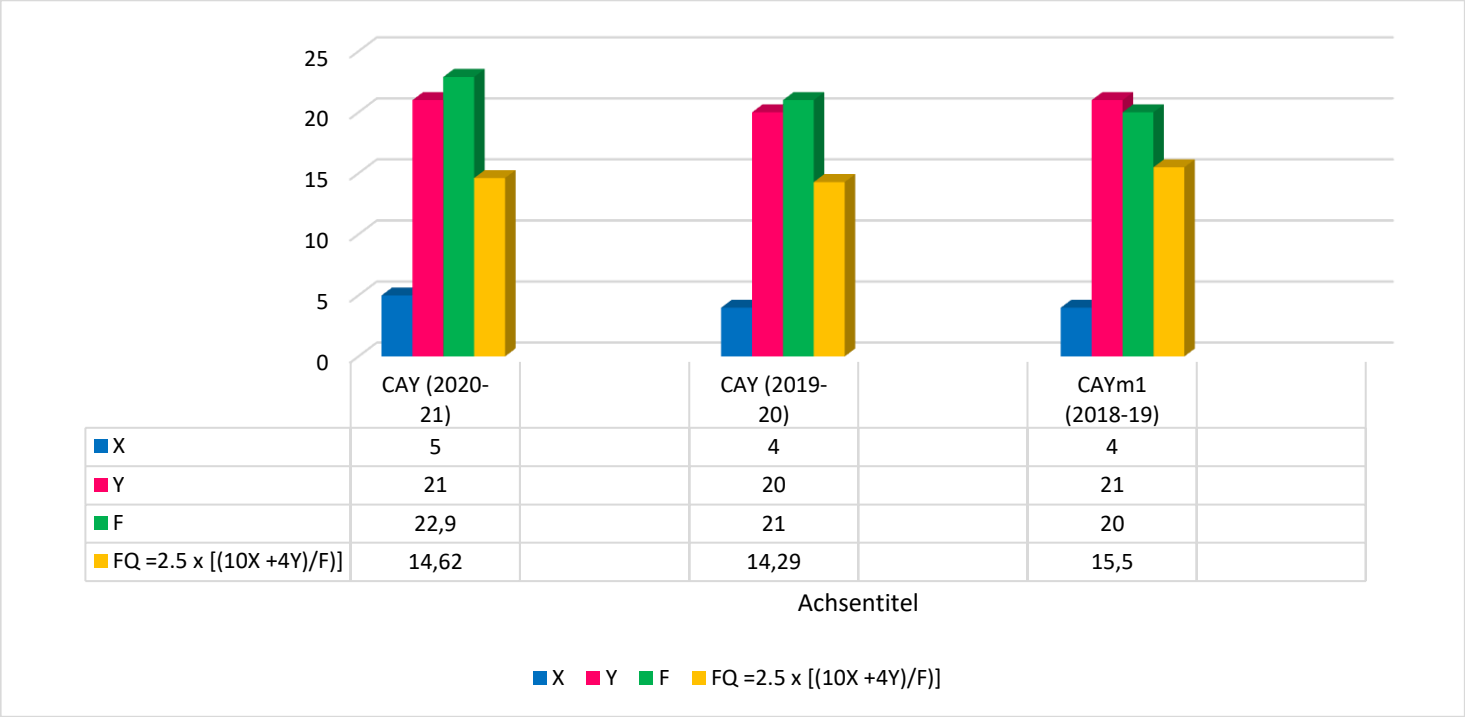


Fig 5.2 Faculty Qualifications

5.4 Faculty Retention (25)

No. of regular faculty members in

CAY [2020-2021] = 15
CAY*m*1 [2019-2020] = 16

Table 5.5 Faculty Retention

Description	CAY*m*1 [2019-2020]	CAY [2020-2021]
No. of Faculty Retained	16	15
Total No of Faculty	23	25
% of Faculty	**70**	**60**

Average: 65

Assessment Marks: 15

Item	Marks
>=90% of required Faculty members retained during the period of assessment keeping CAY*m*2 as base year	25
>=75% of required Faculty members retained during the period of assessment keeping CAY*m*2 as base year	20
>=60% of required Faculty members retained during the period of assessment keeping CAY*m*2 as base year	15
>=50% of required Faculty members retained during the period of assessment keeping CAY*m*2 as base year	10
<50% of required Faculty members retained during the period of assessment keeping CAY*m*2 as base year	0

5.5 Innovations by the Faculty in Teaching and Learning (20)

Innovations by the Faculty in teaching and learning shall be summarized as per the following description.

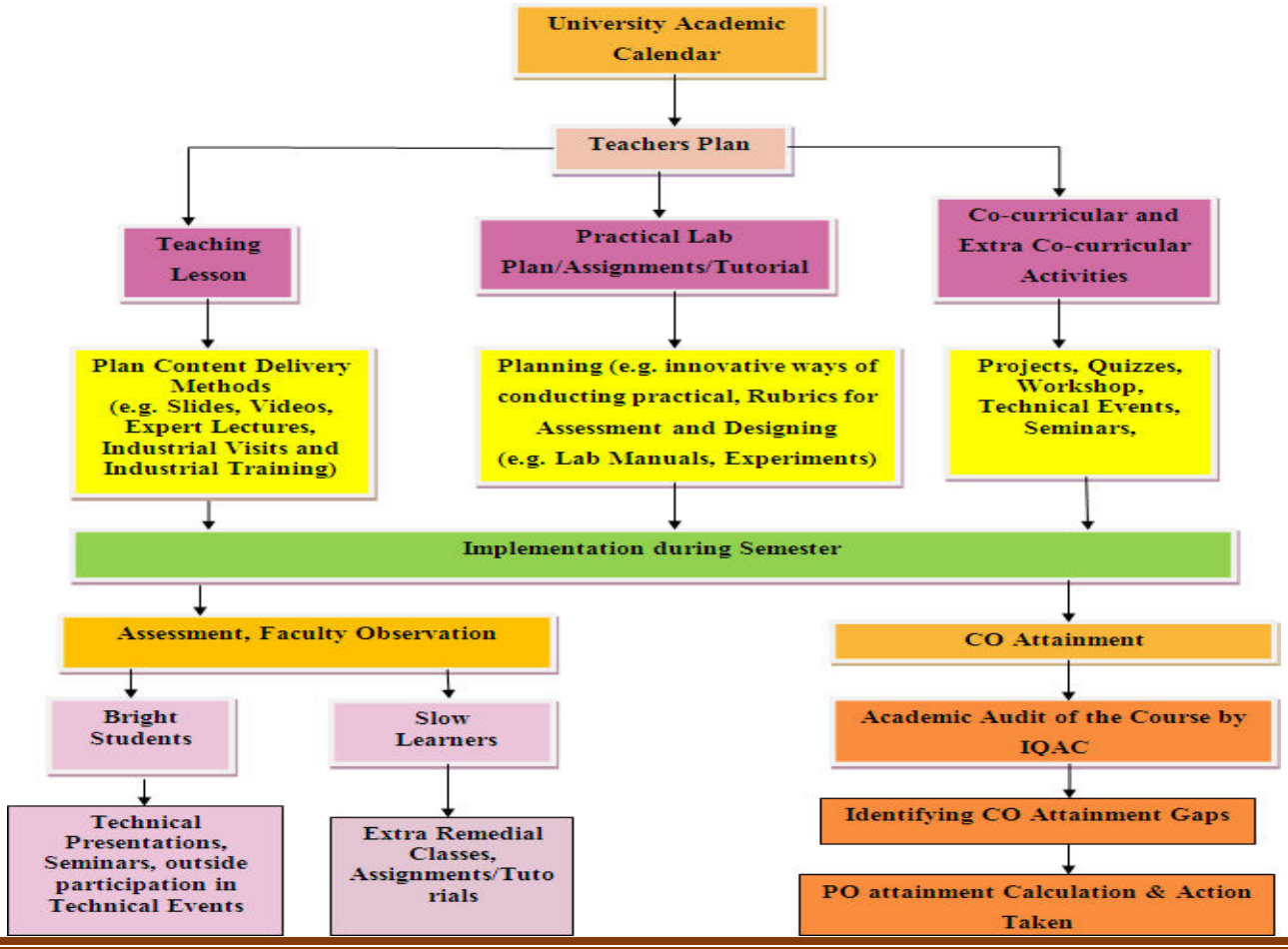


Fig. 5.3 Innovations by the Faculty in TL

Apart from basic teaching requirements, the Department has adopted various initiatives to improve instructional pedagogy methods for the attainment of POs. The faculty members are oriented towards Outcome based Education (OBE) and are actively utilizing the OBE to cater the learning need of students by innovative methods. The faculty of department adopts various innovative Teaching & Learning methodologies to create the best learning environment for students. These methodologies include traditional black board teaching, presentations, video lecturing, collaborative learning methods etc. as given below.

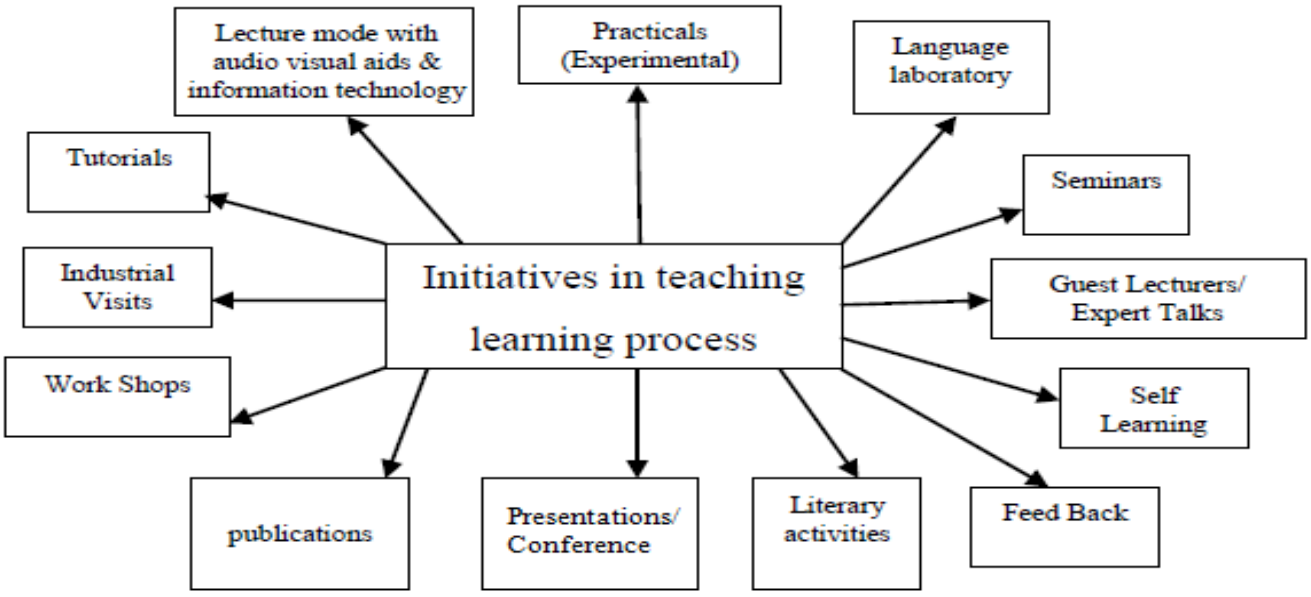


Fig. 5.4: Different initiates in teaching and learning process.

1. **Improved/Innovative Classroom Teaching learning method**

- The faculty use chalk and board and audio-visual aids in teaching.
- Students are encouraged to actively interact during the lecture hour by getting the doubts clarified.
- Further, students are also encouraged to give seminars/presentations relevant to the subjects which add to their presentation and communication skills.
- Revising the topics covered in the previous class through simple questions and answers at the beginning of each class

- Repeating important points in each class
- Conducting Tutorial sessions for problematic contents.
- Revision of syllabus before examinations
- Identifying uniqueness of each student, understanding the variations among students
- Equal attention on the student, his strengths and limitations, along with the subject matter
- Effective counseling based on the student's individual social and financial background.
- Motivating students to set multiple career goals to sustain their interest in the learning process.
- Assigning complex design problems individually to enhance the problem skills of students
- Giving assignments to the students on topics beyond curriculum.

2. Improvement through Project-based learning

During pre-final year, the students are encouraged to carry out minor projects and in the final year major projects are executed under the guidance of faculty. The aim of project based learning is:

- Exposing students to real world through Examples
- Presenting the real life engineering problems.
- Implementing the solutions of engineering problems using models and charts for better subject understanding.
- Providing exposure to real world of Engineering by taking students to on-going projects within and outside the campus
- Building entrepreneurship skills

3. Improvement through Computer-assisted learning

The department is equipped with sufficient number of computers, LCD projectors, internet facility, application software and system software which are effectively used for teaching and learning.

- Faculty members are making effective use of *virtual labs* for effective teaching.
- Use of e-resources.
- Using electronic presentations (PPT) on difficult topics for better understanding.
- Use of e-learning - resources from *National Programme on Technology Enhanced Learning* (NPTEL).
- Presenting videos which show the recent technologies.
- PPT is incorporated as an item in Course Plan in all subjects wherever relevant

- The *Google classroom* is an innovative tool which is very effectively used in our campus for every course. Faculty members add all students to it before commencement of every semester for every course. They also upload course plans, course materials, video lectures, question banks etc. It helps the students to come prepared to the class. The tools in the Google class room facilitate online assessment of students, which can be used to measure the outcomes of each course.

4. Guest Lectures

Guest lectures are organized by industry and academic experts which provide industry exposure, entrepreneurship skills and exposure for higher studies to the students beyond the class room learning and curriculum. The details are provided in Sec.2.1.2

5. Students Participation in Workshops/symposia

Students are encouraged to participate in workshops and technical symposia organized by IES and various engineering colleges including IITs and NITs. This adds to the knowledge and enhances their knowledge, aptitude and communication skills. The details are provided in Sec.2.1.2.

6. **Special Classes**:

Communication skill classes are organized for the students, news paper distribution, and online tests are conducted for placement preparation.

7. **Expert classes:**

T&P classes are organized, Experts lectures from industry and academia are invited to deliver lectures on the latest trends and thrust areas to improve the employability of students.

8. Collaborative Learning:

Through collaborative learning students are exposed to learn various topics and hands-on experience under different laboratories, related to program curriculum

5.6 Faculty as participants in Faculty development/ training activities /STTPs (15)

A Faculty scores maximum five points for participation

Participationin2to5daysFacultydevelopmentprogram: 3 Points

Participation > 5daysFacultydevelopmentprogram: 5 Points

Table 5.6 Faculty development/ training activities /STTPs

Name of the faculty	Max 5 Per Faculty		
	2018-19 (CAYm2)	2017-18 (CAYm3)	2019-20 (CAYm1)
Ms Jyoti Bansal	5.00	3.00	3.00
Mr Akhilesh Dwivedi	5.00	0.00	5.00
Dr G. K. Pandey	0.00	5.00	0.00
Mr. Rahul Malviya	5.00	0.00	0.00
Mr. Anant Thakur	0.00	5.00	3.00
Ms. Poonam Khatarkar	5.00	3.00	5.00
Mr. Kumar Prabhakar	5.00	5.00	0.00
Dr. Suresh Rao	0.00	3.00	5.00
Mr. Padam Singh	5.00	3.00	0.00
Ms. Pallav Singh	3.00	5.00	0.00
Dr. A S Jolly	0.00	5.00	0.00
Mr. J P Sharma	3.00	5.00	5.00
Mr. Ajit Kumar Mishra	5.00	0.00	5.00
Mr. Tarun Agarwal	5.00	0.00	0.00
Mr. Himanshu Nagpal	0.00	5.00	3.00
Mr. Saurabh Mishra	0.00	5.00	0.00
Mr. Sandeep Pandey	3.00	5.00	5.00
Mr. Brajesh Mohan Gupta	5.00	5.00	5.00
Ms. Pratibha Achintya	-	-	5.00

Mr. Manish Agarwal	-	-	5.00
Mr. Rahul Mishra	-	-	5.00
Mr. Anoop Kumar	-	-	3.00
Sum	54.00	62.00	62
RF = Number of Faculty required to comply with 20:1 Student Faculty Ratio as per 5.1	21.90	20.85	22.9
Assessment [3*(Sum / 0.5RF)]	**14.79**	**17.84**	**16.24**

Average assessment over 3 years: 16.29

Marks =15

5.7 Research and Development (30)

5.7.1 Academic Research (10)

Academic research includes research paper publications, M-Tech guidance, and faculty receiving M-Tech. during the assessment period.

- Number of quality publications refereed/SCI Journals, citations, Books/Book Chapters etc. (6)
- Ph.D. guided /Ph.D. awarded during the assessment period while working in the institute (4)

A. Faculty Publication: Following table indicates the list of EX department faculty publications during the three assessment years.

Table 5.7 Faculty Publication

S. No.	Faculty	SCI/Scopus/UGC/Other journals
1.	Dr. Pallavee Bhatnagar	15
2	Mr. Akhilesh Dwivedi	1
3	Mr. Jyoti Bansal	6
4	Mr. Rahul Malviya	3
5	Mr. Anant Thakur	4

6	Ms. Poonam Khatakar	1
7	Mr. Vijay Anand Bharti	3
8	Mr. Kumar Prabhakar	8
9	Ms. Pratibha Achintya	1
10	Dr. Vidhi Rawat	2
11	Dr.A.M. Shandilya	4

Table 5.8 Publication details

Sl.No	Name of the Guide/Author	Title/Topic	Name of the Journal	Conference	Year of Publication	Details	Impact Factor	Citation	DOI
1	Dr. Pallavee Bhatnagar	Multilevel Inverter Topologies with Reduced Device Count: A Review	IEEE Transactions on Power Electronics		2016	Volume 31, Issue 1, pp. 135-151, Jan. 2016	6.373	750	https://doi.org/10.1109/TPEL.2015.2405012
2	Dr. Pallavee Bhatnagar	An Integrated Converter With Reduced Components for Electric Vehicles Utilizing Solar and Grid Power Sources	IEEE Transactions on Transportation Electrification		2020	vol. 6, no. 2, pp. 439-452, June 2020	5.444	7	https://doi.org/10.1109/TTE.2020.2998799
3	Dr. Pallavee Bhatnagar	A Flying Squirrel Search Optimization for MPPT under Partial Shaded Photovoltaic System	IEEE Journal of Emerging and Selected Topics in Power Electronics		2020	Accepted for publication, manuscript ID: JESTPE-2020-05-0523.R1	4.728	0	https://doi.org/10.1109/JESTPE.2020.3024719

4	Dr. Pallavee Bhatnagar	A methodology for even-power-distribution within single time-blocks of power-frequency in CHB MLIs for PV systems	Wiley International Transactions on Electrical Energy Systems		2020	Accepted for publication (ITEES-19-1483.R1) 2020	1.314	0	https://doi.org/10.1002/2050-7038.12591
5	Dr. Pallavee Bhatnagar	Maximum power point tracking control techniques: State-of-the-art in photovoltaic applications	Elsevier Renewable and Sustainable Energy Reviews		2013	Volume 23, July 2013, pages 224-241	12.110	327	https://doi.org/10.1016/j.rser.2013.02.011
6	Dr. Pallavee Bhatnagar	A Maximum Power Point Tracking Algorithm for Photovoltaic Systems using Bang-Bang Controller	Journal of Renewable and Sustainable Energy (AIP)		2013	Volume 6, Issue 5, pages 1-15	1.511	5	https://doi.org/10.1063/1.4898358
7	Dr. Pallavee Bhatnagar	Conventional and global maximum power point tracking techniques in photovoltaic applications: A Review	Journal of Renewable and Sustainable Energy (AIP)		2013	Volume 5, Issue 3, May 2013	1.511	48	https://doi.org/10.1063/1.4803524
8	Dr. Pallavee Bhatnagar	Reduced device count version of single-stage switched-capacitor	IET Power Electronics		2019	Vol. 12, no. 5, pp. 1079-1086, 1 5	2.839	14	https://doi.org/10.1049/iet-

		module for cascaded multilevel inverters				2019			pel.2018.6017
9	Dr. Pallavee Bhatnagar	Switched capacitors 9-level module (SC9LM) with reduced device count for multilevel DC to AC power conversion	IET Electric Power Applications		2019	Vol. 13, no. 10, pp. 1544-1552, 10 2019	3.051	10	https://doi.org/10.1049/iet-epa.2019.0053
10	Dr. Pallavee Bhatnagar	Nine-level voltage-doubler bi-polar module for multilevel DC to AC power conversion	IET Power Electronics		2019	Vol. 12, no. 15, pp. 4079-4087, 18 12 2019	2.839	1	https://doi.org/10.1049/iet-pel.2019.0094
11	Dr. Pallavee Bhatnagar	Modified reduced device multilevel inverter structures with open circuit fault-tolerance capabilities	Wiley International Transactions on Electrical Energy Systems		2020	vol. 30, no. 1, pp. 1-15, Jan 2020	1.314	6	https://doi.org/10.1002/2050-7038.12142
12	Dr. Pallavee Bhatnagar	Open-Switch Fault Tolerance Capabilities of Some Reduced Device Count Multilevel Inverter Topologies	Transactions of Electrical Engineering (Iranian Journ. of Sci. & Tech.		2020	Vol. 44, pp. 253–264 (2020)	0.6	0	https://doi.org/10.1007/s40998-019-00241-3
13	Dr. Pallavee Bhatnagar	A multilevel inverter structure with open circuit fault-tolerant capability	Springer Electrical Engineering		2020	Accepted for publication (manuscript ID:	1.180	0	https://doi.org/10.1007/s00202-020-01149-6

						ELEN-D-19-01113R2)			
14	Dr. Pallavee Bhatnagar	Simulation Study of a Novel Switched-Capacitors Based Multilevel Boost Inverter for Three-Phase Applications with Single DC Source	International Journal of Modelling and Simulation (Taylor and Francis)		2019	Accepted for publication (Manuscript ID: TJMS-2019-0248.R2)	Scopus Indexed	NA	NA
15	Dr. Pallavee Bhatnagar	A Switched –capacitor based 13 level Inverter	IEEE Transaction on Power Electronics		2021	Accepted for publication (Manuscripts ID TPEL-Reg 2020-12-3052.R2)	6.73	NA	NA
16	Dr. Pallavee Bhatnagar	Control techniques analysis of DC-DC converter for photovoltaic application using SIMPSCAPE		International Conference on Power Electronics	2012	2012 IEEE 5th India International Conference on Power Electronics, December 2013 , pages 1-6	International Conference	18	https://doi.org/10.1109/IICPE.2012.6450503

17	Dr. Pallavee Bhatnagar	Carrier based PWM for Even Power Distribution in Cascaded H-bridge Multilevel Inverters within Single Power Cycle		Annual Conference of IEEE Industrial Electronics Society	2016	42nd Annual Conference of IEEE Industrial Electronics Society, IECON 2016, October 24-27, 2016, Florence, Italy.		8	https://doi.org/10.1109/IECON.2016.7793061
18	Dr. Pallavee Bhatnagar	A Novel Algorithm for MPPT in Solar PV Systems Implemented with ARM Cortex M4 32-Bit Microcontroller		IEEE Power Electronics, Drives and Energy Systems Conference	2018	IEEE Power Electronics, Drives and Energy Systems Conference (PEDES 2018), to be held during 18-21 Dec 2018 at IIT Madras (accepted)		NA	NA
19	Dr. Pallavee Bhatnagar	Self-balancing Switched Capacitors based 3X-gain Module for		Confer	2020	MOSICOM 2020		NA	NA

		Cascaded Multilevel Inverters		ence		Dubai			
20	Dr. Pallavee Bhatnagar	Topological Overview of Single-Inductor based Multiple-Output Channel LED Driver			2021/3	2020 First International Conference on Power, Control and Computing Technologies (ICPC2T)			10.1109/ICPC2T48082.2020.9071435
21	Dr. Pallavee Bhatnagar	A Decoupled Low-Frequency Ripple Cancellation Method for High-Power LED Driver circuits			18-21 Oct. 2020	IECON 2020 The 46th Annual Conference of the IEEE Industrial Electronics Society			10.1109/IECON43393.2020.9255287
22	Ms. Jyoti Bansal	Green Technology		International conference paper (RGPV)	27 Dec 2019	-		NA	NA

23	Ms. Jyoti Bansal	Distribution Generation Technology in Indian Scenario		International Conference Paper (RGPV)	27,28 Dec 2019	-		NA	NA
24	Mr. Anant Thakur	Z source inverter fed Asynchronous Motor Drive	International Journal of Trend in Scientific Research & Development	-	Nov 2019	Open assess Journal ISSN: 2456-6470	6.005	0	NA
25	Mr. Rahul Malviya	Simulate to Power Quality or Improvement in D-Statcom with and without connected to Grid during voltage sag Problems	Journal of Emerging Technologies and Innovative Research	-	Oct 2019	An International Open Access Journal, Peer-reviewed, Refereed Journals) ISSN: 2349-5162	5.87	NA	NA
26	Mr. Kumar Prabhakar	Design a Speed Controller for Doubly Fed Induction Generator Based on Wind Turbine System	International Journal for Science and Advance	-	08 Aug 2019	(INTERNATIONAL PEER REVIEWED	6.224	NA	NA

			Research In Technology			OPEN ACCESS JOURNAL)ISSN [Online] : 2395-1052			
27	Mr. Anant Thakur	Improvement of Back EMF & Minimization of Torque Ripple of BLDC motor	International Journal of science	-	08 Aug 2019	IJO-SCIENCE (INTERNATIONAL JOURNAL ONLINE OF SCIENCE) ISSN 2455-0108			https://doi.org/10.24113/ijoscience.v5i8.220
28	Mr. Rahul malviya	Optimal placement and sizing of STATCOM using PSO	International research journal of engineering & technology	-	08 Aug 2019	International Research Journal of Engineering and Technology (IRJET) e-ISSN: 2395-0056 Volume: 06 Issue: 08 | Aug 2019 p-ISSN: 2395-0072	7.34	NA	NA
29	Ms. Poonam Khatarkar	Power System Small Signal Stability Analysis Using FACTS POD	International Journal of Computer Trends and Technology	-	July 2019	International Journal of Computer Trends and Technology (IJCTT) – Volume			10.14445/22312803/IJCTT-V67I7P109

						67 Issue 7 - july 2019 ISSN: 2231-2803			
30	Mr. Vijay Anand Bharti	Design and Analysis of controller for generation control in two area interconnected Power system	Journal of Emerging Technologies & Innovative Research	-	May 2019		5.87	NA	NA
31	Mr. Anant thakur	Transient Stability Enhancement of Hybrid Power System with Wind Generator	International Journal of Science and Research (IJSR)	-	May 2018	ISSN: 2319-7064	-	NA	NA
32	Mr. Vijay Anand Bharti	Power Enhancement by Vector Modulation Control of Inverter in Super Capacitor Integrated Hybrid System	International Journal Online of Science	-	Feb 2019	ISSN NO: 2455-0108 VOLUME 5, ISSUE 2, FEBRUARY2019	-	NA	https://doi.org/10.24113/ijoscience.v5i2.186
33	Mr. Kumar Prabhakar	Performance of a GA based PSS with Tie-line Active-Power deviation Feedback	International Journal of Electrical, Electronics and Computer Engineering	-	Jan 2019	ISSN No. (Online): 2277-2626	-	NA	NA

34	Mr. Vijay Anand Bharti	Study on Power Enhancement Technologies of Inverter PV Wind Energy System	International Journal Online of Science	-	Dec 2018	IJO-SCIENCE ISSN 2455-0108 VOL. 4, ISSUE 12, DECEMBER 2018	-	NA	NA
35	Mr. Kumar Prabhakar	A Coordinated Control Scheme of PSS and FACTS Devices for Improving Power System Stability.	International Journal of Advanced Research Ideas and Innovations in Technology (IJARIIT).	-	Novem ber 2018	ISSN: 2454-132X	4.295	NA	
36	Mr. Kumar Prabhakar	A Coordinated Control Scheme of PSS and STATCOM Devices for Improving Power System Oscillations	International Journal of Science and Research (IJSR)	-	August 2018	ISSN: 2319-7064	-	NA	NA
37	Mr. Kumar Prabhakar	A coordinator control scheme of PSS & UPFC device for improving power system oscillation	International journal of advanced research in electrical, electronics &	-	07 July 2018	ISSN (Print) : 2320 – 3765 ISSN (Online): 2278 – 8875	-	NA	NA

			instrumentation Engineering						
38	Mr. Anant Thakur	Transient Stability Enhancement of Hybrid Power System with Wind Generator	International Journal of Science and Research (IJSR)		May 2018	ISSN: 2319-7064	-	NA	NA
39	Mr. Kumar Prabhakar	A Coordinated Control Scheme of PSS and SVC Devices for Improving Power System Oscillations	International Journal of Science and Research (IJSR)	-	March 2018	ISSN: 2319-7064	-	NA	NA
40	Mr. Kumar Prabhakar	Coordinated Design of PSS and SSSC Damping Controller using PSO & GA -based Optimization Algorithm	International Journal of Science and Research (IJSR)	-	Januar y 2018	ISSN: 2319-7064	-	NA	NA
41	Mr. Akhilesh Dwivedi	Proposed Design of Wide Area Damping Controller to Damp Out Inter Area Oscillation	International journal of Scientific Progress and Research	-	03 Nov 2017	ISSN 2349-4689	-	NA	NA
42	Mr. Kumar Prabhakar	Impact of Time- Delay On Wide-Area PSS For Stability	International Journal of	-	Nov 2017	ISSN No. (Online): 2277-	-	NA	NA

		Enhancement of Interconnected Power System	Electrical, Electronics & Computer Engineering			2626			
43	Mr. Akhilesh Dwivedi	Design of Wide-Area Damping Controller to Damp out the Inter-Area Oscillations	International journal of Scientific progress and research	-	02 Nov 2016	ISSN 2349-4689	-	NA	NA
44	Mr. Kumar Prabhakar	Damping of SSR using Fuzzy logic based SSSC	International journal of advanced research in Electrical, Electronics & Instrumentation Engineering	-	1 Jan 2016	ISSN (Print) : 2320 – 3765 ISSN (Online): 2278 – 8875	-	NA	NA
45	Mr. Vikas Mohan	Dynamic voltage restorer (DVR) utilized for enhancing the voltage network using hybrid power source setup	International journal of science and research (IJSR)	-	2015	International Journal of Science and Research (IJSR) ISSN (Online): 2319-7064	6.391	NA	NA

46	Mr. Rahul Malviya	Power system stability enhancement by using SSSC Facts device with fuzzy logic controller	International Journal for Technological Research in Engineering	-	Feb 2015	Volume 2, Issue 6, February-2015 ISSN (Online): 2347 - 4718	4.62	NA	NA
47	Ms. P. Achintya	Open Circuit Switch Fault Detection in Multilevel Inverter Topology using Machine Learning Techniques		Power India International Conference	2020	2020 IEEE 9th Power India International Conference (PIICON), SONEPAT, India, 2020, pp. 1-6, doi: 10.1109/PIICON49524.2020.9112870.	-	NA	https://doi.org/10.1109/PIICON49524.2020.9112870
48	Ms. Jyoti Bansal	Review on the Artificial Neural Network (ANN) Approachto Improving the Efficiency of Renewable Energy Sources- Solar (PV) Power System	International Journal of Trend in Research and Development	-	April 2021	ISSN: 2397-9333	-	NA	NA
49	MS. Jyoti Bansal	Analysis of the different techniques used to improve the capability and efficiency of Solar (PV) and Wind Power system- A Review	International Journal of Trend in Research and	-	April 2021	ISSN: 2397-9333	-	NA	NA

			Development						
50	Ms. Jyoti Bansal	To Study and Implement MPPT algorithm to extract maximum power from Wind & Solar (PV) Hybrid System in different atmospheric conditions	PUBLISHED IN IJRT	-	Year 2021	Volume 9, Issue 1, Year 2021 Paper Id – IJRT000469 ISSN 2321-7510	-	NA	https://doi.org/10.26495/IJRT000409
51	MS. Jyoti Bansal	Multi Photovoltaic array buck boost single phase grid interconnection with fuzzy logic controller	International journal of innovative research in technology and management	-	Year 2020	vol 04 issue 06	-	NA	NA
52	Mr. Rahul Malviya	Design and fault Analysis of Photovoltaic Cable Array with grid connected system	Journal of emerging technologies and innovative research	-	Year 2021	Vol 8 Issue 3 ISSN: 2349-5162	-	NA	NA
53	Dr. Vidhi Rawat	Automated Techniques for the Interpretation of Fetal Abnormalities: A Review	Hindawi Applied Bionics and Biomechanics	-	Year 2018	Volume 2018, Article ID 6452050, 11 pages	-	-	https://doi.org/10.1155/2018/6452050
54	Dr. Vidhi Rawat	Neutral Modeling of Fetal biometric	IETE Journal		Year	IETE Journal of			https://doi.org/10.

		parameters for detection of fetal abnormaling	of Research		2019 Januar y	Research Vol-27, p.p 1-13			1080/2018/037726 623
55	Dr.A.M. Shandilya	A GWO Implementation for Free FEM++ and Its Utilization in Optimization of Roebel Cable for SFCL Applications	Jour of Adv Research in Dynamical & Control Systems		Year 2020	Vol. 12, 05-Special Issue, 2020 ISSN 1943-023X			DOI: 10.5373/JARDCS/ V12SP5/20201763
56	Dr.A.M. Shandilya	FEM Based Modeling And Optimization Of Roebel Cable For SFCL Applications Using PSO	International Journal of Advanced Science and Technology		Year 2020	Vol. 29, No. 12s, (2020), pp. 1430-1443			ISSN: 2005-4238 IJAST Copyright ⓒ 2020 SERSC
57	Dr.A.M. Shandilya	Impact of NOVEL HVDC Superconducting Circuit Breaker on HVDC Faults	Advances in Intelligent Systems and Computing 741		Year 2019	© Springer Nature Singapore Pte Ltd. 2019			https://doi.org/10. 1007/978-981-13-0761-4_19
58	Dr.A.M. Shandilya	NSGA-II Based Multi Objective Design Optimization of Resistive Superconducting Fault Current Limiters	International Journal of Recent Technology and		Year20 20	(IJRTE) ISSN: 2277-3878, Volume-8 Issue-6, March 2020			DOI:10.35940/ijrte. F8303.038620

			Engineering						

B. Faculty Pursuing Ph.D:

Table 5.9 A. Faculty Pursuing Ph.D:

Faculty name	Research Topic	University	Guide	Date of registration	Number of quality publications in refereed /S CI Journals, citations, Books/ Chapters
Mr.Kumar Prabhakar	Wide Area Measurement System	PDPMIIITMDM Jabalpur	Dr. Sachin Jain	1/07/2019	Communicated

Table 5.9. B. Details of Faculty who have been awarded/Submitted PhD

S.N	Faculty name	Research Topic	University	Guide	Date of registration	Number of quality publications in refereed / SCI Journals, citations, Books/ Book Chapters
1	Dr. Vidhi Rawat	Analysis of Ultrasound Images for Detection of Fetal Abnormality using Biometric Parameters"	Rajiv Gandhi Technological University, Bhopal	Dr. Alok Jain, Professor &HOD Electronics and Instrumentation Engineering, Samrat Ashok Technological Institute, Vidisha (MP). Dr. Vibhakar Shrimali, Dy. Director, Directorate Of Technical Education, Delhi	15/07/2012	**International Journals** – 06 (Three SCI indexed Journal) **International Conferences** – 04 **National Conferences** –05

Patents Filed/ Published

1. 201921023225 TEMP/E-1/24453/2019-MUM,"Circuit for Multilevel dc-to-ac and ac-to-dc Power Conversion" ON 2019/06/12
   Dr. K. K Gupta, Dr. Pallavee Bhatnagar, Dr. LalitSahu.

2. 201921023226 TEMP/E1/24471/2019MUM,"Switched-Capacitors based Circuit for Multilevel dc-to-ac and ac-to-dc Power Conversion" ON 2019/06/12
   Dr. K. K Gupta, Dr. Pallavee Bhatnagar, Dr. LalitSahu.

3. 202111023687 TEMP/E1/26516/2021- DEL 1600 18565 FORM 1 Power circuits and working methodology of Power Electronics Transformer (PET) with semiconductor-base

4. 201721005324 India patent on "METHODS AND SYSTEMS FOR DATA RATE BASED PERIPHERAL SECURITY" Published on 24 Feb 2017, applied for the examination in June 2017.

PhD. Guided:

Table 5.10 PhD Guide

Faculty name	**Research Scholar**	**Research Topic**	**University**	**Guide**	**Number of quality publications in refereed /SCI Journals, citations, Books/ Book Chapters**
Dr. Pallavee Bhatnagar	Manish Kumar Barwar	LED driver circuits	NIT Raipur	Co Guide	Course work completed, two papers under communication (**One SCI paper, two conference paper published**)

5.7.2 Sponsored Research (5)

Table 5.11 Funded research

S.No	**Title of the Project**	**Funding Agency**	**Year**	**Amount Sanctioned(INR)**	**Department of Principal Investigator**

01	Entrepreneurship Development Program	DST NIMAT	2019-2020	20,000	Mr..Akhilesh Dwivedi
02	Design and Development of AI-Controlled, PV-Based, Commercially-Viable, V2G-Enabled, Modular EV Level-3 Charging Station	Proposal submitted under NaMPET Phase-III Fifth Meeting of Sub-Committee for Exploratory (Under final review of National Steering committee)	2020-21	28,67,000	Dr. Pallavee Bhatnagar
03	Development of Single Source 3 –Phase-High-Power-Density Switched-Capacitor Multilevel Boost Inverter	One INDO_POLAND Research project- International Cooperation Division, Department of science and technology	20-21	10,00,000	Dr. Pallavee Bhatnagar
04	SemiCapMer- power electronics transformers (PETs)	SUPRA- Scientific and Useful Profound Research Advancement (Communicated)	20-21	53,19,028	Dr. Pallavee Bhatnagar

5.7.3 Development activities (10)

A. Product Development –

Products Developed by faculties in Electrical and Electronics Department

Table 5.12 Product Development by Faculty Member

Sn.	Title of the Project	Name of the Faculty Member	Year

1	Micro-controller based oil level monitoring & tripping mechanism	Mr. Shyam Chandnani	2019-2020
2	PIR Based scanning power supply system (Smart room power saver)	Mr. Sandeep Pandey	2019-2020
3	Solar – Battery operated vehicle	Mr. Kumar Prabhakar	2019-2020
4	Alcohol Detector	Mr. J P Sharma	2018-2019
5	Star-Delta Starter for 3- Phase Induction Motor	Mr. Himanshu Nagpal	2018-2019
6	Model Prototype of shadow Alarm	Mr. Ajit Kumar Mishra	2018-2019
11	Hand Sanitizer machine	Mr. Akhilesh Dweivedi	2020-21
12	LED Driver circuit	Dr. Pallavee Bhatnagar	2020-21

Table5.13 Student Projects

Project Made by students under the guidance of faculties during 2019					
Sn.	**Title of the Project**		**Name of the Students**	**Enrollment No.**	**Guide**
1	Mutual Inductance based Electromagnetic Energy & circuit coupling analysis of wireless power transfer system		Md. Entakhab Alam Md Tarque Anwar Jiyaul Haque Istekhar Ansari	0177EX151066 0177EX151071 0177EX151051 0177EX151050	Mr. Padam Singh
2	Auto phase selection for single phase load from three phase supply		Abhimanyu Kumar Amit Kumar Saini Dhirendra Kumar Krishna kant singh Manish Kumar	0177EX151004 0177EX151012 0177EX151041 0177EX151057 0177EX151059	Mr. Kumar Prabhakar
3	PC Based Electrical load control		Ajay Kumar Saket Arjun Kumar ray Gaurav Anand Anshu Kumari	0177EX151007 0177EX151021 0177EX151044 0177EX151016	Ms. Poonam Khatarkar
4	Bidirectional speed control of DC Motor		Arvind Kumar Kushwaha Prince Kumar	0177EX151022 0177EX151089	Mr. Shyam Chandnani

			Subhash Kumar	0177EX151105	
5	Power Grid Synchronization by sensing Frequency & Voltage		Dheeraj Yadav Abhay Pathak Atul Singh Azruddin Khan	0177EX151040 0177EX151003 0177EX151028 0177EX151029	Mr. Sandeep Pandey

Project Made by students under the guidance of faculties during 2018

Sn.	Title of the Project		Name of the Students	Enrollment No.	Guide
1	Road Power Generation		Nikhil Kumar Bhatt Rakesh Raman Santosh Kumar Neha Kumari Ravi Kumar Nayak	0177EX141021 0177EX141025 0177EX141030 0177EX141020 0177EX141026	Mr.Anant Thakur
2	Bluetooth Based Home Automation System using Cell Phone		Raja Babu Aditya Patel Kundan Sah Santosh Kumar singh Gopal Chourasiya	0177EX141024 0177EX141003 0177EX141015 0177EX141031 0177EX141012	Mr. J P Sharma

Project made by students under the guidance of faculties during 2020-21

	Title of project	Group Member	Enrollment No.	Guide
1	Bluetooth control robotics car using arduino	Jitendra Ahirwar.	0177EX171038	Mr. Akhilesh Dwivedi
		Keshav Ahirwar.	0177EX171042	
		Lalit.	0177EX171044	
		Amod Yadav	0177EX171018	
		Buland akhtar.	0177EX171023	
2	Auto power supply control for different sources using PIC microcontroller	Abhishek Kumar	0177EX171007	Mr. Rahul Malviya
		Shubham Prajapati	0177EX183D12	
		Imbasatul Hasan	0177EX171034	

3	Automatic Solar Tracking System	Mr Akanksha Chakrawart	0177EX183D03	Ms. Poonam Khatarkar
		Shrinath Tiwari	0177EX171108	
		Shrikant Tiwari	0177EX171107	
		Shubham Kumar singh	0177EX171109	
		Surya Pratap Sharma	0177EX171112	
4	Bluetooth Controlled Robot Using Arduino Uno	Md. Kausar Ali	0177EX171061	Dr. B.M Gupta
5	Solar system in Agriculture	Md Imran Ansari	0177EX171059	Mr.Sandeep Pandey
		Md Akbar Ali	0177EX171052	
		Md Guffran Raza	0177EX171057	
		Md Aasif	0177EX171047	

B. Research Laboratories

- All other labs are open for the students and faculties for the completion of their projects/research throughout the day.
- Research lab is exclusively for the research work with the hardware and software facilities listed below:

Table 5.14 Hardware/ Software Facilities

S. No	Name of the Equipment's
1.	Scientific 3MHz Function Generator Supply
2.	LCD display, Relays, Sensors. ICs
3.	Multi-Sim
4.	Lab VIEW 2012
5.	MATLAB licensed version software.
6.	PSPICE Open source software used software for implementation of power circuits.
7.	SCI-Lab – Open access software
8.	100kW Solar power plant
9.	Internet of 50Mbps and Wi-Fi of 50Mbps
10.	Equipment for PCB Fabrication , Drilling Machine, Grinder, Winding Machine ,Printer etc.
11.	Project seminar hall which includes projector, PC system, software, audio systems.
12.	10KVA UPS 240 VDC along with batteries

C. Instructional Materials:

- Instructional manuals for MATLAB, PV power plant, DSP processor etc.
- Lab Manuals Electrical Instrumentation lab, Electrical Machine lab, Network lab etc.

- Power Point Presentation
- Handouts
- Subject notes
- Video Lecturers

D. Working models/charts/monograms etc.

Charts displayed in all Laboratories. These help the students to understand the working of basics and recent technologies in a better manner. Also this can be used for better teaching and learning process.

Table 5.14 Charts

S.n.	Particular	Lab
1	Components used in Electrical Circuit – R,L,C, Diode, BJT, Relay, Colour Coding resistor	BEEE / Deptt. Lab
2	Cut Sectional View of Machines	BEEE/ Machine lab
3	Different Parts of Transformer – Primary windings, Secondary winding	BEEE/ Machine lab
4	Half adder / Full adder ,RS Flip-flop & JK Flip-flop	BEEE/ DELD Lab
5	Different types of Circuit breakers – Oil, Vacuum, SF6 CB	Switchgear & Protection Lab
6	Lightning arrestors of different types	Switchgear & Protection Lab
7	Different network theorems – Thevenins & Superposition	BEEE / Network lab
8	Different instruments used in instrumentation lab – Voltmeter, Ammeter, Wattmeter, Energy meter, Megger	Electrical instrumentation lab
9	Different parts of CRT	Electronics instrumentation lab
10	3 Point Starter & 2 Point Starter	Electrical Machine lab
11	Structure and Characteristics of SCR, TRIAC, DIAC and IGBT	Power Electronics lab / Electronic Devices lab
12	Single phase Energy meter	Electrical instrumentation lab
13	Open loop / Closed Loop Control System	Control system
14	Electric Vehicle Charging	Power System
15	Energy Audit	Power System
16	Single line diagram of Power system	Power System

5.7.4 Consultancy (from Industry) (5)

Table 5.15. A Consultancy- 2019-20 (CAY)

Project Title	Duration	Funding Agency	Amount
Repair and maintenance	January 2020-April;,2020	HLBS BHOPAL	75000
Transformer repair and testing	October2019-March 2020	SEARK BHOPAL	135000
			Total Amount(X): 210000.00

Table 5.15. B Consultancy- 2018-19 (CAYm1)

Project Title	Duration	Funding Agency	Amount
Transformer repair and testing	May, 2019-Jan, 2020	SEARK Bhopal	219000.00
			Total Amount(X): 219000.00

Total 429000

Marks=2

5.8 Faculty Performance Appraisal and Development System (FPADS) (30)

A. A well-defined system for faculty appraisal for all the assessment years (10)

Its implementation and effectiveness (20)

- Faculty Performance Appraisal format is collected from each faculty in which they need to show their innovations and research for their self-renewal to cope up with changes in technology and develop expertise for effective implementation of the curricula. The format of Faculty Performance Appraisal format is provided in annexure.
- Institute organizes a meeting every month for faculty for feedback in which they discuss about the class conduct, performance, assignment, unit test, class test and activity of students. For the same faculty feedback is also considered on results, behaviour and own performance for active participation and achievements, discipline and quality basis, complied annually for two semesters (even and odd). Institute acknowledge faculty on the basis of self-appraisal report. Increments are assigned given according to appraisal report.

- Process for the appraisal –
  - Format given by the Head of the department
  - Filled by the concerned faculty
  - Submitted to Head of the department for remarks
  - Final submitted to director office for verification of marks and appropriate action (Increments/Reward)

Key points for faculty appraisal are:

1. Students Aggregate Attendance
2. Results of Previous Semester Subjects Taught
3. Research Papers/ Book Published/ICT Tool uses
4. Grant received from AICTE/UGC/MAPCST/Other Government bodies/Consultancy
5. Students Projects/Product made by faculty
6. Students Feedback
7. Extra Curricular involvement/FDP /Conferences /Seminar(Attended / Organized)
8. New Lab Establishment / Lab Maintenance/ Uses of virtual labs
9. Ph.D. /M. Tech Thesis Guided
10. Responsibility((Exam Control Room/TG/Anti Ragging/ Monitoring)

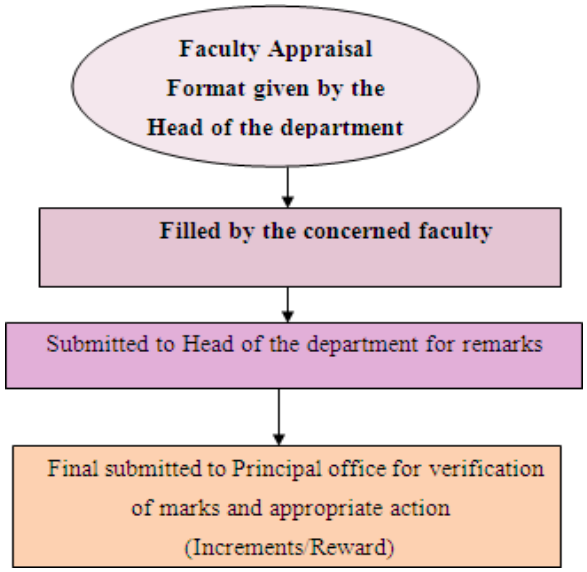


Fig 5.3 Flow chart of Faculty Appraisal Process

Sample of monthly performance appraisal of faculty

Faculty Appraisal Performa 2018-2019												
(Information Sheet)												
1	Name of the Faculty Member											
2	Designation											
3	Department											
4	Institute											
5	Qualification											
6	Subjects taught in last Session: 2018-2019											
S.No.	Name of Subject	Branch	Sem	Sub. code	No. of Students	Aggregate % Attendance	% of result	Result			Student Feedback %	HOD Verification
								No. of students passed with A+	No. of students passed with A	No. of students passed with B+/B		
a												
b												
c												
d												
	TOTAL											
7	Research Papers/ Book Published/ICT Tool uses											
	1											

	2									
8	Grant received from AICTE/UGC/MAPCOST/Other Government bodies/Consultancy									
9	Extra Curricular involvement/FDP /Conferences /Seminar(Attended / Organized)									
	S.N	Name of Event	Title		Detail of Organiser	Sponsored By	Date/Duration	Cerificate No.		
	a.									
	b									
	c									
10	Students Projects Guided/Product made by faculty	B.E.		No. of Project		No. of Product made by faculty				
		Ph.D /M. Tech		No. of Thesis						
11	Extra Curricular Duties Performed:									
		1								
		2								
12	Administration Duties of Mentor/Anti Ragging/Monitoring Duties: (Excuding Counselling)		1							
			2							
			3							
13	New Lab Establishment / Lab Maintenance/ Uses of virtual labs									
								Date:		

Table 5.16: Faculty Appraisal Evaluation Rubrics

Faculty Appraisal Evaluation Rubrics					
S.No	**Title**	**Verification Authority**	**Marking Scheme**	**Obtained Marks**	**Signature of Verified Authority**
1	Students Aggregate Attendance (20Marks)	HOD & Principal	< 40% = 0 < 40 to 50% = 5 < 50 to 65% = 10 < 65 to 75% = 15 > 75 = 20		
2	Results of Previous Sem Subjects Taught(15Marks)	HOD & Principal	No. of students with respct to grade A+/A/B+/B If total A+/A/B+/B > 30% then 15 if A+/A/B+/B> 20% then 8 A+/A/B+/B > 10% then 5		
3	Research Papers/ Book Published/ICT Tool uses (10Marks)	Principal	If 1 book published award =5, ICT Tool uses =5 1 SCI Paper Published = 5 3 Papers with ISSN/UGC = 5 if Published up to 2 papers = 2 NIL = 0		
4	Grant received from AICTE/UGC/MAPCOST/Other Government bodies/Consultancy (5Marks)	Principal	YES = 5 NO = 0		
5	Students Projects/Product made by faculty(10Marks)	HOD & Principal	If among best project = 10 Otherwise if guided =5 Product made by faculty=5 Not Guided = 0		
6	Students Feedback(20Marks)	HOD & Principal	Excellent = 20 Very Good = 18 Good = 15 Average = 10 Satisfactory = 5		

7	Extra Curricular involvement/FDP /Conferences /Seminar(Attended / Organized) 5 Marks	HOD/ Principal	Yes (Actively involved) = 05 Participated = 02 Organized=03 NO = 0		
8	New Lab Establishment / Lab Maintenance/ Uses of virtual labs (5Marks)	HOD/ Principal	If YES = 5 NO = 0		
9	Ph.D. /M. Tech Thesis Guided (5Marks)	HOD/ Principal	1 Mark/Thesis if completed within time Maximum mark = 05		
10 11	Responsibility (Exam Control Room/TG/Anti Ragging/ Monitoring 5Marks	HOD/ Principal	If doing with full cooperation then 05 doing without co operation then 3 Refusing = 0		
	Forwarded by HOD		**Signature of Faculty**		**Principal**

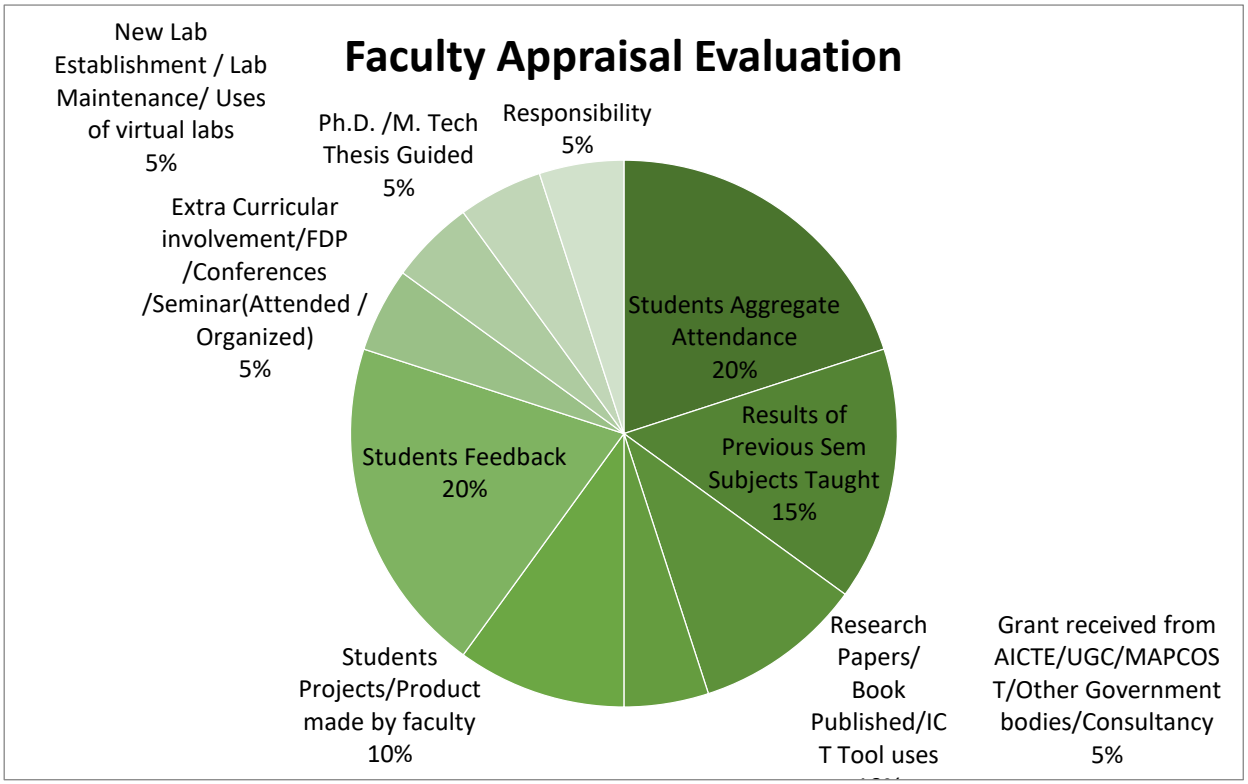


Figure 5.4 Faculty Appraisal Evaluation

5.9 Visiting / Adjunct / Emeritus Faculties (10)

Adjunct faculty also includes Industry experts. Provide details of participation and contributions in teaching and learning and/or research by visiting /adjunct/ Emeritus faculty etc.

For all the assessment years: Provision of in visiting/having visiting/adjunct/emeritus faculty (1) Minimum 50 hours per year interaction with adjunct faculty from industry/retired professors etc.

(Minimum 50 hours interaction in a year will result in 3 marks for that year; 3marks x 3Years = 9 marks)

Table 5.17: Visiting / Adjunct / Emeritus Faculties

Sl. No.	Academic Year	Year	Name of the course	Name of the Industry Expert	Hours
01	2020-2021	VII	Grid stability & control	Mr. J P SHARMA	**50**
01	2019-2020	VI	Optimization techniques in power system	Mr. Narayan Puri S valkunthe	**100**
02		VII	Electric vehicle	Mr. Mohan Singh Yadav	
01	2018-2019	VII	Electric vehicle	Mr. Mohan Singh Yadav	**150**
02		VI	Optimization techniques in power system	Mr. Narayan Puri S valkunthe	
03		VII	Grid stability & control	Mr. S.N.Awasthi	

Criterion 6	Facilities and Technical Support	80

6. FACILITIES AND TECHNICAL SUPPORT (80)

6.1 Adequate and well-equipped laboratories, and technical manpower (30)

1. Adequacy of Laboratory: The adequate well equipped laboratories are available to run the entire program specific curriculum.

2. Equipment of Laboratory: The labs have all the required equipments as per curriculum. The maintenance of the laboratory equipment's are excellent with best services and laboratories are well equipped with air ventilation, good ambience with adequate lighting facility, fan facility, power supply to run the machine.

3. Adequacy of Man Power: The students are also allowed to do lab experiments after their lab hours within working hours with technical support after getting the permission from the staff in charge of the respective lab. Beyond working hours, the laboratories are available for the students to do their projects. Faculty and technicians use to support the project works during late hours too. Availability of adequate and qualified technical supporting staff as per norms listed in table **6.1.**

Table 6.1: Details of labs

S. N.	Name of the Laboratory	No. of students per setup (Batch Size)	Name of the Important equipment	Weekly utilization status	Technical Manpower support		
					Name of the technical staff	Designation	Qualification
1.	Electrical Measurement & Measuring Instruments (EX-303)	4(30)	1. Kelvin Bridge 2. Wheatstone Bridge 3. Meggar hand driven generator type 4. 1-Phase Energy meter 5. 3-Phase Energy meter 6. LPF Wattmeter 7. Digital multi-meter auto manual 8. Dual Power Supply 9. Conductivity Attachment & connecting lead 10 Amps (for Kelvin Bridge) 10. Power Supply,0-12 VDC/10 Amps 11. SPOT Reflecting Galvanometer 12. MI AC Port meter 13. Ampere meters 14. Voltmeters	8hrs	Mr. Shailendra Yadav	Lab Technician	ITI
2.	Network Analysis Lab (EX-304)	4(30)	1. Thevenin's theorem 2. Superposition theorem	8hrs	Mr. Narvesh Sahu	Lab Technician	Diploma

S. N.	Name of the Laboratory	No. of students per setup (Batch Size)	Name of the Important equipment	Weekly utilization status	Technical Manpower support		
					Name of the technical staff	Designation	Qualification
			3. Reciprocity theorem 4. Max. power transfer theorem 5. Millman's theorem, 6. Cascaded two port N/W 7. LCR Resonance Kit 8. Two port network parameter 9. Transient response of LCR circuit				
3	Analog Electronics (EX-305)	4(30)	1. Operational amplifier as inverting non-inverting, summing & difference amplifier with one digital voltmeter 2. Application of operational amplifier (Discrete component trainer) 3. Operational amplifier as differentiator & integrator. 4. Linear wave shaping circuits (Study of clipping, clamping, integrator, differentiator) 5. Operational amplifier as voltage comparator. 6. Bistable Multivibrator using transistors. 7. Monostable & fee running Multivibrator using	8hrs	Mr. Manish Jain	Lab Technician	Diploma

S. N.	Name of the Laboratory	No. of students per setup (Batch Size)	Name of the Important equipment	Weekly utilization status	Technical Manpower support		
					Name of the technical staff	Designation	Qualification
			transistors 8. RC, low pass, high pass, band pass & band stop filters. 9. Feedback amplifier series and shunt voltage 10. Class 'A', 'B', 'AB' & Push-Pull amplifier 11. Class C RF tuned amplifier				
4	Computer Programming – I(EX-306)	1(30)	1. Java 2. Computer Lab	8hrs	Mr. Sandeep Raghuwanshi	Lab Technician	**BE**
5	Electrical Machine-I Lab (EX-402)	4(30)	1. 3-phase 2KVA, 415V delta-star transformer 2. 1-phase transformer 3. 1-phase Induction Machine 4. MI type Ammeters 5. MI type Voltmeters 6. Dynamo type wattmeter 7. Rheostat 8. 1 phase Variac 9. 3 phase Variac	8hrs	Mr. Manish Jain	Lab Technician	Diploma

S. N.	Name of the Laboratory	No. of students per setup (Batch Size)	Name of the Important equipment	Weekly utilization status	Technical Manpower support		
					Name of the technical staff	Designation	Qualification
			10. Analog Multimeter 11. Digital clamp meter 12. Inductive load 13. 1 phase rectifier control panel 14. 3 phase Induction motor 15. Tachometer Digital				
6	Digital Electronics & Logic Design Lab – I(EX403)	4(30)	1. 4 Bit Adder & Subtractor Circuits using IC 7483, 2. Digital Logic Trainer 3. Digital Full adder & Subtractor Circuit 4. 4:1 Line multiplexer 5. 1:4 Line de-multiplexer 6. Code conversion (BCD to excess-3 codes) 7. 16 to 1 line multiplexer &1 to16 line de-multiplexer 8. Logic gate using six TTL IC	8hrs	Mr. Narvesh Sahu	Lab Technician	Diploma
7	Power System-I Lab (EX-404)	4(30)	1. Hydral Power Plant Model 2. Thermal Power Plant Model 3. Nuclear Power Plant Model	8hrs	Mr. Yogesh Upadhyay	Lab Technician	BE
8	Control Systems Lab	4(30)	PID Controller Kit	8hrs	Mr. Narvesh	Lab	Diploma

S. N.	Name of the Laboratory	No. of students per setup (Batch Size)	Name of the Important equipment	Weekly utilization status	Technical Manpower support		
					Name of the technical staff	Designation	Qualification
	(EX-405)				Sahu	Technician	
9	Computer Programming – II(EX-406)	4(30)	1. Python 2. Computer Lab	8hrs	Mr. Sandeep Raghuwanshi	Lab Technician	**BE**
10	Electrical Machine Lab– II (EX-501)	4(30)	1. Motors (3 Phase Synchronous motor 3HP 3 Phase 415V)AC to DC 2. DC Motor coupled with alternator 3. AC Generator 4. DC Shunt Motor 2HP 220V 1500 RPM 5. DC Series Motor 2HP 220V 1500 RPM 6. Ammeters 7. Resistive load 8. Rheostat 9. Starter 3 point 10. Starter 4 point 11. 3 phase variac	8hrs	Mr. Yogesh Upadhyay	Lab Technician	BE
	Power Electronics Lab (EX-502)	4(30)	1. SCR Single Phase Half Wave Full wave , Full Wave controlled Bridge Rectifier Converter ME	8hrs	Mr. Prashant Singh Rajpoot	Lab Technician	BE

S. N.	Name of the Laboratory	No. of students per setup (Batch Size)	Name of the Important equipment	Weekly utilization status	Technical Manpower support		
					Name of the technical staff	Designation	Qualification
11			2. Jones Chopper 3. Series Inverter using SCR's 4. Margons Chopper 5. Parallel Inverter 6. SCR Firing Kit 7. SCR Commutation Techniques 8. Phase control using Triac 9. Thyristor Firing Circuit Kit(UJT controlled SCR Time Delay) 10. Setup Chopper 11. Three Phase Half controlled Bridge Rectifier 12. Three phase fully controlled bridge rectifier 13. Single phase Cyclo Converter 14. SMPS Trainer Kit 15. Single Phase Invertor (using power MOSFET) 16. Chopper circuit (using power MOSFET with motor) 17. Switching action of BJT				

S. N.	Name of the Laboratory	No. of students per setup (Batch Size)	Name of the Important equipment	Weekly utilization status	Technical Manpower support		
					Name of the technical staff	Designation	Qualification
			18. Switching action of BJT 19. Characteristic and application of basic thyristor 20. Characteristic of MOSFET				
12	Power System-II Lab (EX-601)	4(30)	1. Hydral Power Plant Model 2. Thermal Power Plant Model 3. Nuclear Power Plant Model	8hrs	Mr. Shailendra Yadav	Lab Technician	ITI
13	Microprocessors & Micro Controllers Lab (EX-602)	4(30)	1. 8086 microprocessor trainers with LCD display, 2. 16*2 line alphanumeric display 3. CPLD Starter Kit 4. FPGA Starter Kit 50K gates 5. 8155 study card, 6. D to A converter study card 7. 8251 card 8. 8259 card 9. A to D study card 10. 8255 card 11. PIO-ADC 018 bit1 channel advance micro controller lab system	8hrs	Mr. Prashan Singh Rajput	Lab Technician	BE

S. N.	Name of the Laboratory	No. of students per setup (Batch Size)	Name of the Important equipment	Weekly utilization status	Technical Manpower support		
					Name of the technical staff	Designation	Qualification
			12. 8051 Flash microcontroller Board, FMS-51 13. ADC/DAC interface card 14. Elevator controller card 15. DC motor controller card 16. Stepper motor controller card 17. 6 digit 7 segment LED display 18. Traffic light controller card				
14	Electronics Instrumentation Lab (EX-605)	4(30)	1. Oscilloscope 2. Function Generator 3 MHz 3. Displacement Measurement using LVDT 4. Strain guage trainer 5. Temperature measurement & control using RTD 6. Temperature measurement & control using Thermocouple 7. 4/8-Bit Analog to Digital Converter 8. 4/8-Bit Digital to Analog Converter 9. Anderson Bridge 10. Schering Bridge	8hrs	Mr. Rajendra Kumar	Lab Technician	Diploma

S. N.	Name of the Laboratory	No. of students per setup (Batch Size)	Name of the Important equipment	Weekly utilization status	Technical Manpower support		
					Name of the technical staff	Designation	Qualification
			11. LCR-Q Bridge 12. Opto Electronic Devices Characteristics (LED, LDR, Photo Diode) 13. Pressure measurement using strain gauge 14. Digital Oscilloscope				
15	Simulation Lab (EX-606)	1(30)	1. MATLAB/SCILAB 2.Computer Lab	8hrs	Mr. Shailendra Yadav	Lab Technician	ITI
16	Power System Protection (EX-701)	4(30)	1. Hydral Power Plant Model 2. Thermal Power Plant Model 3. Nuclear Power Plant Model	8hrs	Mr. Prashan Singh Rajput	Lab Technician	BE
17	Electrical CAD Lab (EX-704)	4(30)	1. MATLAB/SCILAB Simulation Lab 2. Computer Lab		Mr. Yogesh Upadhyay	Lab Technician	BE
18	Minor/Major Project Lab (EX-706)	4(30)	1. Mounting and Soldering Facilities 2. Computer system, 3. Etching Facilities, 4. Testing facilities of project	8hrs	Mr. Rajendra Kumar	Lab Technician	Diploma
19	Switchgear & Protection Lab	4(30)	1. IDMT over current relay with testing kit OC relay 2. Percentage bias differential relay	8hrs	Mr. Manish Jain	Lab Technician	Diploma

S. N.	Name of the Laboratory	No. of students per setup (Batch Size)	Name of the Important equipment	Weekly utilization status	Technical Manpower support		
					Name of the technical staff	Designation	Qualification
			3. Buchholz relay				
20	Electrical Drives Lab	4(30)	1. DC Motor Control using SCR's(with Tachometer) 2. Three Phase Induction Motor Speed Controller 3. Chopper Motor Controller with Motor 4. Universal AC/DC Motor Controller 5. DC Drive Trainer 6. Phase Half controlled DC Drive	8hrs	Mr. Yogesh Upadhyay	Lab Technician	BE
21	Basic Electrical and Electronics Engineering lab (BT-1004)		1. CRO 2. Function generator 3 MHz 3. Analog meter 4. Digital multimeter 5. Resistance ,Inductors, Capacitor on board with colour coding 6. PN/ZENER/LED Characteristics apparatus 7. Solar Cell Characteristics Apparatus 8. Photodiode Characteristics Apparatus 9. Half/full wave Rectifier	8hrs	Mr. Shailendra Yadav	Lab Assistant	**ITI**

S. N.	Name of the Laboratory	No. of students per setup (Batch Size)	Name of the Important equipment	Weekly utilization status	Technical Manpower support		
					Name of the technical staff	Designation	Qualification
			10. PNP Transistor Kit 11. NPN Transistor kit 12. CE Transistor Amplifier 13. Transistor characteristics apparatus with regulated power 14. Operational Amplifier as inverting non-inverting, 15. Application OF IC 555 16. Universal Gate Trainer 17. Half adder & Full adder kit 18. Demorgon's Theorem 19. Logic Gates Experiment Kit 20. Basic logic gates using TTL 21. 4 Bit Adder & Subtractor Circuits using IC 22. Study of Flip-Flop Circuits 23. LCR bridge kit 24. LCR-Q Meter 25. Study of RC Passive, Low Pass, High Pass 26. Patchcord thin				

S. N.	Name of the Laboratory	No. of students per setup (Batch Size)	Name of the Important equipment	Weekly utilization status	Technical Manpower support		
					Name of the technical staff	Designation	Qualification
			27. Patchcord thick				

6.2 Additional facilities created for improving the quality of learning experience in laboratories (25)

S. N.	Facility Name	Details	Reason(s) for creating facility	Utilization	Areas in which students are expected to have enhanced learning	Relevance to POs/PSOs
1.	Smart Class Room	• E-board & projector facility with the seating capacity of 60. • Fully equipped furniture and teaching aids.	• In Digital Class room classes, we use all interactive modules like videos/ presentations and these visually attractive methods of teaching • Teaching becomes appealing to students who are already struggling with the traditional method of teaching in a classroom.	Throughout the semester	The graphs, design, models, simulation and fabrication of difficult subjects can be easily analyzed and visualized	PO1,PO2,PO 3, PO4, PO5, PO10,PO12, PSO-1 & PSO-3
2.	Seminar Hall	Fully equipped seminar hall with Computer, Projector, Student Desk, White Board, Air conditioner, Fan,	• To present technical talk/project seminars/research papers/workshops/ industry interaction presentation. • Development of technical skills.	12hrs per semester	• To bridge the band gap between academic and industry curriculum.	PO1,PO2,PO 3, PO4, PO5, PO10,PO12, PSO-1 &

S. N.	Facility Name	Details	Reason(s) for creating facility	Utilization	Areas in which students are expected to have enhanced learning	Relevance to POs/PSOs
		microphone and speaker with capacity of 400 seating			• To upgrade students to industry standard. • Cultural and sports activities.	PSO-3
3.	Departmental Library	Departmental library has a collection of text books, CD's, reference books, project / seminar report and NPTEL lecture.	• To provide academic support to students. • To provide advanced information of the seminars and projects.	Throughout the semester	Student learning process	PO1, PO-2, PO-4, PSO-1, PSO-2 & PSO-3
4.	Video's From NPTEL and NPTEL Course has been conducting for the students	Displayed in the central and dept. library.	• Understand Video oriented Teaching and learn about the new technology	Throughout the semester	To understand important concept of various Lab Subject like Electronics and Electrical lab, and modern tool uses in signal	PO-1, PO-2, PO 5 &PSO1
5.	Training on MATLAB/SCIL	Students would be trained in MATLAB simulator, hand on	To enhance solving complex problem capability in electronics and	90hrs for each batch	Students would be able to design various	PO1, PO3,

S. N.	Facility Name	Details	Reason(s) for creating facility	Utilization	Areas in which students are expected to have enhanced learning	Relevance to POs/PSOs
	AB (by Indeyes Institute Bhopal)	in various tool box used in Electrical and Electronics Students will also aware about MATLAB uses in industrial application.	communication domain		project and model in the field of electronics and communication	PO4, PO5, PO9, PO11, PO12, PSO-1 &PSO-3
6.	Training on "Embedded Systems & Robotics" By (Indeyes Institute Bhopal)	Students are trained in Embedded Systems & Robotics and they are made aware about IoT technology.	It will help them in grabbing various job opportunities in MNCs.	90hrs for each batch	Designing capability of embedded and robotics	PO1, PO2, PO3, PO4, PO5, PO8 &PO12,
7.	Provide training by CRISP Bhopal) on various Lab	Industrial Automation, RS View32 SCADA, PLC Programming**&** Power Electronics and Industrial Drives	It will help them in grabbing various job opportunities in MNCs.	The contents covered during 90 hours for a batch	Student will be enhance learning in, Energy Conservation Field, Instrumentation & Control ,Industrial Automation, PLC Programming & Application, Power Electronics and	PO1, PO2, PO3, PO4, PO5, PO8 & PO12,

S. N.	Facility Name	Details	Reason(s) for creating facility	Utilization	Areas in which students are expected to have enhanced learning	Relevance to POs/PSOs
					Industrial Drives	
8.	Internet Facility	Internet of 100 Mbps and Wi-Fi of 100 Mbps	Self-learning /Seminars /Presentations /Solve assignments, documentation	Throughout semester	Courses specified in Curriculum	PO1, PO2, PO3, PO4, PO5 PO8 & PO12
9.	Training and placement classes	Training on reasoning, group discussion, and technical skill by experts.	Job oriented training and to improve logical reasoning and technical skills.	60 Hrs for pre final year students	Employability and entrepreneurships	PO4, PO5, PO8 & PO12
10	Solar power plant	100kW rooftop Solar power plant	For minor and major projects students can use these facilities	As needed	Understanding the role of renewable energy and developing projects based on RES	PO5, PO6, PO8 & PO12
11	Charts	Subject-wise	Explanation of procedure, description	As needed	During	PO1,PO2,PO

S. N.	Facility Name	Details	Reason(s) for creating facility	Utilization	Areas in which students are expected to have enhanced learning	Relevance to POs/PSOs
		Charts available for learning	etc. to clarify concept by visual display		practical's Constant exposure to Visual displays help in remembering concepts for a longer time	3,PO 4,PO5,PO6,PO7, PO10,PSO1

6.3 Laboratories: Maintenance and overall ambience (10)

To ensure high quality technical education to the students, the college provides best possible infrastructure facilities in the campus.

The Department is equipped with sophisticated laboratories and state of art instruments to satisfy the curriculum requirements. All laboratories are spacious, well ventilated and provided with adequate electrical fittings to take care of ambiance. Salient features regarding maintenance and ambience of laboratory facilities are as follows;

- **Electricity, telecom facility, drinking water, and security**

  Electricity: Electrical power is supplied to IES College through 33 K.V 3 - phase feeder. The supply is received through 33kV, 200 kVA transformer located inside the campus. College has 125 Kva, Jakson Genset also.

  Water supply: There are bore wells and well also in the campus with adequate yield to fully meet the water requirement for drinking, laboratory use and other purposes.

  Academic Building Maintenance: Estate Supervisor – looks after maintenance of buildings and green covers.

- **Laboratory Equipment Maintenance:**
  - All the equipment in the laboratories is maintained on a regular basis by the concerned laboratory technicians under the guidance and supervision of the Faculty members.
  - General servicing is done before commencement of academic session. Servicing is also done whenever necessary.
  - An equipment maintenance register is maintained separately for each laboratory to record the maintenance, repairs and servicing if any carried out for the equipment.
  - For Computers: Routine complaints are looked after by an internal team of programmers and technicians
  - For large & expensive equipment: Malfunctioning of equipment is referred to the supplier of the equipment for necessary servicing and repairs
  - Qualified technical assistants are available for maintenance of the equipments and software in labs.

- **Ambience, green cover, environment preservation etc.**
  - Ambience has been given special importance for the students to feel refreshed when they enter the campus.

- Green lawn is developed and trees are grown in the campus for good ambiance and greenery
- To add to protection of environment and to reduce the load on conventional electrical energy, 100 kW solar power plant is located on the rooftop.
- As per university curriculum department has well equipped labs.
- All laboratories are acoustics having sufficient natural light, proper ventilation with tubes and fan arrangement.
- For proper ventilation and natural light, sufficient numbers of windows are available in every laboratory and class room.
- All Labs are open for students and faculties for projects and research.
- Laboratory manuals are provided to the students.
- Each lab is equipped with green/white board facilities.
- Fire extinguishers are provided on all the floors.

6.4 Project laboratory (5)

- Technical support for the students is available throughout the day.
- All other labs (Workshop, Embedded System Lab, Signal Processing Lab etc.) are open for the students to completion of their projects throughout the day.
- MOU with industries for training students.
- 100kW solar power plant
- Project/Research lab is exclusively for the research and project work with the hardware and software facilities listed below:

Table 6.2: Project lab

Sr. No.	Name of the Facilities	Utilization
1.	Project Lab	UG/PG students utilize for their mini projects, projects, and research activities.

Table 6.3: Hardware/ Software Facilities

S. No	Name of the Equipment's
1.	Scientific 3MHz Function Generator Supply

2.	LCD display, Relays, Sensors. ICs
3.	Multi-Sim
4.	Lab VIEW 2012
5.	MATLAB licensed version software.
6.	PSPICE Open source software used software for implementation of power circuits.
7.	SCI-Lab – Open access software
8.	100kW Solar power plant
9.	Internet of 100 Mbps and Wi-Fi of 100 Mbps
10.	Equipment for PCB Fabrication , Drilling Machine, Grinder, Winding Machine ,Printer etc.
11.	Project seminar hall which includes projector, PC system, software, audio systems.
12.	10KVA UPS 240 VDC along with batteries

6.5 Safety measures in laboratories (10)

The following safety measures are used in all the labs:

- Specific safety rules like Do's and Don'ts are displayed in all the labs.
- Well trained technical supporting staff monitor the labs at all times.
- Faulty equipments are identified and serviced at the earliest.
- The use of cell phones is prohibited.
- Fire extinguishers are provided on all the floors.
- Medical facility/ first aid box is provided in the department.
- All power supply lines are properly insulated and covere

Table 6.4: Safety measures in laboratories

S.N.	Laboratory Name	Safety measure
1	**Electrical Instrumentation Lab**	1. Clean and structured laboratories are maintained. 2. The switching of power supply is to be handled only by authorized person. 3. Faulty apparatus are identified and serviced at the earliest. 4. Circuits are properly grounded. 5. Use of cell phones is strictly prohibited. 6. Switch on the power supply after checking connections. 7. Handle the trainer kit carefully. 8. Capacitors can store dangerous quantities of energy. After switching off, discharge any capacitors that were in the circuit. 9. If you use electrolytic capacitors, do not put excessive voltage across them 10. Never handle electrical equipment with wet hand.
2	**Electronics Device Lab**	1. Do's and don'ts are displayed 2. First aid box is kept in department. 3. Fire extinguishers are available on floor. 4. Clean and structured laboratories are maintained. 5. The switching of power supply is to be handled only by authorized person. 6. Faulty apparatus are identified and serviced at the earliest.

		7. Use of mobile phones is strictly prohibited in lab. 8. Incorrect connection of power to the ICs could result in them exploding or becoming very hot - with the possible serious injury occurring to the students working on the experiment. 9. Ensure that the power supply polarity and all components and connections are correct before switching on power. 10. Capacitors can store dangerous quantities of energy. After switching off, discharge any capacitors that were in the circuit. 11. If you use electrolytic capacitors, do not put excessive voltage across them
3	**Network Analysis Lab**	1. The switching of power supply has been handled only by authorized person. 2. Use of mobile phones is strictly prohibited in lab. 3. Switch on the power supply after checking connections. 4. Handle the trainer kit carefully. 5. Do's and don'ts are displayed 6. First aid box is kept in department. 7. Fire extinguishers are available on floor. 8. Ensure that the power supply polarity and all components and connections are correct before switching on power.
4		1. The 5V supply or specified voltage level should not be exceeded since this will damage the ICs (Integrated Circuits) used during the experiments. 2. A fire extinguisher is available on floor.

	Digital Electronics & Logic Design Lab – I	3. Clean and structured laboratories are maintained. 4. The switching of power supply is to be handled only by authorized person. 5. Incorrect connection of power to the ICs could result in them exploding or becoming very hot - with the possible serious injury occurring to the students working on the experiment. 6. Faulty apparatus are identified and serviced at the earliest. 7. Ensure that the power supply polarity and all components and connections are correct before switching on power. 8. Make sure that equipment working on electrical power is grounded properly.
5	**Electrical Machine Lab – I**	1. The switching of power supply is to be handled only by authorized person. 2. Faulty apparatus are identified and serviced at the earliest. 3. All Electrical equipment is connected with proper earth- line. 4. Use of cell phones is avoided. 5. Never handle electrical equipment with wet hand 6. Ensure that the power supply polarity and all components and connections are correct before switching on power. 7. Only make changes to the experimental setup when the circuit power is turned off and all power sources read zero voltage and zero current, as applicable. 8. Use wires of suitable length for their appropriate applications. Long wires or connections can cause clutter on a bench, and very short wires or connect can cause open circuit. 9. Make sure that all DC power supplies, AC sources, and other power sources start from a zero voltage and zero current output or as directed in an experiment.

		10. Starting from a non-zero voltage is possible in certain applications where a voltage source should have a specific initial condition. 11. Do not allow a single user to perform an experiment alone. Make sure at least two users perform an experiment when operating more than 50 V DC and three-phase AC.
6	**Analog Electronics Lab**	1. Do's and don'ts are displayed 2. First aid box is kept in department. 3. Fire extinguishers are available on floor. 4. Clean and structured laboratories are maintained. 5. The switching of power supply is to be handled only by authorized person. 6. Damaged apparatus are identified and serviced at the earliest. 7. Switch on the power supply after checking connections. 8. Handle the Trainer kit carefully 9. Incorrect connection of power to the ICs could result in them exploding or becoming very hot - with the possible serious injury occurring to the students working on the experiment. 10. Ensure that the power supply polarity and all components and connections are correct before switching on power.
7	**Electrical Engineering Simulation Lab – 1**	1. Do's and don'ts are displayed 2. First aid box is kept in department. 3. Fire extinguishers are available on floor. 4. Clean and structured laboratories are maintained. 5. The switching of power supply is to be handled only by authorized person.

		6. Use of cell phones is avoided.
8	**Microprocessors & Micro Controllers Lab**	1. Do's and don'ts are displayed 2. First aid box is kept in department. 3. Fire extinguishers are available on floor. 4. Clean and structured laboratories are maintained. 5. The switching of power supply is to be handled only by authorized person. 6. Switch on the power supply after checking connections. 7. Handle the Trainer kit carefully 8. Ensure that the power supply polarity and all components and connections are correct before switching on power.
9	**Electrical Machine Lab – II**	1. Do's and don'ts are displayed 2. First aid box is kept in department. 3. Fire extinguishers are available on floor. 4. Clean and structured laboratories are maintained. 5. The switching of power supply is to be handled only by authorized person. 6. Use of cell phones is avoided. 9. All Electrical equipment is connected with proper earth- line. 10. Never handle electrical equipment with wet hand 11. Switch on the power supply after checking connections.

		12. Handle the Trainer kit carefully 13. Only make changes to the experimental setup when the circuit power is turned off and all power sources read zero voltage and zero current, as applicable. 14. Use wires of suitable length for their appropriate applications. Long wires or connections can cause clutter on a bench, and very short wires or connect can cause open circuit. 15. Make sure that all DC power supplies, AC sources, and other power sources start from a zero voltage and zero current output or as directed in an experiment. 16. Starting from a non-zero voltage is possible in certain applications where a voltage source should have a specific initial condition. 17. Do not allow a single user to perform an experiment alone. Make sure at least two users perform an experiment when operating more than 50 V DC and three-phase AC.
10	**Power Electronics Devices & Circuits Lab**	1. Do's and don'ts are displayed 2. First aid box is kept in department. 3. Fire extinguishers are available in floor. 4. Clean and structured laboratories are maintained. 5. The switching of power supply is to be handled only by authorized person. 6. Incorrect connection of power to the ICs could result in them exploding or becoming very hot - with the possible serious injury occurring to the students working on the experiment. 7. Ensure that the power supply polarity and all components and connections are correct before

		switching on power.
11	**Power System Lab– I**	1. Do's and don'ts are displayed 2. First aid box is kept in department. 3. Fire extinguishers are available on floor. 4. Clean and structured laboratories are maintained. 5. The switching of power supply is to be handled only by authorized person.
12	**Control Systems Lab**	1. Do's and don'ts are displayed 2. First aid box is kept in department. 3. Fire extinguishers are available on floor. 4. Clean and structured laboratories are maintained. 5. Use of cell phones is avoided.
13	**Switchgear & Protection lab**	1. Do's and don'ts are displayed 2. First aid box is kept in department. 3. Fire extinguishers are available on floor. 4. Clean and structured laboratories are maintained. 5. The switching of power supply is to be handled only by authorized person. 6. Use of cell phones is avoided.
14	**Electronics Instrumentation Lab**	1. Do's and don'ts are displayed 2. First aid box is kept in department. 3. Fire extinguishers are available in floor. 4. Clean and structured laboratories are maintained.

		5. The switching of power supply is to be handled only by authorized person.
15	**Power System Lab – II**	1. Do's and don'ts are displayed 2. First aid box is kept in department. 3. Fire extinguishers are available on floor. 4. Clean and structured laboratories are maintained. 5. The switching of power supply is to be handled only by authorized person.
16	**Electrical Drives Lab**	1. Do's and don'ts are displayed 2. First aid box is kept in department. 3. Fire extinguishers are available on floor. 4. Clean and structured laboratories are maintained. 5. The switching of power supply is to be handled only by authorized person.
17	**Computer Aided Electrical Machine Design lab**	1. Do's and don'ts are displayed 2. First aid box is kept in department. 3. Fire extinguishers are available on floor. 4. Clean and structured laboratories are maintained. 5. The switching of power supply is to be handled only by authorized person. 6. Use of cell phones is avoided.
18	**Computer Application to Power System Lab**	1. Do's and don'ts are displayed 2. First aid box is kept in department. 3. Fire extinguishers are available on floor.

		4. Clean and structured laboratories are maintained. 5. The switching of power supply is to be handled only by authorized person.
19	**Major Project Lab**	1. Do's and don'ts are displayed 2. First aid box is kept in department. 3. Fire extinguishers are available on floor. 4. Clean and structured laboratories are maintained. 5. The switching of power supply is to be handled only by authorized person. 6. Soldering process must be carried out in enclosed area to make sure that the fumes (containing lead) are contained and not released into the open air. 7. Wear hand gloves while handling hazardous chemicals. 8. Adequate care must be taken in Soldering and etching process. 9. Soldering requires heat and metal; therefore there is possibility for metal pieces to fly into your eyes. 10. In the etching process, strong acids might emit fumes that are dangerous to your eyes.
20	**Modeling & Simulation Lab**	1. Do's and don'ts are displayed 2. First aid box is kept in department. 3. Fire extinguishers are available on floor. 4. Clean and structured laboratories are maintained. 5. The switching of power supply is to be handled only by authorized person.

		6. Use of cell phones is avoided. 7. Don't forget to shut down your system properly.
21	**Basic Electrical and Electronics Lab**	1. Do's and don'ts are displayed 2. First aid box is kept in department. 3. Fire extinguishers are available on floor. 4. Clean and structured laboratories are maintained. 5. The switching of power supply is to be handled only by authorized person. 6. Faulty apparatus are identified and serviced at the earliest. 7. Use of mobile phones is strictly prohibited in lab. 8. Incorrect connection of power to the ICs could result in them exploding or becoming very hot - with the possible serious injury occurring to the students working on the experiment. 9. Ensure that the power supply polarity and all components and connections are correct before switching on power.

CRITERION 7	Continuous Improvement	50

Criterion 7 CONTINUOUS IMPROVEMENT (50)

7.1. Actions taken based on the results of evaluation of each of the POs & PSOs (20)

Identify the areas of weaknesses in the program based on the analysis of evaluation of POs & PSOs attainment levels. Measures identified and implemented to improve POs & PSOs attainment levels for the assessment years.

Table 7.1 PO attainment analysis

IES COLLEGE OF TECHNOLOGY BHOPAL						
Department of Electrical and Electronics Engineering						
PO attainment analysis batch wise						
	2014-18 Batch		2015-19 Batch		2016-20 Batch	
POs	Target value	Total Achieved value	Target value	Total Achieved value	Target value	Total Achieved value
PO1	2.3	2.1	2.3	2.1	2.2	2.2
PO2	2.1	2.1	2.2	2.1	2.2	2.2
PO3	2	2.2	2	2	2	2.2
PO4	1.8	2.3	1.8	2.1	1.9	1.9
PO5	2	2.2	2.2	2	2.2	2.3
PO6	1.8	2.2	2	1.9	2	2.3
PO7	1.9	1.9	2	1.6	2	2
PO8	1.8	2	2	2.3	2.1	2.7
PO9	2.1	2.1	2.3	1.7	2.3	2.5
PO10	2	2.3	2.2	2.3	2.2	2.57
PO11	1.6	2.4	2.1	2.1	2.1	2.1
PO12	2	2	2.2	2.1	2.2	2.1
Average	**1.95**	**2.0**	**2.1**	**2.03**	**2.1**	**2.25**
Percentage	**65**	**67**	**70**	**68**	**70**	**75**

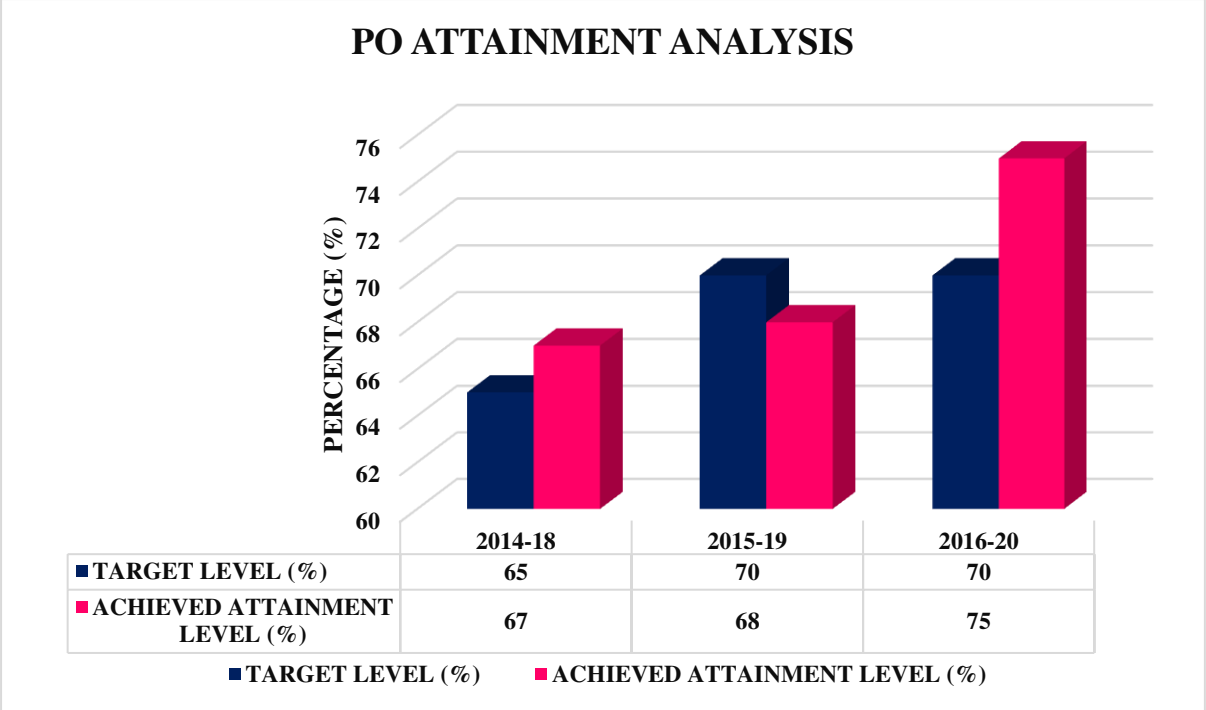


Fig. 7.1 PO attainment analysis

Table 7.2 PSO attainment analysis

IES COLLEGE OF TECHNOLOGY BHOPAL						
Department of Electrical and Electronics Engineering						
PSO attainment analysis batch wise						
	2014-18 Batch		2015-19 Batch		2016-20 Batch	
PSOs	Target value	Total Achieved value	Target value	Total Achieved value	Target value	Total Achieved value
PSO1	2.2	2.1	2.3	2.2	2.3	2.2
PSO2	1.7	2.1	2	2.1	2	2.2
PSO3	2	2	2.1	2.3	2.1	2.3
Average	**1.95**	**2.06**	**2.1**	**2.2**	**2.1**	**2.233**
Percentage	**65.00%**	**68.66%**	**70.00%**	**73.33%**	**70.00%**	**74.4%**

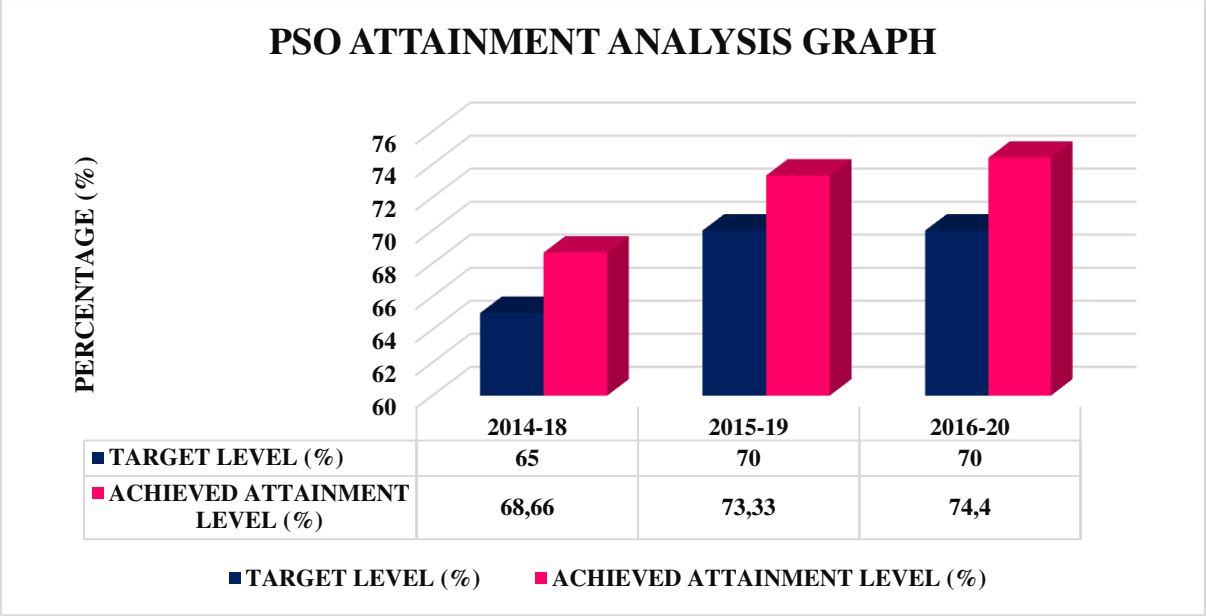


Fig. 7.2 PSO attainment analysis

PO and PSO attainment and action taken-2016-20 Batch (2020-21)

POs	Target Level	Attainment Level	Observations
PO1: Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.			
PO1	**2.2**	**2.2**	**Observations** **Target Attained** **1.** Problem in understanding of Mathematics –I & II. **2.** Problem in understanding of Control System
Actions **1.** Remedial / Revision classes and NPTEL video session were conducted to solve problems of Mathematics and control system. **2.** More problems were given for practice in mathematics subjects.			
PO2: Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.			
PO2	**2.2**	**2.2**	**Observations** **Target Attained** **1.** Lacking in solving Analytical Problems of Mathematics –I & II. 2. Extra Analytical classes should be conducted in Major and Minor Projects.
Actions **1:** More numerical problems were practice in class room. **2:** More problems were assigned as part of assignment. **3:** NPTEL video sessions were conducted.			
PO-3: Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.			
PO3	**2**	**2.2**	**Observations** **Target Attained** • Require improvement in Design/ Development solutions in the field of Power System and control system. • Extra session to be conducted for design and development in Major and Minor Projects.
Actions **1:** NPTEL video lectures were conducted. **2:** For the technical understanding of project design technical events, seminar and workshop, webinar and course beyond syllabus session were organized.			

PO-4: Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.			
PO4	**1.9**	**1.9**	**Observations** **Target Attained** 1. Research oriented session should be organized.
Actions **1.** Emphasis given on project based learning by giving the project based assignments. **2.** Online guest lectures, webinar and seminar were conducted. **3.** How to write an effective technical paper webinar was organized.			
PO-5: Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.			
PO5	**2.2**	**2.3**	**Observations** **Target Attained** **1.** Should be more emphasis on latest tool and technology. 2. Should be increase frequency of industrial interaction program
Actions **1.** Online lectures on MATLAB conducted **2.** Webinar and seminar were conducted related to industry issues. **3.** Emphasis on online certification course.			
PO-6: The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.			
PO6	**2**	**2.3**	**Observation** **Target Attained** • Improve frequency of conducting events related to safety, legal and cultural issues
ACTION: 1. To understand the safety concerns and social aspects, student's webinar, NPTEL video session and training has been organized to expand their practical knowledge. 2. Students were motive to participate in various technical events, social events such as Clean India Campaign, NSS/NCC and outside workshop for awareness of legal and cultural issues of society. 3. Entrepreneurship & innovation session was organized to develop Entrepreneurship and professional.			
PO-7: Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.			
PO7			Observation Target Attained

	2	**2**	• The issues of global and environmental awareness among the student should be improved.
Action 1. Students were motive to participate in various technical events, social events such as Clean India Campaign, NSS/NCC and outside workshop for awareness of legal and cultural issues of society.			
PO8: Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.			
PO8	**2.1**	**2.7**	Observation Target Attained • Professional ethics session should be improved
Action 1. Expert sessions and Motivational lectures on professional ethics were conducted by professional society like IEEE, IETE etc. 2. Training sessions on life skills and Professional Ethics. 3. Entrepreneurship & innovation session was organized to develop Entrepreneurship and professional ethics. 4. Webinar were conducted in Startup and Entrepreneurial Opportunities Post COVID			
PO9: Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.			
PO9	**2.3**	**2.5**	**Observations :** **Target Attained** 1. It has been observed that some students did not perform given task individual as required.
Actions : 1. Final year projects give in group so that to enhance team sprit to work in team collaborations 2. Entrepreneurship & innovation session was organized to develop Entrepreneurship and professional ethics			
PO-10: Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.			
PO10	**2.2**	**2.57**	**Observations :** **Target Attained**

			• The speaking and writing skill should be improve

ACTION:

1. HR activities such as webinar and online technical interviews were conducted.
2. Alumni talks were conducted

PO-11: Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

PO11	**2.1**	**2.1**	**Observations :** **Target Attained** • More activities should be organized in Project management and finance skill. • Events should be conducted on Intellectual Property Right

ACTION:

1. Webinar, Seminar and guest lecturers were organized to understand the principle of project management and financial.
2. Alumni talks were conducted
3. Entrepreneurship & innovation session was organized to develop Entrepreneurship, project management and finance skills.
4. Intellectual Property Right webinar was organized.
5. Webinar was conducted on Preparation for Service Selection Board Interview and Tips.
6. Webinar was conducted on Organization Readiness to Re-skills and Up-skills Campus Talent

PO-12: Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

PO12	**2.2**	**2.1**	**Observations :** **Target Not Attained** • Improve frequency of organizing events in contemporary issues and lifelong learning.

ACTION :

1. Lecture content included new technological developmental tools and knowledge of new Products.
2. Assign projects on core electrical and electronics based topics to improve lifelong learning
3. Webinar and guest lecturers were organized to learn lifelong learning

4. How to write an effective technical paper webinar was organized.
5. Guest lecture was organized in "Artificial Intelligence in Gaming And Robotics"
6. Webinar were conducted in Global Business and Career Opportunities for Students Arising Post COVID-19.
7. Webinar were conducted in Job Opportunities in Post COVID-19 Scenario and Challenges thereafter.
8. Webinar conducted on "Emerging Trends in Automotive Industry - Digital Age"

PSO-1: The ability to create, design, and test the specify electronic communication systems for analog and digital signal processing as per industry requirements.

PSO1	**2.3**	**2.2**	**Observations :** **Target Not Attained** • Require more exposure of industry oriented problems.

ACTION:

1. Students are motivated to take up the real life problems during their project work so that they can design, analyze and find solution which gives exposure to latest technologies.
2. Alumni and Expert talks were organized.
3. Remedial / Revision classes and NPTEL video session were conducted.

PSO-2: The ability to Formulate, solves, design and implement the realistic problems of society relevance to VLSI and embedded industries.

PSO2	**2**	**2.2**	**Observations :** **Target Attained** • Improved frequency of hands-on training and workshop in the field of embedded system required

ACTION

1. Emphasis on industry oriented problems
2. Practical pedagogy of teaching was adapted for design and development of solutions.
3. More problems were given for practice and extra classes had been conducted.
4. Organized seminar and guest lecturers on recent technology

PSO-3: Graduates will be able to Formulate, solve and adopt rapid changes in tools and technology with appropriate consideration of social and environmental issues.

PSO3	**2.1**	**2.3**	**Observations :** **Target Attained** • Lacking in adoption of changes in tools and technology

ACTION:

1. Various training programs, webinar Workshops were organized
2. Career awareness programs were in field of Electrical and Electronics engineering.
3. Expert lectures were organized

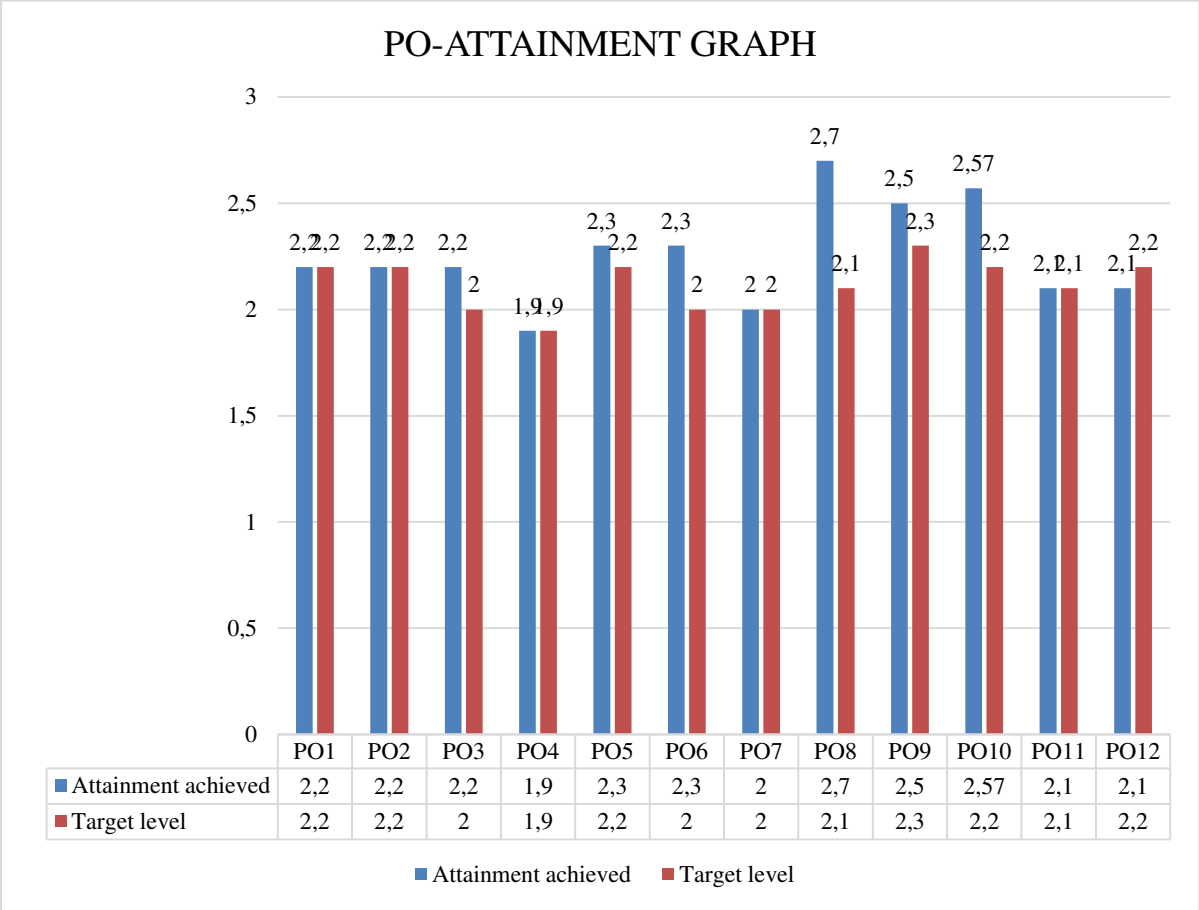


Fig.7.3. PO Attainment analysis of 2016-2020 Batch (2020-2021)

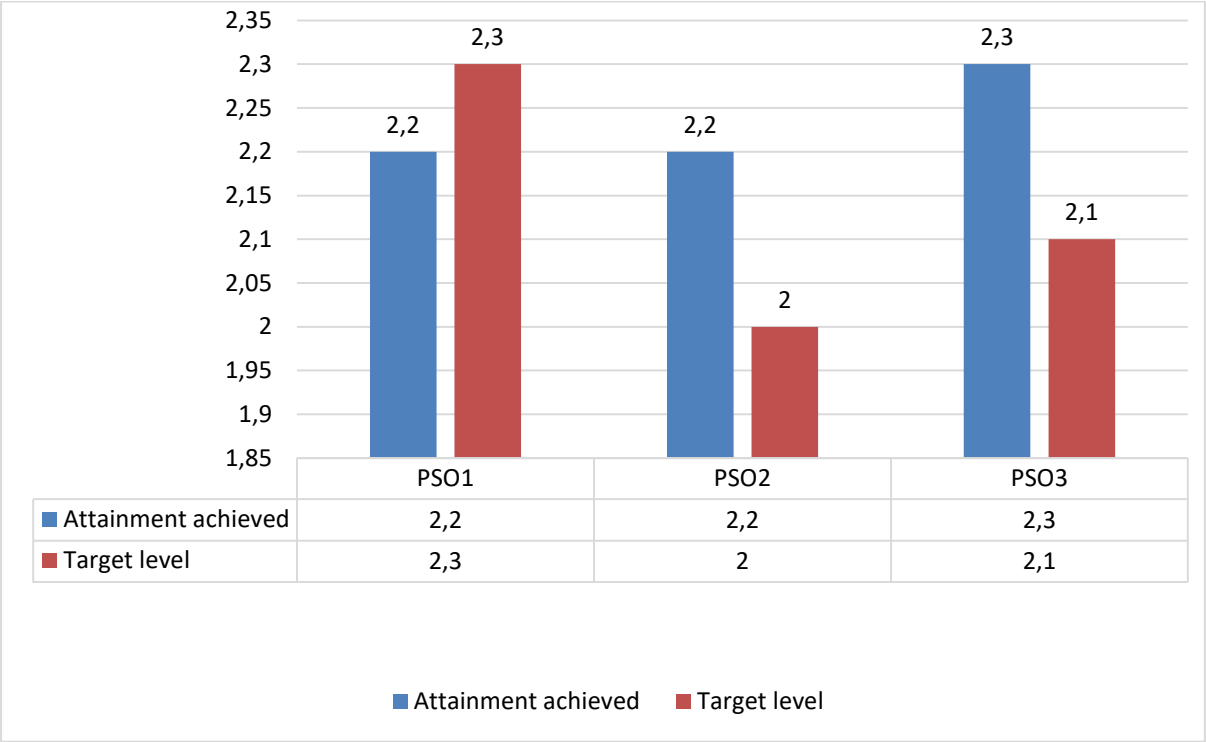


Fig.7.4. PSO Attainment analysis of 2016-2020 Batch (2020-2021)

PO and PSO attainment and action taken - Batch 2015-19 (2019-2020)			
POs	**Target Level**	**Attainment Level**	**Observations**
PO1: Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.			
PO1	**2.3**	**2.1**	**Observations** **Not Attained** 1. Lack of implementing the basic concept of Electromagnetic theory and unable to solve the complex problems of the Electromagnetic theory. 2. Lack of understanding the principle and few topics of Electrical Machines 3. Facing problem of analysing the concept of the Power system. 4. Lack of understanding the basic concepts of Power Electronics and Electronic Devices.
ACTIONS :			

1. Remedial/Revision classes were conducted to solve problem of Electrical Machines and Electromagnetic theory and Power System.
2. Remedial/ Revision classes were conducted to improvise transformers- voltage regulation, phasor diagrams and efficiency concepts through NPTEL classes.
3. More complex problems were given for practice in assignments.
4. NPTEL Video classes were organized to improve the concept of complex problems.

PO2: Problem analysis: Identify, formulate, research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

PO2	**2.2**	**2.1**	**Observations:** **Not Attained** 1. Problem of understanding the complex network problem. 2. Students were facing problem in the design of Electronic circuits. 3. Lack in communication skills. 4. Problem in Mathematical derivation and application in EMT.

ACTIONS :

1. Remedial/Revision classes were conducted for solving the complex problems.
2. More numerical and mathematical derivation based assignments were included
2. NPTEL Video classes were organized to improve the concept of complex problems.
3. Assembly events (Anchoring, weekly news presentation and sharing thoughts) were conducted for improving English communications.
4. Number of English classes were increased.

PO3: Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

PO3	**2**	**2**	**Observations** **Attained PO3 still:** 1. Concept of Digital Electronic Logic Design was not well understood. **2.** The problems faced by students in topic related to application of Analog Electronics and Microprocessor and Microcontroller.

ACTIONS :

1. NPTEL Video classes were organized to improve the concept of complex problems.
2. Design problems were given in assignments.
3. Workshop on Microcontrollers was conducted.
4. More problem based exercises were assigned in the tutorial classes on Digital Electronic Logic Design.

<table>
<tr><td colspan="4">PO4: Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.</td></tr>
<tr><td>PO4</td><td>1.8</td><td>2.1</td><td>Observations
Attained PO4
Although target achieved yet few gaps were identified
1. The problem faced by students in difficult topic related to Signals and Systems.
2. Students were facing problem to understand the concepts of Electromagnetic theory.</td></tr>
<tr><td colspan="4">ACTIONS :
1. NPTEL Video classes were organized to improve the concept of complex problems.
2. Remedial classes were conducted.
3. Virtual Labs were organized for improving analytical skill.</td></tr>
<tr><td colspan="4">PO5: Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.</td></tr>
<tr><td>PO5</td><td>2.2</td><td>2</td><td>Observations
Not Attained
1. Students were not able to understand the concepts of Communication Engineering.
2. Lack knowledge of implementing simulation tools in projects and design based subjects like Electronic circuits
3. Lack knowledge of use of software like MATLAB in design and development.</td></tr>
<tr><td colspan="4">ACTIONS :
1. NPTEL video lectures on Networking were included.
2. Various Training programs / Workshops on MATLAB/SCILAB were organized
3. Virtual labs were included.
4. Webinar was included on technical topics.</td></tr>
<tr><td colspan="4">PO6: The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.</td></tr>
<tr><td>PO6</td><td>2</td><td>1.9</td><td>Observation
Not Attained
1. The students were not able to apply reasoning contextual knowledge to assess safety, legal and cultural issues in real life.
2. Lack of knowledge of the impact of</td></tr>
</table>

			engineering solutions on environment and society 3. Lack of understanding of societal importance of Electrical engineering.

ACTIONS:

1. To understand the safety concerns and social aspects, students were visited in industry to expand their knowledge.
2. Students were motivated to take a part in various social technical and events such as Tech fests, Clean India Campaign, Blood donation camp and NSS/NCC etc.
3. Programmes were conducted on a frequent basis to create social awareness.
4. Renewable energy based and other eco-friendly projects were asked to made by students to make them understand the impact of Electrical Engineering on society

PO7: Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

PO7	**2**	**1.6**	**Observation** **Not Attained** 1. The issues of global and environmental awareness among the student should be improved. 2. Students lack innovative ideas and ideas related to real time industrial based engineering problems while deciding major project.

ACTIONS:

1. Students were encouraged to indulge in projects related to consumption of energy and utilization of renewable energy resources in which global and environmental issues are addressed.
2. Lectures were organized on role of renewable energy in Electrical and Electronics engineering and society.
3. Importance of tobacco free campus was taught as live example.
4. Importance of IES campus as green building was taught as live example.
5. 100 kW PV Power plant in campus was explained from the impact on environment point of view

PO8: Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

PO8	**2**	**2.3**	**Observation** **Attained PO8 yet few gaps were identified** The students are doing better in field of engineering but need improvement in communication skills and other ethical & moral knowledge

ACTIONS:

1. Motivational lectures on “Self Realization” were given to the students.

2. Students were motivated to take part in various social events such as Clean India Campaign, Blood donation camp and NSS/NCC etc.
3. More communication classes were included.
4. Alumni interaction sessions, Monday assembly, induction programs, cultural activities, T&P classes, activity on human values, yoga were conducted.

PO9: Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

PO9	**2.3**	**1.7**	**Observations :** **Not Attained** 1. It has been observed sometimes some students did not perform given task individual as required. 2. Requirement of more team work capacity among students

ACTIONS:

1. Students were motivated to organize various technical, non technical and social events such as Clean India Campaign, and Blood donation camp.
2. Team work and leadership qualities were inculcated through inter college and intra college activities like, cultural events, sports and project work
3. Alumni interaction sessions, Monday assembly, induction programs, cultural activities, T&P classes, activity on human values and yoga were conducted.
4. Students participated in awareness programs (RUN BHOPAL RUN, traffic week) etc.

PO10: Communication: Communicate effectively on complex engineering activities With the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

PO10	**2.2**	**2.3**	**Observations :** **Attained PO10 still:** The communication, presentation and report writing skills are to be improved among the students.

ACTIONS:

1. Soft skills training were conducted to enhance various aspects of communication/technical talks by group discussions, presentations and new learning outcomes.
2. The students with good soft skills were grouped with average students and were helped in their weak areas and sessions like group discussions.
3. Assembly events were conducted for improving English communications.
4. Newspapers clippings were distributed and students were motivated to read in order to enhance communication skills.
5. Monday assembly organised and students were given chance to speak on different topics by 4-5 students, play role model, skit was presented in morning assembly.

PO11: Project management and finance: Demonstrate knowledge and understanding of

the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.			
PO11	**2.1**	**2.1**	**Observations :** **Attained PO11:** Still needed few courses in curriculum to give knowledge of Management principle and applying managerial principles to his/her work including financial implications and to manage the projects.
ACTIONS: 1. The awareness was created among the student regarding the management principles and managing finance through minor and major projects. 2. Leadership qualities were inculcated to students by allowing them to participate in Entrepreneur Awareness Camp, Project expo, tech fests and other events. **3.** Management and financial skills were inculcated through various technical and non technical events in intra-college and inter-college activities.			
PO12: Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life- long learning in the broadest context of technological change.			
PO12	**2.2**	**2.1**	**Observations :** **Not Attained** Students found it to be difficult to get acquainted with the recent updates.
ACTIONS : 1. Lectures / Webinars were included on new technological developmental tools and knowledge of new Products. 2. Guest lecture on recent innovations in field of Electrical and Electronics Engineering were conducted. 3. Students were motivated to take up the real life problems during their project work so that they can design, analyze and find solution which gives exposure to latest technologies and lifelong learning. 4. Library hours were properly utilized by monitoring the students to ensure the effective use of journals, Magazines, Reference Books, NPTEL videos and internet facilities to browse and update the latest technological developments and current happenings in the industries and society **5.** Newspaper clippings were distribution to the students.			
PSO-1:- Apply Mathematics, transformation methods, simulation tools etc. to solve practical problems in the field of Electrical / Electronic Circuits and Networks.			
PSO1	**2.3**	**2.2**	**Observations :** **Not attained:** Target is not achieved and it was observed that more emphasis on inculcating knowledge related to subjects through industrial exposure, modern

			design and simulation tools and real time engineering problems is required.

ACTIONS:

1. Students were motivated to take up the real life problems during their project work so that they can design, analyze and find solution which gives exposure to latest technologies.

2. More Industrial visits (like CPRI, BSNL, and Substations, CRISP etc.) were organized for enhancing the practical knowledge.

3. More Guest Lectures were organized by experts of industries and electricity boards.

4. More workshops on MATLAB/SCILAB were included

PSO-2:- Analyze and design Electronic devices, Control System, Instrumentation and Power System by using mathematics and simulation techniques and implement in power electronics drives and electrical machines.

PSO2	**2**	**2.1**	**Observations :** **Attained PSO2:** 1. Need of understanding the concept of applying Matlab / Simulink in various subjects. 2. Need to acquire knowledge of microcontroller and embedded systems for their projects in final year of engineering.

ACTIONS:

1. Software training/Learning programs were conducted for improving the software skills.

2. Workshops and seminars were organised for the students to increase their understanding of embedded systems.

3. Virtual labs were conducted related to Embedded Systems.

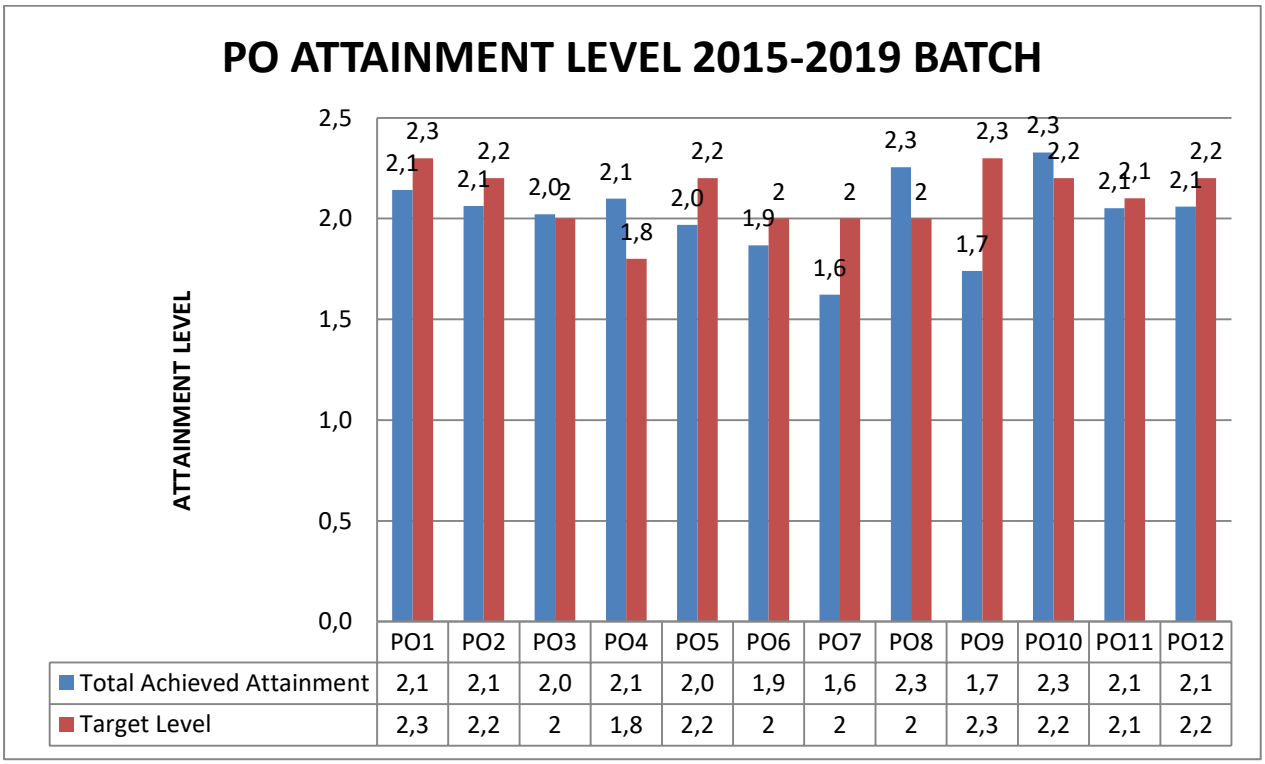
4. Workshop on MATLAB/SCILAB were organised

PSO-3:- Design and develop cost effective and appropriate system engineering solutions applying the software and hardware tools with consideration for safety, environment and society.

PSO3	**2.1**	**2.3**	**Observations :** **Attained** 1. Need to enhance the usage of different tools to designs and develop projects which provide engineering solutions 2. Need to take up projects on multidisciplinary topics to meet social, environmental issues by the students 3. Need to take up projects having positive impact on society and environment

ACTIONS:

1. Implementation of MATLAB/ Simulink for simulation of electrical circuits was included in laboratory experiments.
2. Students were encouraged to indulge in multidisciplinary projects related to consumption of energy and utilization of renewable energy resources in which global and environmental issues are improved.
3. Projects on renewable energy were asked to make in major projects for understanding environmental impact.



	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
Total Achieved Attainment	2,1	2,1	2,0	2,1	2,0	1,9	1,6	2,3	1,7	2,3	2,1	2,1
Target Level	2,3	2,2	2	1,8	2,2	2	2	2	2,3	2,2	2,1	2,2

Fig.7.5. PO Attainment analysis of 2015-2019 Batch (2019-2020)

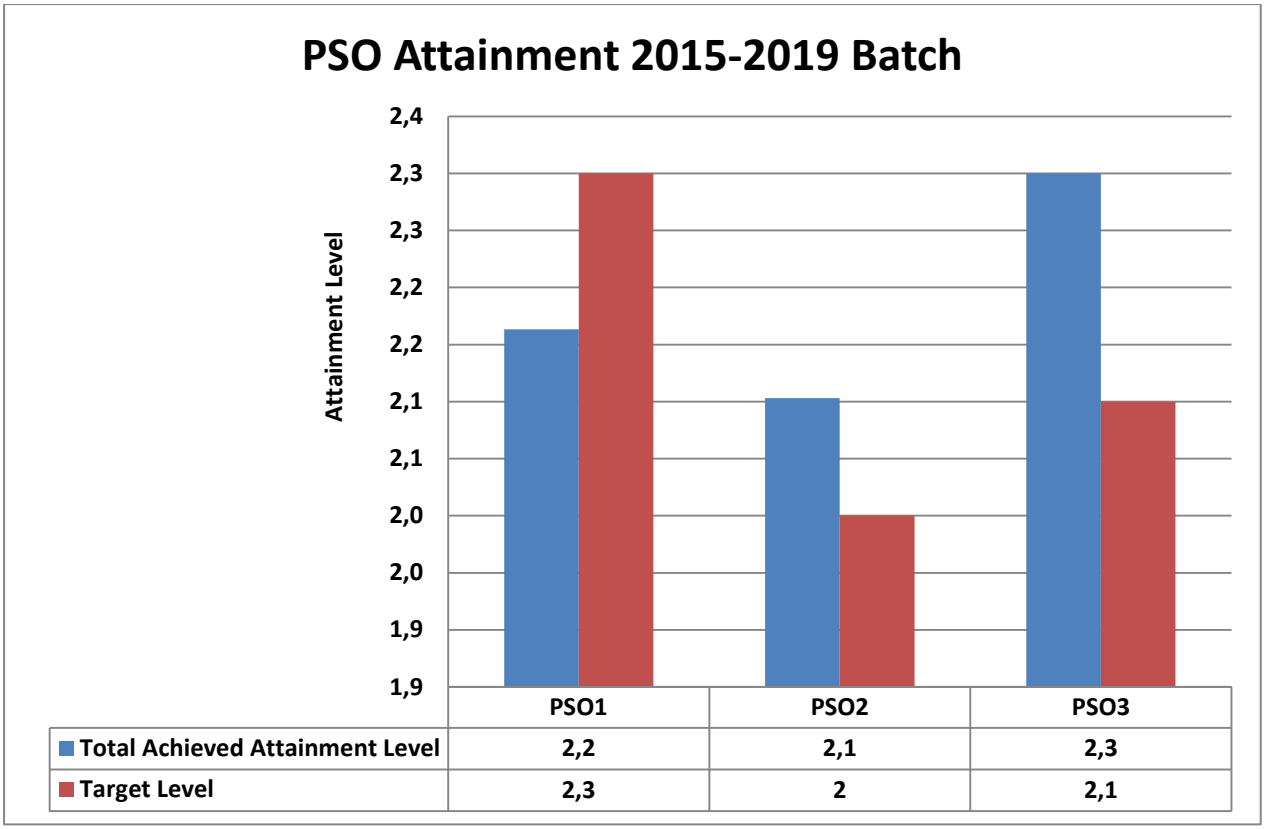


Fig.7.6. PSO Attainment analysis of 2015-2019 Batch (2019-2020)

PO and PSO attainment and action taken-Batch 2014-18(2018-2019)			
POs	**Target Level**	**Attainment Level**	**Observations**
PO1: Engineering knowledge: To Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex electrical and electronics engineering problems.			
PO1	**2.3**	**2.1**	**Observations** **Not Attained** Emphasis is to be given on strengthening the basic concept of subjects such as Electronics Devices and Circuits, Electrical Machines, Digital Electronics and EMT.
ACTIONS : 1. Remedial classes were conducted. 2. Workshops/ Seminars were provided to the students for the improving the practical and theoretical Knowledge.			

3. NPTEL Video classes were organized for strengthening of the concept.			
PO2: Problem analysis: Identify, formulate, review research literature, and analyze complex Engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.			
PO2	**2.1**	**2.1**	**Observations** **Attained PO2** 1. Lack of understanding complex problems in Network, Electrical Machines, 2. Students faced problem in the design of Electronic circuits 3. Students faced difficulty in application of Microprocessor and Microcontroller
ACTIONS : 1. Industrial visits were organized for enhancing the practical understanding. 2. NPTEL video classes were organized to improve the concept of complex problems. 3. Remedial classes were conducted. **4.** Expert lectures were organized.			
PO3: Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate considerations for the public health and safety, and the cultural, societal, and environmental considerations			
PO3	**2**	**2.2**	**Observations** Attained PO3 1. Concept of few topics of network Analysis is not well understood. 2. The problems faced by students in difficult topic related to Electronic devices and Communication system. 3. Implementation of real time application based projects need to be understood by students.
ACTIONS : 1. NPTEL Video classes were organized to improve the understanding of complex problems and there solution. 2. Technical events, seminar and workshop were organized. 3. Practical approach of teaching was adapted for design and development of solutions. 4. Design and mathematical based problems were given in Mid-Semester exams and in tutorials. 5. In-house training was organised on design and development of Electronic circuits. 6. Industrial visits like BSNL and CRISP were conducted			
PO4: Conduct investigations of complex problems: Use research-based knowledge and			

<table>
<tr><td colspan="4">research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.</td></tr>
<tr><td>PO4</td><td>1.8</td><td>2.3</td><td>Observations
Attained PO4
1. Student were facing problem for solving the complex problem of networks.
2. Design solutions to solve complex problems
3. Lack of innovative ideas and real time engineering problems in projects
4. Lack of understanding how to implement engineering based solutions in projects</td></tr>
<tr><td colspan="4">ACTIONS:
1 NPTEL video presentation were given
2. Seminar and Guest Lectures were organized.
3. Network complex questions were included in assignments and Mid Term paper.
4. More industrial based and real time based projects were included</td></tr>
<tr><td colspan="4">PO5: Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.</td></tr>
<tr><td>PO5</td><td>2</td><td>2.2</td><td>Observations
Attained PO5
1. Lacking of concepts of design and simulation tools
2. Students facing difficulty in understanding the programming of the Microcontrollers
3. Difficulty in understanding the principle and concept of Electrical machines.</td></tr>
<tr><td colspan="4">ACTIONS
1. Remedial classes were conducted for solving the mathematical problems.
2. More problems were given for practice and extra classes were conducted.
3. Software training/Learning programs were conducted for improving the software skills.
4. Video lecture were included for better understanding
5. Expert Lecture on MATLAB was organised</td></tr>
<tr><td colspan="4">PO6: The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.</td></tr>
<tr><td>PO6</td><td>1.8</td><td>2.2</td><td>Observation
Attained PO6
1. The students were not able to apply reasoning contextual knowledge to assess safety, legal and</td></tr>
</table>

			cultural issues in real life. 2. Students were not able to understand control techniques, resources to solve the complex engineering problems.

ACTIONS:

1. To understand the safety concerns and social aspects, students visited industry to expand their practical understanding.
2. Lectures were organized on Recent Innovations in Electrical Engineering.
3. Students were motivated to carryout projects which caters to societal needs, health monitoring, safety aspects in hazardous environments etc.
4. Students participated in cultural events, on health and cultural issues and various awareness programmes that benefit the society
5. Students were encouraged to read newspapers, magazines, technical and non-technical articles daily to know about societal, health, safety, legal and cultural issues and share the information among other students through morning assembly and other events.
6. Important news related to society, health, sports etc were announced in the morning assembly by the students.

PO7: Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

PO7	**1.9**	**1.9**	**Observation.** **Attained PO7** Student needs to be made more aware on the impact of Electrical and Electronics engineering on environment and society

ACTIONS:

1. Guest Lectures were held on renewable energy.
2. Importance of tobacco free campus was taught as live example.
3. Importance of IES campus as green building was taught as live example.
4. 100 kW PV Power plant in campus was explained from the impact on environment point of view

PO8: Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

PO8	**1.8**	**2**	**Observation** **Attained PO8** The students were performing good in field of engineering but need more ethical & moral knowledge

ACTIONS:

1. Students were encouraged to participate in various social events (i.e. Clean India Campaign, NSS/NCC and Blood donation camp).
2. Alumni interaction sessions, Monday assembly, induction programs, cultural activities, T&P classes, activity on human values, yoga were included.

<table>
<tr><td colspan="4">3. Students participated in awareness programs (RUN BHOPAL RUN, traffic week).</td></tr>
<tr><td colspan="4">PO9: Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.</td></tr>
<tr><td>PO9</td><td>2.1</td><td>2.1</td><td>Observations :
Attained PO9
Found that the students lack to work more effectively in a team and as a member or leader in diverse teams and in multidisciplinary settings.</td></tr>
<tr><td colspan="4">ACTIONS :
1. Technical events were organized to enhance leadership qualities in individuals as well as to make them work in team.
2. Students were motivated to organize various social events
3.Students were motivated to plantation work for making green campus in our college
4. Sports and cultural events were organized in the college campus.
5.Students participated in the Inter-college events (i.e. Technical events , sports events and cultural events)</td></tr>
<tr><td colspan="4">PO10: Communication: Communicate effectively on complex engineering activities With the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.</td></tr>
<tr><td>PO10</td><td>2</td><td>2.3</td><td>Observations :
Attained PO10
The communication, presentation and report writing skills were to be improved more among the students.</td></tr>
<tr><td colspan="4">ACTIONS:
1. Soft skills training were conducted to enhance various aspects of communication/technical talks by group discussions, presentations and new learning outcomes.
2. Few topics were taught with the help of NPTEL video presentation.
3. Assembly events were conducted for improving English communications.
4. Group discussion were organized for improving communication skills.
5. Newspaper clippings were distributed.</td></tr>
<tr><td colspan="4">PO11: Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one’s own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.</td></tr>
<tr><td>PO11</td><td>1.6</td><td>2.4</td><td>Observation:
Attained PO11
1. Lacking in practical knowledge of Electrical and Electronics Devices & circuit & their implementation in projects
2. Few courses should be included in curriculum giving knowledge of</td></tr>
</table>

			Management principle and applying managerial principles to his/her work including financial implications and to manage the project in multidisciplinary environments.

ACTIONS:

1. The awareness was created among the student regarding the management principles and managing projects through expert lecture.
2. Industrial visits were organized for enhancing the practical knowledge.
3. Management and leadership qualities were inculcated through different technical and social events in college and through inter college events.

PO12: Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life- long learning in the broadest context of technological change.

PO12	**2**	**2**	**Observation:** **Attained PO12** 1. Students were not able to learn problem analysis and practical implementation of subjects. **2.** Students were not aware of latest technologies.

ACTIONS :

1. Using ICT facilities, such as PPTs, live demonstration of topic were imparted.
2. Guest Lecture on Recent Innovations in Electrical and Electronics engineering were conducted
3. Projects of Electrical and Electronics engineering were assigned based on lifelong learning
4. Students were motivated to take up the real life problems during their project work so that they can design, analyze and find solution which gives exposure to latest technologies and lifelong learning.
5. Newspaper were distributed and students were motivated to read it regularly
6. Students were motivated to visit departmental library and read technical magazines and journals.

PSO-1: Apply Mathematics, transformation methods, simulation tools etc. to solve practical problems in the field of Electrical / Electronic Circuits and Networks.

PSO1	**2.2**	**2.1**	**Observation:** **Not attained PSO1** 1. Need more practice on simulation tools in designing and developing Electrical and Electronics and Network circuits. 2. Students need more practice in mathematical and numerical part.

			3. Students lack visualizing the basic concepts mainly in Electrical machines, Digital Electronics and EMT.

ACTIONS:

1: Students were motivated to take up the real life problems during their project work so that they can design, analyze and find solution which gives exposure to latest technologies.

3. Guest Lectures were organized by experts of industries and electricity boards.

4. Simulation based projects were included

5. Matlab workshop was conducted

6. More numerical based assignments were given.

7. Tutorials were conducted on numerical and conceptual subjects like Electrical machines and EMT.

PSO2: Analyze and design Electronic devices, Control System, Instrumentation and Power System by using mathematics and simulation techniques and implement in power electronics drives and electrical machines.

PSO2	**1.7**	**2.1**	**Observation:** **Attained PSO2** Need to enhance the usage of different tools to designs, develop / implement and test Electronic devices, Power Electronics drives and Electrical Machines

ACTIONS:

1: Various Training programs, workshops on MATLAB were organized.

2. Emphasis on industry oriented problems were given like expert lectures and visits

3. Industrial visit to substation and CPRI.

4. Virtual labs were conducted on subject for better understanding.

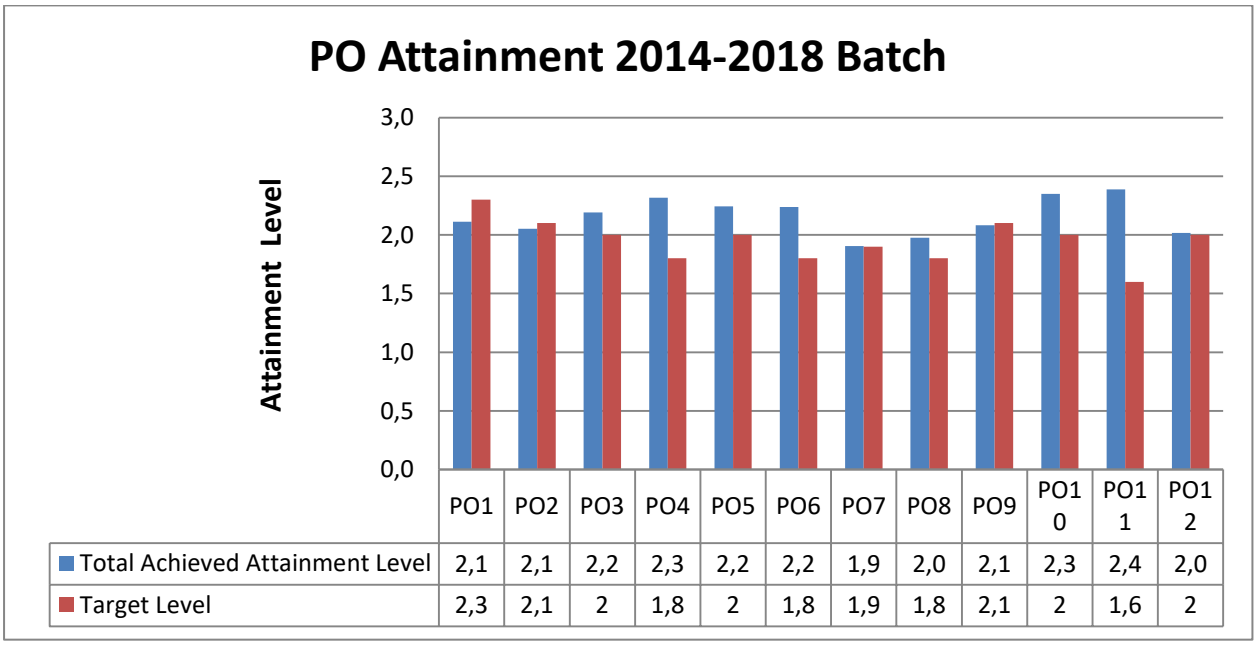
5. Webinars conducted.

PSO-3: Design and develop cost effective and appropriate system engineering solutions applying the software and hardware tools with consideration for safety, environment and society.

PSO3	**2**	**2**	**Observation:** **Attained PSO3** 1. Lacking in applying research based approach and research-based knowledge.

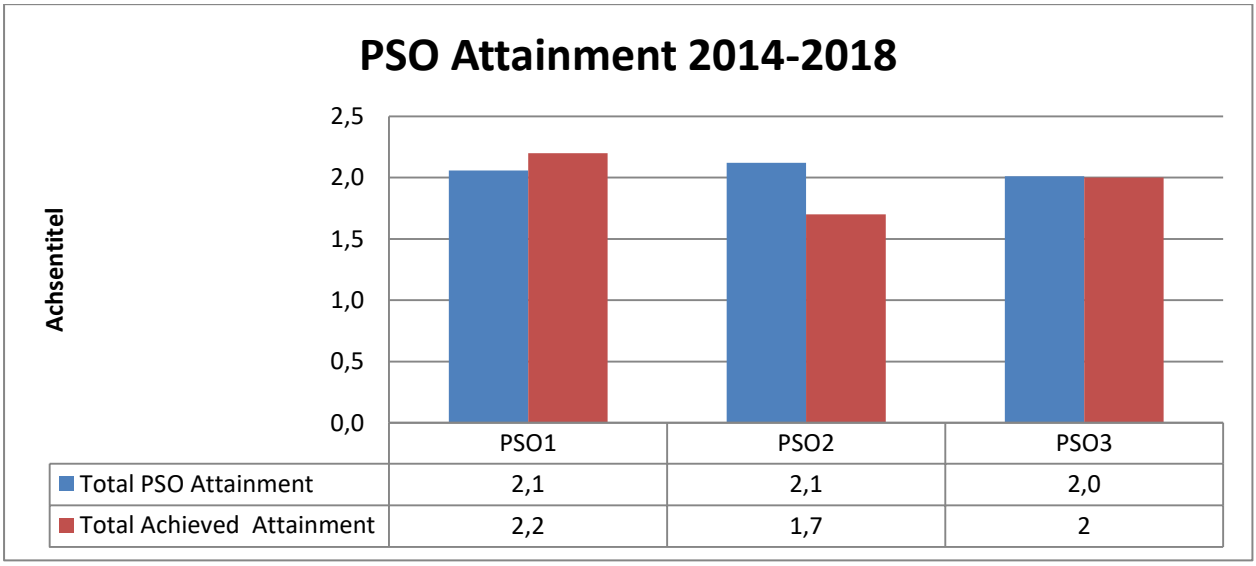
ACTIONS:

1. Guest Lectures and seminar were organized to develop interest into the students towards the research and publications.
2. Science Fest were organised.
3. Questions related to practical solutions were included in assignments.
4. Innovative idea based events were organized in the campus.
5. Industrial visit to CRISP



	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
Total Achieved Attainment Level	2,1	2,1	2,2	2,3	2,2	2,2	1,9	2,0	2,1	2,3	2,4	2,0
Target Level	2,3	2,1	2	1,8	2	1,8	1,9	1,8	2,1	2	1,6	2

Fig.7.7. PO Attainment analysis of 2014-2018 (2018-2019)



	PSO1	PSO2	PSO3
Total PSO Attainment	2,1	2,1	2,0
Total Achieved Attainment	2,2	1,7	2

Fig.7.8. PSO Attainment analysis of 2014-2018(2018-2019)

7.2. Academic Audit and actions taken therefore during the period of Assessment (10)

A. OVERVIEW OF ACADEMIC AUDIT

Internal Audit shall be done by committee formed by IQAC of the institutions. Internal academic audit is scheduled at end of semester to review the academic and other activities in the department. The department is expected to develop a strong outcome based approach in

teaching-learning. The audit team will assess the activities involved in developing learning outcomes, design and development activities in curriculum, teaching-learning process, student learning assessment process and student engagement programs. The audit team will also assess the quality and quantity of research outcomes in the department.

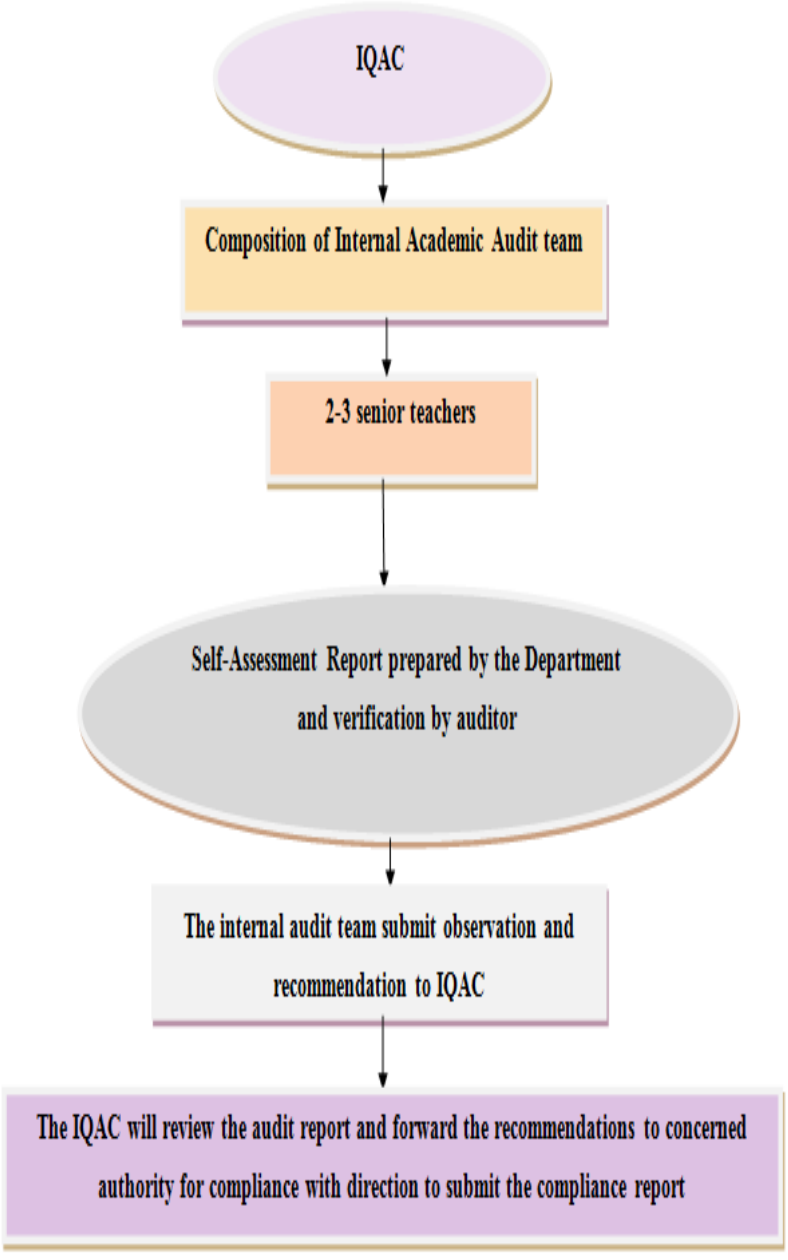


Fig.7.8. Academic audit flow chart

B. Academic Audit committee:

In the department of Electrical and Electronics Engineering, the internal quality assurance committee (IQAC) of the institute forms a committee for the Academic audit process. Members of this Academic audit team consist of 2- 3 senior faculty members. The team monitors and enhances the quality of teaching & learning process and student development process, through appropriate guidelines for both faculty and students.

C. Goal of Audit

The team during Academic Audit process monitor the conduct of the course, adherence to the course plan, time schedule, completion of the syllabus, standard of internal tests and evaluation process, inspection of labs, monitoring of student development programs and also addresses the difficulties faced by students and takes suitable actions. Following area to be audited:

1. Adherence to Academic Calendar
2. Completion of syllabus
3. Adherence to CO, PSOs, PEOs in course coverage, internal exams, assignments and practical.
4. Student feedback
5. Action taken against feedback
6. PO, PSO and CO mapping and attainments
7. Gap identification and action taken
8. Course beyond curriculum / Adherence to Co-curricular calendar
9. Research activities in the department
10. Placement report

D. Frequency of Audit

The Academic audit process is conducted twice in a year. One audit in each semester

E. Stages of the Academic Audit process

Stages of the academic audit process involve the following stages:

1. IQAC provide the department to fill Self-Assessment Report with evidence-based documentation.
2. Department peer review and evaluate the Self-Assessment Report
3. Internal audit by the internal audit team constitute by IQAC

4. On the basis of their observations, the internal audit team submit observations recommendations to the IQAC
5. The IQAC will review the audit report and forward the recommendations to concerned authority for compliance with direction to submit the compliance report
6. Department implement the suggestions and recommendations of the internal audit team.

F. Self-Assessment Report

IQAC shall provide the departments with Self-Assessment Report at the end of the semester after the results are declared. The department will fill the report and present it to the Internal Audit team, which would give its recommendations and observations on the reports and submit it to IQAC. It shall include all the activities of the department with supporting documents/ evidence. Give emphasis to the following points:

- The Course plan and Teaching plan
- Innovations implemented for the teaching, learning and evaluation
- Strategies put into practice for the implementation of Outcome-Based Learning (OBE) and PO, PSO and CO mapping
- Remedial/Revision classes, mentoring and counselling, programmes and activities
- Research, publication, consultancy, project, Tie-ups and collaboration etc.
- Seminar/ Conference/ Workshops conducted by the department as well as attended by the staff and students outside the college including paper presentation and chairing the sessions, Start-ups by students and alumni etc
- Teacher Performance Appraisal, feedback analysis of teachers along with Action Taken Report.
- Best/ exemplary Practices, Green initiatives, Waste management, *Swatch Bharat*, 'Interdepartmental competition', 'Interdepartmental cooperation', etc.
- Minutes of the department meetings, staff and students welfare activities
- Industry interactions activities
- Strengths, weaknesses, Opportunities and Threats/ Challenges of the department describing initiatives to address practices that need improvement

- Follows Bloom's Taxonomy and ensures targets set by faculty are realistic
- Future plans and its implementation strategies and priority-wise plans for improvement

Following are the findings during Academic Audit Process by IQAC team in CAY (2020- 21):
AUDIT: 01

- More technical activities are required to add in departmental co-curricular/ activity calendar.
- More online teaching methods to be explored.
- Require to give more emphasis on skill development programs.
- More online expert lectures recommended
- Measures to be taken to improve communication.

Table 7.3 Action Taken and Improvement

Description of Activity
In Departmental Activity calendar some activities were added.
Interactive lecture methods such as Video lectures, Power point presentations were included
MoU with some industries for mutual exchange of expertise, to provide more exposure to the student regarding Industrial practices were taken up
Faculty members attended webinars Seminars/ Workshops/ FDPs conducted by various institutions.

Following are the findings during Academic Audit Process by IQAC team in CAY (2019- 20):
AUDIT: 01

- The university syllabus does not include Practical training of Embedded System so workshop on Embedded system must be conducted.
- More technical activities are required to add in departmental co-curricular/ activity calendar.

- Suggestion is given to include content beyond the syllabus in few theoretical subjects (Microprocessor, Electronic circuits and devices, Electrical Machines and EMT).
- For the understanding of subjects, project based learning is needed.
- Require to give more emphasis on skills development programs.
- More industrial visits and Expert lectures recommended
- Measures to be taken to improve communication

AUDIT: 02

· Suggestion given to include interactive teaching modes such as PPT and video lectures for the delivery of lectures

· More emphasis is needed on the training, workshop and industrial visits.

· Faculty development program is needed to improve faculty member's skills.

· More encouragement is required to motivate students towards the project learning.

· Required to give more assignments on mathematical and numerical based

· Suggestion is given to include virtual labs in some courses.

Table 7.4 Action Taken and Improvement

Description of Activity
In Departmental Activity calendar some activities were added.
Virtual labs were included in Electrical machines, Network and other subjects
Interactive lecture methods such as Video lectures, Power point presentations were included
Industrial visits in CPRI, Substations ,BSNL etc organised
To assess students knowledge of engineering practices, framework, and problem solving abilities various tests were taken
Class Tests were taken after every unit completion
Assignment based on COs were given to the students after completion of each unit

The various technical events were conducted.
MoU with some industries for mutual exchange of expertise, to provide more exposure to the student regarding Industrial practices were taken up
Experts from industry deliverd guest lectures.
Alumni meets/ get together were organized
Faculty members attended Seminars/ Workshops/ FDPs conducted by various institutions.
More remedial/revision classes were conducted

7.3 Improvement in Placement, Higher Studies and Entrepreneurship (10)

Table 7.5 Placement Details

Item	CAY (2020-21)	CAY1 (2019-20)	CAYm2 (2018-19)
Total No. of Final Year Students(N)	82	80	22
No. of Students Placed in Companies or Government Sector (X)	56	53	14
No. of Students admitted to higher studies with valid qualifying scores (GATE or Equivalent State or National Level Tests, GRE, GMAT, etc.)(Y)	1	1	-
No. of students turned entrepreneur in engineering / technology(Z)	1	-	1
Placement Index: (X+Y+Z)	58	54	15
Placement Index: (X+Y+Z)/N	**0.70**	**0.68**	**0.68**

Table 7.6 Placement Summary

S.N	Academic Year	No of Selection	Average Package
1	**2020-2021**	**56**	**3.31**
2	**2019-2020**	**53**	**2.76**
3	**2018-2019**	**14**	**3.88**

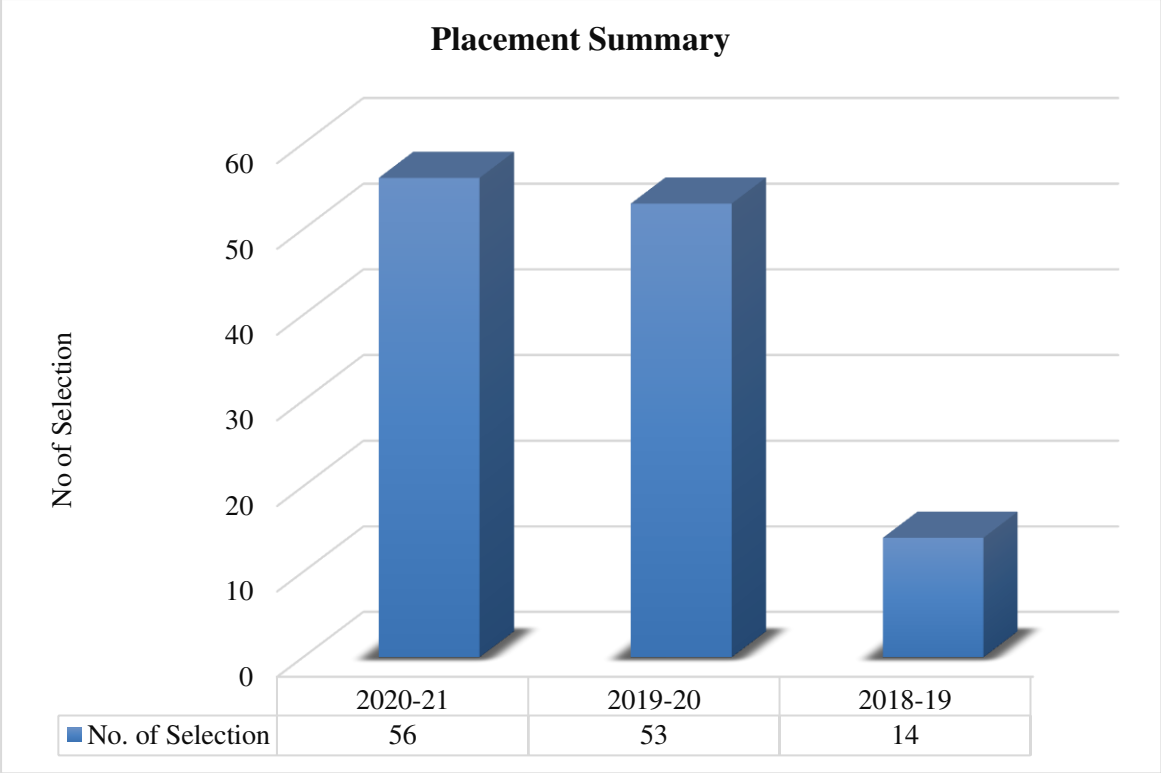


Fig 7.10 Placement analysis

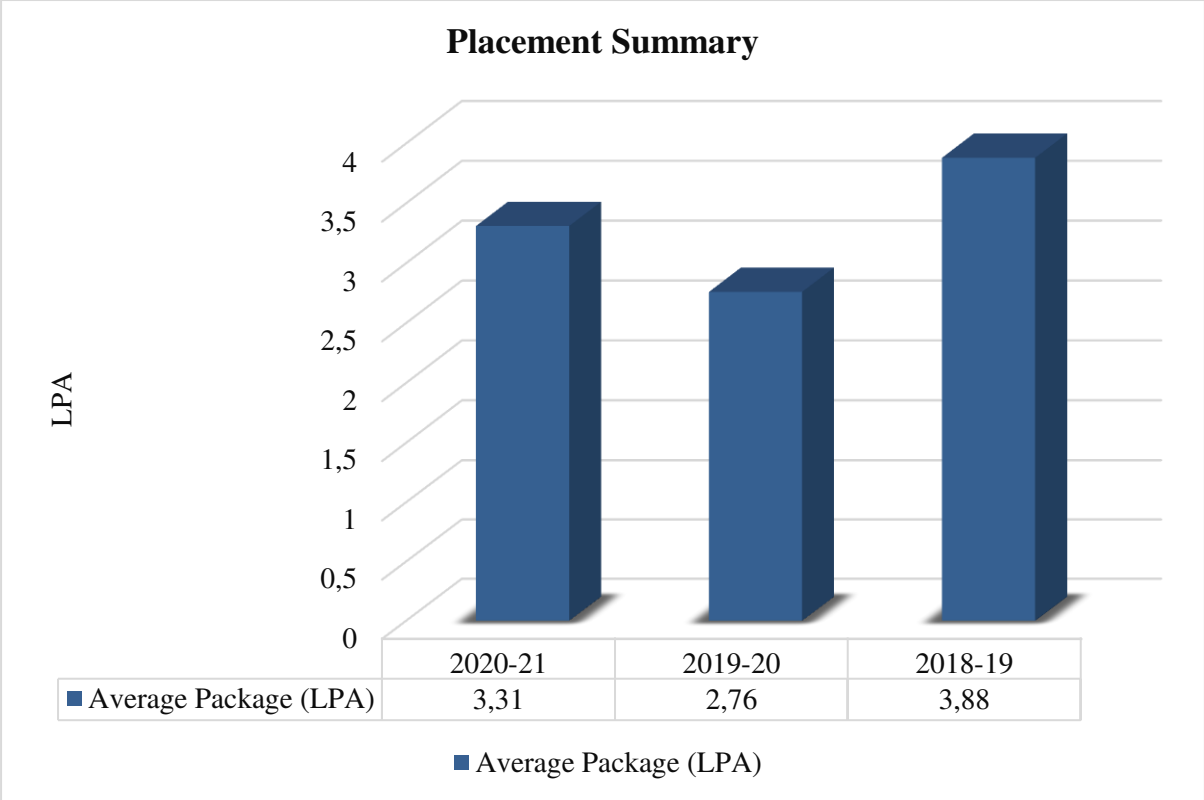


Fig 7.11 Average package analysis

Table 7.7 No. of Students placed in 2018(Company Wise)

2018			
S.No	**Company Name**	**Number of students placed**	**Salary/Annum**
1	Ceasefire	4	4
2	Evolve Technologies	5	2.17
3	KPIT	1	3.35
4	Topper Technologies	4	6
Total Placements		**14**	**3.88**

Table 7.8 No. of Students placed in 2019(Company Wise)

2019			
S.No	**Company Name**	**Number of students placed**	**Salary/Annum**
1	Ceasfire	6	4
2	Delta Electronics India Pvt lmt.	1	3
3	EPIC R	5	2.53
4	Feathers Management Services Pvt. Ltd.	1	2.15
5	Hyeopseong (samsung india pvt. Ltd.)	1	2.75
6	IT Solutions	4	2.4
7	KEC International Ltd.	3	3.35
8	Modern Informatics	7	2.2
9	Pacific cyber technology	1	2.35
10	Piaggio	1	3
11	Repro India	8	2.5
12	Sanathan Textile Pvt. Ltd.	1	2.4
13	Topper Technologies	5	6
14	Vantage	1	1.7
15	VOLTECH Engineers Private Limited	1	2.3

16	Zicom	6	2.21
17	Zisafe	1	2.21
Total Placements		**53**	**2.76**

Table 7.9 No. of Students placed in 2020 (Company Wise)

S.No	Company	No of Selection	Package
1	Ceasfire	10	4.5
2	Millennium Semiconductors	11	3
3	KPIT	3	3.6
4	Mphasis	1	3.25
5	Asahi India Galss Ltd.	7	1.8
6	Kreativen Technologies	4	2.4
7	Epic Research	4	2.75
8	Topper Technologies	5	6
9	DXC technology	3	4
10	HLBS	4	3.25
11	Adonai	2	2.75
12	IT Solutions	2	2.5
Total Placements		**56**	**3.31**

Based on this table we will have to give analysis (Placement, higher studies, entrepreneurship wise and how & why such implement took place.

Action taken:

- Faculty members incorporate changes suggested by the academic committee, in case of any gaps are found, to ensure quality deliverables.
- Faculty members are required to match the pace of their deliverables as per the students' requirements as well as they have to schedule the lecture plans in such a way that the syllabus is completed on time. To achieve this they arrange extra lectures and cope-up with the syllabus.
- Regular analysis of the results of internal assessment examination of all subjects is done and concerned faculties are guided to take necessary actions.

- Remedial classes are scheduled in reference to academic progress of the student.
- Mock interviews conducted by the faculty members.
- Faculty members attended FDP as required for overall development of teaching skills in terms of communication and technology.
- The academic audit is carried out at the beginning of the semester as soon as the faculty members are ready with their course files.
- The academic observation is carried out considering two criteria – feedback from students (requested to the authorities) and randomized observation.
- Classes for communication skill development and improving methods of teaching-learning are being carried out regularly by the learning and development department.
- Technical FDP, expert lectures, seminars etc. are being arranged by the individual departments at least once in a semester.
- Students are assigned Mentors. The faculty monitors the progress of the students in placement activities.
- Soft skills trainings (Aptitude training, Group discussions, etc) are conducted by institute.
- Career guidance programmes are conducted.
- Students are motivated to go for higher studies.
- Guest lectures are organized to provide information to students as to how to develop a strategy and acquire a knowledge base.
- Industrial visits are arranged to enhanced entrepreneurship.

7.4 Improvement in the quality of students admitted to the program (10)

Assessment is based on improvement in terms of ranks/score in qualifying national level entrances tests (JEE Main), percentage of Physics, Chemistry and Mathematics marks in 12th standard and percentage marks of the lateral entry student.

Item		CAY 2020-21	CAYm1 (2019-2020)	CAYm2 (2018-2019)	CAYm3 (2017-2018)
National Level Entrance Examination (JEE MAIN)	No. of Students admitted	4	10	14	16
	Opening Score/Rank	277427	147440	193651	294904
	Closing Score/Rank	752078	1110395	971314	966747
State/University/Level Entrance Examination/Others [PET (VYAPAM)]	No. of Students admitted	-	-	-	-
	Opening Score/Rank	-	-	-	-
	Closing	-	-	-	-

	Score/Rank				
Lateral entry details (DIPLOMA PERCENTAGE)	No. of Students admitted	27	23	12	07
	Opening Score/Rank	221	1644	184	-
	Closing Score/Rank	3617	3432	1794	-
Average CBSE/Any other Board Result of admitted Students (Physics, Chemistry & Mathematics)		**74**	**106**	**106**	**104**

CRITERION 8	First Year Academics	50

8.1. First Year Student-Faculty Ratio (FYSFR) (5)

Assessment = (5 × 20)/Average FYSFR (Limited to Max. 5)

1. Civil Engineering (120)
2. Computer Science Engineering (180)
3. Electronics and Communication Engineering(120)
4. Electrical and Electrical Engineering(120)
5. Mechanical Engineering(120)

Table 8.1 Data for first year courses to calculate the FYSFR

Year	Number of Students (Approved Intake Strength)	Number of faculty members (Considering Fractional Load)	FYSFR	Assessment = (5 x 20)/ FYSFR (Limited to Max 5)
2020-2021	660	40	17	5.00
2019-2020	660	39	17	5.00
2018-2019	660	36	18	5.00
Average	660	38	17	5.00

8.2. Qualification of Faculty Teaching First Year Common Courses (5)

Assessment of qualification = (5x +3y)/RF, x= Number of Regular Faculty with PhD, y = Number of Regular Faculty with Post-graduate qualification RF= Number of faculty members required as per SFR of 20:1, Faculty definition as defined in 5.1

Table 8.3 Assessment of faculty qualification

Year	X	Y	RF	Assessment of faculty qualification (5X + 3Y)/RF
	(No of Regular Faculty with PhD)	(No of Regular Faculty with PG Qualification)	(No of Faculty as per SFR of 20:1)	
2020-2021(CAY)	13	31	33	4.00
2019-2020 (CAYm1)	11	32	33	4.00
2018-2019 (CAYm2)	8	28	33	3.00
Average Assessment	**10.7**	**30.3**	**33.00**	**3.67**

Table 8.2 Faculty list (2020-2021)

S. No.	Name	PAN No	Qualification	Area of Specialization	Designation	Date of Joining	Date on which Designated as Professor/ Associate Professor	Currently Associated (Y/N)	Nature of Association (Regular/Contract/ Adjunct)	If contractual mention Full time or Part time	Date of Leaving (In case Currently Associated is "No")
1.	Dr. VINEETA JAIN	AEJPJ5862Q	PH.D	PHYSICS	PROFESSOR	24/08/15	-	Y	Regular	-	-
2.	Dr. DHIRENDRA KUMAR GUPTA	ALBPG8333J	PH.D	PHYSICS	PROFESSOR	27/08/12	-	Y	Regular	-	-
3.	Dr. SONALI SAHA	CWDPS4671N	PH.D	PHYSICS	ASSOCIATE PROFESSOR	01/07/2020	-	Y	Regular	-	-
4.	Dr. SANGEETA JANGID	AMJPT1755E	PH.D	PHYSICS	ASSISTANT PROFESSOR	28/12/13	-	Y	Regular	-	-
5.	Mrs. PREETI PANDEY	AXRPP0500C	M.SC	PHYSICS	ASSISTANT PROFESSOR	28/03/08	-	Y	Regular	-	-
6.	DR. ALKA RANI	GYDPS2665Q	PH.D	PHYSICS	ASSISTANT PROFESSOR	14/01/19	-	Y	Regular	-	-
7.	Dr. PREETI CHINCHOLIKAR	ASWEC5687	PH.D.	CHEMISTRY	PROFESSOR	01/08/2020	-	Y	Regular	-	-

8.	Dr. AMAR SINGH THAKUR	ACKPT2376G	PH.D., M.SC	CHEMISTRY	ASSOCIATE PROFESSOR	26/07/08	-	Y	Regular	-	-
9.	Dr. RASHMI SHRIVASTAVA	DHZPS7626R	PH.D.	CHEMISTRY	ASSISTANT PROFESSSOR	14/08/15	-	Y	Regular	-	-
10.	Ms. SAVITRI SINGH	CMNPS4192J	M.SC.	CHEMISTRY	ASSISTANT PROFESSSOR	07/01/12	-	Y	Regular	-	-
11.	DR. TAJINDER MAJITHIA	ATBPM1885H	PH.D.	CHEMISTRY	ASSISTANT PROFESSSOR	01/07/19	-	Y	Regular	-	30.4.21
12.	MR. PRAMOD KUMAR SAKET	EZKPS4252P	M.SC.	PHYSICS	ASSISTANT PROFESSSOR	17/08/19	-	Y	Regular	-	-
13.	Dr. GAURAV SHARMA	CLOPS4648M	P.HD	MATHS	ASSOCIATE PROFESSOR	01/07/2019	-	Y	Regular	-	-
14.	Dr. ARCHANA SINGH JADON	CIEPS2569E	P.HD.	MATHS	ASSOCIATE PROFESSOR	01/08/2020	-	Y	Regular	-	-
15.	Mrs. SARITA TRIPATHI	ARDPT9850F	M.SC.	MATHS	ASSISTANT ROFESSOR	07/01/10	-	Y	Regular	-	-
16.	Ms. SUJATA KUMBHARE	DMLPK0154D	M.SC.	MATHS	ASST PROFESSOR	10/05/13		Y	Regular	-	-
17.	Mrs. SIMRAN CHHABRA	AQVPC4574E	M.SC., M.PHILL	MATHS	ASST PROFESSOR	26/08/15		Y	Regular	-	-
18.	MR. DHIRAJ DIWEDHI	ALAPD1241K	M.SC.	MATHS	ASST PROFESSOR	04/09/17	-	Y	Regular	-	-

19.	MR. SACHIN DEV KUSHWAHA	CGJPK2956E	M.SC., M.PHILL	MATHS	ASST PROFESSOR	16/08/18	-	Y	Regular	-	-
20.	Ms. POOJA RANA	DAAPR0980K	M.SC.	MATHS	ASST PROFESSOR	31/07/17	-	Y	Regular	-	-
21.	MS. BHAVANA SHRIVASTAVA	CEWPS3370F	M.SC.	MATHS	ASST PROFESSOR	17/08/19	-	Y	Regular	-	-
22.	Dr. VANDANA VAISHNAV	AFSPV9496A	PH.D.	COMM.SKILLS	PROFESSOR	01/08/20	-	Y	Regular	-	-
23.	Ms. RUMEET BHATIA KAUR	AOQPB1546E	MA	COMM.SKILLS	ASST PROFESSOR	23/10/07	-	Y	Regular	-	-
24.	Ms. SHWETA TRIPATHI	ANUPT9397E	MA	COMM.SKILLS	ASST PROFESSOR	09/01/10	-	Y	Regular	-	-
25.	Ms. RICHA PANDEY	BBSPR6722A	MA	COMM.SKILLS	ASST PROFESSOR	16/01/10	-	Y	Regular	-	-
26.	Dr. UJJAWALA OJA	AAOPO2063R	PH.D.	COMM.SKILLS	ASST PROFESSOR	01/07/2020	-	Y	Regular	-	-
27.	Ms. ANKITA GHOSH	CFKPW5752D	MA	COMM.SKILLS	ASST PROFESSOR	05/08/2020	-	Y	Regular	-	-
28.	Mr. VIJAY DHOTE	BEZPD3889J	M.Tech	CSE	Asst Professor	16/08/2018	-	Y	Regular	-	-

29.	Mr. SUDHEER LODHI	CHDPK7032E	M.Tech	CSE	Asst Professor	16/08/2018	-	Y	Regular	-	-
30.	Ms. ANKITA SINGH	CPUPS3283N	M.TECH	CSE	Asst Professor	14/08/2020	-	Y	Regular	-	
31.	Mr. ASHISH PATHAK	BRMPP4718A	M.Tech	CSE	Asst Professor	01/07/2019	-	Y	Regular	-	-
32.	Mr. ASHISH RAGHUWANSHI	BVTPR6094J	M.Tech	EC	Asst Professor	25/06/2014	-	Y	Regular	-	-
33.	Mr. MAHAVIR KASHYAP	DWGPK2721F	M.Tech	Power System	Asst Professor	09/08/2017	-	Y	Regular	-	-
34.	Mr. SWAPNIL GUPTA	ARKPG6001A	ME	Power System	Asst Professor	01/08/2018	-	Y	Regular	-	-
35.	MR. NEERAJ AGARWAL	AIFPA5170N	M.TECH	MECHANICAL ENGINEERING	ASSOCIATE PROFESSOR	22/10/2012	-	Y	Regular	-	-
36.	MR.ARVIND AHIRWAR	AYMPA8095K	M.TECH	MECHANICAL ENGINEERING	ASSISTANT PROFESSOR	20/07/2015	-	Y	Regular	-	30/06/21
37.	MR. MANOJ MISHRA	BUAPM5043A	M.TECH	MECHANICAL ENGINEERING	ASSISTANT PROFESSOR	16/08/2018	-	Y	Regular	-	30/06/21
38.	MR. ASHISH SAHU	FUQPS3583D	M.TECH	MECHANICAL ENGINEERING	ASSISTANT PROFESSOR	06/09/2018	-	Y	Regular	-	-
39.	Mr. MAHENDRA KUMAR	EJLPK8453D	M.TECH	MECHANICAL ENGINEERING	ASSISTANT PROFESSOR	16/08/2018	-	Y	Regular	-	-
40.	MR. DHRUVRAJ SINGH	GECPS4997Q	M.TECH	MECHANICAL ENGINEERING	ASSISTANT PROFESSOR	01/07/2019	-	Y	Regular	-	-

41.	Ms. PRAGATI GAJBHIYE	BMIPG7271E	M.TECH	MECHANICAL ENGINEERING	ASSISTANT PROFESSOR	01/07/2019	-	Y	Regular	-	-
42.	MR. HARSHIT SHRIVASTAVA	FRZPS3998L	M.TECH	MECHANICAL ENGINEERING	ASSISTANT PROFESSOR	18/03/2020	-	Y	Regular	-	-
43.	Mr. VIKESH KUMAR MEWADA	BETPM8744K	M.TECH	CIVIL ENGINEERING	ASSISTANT PROFESSOR	01/08/2017	-	Y	Regular	-	-
44.	Mr. DHANESH KHALOTIA	CLXPK3685F	M.TECH	CIVIL ENGINEERING	ASSISTANT PROFESSOR	05/09/2018	-	Y	Regular	-	-

8.3. First Year Academic Performance (10)

Academic Performance = ((Mean of 1st Year Grade Point Average of all successful Students on a 10 point scale) or (Mean of the percentage of marks in First Year of all successful students/10)) x (number of successful students/number of students appeared in the examination) Successful students are those who are permitted to proceed to the second year

Table 8.4 First Year Academic Performance

Academic Performance	2019-2020 (CAY)	2018-2019 (CAYm1)	2017-2018 (CAYm2)
Mean of CGPA or mean percentage of all successful students (x)	7.21	6.48	6.26
Total Number of successful students (y)	97	88	80
Total Number of students appeared in the examination (z)	98	91	106
API (x*(y/z)	**7.13**	**6.27**	**4.72**

Total Average API: 6.04

8.4. Attainment of Course Outcomes of first year courses (10)

8.4.1. Describe the assessment processes used to gather the data upon which the evaluation of Course Outcomes of first year is done (5)

A) We are following the Assessment Process to evaluate the student's Academic Performance

- ✓ Two Mid-Semester exams for maximum marks of 20 are conducted. The average of these two internal marks is taken for final internal assessment marks.
- ✓ 3 to 5 assignments given for evaluation of student's performance.
- ✓ The performance of every student in internal assessment with respect to the COs is recorded.
- ✓ End- semester University examination performance of students for the maximum mark of 70 is considered for external exam performance.
- ✓ The summation of these two performances is considered as cumulative assessment for a prescribed course outcome.
- ✓ For laboratory assessment, the performance of a student in conduct of lab (10 marks), final lab internal test (10 marks) and external lab exam (30 marks) is considered.

- **Evaluation Scheme:**

Table 8.5 Evaluation Components (Grading System)*

S. No	COMPONENT	MARKS	
I	INTERNAL ASSESSMENTS		
1	Mid Semester Tests	20	30
2	Quiz/ Assignment	10	
II	END SEMESTER EXAMINATION		70
TOTAL			**100**

Table 8.6 Evaluation Components Practical's (Grading System)*

S. No	COMPONENT	MARKS	
I	**INTERNAL PRACTICAL ASSESSMENTS**		
1	**Lab Work**	**10**	**20**
2	**Sessional / Viva-voce**	**10**	
II	**END SEMESTER PRACTICAL**		**30**
TOTAL			**50**

B. Assessment tools are categorized into two methods to assess the course outcomes as:

Direct methods:

Formative and Summative assessment are used for evaluation of the internal and external marks in a theory and practical subjects, based onMid Semester examination, unit tests, assignments, seminar, group discussion, self study, tutorials, internal viva and end semester exam. Students are awarded internal and external marks on the basis of the performance in the above-noted criteria. Projects, internal reviews are conducted and evaluated for judging the level of students' standards.To know the learning status of the students, assignments are given. At the end of the semester examinations are conducted by the affiliated University- RGPV, Bhopal.

Table 8.7 Direct Assessment Methods

Direct Assessment Methods		
S. No	**Assessment Processes**	**Method Description**
1.	Internal Assessment Test, Assignments, Quizzes, Internal Viva	Formative and Summative Assessment are used for evaluation of the Internal and external marks in theory and practical subjects, based on Mid semester

		examination, unit tests, assignments, seminar, group discussion, self study and tutorials generally conducted in between and on completion of course. An improvement test is conducted for those students who score very less marks in internal assessment before the end of the semester to give an opportunity to such students to improve their internal Assessment Marks. It is a metric to continuously assess the attainment of course outcomes. Average of the two Mid Semester marks, assignment marks and tutorials are taken as Internal Assessment Marks for the relevant subject.
2.	Theory / Practical Semester Examination.	Semester examinations are conducted by the affiliating University RGPV, Bhopal and the metric to assess whether all the course outcomes are attained or not are framed by the course owner. Semester Examination is more focused on attainment of course outcomes and uses descriptive exam pattern.
3.	Seminar, Presentations	Seminar in the first year will be conducted semester-wise; the student shall collect the information on the attended seminar on specialized topic(s), showing his/her understanding of the topic through presentation and viva- voce. It shall be evaluated by the committee consisting of Senior Faculty Members. The committee evaluates presentation based on following parameters: i) Presentation ii) Viva-voce

PO Assessment Tools:

We are using following PO assessment tools:

- Internal/External Evaluation as per University exam.
- Lab Experiments
- Mentoring, software skills
- Technical Events/Workshop/conferences/Seminar/ Group discussion/Social Activities
- Course Beyond syllabus
- Problem Base Learning

Evaluation Process of Question paper setting

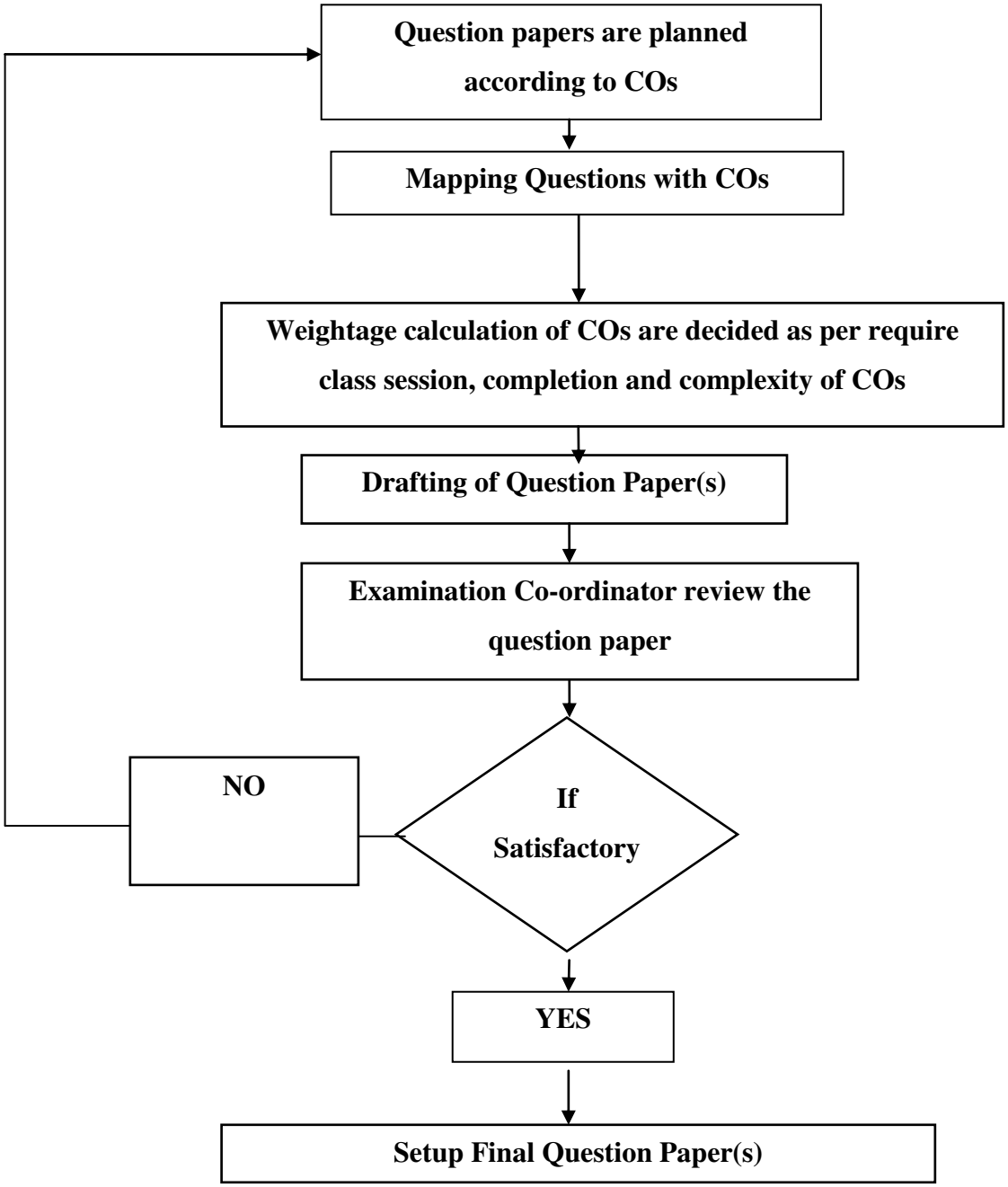


Figure 8.1 Evaluation Process

PO & CO-ATTAINMENT (2019-2020 Batch)

Direct method is used to assess the program outcomes and outcomes

- Direct attainment of COs is determined from the performances of students in 30% of Internal Evaluation (IE) and 70% of Semester End Examination (SEE)
- 30% of Internal Evaluation (IE) is calculated from 67% of Mid Semester Examination and 33% of Assignment/theory quizzes.
- For assessment of Mid Semester Examination marks, two mid semester are conducted and final marks is consider as an average of two mid marks.
- First Mid Semester Examination is included four questions with respect to 40% Coverage of COs.
- Second Mid semester Examination is included six questions with respect to remaining 60% Coverage of COs.
- For assessment of assignment four or five assignments are given and each assignment includes three to five questions with respect to concern COs.
- For practical COs attainment is determined from the performances of students in 40% of Internal Evaluation (IE) and 60% of End Semester Examination (SEE).
- Direct method enables faculty to judge student's knowledge and skills from their performance in the continuous assessment tests, end–semester examinations, presentations, and classroom assignments etc. These methods provide a sample of what students know and/or can do and provide strong evidence of extent of student- learning.

The process of attainment has described in flow chart

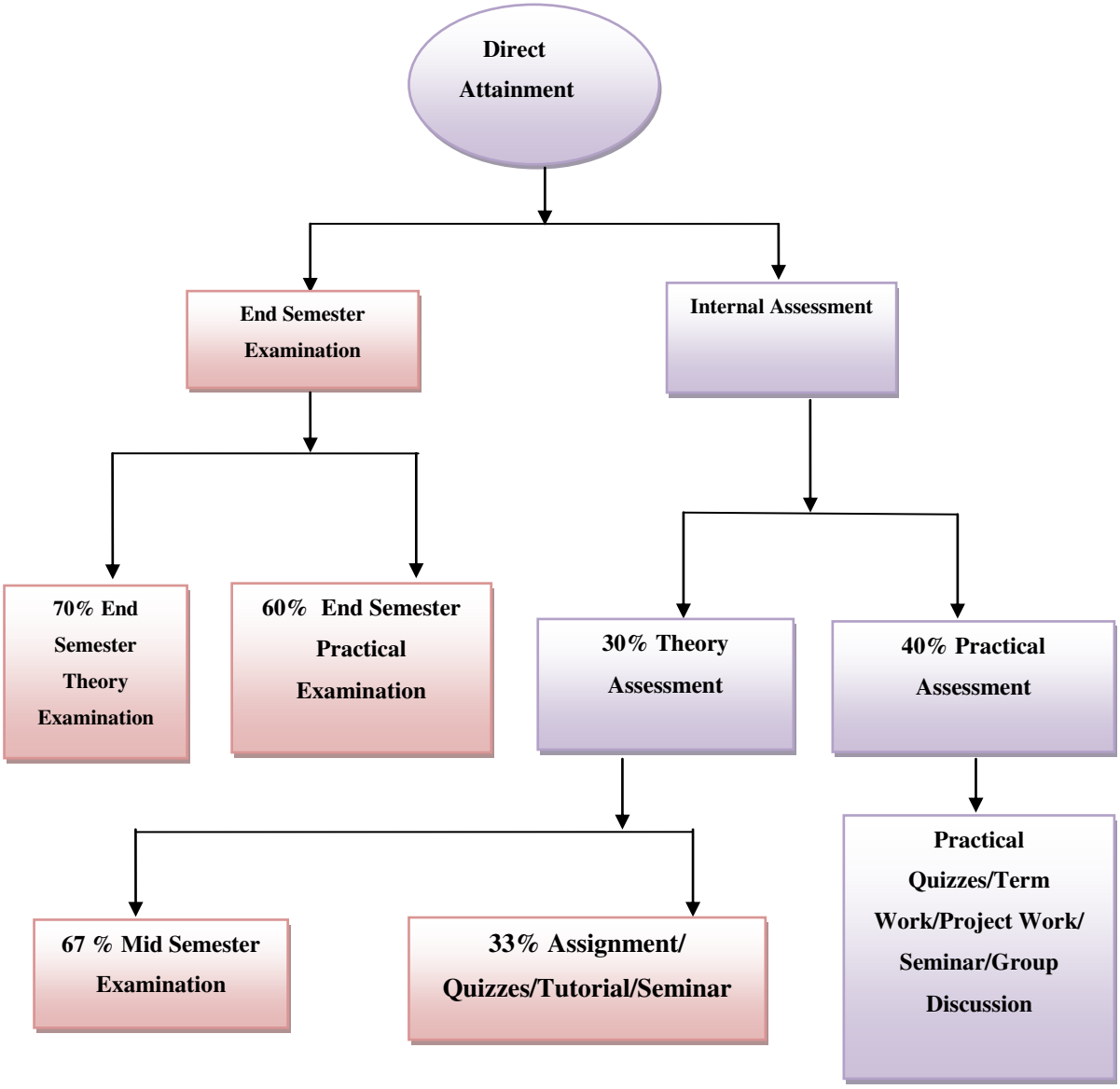


Figure 8.3 Flow Chart of Attainment Calculation

Use of Rubrics for Evaluation and Assessment of PO's

- The Course/ Program outcomes are difficult to measure e.g. assessment of critical thinking, creativity, analytical skills, and problem solving etc. Hence the Department has adopted criterion referenced rubrics to assess the POs and COs, wherever appropriate. The Rubric criteria are either developed by faculty or

sometimes even with consultation with students and distributed among concerned before an assignment, project or test.

- Rubrics are used for both formative and summative assessment of students. Same rubric is used for assessing an outcome so that the faculty is able to assess student progress and maintain the record of the same for each student.
- The rubrics are shared with students before being evaluated so that they are aware of the performance criteria and their weight age.

Table 8.8 Internal & External Evaluation Rubrics (Theory Subject)

Rubrics	
External Evaluation	**If 80% students achieve marks above 50 % marks then attained level is 3**
	If 70% students achieve marks above 50% marks then attained level is 2
	If 60% students achieve marks above 50 % marks then attained level is 1
Internal Evaluation	**If 80% students achieve marks above 60% marks then attained level is 3**
	If 70% students achieve marks above 60% marks then attained level is 2
	If 60% students achieve marks above 60% marks then attained level is 1

Lab Performance Evaluation Rubric

Student Name: ---------- **Enrolment Number: ----------**

Evaluation Date: ----------

S. no	**Method of Evaluation**	**Rubrics**	**Exceeds expectation(3)**	**Meets expectation(2)**	**Doesn't meet expectation(0-1)**	**Marks**
1	Conduction of Experiments	Lab Participation	Student demonstrates an accurate understanding of the lab objectives and concepts. The student can correctly answer questions and if	Student arrives on time to lab, but may be unprepared. Answers to questions are basic and	Student tardiness or unpreparedness makes it impossible to fully participate. If	.

			appropriate, can explain concepts to fellow classmates. Student is eager to participate and assists when needed.	superficial suggesting that concepts are not fully grasped.	able to participate, Student has difficulty explaining key lab concepts. OR Student was absent from lab	
2		Equipment connection	Student has made correct equipment/component connections as per standard circuit diagrams.	Student needed guidance to make correct equipment/component connections as per standard circuit diagrams.	Student was unable to make correct equipment/ Component connections as per standard circuit diagrams.	
3		Data Recording/ Collection	Student has correctly measured the relevant parameters	Student has performed incorrect measurement of relevant parameters	Student was unable to identify /measure relevant parameters	
4		Results	Accurate results have been achieved	The achieved results are not accurate but are within tolerance range	No results are achieved OR The achieved results are meaningless	
5		Troubleshooting	Student has ability to detect and correct the errors	Student can detect the error but unable to correct it	Student was unable to detect the error	
6		Lab Report	Student demonstrates	Student has a	Student has	

	Conduction of Experiments		an accurate understanding of the lab objectives and concepts. Questions are answered completely and correctly. Graphs are neat, creative and include complete titles and accurate units. Errors, if any are minimal	basic knowledge of content, but may lack some understanding of some concepts. Questions are answered fairly well and/or graphs could have been done more neatly, accurately or with more complete information.	problems with both the graphs and the answers. Student appears to have not fully grasped the lab content and the graph(s) possess multiple errors. OR Student turns in lab report late or the report is incomplete	
7	Ethics	Safety	Student carefully observes the safety rules and procedures during practical work	Student observes safety rules and procedures with minor deviation during practical work	Student does not care about safety rules during practical work.	
8	Ethics	Punctuality	Student was on time and stayed till the completion of task	Student was on time but wasted time outside the work place during the experiment.	Student was not on time and left class before time.	
9	Ethics	Workplace Clearance	The student uses the equipment responsibly and clears the leftovers at the work place on completion of lab work	The student has shown responsibility towards using the equipment while he didn't care about the	The student has shown irresponsibility using the equipment and didn't clear the leftovers at the	

				cleanliness of work place	workplace on completion of lab work	
10	Team Work	Research & gather information	Student has collected a great deal of information which goes beyond the basics.	Student has collected basic information related the topic.	Student has not collected any information that relates to the topic	
11		Fulfil team role's duties	Student has performed the duties assigned and actively assisted others.	Student has shown limited performance in the duties that are assigned	Student has not performed any duties of assigned team role.	
12		Listen to other teammates	Consistently listens and responds to other appropriately	Usually doing most of the talking rarely allowed others to speak.	Student shows an assertive behaviour and was unable to show respect towards other teammates.	
13	Conduction of Experiments	Familiarity with software	Student has full command on the basic tools of the software.	Student has limited command on the basic tools of the software.	Student has no idea how to use the basic tools of the software.	
14		Simulation Steps	Has applied all the steps in correct sequence to obtain the results.	Some steps are followed but not in proper sequence	Student has no idea regarding the steps to be followed to perform simulation	
15		Coding Skills	The code is completely functional and responds correctly producing the correct outputs.	The Code is correct with regard to syntax but required	The code has several syntax errors. Important parts	

				output is not correct.	of code are missing.	
16	Conduction of Experiments	Schematic of the Circuit	Schematic of circuit/board is made with proper connections/wiring.	Schematic of circuit/board is made with only basic proper connections/wiring	Schematic of circuit/board is made with only basic connections/wiring and has several errors.	
					Total Marks	

STUDENT SEMINAR EVALUATION RUBRIC

Student Presenter:_____

Evaluator Date:

Grading Scale:

Evaluate the student's presentation					
	Inadequate	**Average**	**Admirable**	**Outstanding**	**Score**
Knowledge and Content	**1**	**2**	**3**	**4**	
Organization of presentation	Hard to follow; sequence or information is jumpy	Most of the information presented is in sequence	Information presented in logical sequence; easy to follow	Information presented as interesting story in logical, easy to follow sequence	
Background content	Material not clearly related to topic **or** background dominated seminar	Material sufficient for clear understanding **but** not clearly presented	Material sufficient for clear understanding **and** effectively presented	Material sufficient for clear understanding **and** exceptionally presented	
Methods	Methods too brief or insufficient for	Sufficient for understanding	Sufficient for understanding **and**	Sufficient for understanding	

	adequate understanding **or** too detailed	**but** not clearly presented	effectively presented	andexceptionally presented	
Results (Figures, graphs, tables, etc.)	Some figures hard to read	Majority of figures clear	Most figures clear	All figures clear	
	Some in inappropriate format	Majority appropriately formatted	Most appropriately formatted	All appropriately formatted	
	Some explanations lacking	Reasonably explained	Well explained	Exceptionally explained	
Contribution of work	Significance not mentioned or just hinted	Significance mentioned	Significance explained	Significance exceptionally well explained	
Knowledge of subject	Does not have grasp of information; answered only rudimentary questions	At ease with information; answered most questions	At ease; answered all questions **but** failed to elaborate	Demonstrated full knowledge; answered all questions with elaboration	
Presentation Skills					
Graphics (use of PowerPoint)	Uses graphics that rarely support text and presentation	Uses graphics that relate to text and presentation	Uses graphics that explain text and presentation	Uses graphics that explain and reinforce text and presentation	

8.4.2. Record the attainment of Course Outcomes of all first year courses (5)

Academic year 2019-2020

Record the attainment of Course Outcomes of all courses with respect to set attainment levels

Setting of Target

Target of the course outcome has been decided as per

- Average end semester marks
- Subject internal assessment Average Marks
- Class session require for completion of course outcome

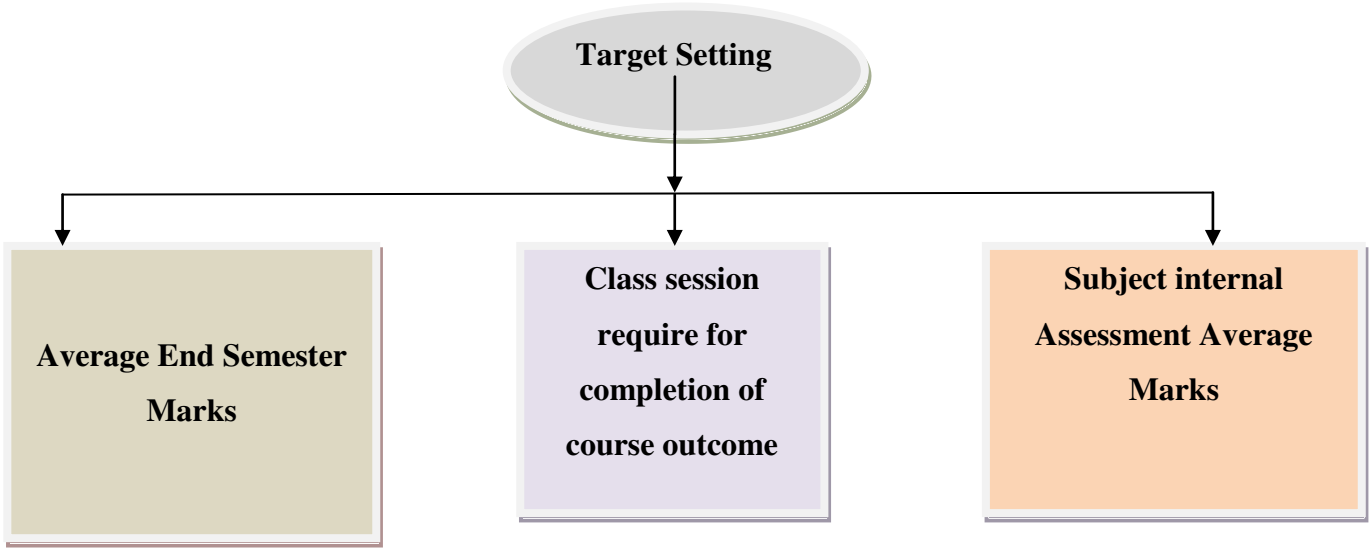


Fig. 8.3 Process of target setting

Table 8.9 CO Attainment Analysis

	2018-19		2019-20	
Semester	**I**	**II**	**1**	**II**
Achieved Attainment Level (%)	**63**	**61**	**65**	**82**
Target Level (%)	**60**	**60**	**65**	**65**

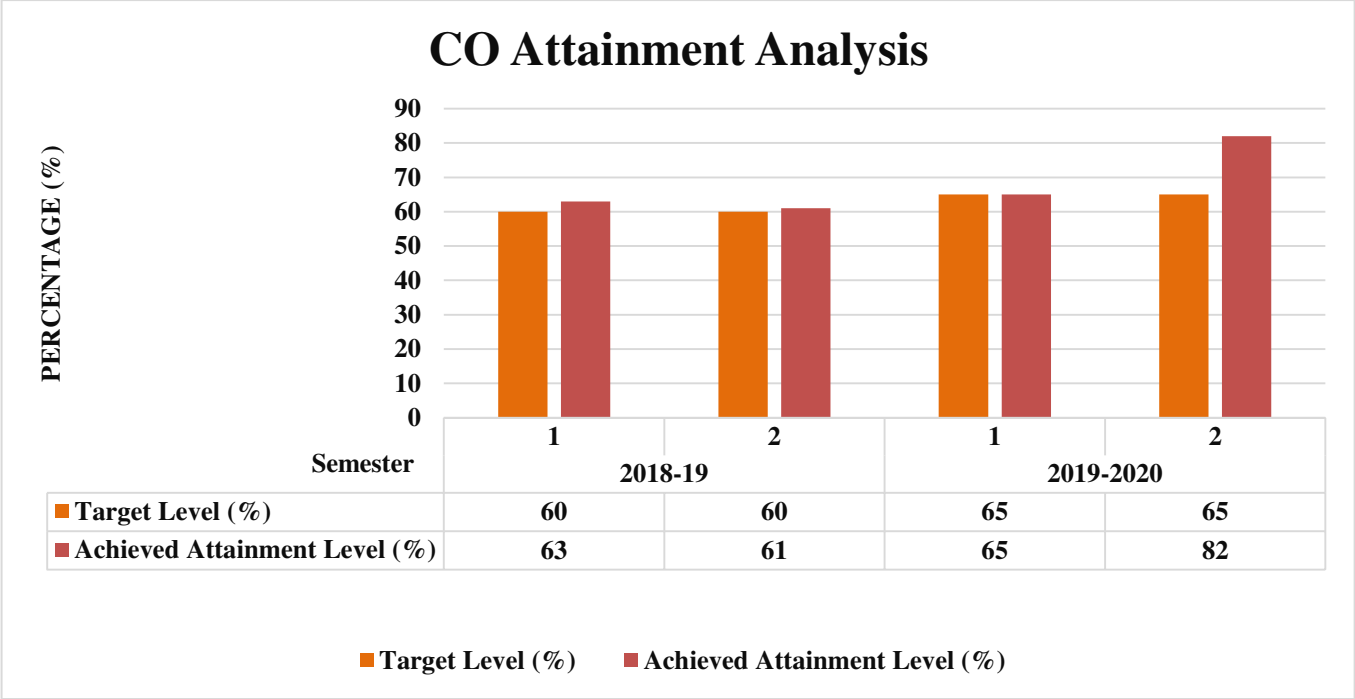


Fig. 8.4 CO Attainment analysis

Table 8.10. First semester CO Attainment (2019-20)

Semester	Subject Code	Cos	Target Level	Achieved Attainment Level	Status
I	BT101	C101.1	1.6	2	0.4
		C101.2	1.6	2	0.4
		C101.3	1.6	2	0.4
		C101.4	1.6	2	0.4
		C101.5	1.6	1.8	0.2
	BT102	C102.1	1.7	0.8	-0.9
		C102.2	1.7	0.8	-0.9
		C102.3	1.7	0.6	-1.1
		C102.4	1.7	0.6	-1.1
		C102.5	1.7	0.6	-1.1
	BT103	C103.1	1.5	2	0.5
		C103.2	1.5	2	0.5
		C103.3	1.5	2	0.5
		C103.4	1.5	2	0.5
		C103.5	1.5	1.6	0.1
	BT104	C104.1	1.75	2	0.25
		C104.2	1.75	1.8	0.05
		C104.3	1.75	2	0.25
		C104.4	1.75	2	0.25
		C104.5	1.75	1.4	-0.35
	BT105	C105.1	2	2	0
		C105.2	2	1.8	-0.2
		C105.3	2	2	0
		C105.4	2	2	0
		C105.5	2	2	0
	BT106P	CL106.1	2.5	2.8	0.3
		CL106.2	2.5	2.8	0.3
		CL106.3	2.5	2.6	0.1
		CL106.4	2.5	2.6	0.1
		CL106.5	2.5	2.6	0.1
	BT108P	CL108.1	2.6	2.6	0
		CL108.2	2.6	2.6	0
		CL108.3	2.6	2.6	0
		CL108.4	2.6	2.6	0
		CL108.5	2.6	2.6	0
			Target level= 1.95	**Achieved attainment level=1.95**	
			Target level(%) = 65	**Achieved attainment level(%) = 65**	
II	BT201	C201.1	1.7	2.5	0.8
		C201.2	1.7	2.8	1.1
		C201.3	1.7	3	1.3
		C201.4	1.7	3	1.3
		C201.5	1.7	3	1.3
	BT202	C202.1	1.3	0.8	-0.5

		C202.2	1.3	0.6	-0.7
		C202.3	1.3	0	-1.3
		C202.4	1.3	0.7	-0.6
		C202.5	1.3	0.8	-0.5
	BT203	C203.1	1.9	2.5	0.6
		C203.2	1.9	2.9	1
		C203.3	1.9	2.9	1
		C203.4	1.9	3	1.1
		C203.5	1.9	3	1.1
	BT204	C204.1	2	2.4	0.4
		C204.2	2	2.9	0.9
		C204.3	2	2.9	0.9
		C204.4	2	3	1
		C204.5	2	3	1
	BT205	C205.1	2	2.7	0.7
		C205.2	2	2.8	0.8
		C205.3	2	3	1
		C205.4	2	3	1
		C205.5	2	3	1
	BT206P	CL206.1	2.8	3	0.2
		CL206.2	2.8	3	0.2
		CL206.3	2.8	2.9	0.1
		CL206.4	2.8	2.6	-0.2
		CL206.5	2.8	2.6	-0.2
			Target level= 1.95	**Achieved attainment level=**2.47	
			Target level(%) = 65	**Achieved attainment level(%) = 82**	

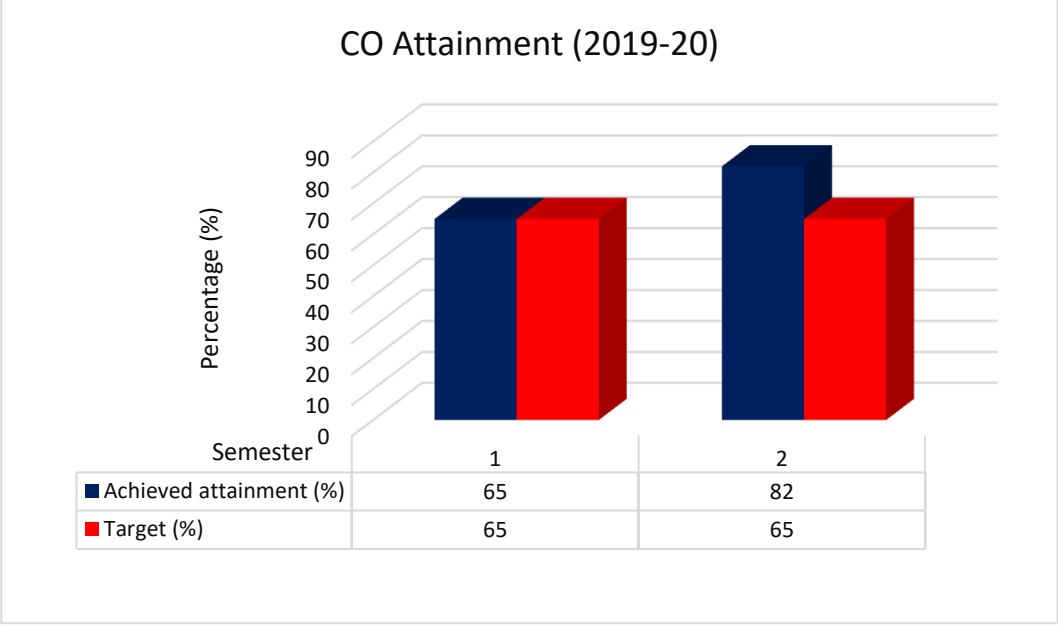


Fig. 8.5 CO Attainment (2019-20)

8.5 Attainment of Program Outcomes from first year courses (20)

8.5.1 Indicate results of evaluation of each relevant PO and/or PSO, if applicable (15)

Table 8.11 PO Attainment Analysis

PO Attainment Analysis		
Session	**2018-19**	**2019-20**
Achieved Attainment (%)	**55.5**	**73.33**
Target (%)	**60**	**60**

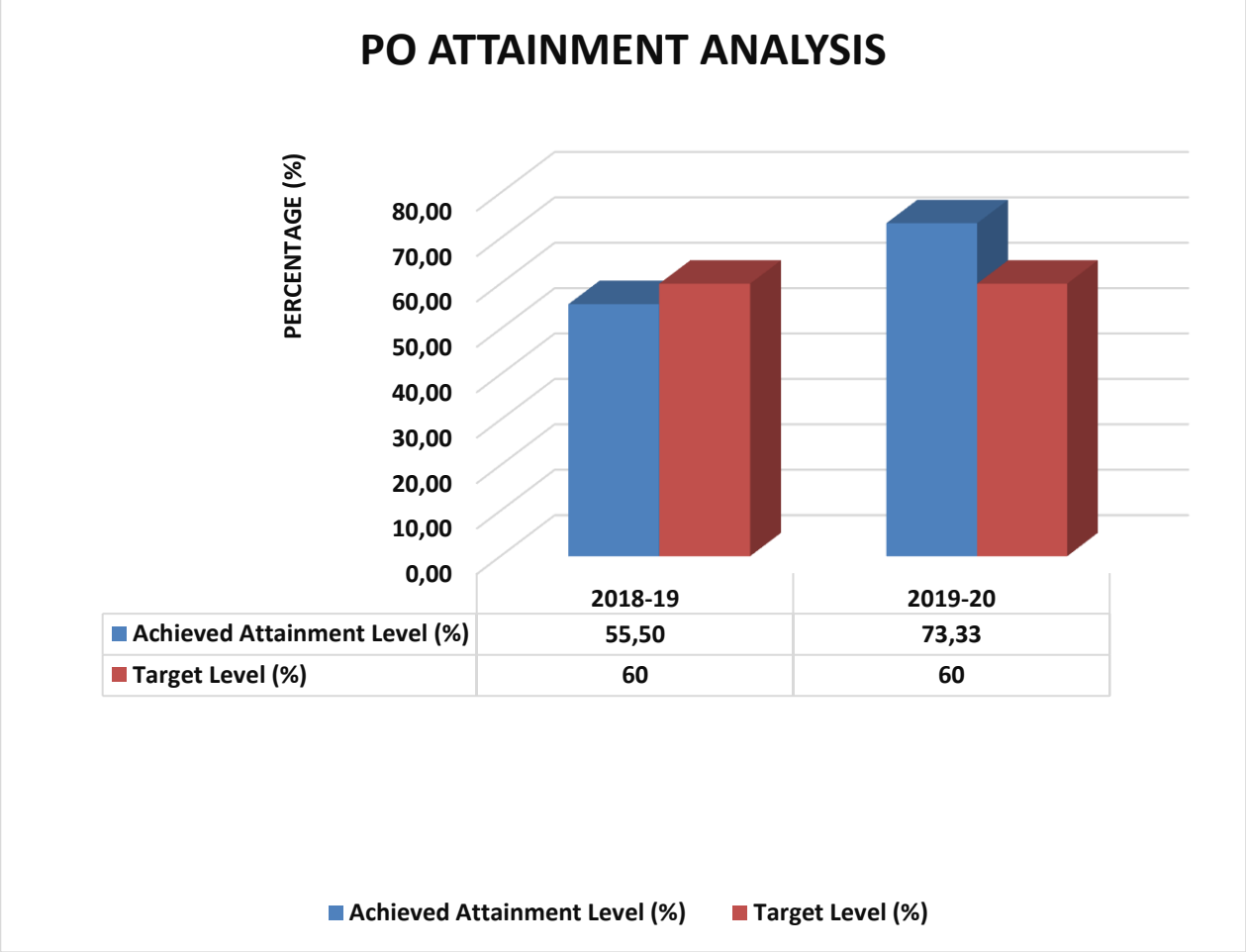


Fig. 8.6 PO Attainment Analysis

Table 8.12. PSO Attainment Analysis

PSO Attainment Analysis		
Session	**2018-19**	**2019-20**
Achieved Attainment (%)	**55.5**	**65**
Target (%)	**60**	**60**

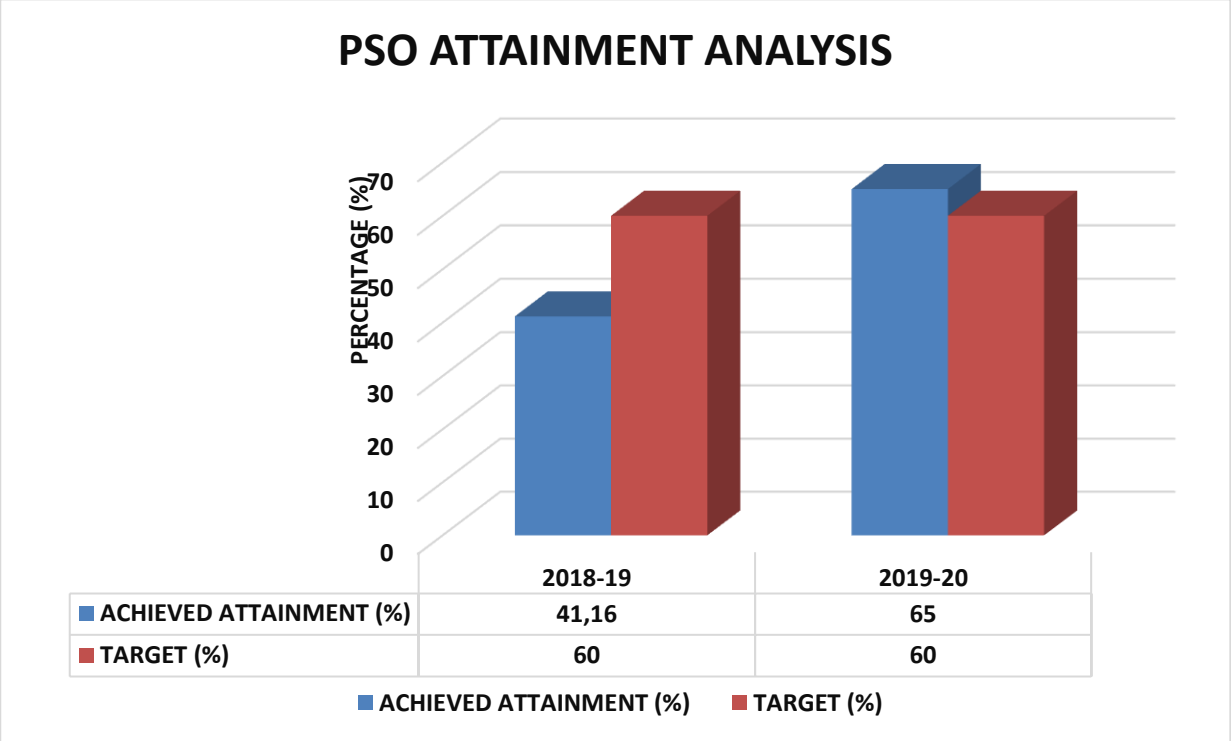


Fig. 8.7 PSO Attainment Analysis

Table 8.13. PO Attainment 2019-2020

Academic Year 2019-2020													
Department Electrical and Electronics Engineering Attainment Summary													
Semester	**COURSE**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
I	**BT101**	1.91	1.91	-	-	-	0.90	0.90	0.90	-	-	-	1.88
	BT102	0.90	0.90	-	-	-	0.90	0.90	0.90	-	-	-	0.90
	BT103	1.86	1.91	-	-	2.90	0.90	0.90	0.90	3.00	2.94	-	1.89
	BT104	1.76	1.87	-	-	-	1.91	1.90	1.95	-	-	-	1.77
	BT105	1.91	1.92	-	-	3.00	0.83	0.80	0.90	-	-	-	1.89
	BT106	2.38	2.34	2.30	-	2.60	-	-	-	2.30	-	-	2.31
	BT108	2.60	2.33	-	-	-	-	-	-	-	-	-	2.20
II	**BT201**	2.83	2.79	-	-	-	2.70	-	-	2.92	-	-	2.80
	BT202	2.73	2.69	-	-	-	2.70	-	-	-	-	-	2.66
	BT203	2.83	2.82	-	-	-	-	-	-	2.92	-	-	2.81
	BT204	2.80	2.82	-	-	-	2.78	2.81	-	3.00	-	-	2.81
	BT205	2.86	2.87	2.91	-	3.00	-	-	-	3.00	-	-	2.83
	BT206	2.57	2.57	-	-	2.73	2.20	-	-	2.64	2.60	-	2.60
	Direct Attainment Level	**2.30**	**2.29**	**2.61**	**-**	**2.85**	**1.76**	**1.37**	**1.11**	**2.83**	**2.77**	**-**	**2.26**
	Target Level	**2.1**	**2**	**1.4**	**1.4**	**2.1**	**2**	**1.8**	**1.5**	**2**	**2.1**	**1.4**	**2.1**

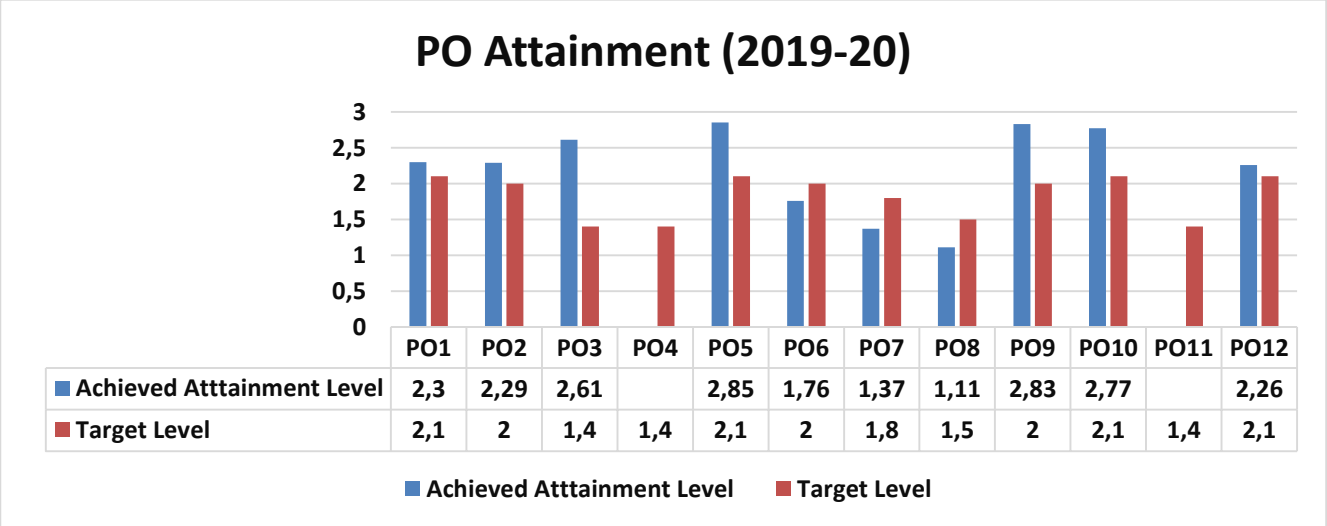


Fig.8.8 PO Attainment (2019-2020)

Table 8.14 PSO ATTAINMENT

Department of Electrical and Electronics Engineering			
PSO Attainment			
EX (2019-2020)			
Subject Code	**PSO1**	**PSO2**	**PSO3**
BT101	-	-	1.95
BT102	-	-	0.90
BT103	-	-	-
BT104	-	-	1.95
BT105	0.90	-	1.12
BT106	-	-	2.28
BT108	-	-	2.47
BT201	-	-	2.71
BT202	-	-	2.69
BT203	-	-	2.79
BT204	-	-	2.75
BT205	2.73	-	2.62
BT206	-	-	1.00
Direct Attainment	1.82	-	2.10
Target	2	1.6	1.8

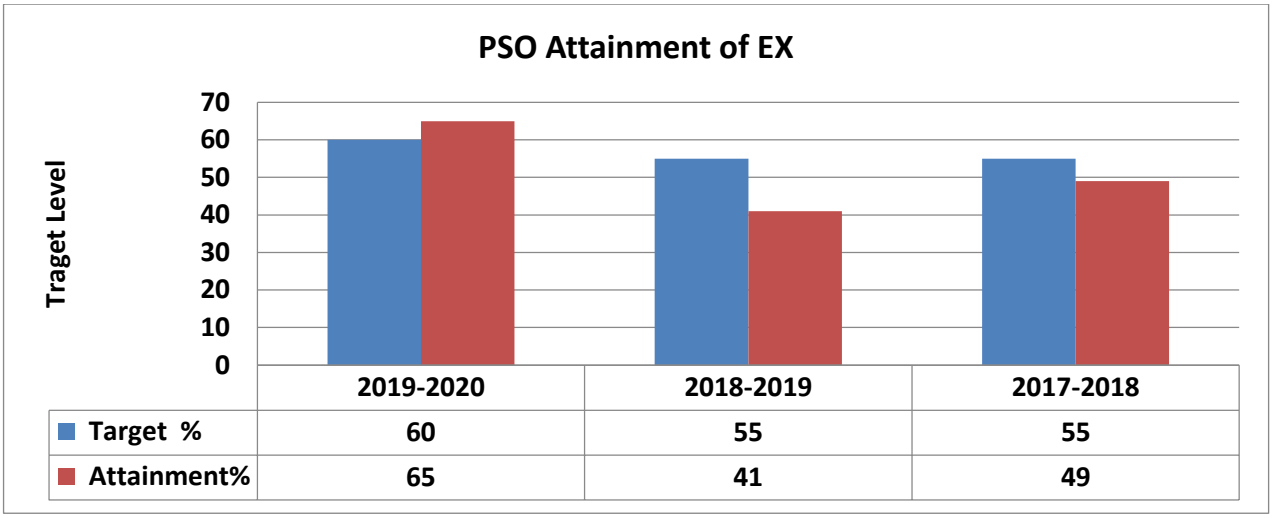


Fig.8.9. PSO Attainment Graph (2019-2020)

8.5.2 Actions taken based on the results of evaluation of relevant POs (5)

(The attainment levels by direct (student performance) are to be presented through Program level Course-PO matrix as indicated)

PO Attainment Levels and Actions for improvement - CAY – Mention for relevant Pos

POs	Target Level	Attainment Level	Observations
PO1: Engineering knowledge: To Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.			
PO1	2.1	2.30	**Observations** 1. Student's not acquainted with the Fundamental concepts in the mathematics /Problem- Oriented subjects. 2. BEEE, BME, engineering chemistry, Basic Computer engineering Subjects
Actions 1. Remedial/Revision classes were conducted through NPTEL classes. 2. Numerical problems in BEEE were solved and given for practice in tutorial classes. 3. More numerical based problems on nodal & Mesh analysis and theorems were solved in tutorials. 4. Numerical on, e.m.f. equation, EDTA method and LS-process were conducted in tutorial classes along with extra assignments.			
PO2: Problem analysis: Identify, formulate, review research literature, and analyze complex Engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.			
PO2	2.0	2.29	**Observations**

			1. Need understanding of analytical skill in M-I, Electronics, Thevenin's theorem, spectroscopic techniques. In BME fluids module was difficult to understand. 2. Students were facing problem in applying the basic principles
Actions 1. Audio-Visual lectures were conducted for clearing the concepts. 2. Regularly appeared questions in the previous exam of University Question Papers were solved in the classes. 3. Principles of spectroscopy had been made clear with animated video lectures.			
PO3: Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate considerations for the public health and safety, and the cultural, societal, and environmental considerations.			
PO3	1.4	2.61	**Observations** 1. Students find it difficult to solve engineering problems in BCE &EM. 2. Basic knowledge of design in EG is not well understood. 3. Needs improvement in Programming
Actions 1. Some classes were delivered with the help of NPTEL lectures. 2.More emphasis was given on mathematical basic in the previous course like surveying, planning etc 3. Practical approach of teaching of BCE & EM was included.			
PO4: Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.			
PO4	1.4	-	**Observations** 1. Students find difficulty in solving the engineering problems. 2. Subject involving both analysis and design as in EG, BME needs more understanding of the concepts.
Actions 1. Practical approach of teaching of topics in casting, carpentry and welding had been adapted. 2. More practical problems and exercises were given for practice. 3. Motivated students to participate in activities organized by MPCST & inter-collegiate.			
PO5: Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.			
PO5	2.1	2.85	**Observations** Students are unfamiliar with the use of modern tools.
Actions			

1. Training/workshop were conducted to enhance the usage of modern tool.

2. More English spoken & written classes were conducted for practice

3. Use of Projector was more beneficial for acquiring presentation skill as well as development of familiarity of ICT Tool.

PO6: The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

PO6	2.0	1.76	**Observation** The students are not able to apply reasoning contextual knowledge to assess safety, legal and cultural issues in real life.

Actions

1. Awareness about environmental change was provided by video lecture.

2. To understand the safety concerns and social aspects, Motivate students to visited like Tribal Museum, Science Centre and many useful places to expand their practical Knowledge.

PO7: Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

PO7	1.8	1.37	**Observation** Awareness of global and environmental issues was observed among the student that needs to be improved

Action

1. Students were encouraged to participate in programs on global and environmental issues (Tree Plantation Program).

2. Video Lecture on environmental awareness and pollution - cause, effect and control were conducted for better understanding of the subject.

3. Students were motivated to take a part in various social events such as, “Swaccha Bharat Abhiyan” of the subject.

PO8: Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

PO8	1.5	1.11	**Observation** 1. Need more Professional Ethics & Moral values. 2. Personality of students needs to be upgraded

Action

1. Alumni and Campus selected students of final year interaction sessions with fresher, induction programs, T&P classes, activity on human values.

2.Motivational talks, personality development sessions and activities were arranged to overcome shortcomings amongst the students

3.Thoughtoftheday”isimpartedinpracticetoimprovetheethics&moralvalues

PO9: Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

PO9	2	2.83	**Observation** 1. Some students are not able to work as individual while some

			do not work in team. 2. Self –centeredness amongst Students.
Actions Inter-Collegiate and Inter-Branch competitions as well as collaborations in technical / Non-technical event were conducted to develop team spirit, responsibility, leadership and ownership qualities.			
PO10: Communication: Communicate effectively on complex engineering activities			
PO10	2.1	2.77	**Observation** 1. Fluency in communication is lacking. 2. The communication, presentation and report writing skills are to be further improved by the students.
Actions **1.** More writing exercise was provided for practice to improve presentation and report writing skills 2. Vocabulary building task were provided.			
PO11: Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.			
PO11	1.4	-	**Observation** 1. Lack of team spirit, leadership qualities 2. Lacking awareness in financial management. 3. Difficulty in deriving conclusions through observations
Actions 1. Student were motivated to participate in Tech Fest 2. Self-discipline and management skills were made aware of through motivational lectures, corporate training sessions.			
PO12: Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.			
PO12	2.1	2.26	**Observation** 1. Awareness concerned to independent learning is lacking. 2. Awareness of current trends and development in engineering is lacking
Actions 1. Exposure to newer engineering methods and innovations were imparted through special Expert Lectures from different institutes of repute and through NPTEL. 2. More examples on current issues were practiced by students 3. Practical training at the departments through over the curriculum approach of teaching was adapted.			

PSOs Attainment Levels and Actions for Improvement (2019-2020)

PSOs	Target Level	Attainment Level	Observations
PSO1: Apply Mathematics, transformation methods, simulation tools etc. to solve practical problems in the field of Electrical and Electronic Circuits and Networks.			
PSO1	**2**	**1.82**	**Observations** It was observed that more emphasis on inculcating knowledge related to the basic concepts of fundamentals of electrical engineering is required
Actions: 1. More Video Lectures were included for better understanding of fundamental.			
PSO2: Analyze and design Electronic devices, Control System, Instrumentation and Power System by using mathematics and simulation techniques and implement power electronics drives and electrical machines.			
PSO2	**1.6**	**-**	**Observations** Need to acquire knowledge of application of basic electrical and electronics devices/machine.
Actions : 1. More Video Lectures were included for better understanding of application of basic electrical and electronics devices/machine			
PSO3: Design and develop cost effective and appropriate system engineering solutions applying the software and hardware tools with consideration for safety, environment and society.			
PSO3	**1.8**	**2.10**	**Observations** Awareness about the application electrical and electronics engineering in society to be created.
Actions :1. Online lecture conducted to create awareness about the application electrical and electronics engineering in society were conducted			

CRITERION 9	Student Support Systems	50

9. STUDENT SUPPORT SYSTEMS

9.1. Mentoring system to help at individual level (5)

A. Details of the mentoring system that has been developed for the students for various purposes and also state the efficacy of such system

The role of the mentoring system is to nurture and provide support for the students during the transition period in academic, professional as well as personal growth thus enabling them to deal with the challenges in their life more effectively.

- To bring forth hidden potential of students, thereby improving their overall performance and skills.
- To overcome weaknesses of students.
- To solve various personal and professional issues and problems related to students.
- To provide a platform for students to express their issues freely.
- To form strong relationships/ bonding with student of diverse cultures and backgrounds.

Our department has adopted a mentoring system which takes care of the various issues related to students and enhances their academic performance, develops their personality and helps them to tackle problems in professional and personal life to become a good human being and capable professional. In our mentoring system, HOD keeps a close watch on individual student along with Mentors. Department adopts Mentor Teaching Learning system to support weak/slow learner and bright students equally. Mentoring by faculty supports and encourages students to manage their own learning in order that they may maximize their potential, develop skills, improve performance and become the person they want to be. Each mentor is allotted with 20-30 students. To start identifying Slow and Bright learner in this process, the following inputs is needed

- Overall result in preceding examination
- Internal Assessment (Class test/Assignment/Tutorials/Internal Viva/Presentation)

- Class observation by subject teacher

Weak/slow learner students are given counselling for their career guidance, bright students are encouraged to take up new challenges time to time. The parents are also informed about the progress report like result, attendance and performance of the students. The students needing improvement are groomed not only for improving academic performance, but also given opportunity to showcase their skills through events, competitions etc and this helps to improve academic performance also. Mentors meet with the mentees in the weekly meeting and prepare report. The report is as shown below in Fig **9.1:**

IES COLLEGE OF TECHNOLOGY BHOPAL							
DEPARTMENT OF _____							
Academic Year : Semester:							
STUDENT COUNCELLING RECORD							
Class:		**Batch:**			**Name of Mentor:**		
Sr.No	**Roll No.**	**Name of the Mentee**	**Date**	**Time**	**Issue**	**Suggestion**	**Remark**

IES COLLEGE OF TECHNOLOGY BHOPAL				
DEPARTMENT OF _____				
Academic Year : **Semester :**				
IMPROVEMENT STATUS OF MENTEES				
Class:		**Batch:**	**Name of Mentor:**	
Roll No.	**Name of the Student**	**Active Participation in Mentor Program (Yes/No)**	**Areas of Improvements Seen in Student**	**Remark**

Fig.9.1 Mentor Format

Mentor's Role and Responsibilities:

1. Mentors serve as positive role model, encourage and motivate students to achieve their target/goal.
2. Motivate and guide students in all academic, co-curricular and in extra-curricular activities.
3. Mentors maintain a mentees record.
4. Collect information regarding weak students from the subject teachers on the basis of their previous results, various other skills, having less attentiveness, etc.
5. The record of counselling and mentoring is maintained in file, which is updated on regular basis.
6. Mentors submit a report to HOD and after approval by the Principal seek/ remedial actions taken for improvement
7. Monitoring student's readiness for personal interview, group discussion, technical and non-technical support (including resume making, dressing sense, skills etc.)
8. Evaluate student's progress and performance in various technical/ non technical events and online computer based tests.
9. Encouraging and motivating the students for attending all the classes, expert lectures and other technical sessions for better performance in examination, contests and placement.

Assistance for slow learner students:

- Mentors (from time to time) follow their progress and counsel them to attend the classes sincerely.
- Subject handling faculty members conduct revision classes.
- Faculty members inculcate theoretical concepts through model specimen/charts/ video lectures/ online lectures.
- Remedial classes are also conducted for tough subjects/ tough contents.
- Confidence is boosted by motivating them to participate in sports, NCC, NSS and other activities.
- Slow learners are supported in difficult areas of learning; like encouraging students to sharpen their listening, writing skills and improving communication skills.

Encouraging bright students

- Students securing First and Second rank in end semester examination are awarded with certificate.

- Student securing 100% attendances are also awarded by certificate.
- Students are motivated for attending workshops, seminars, and technical contests.
- Students are encouraged to undergo Internships
- Students are mentored to achieve RGPV Chancellor Awards.

Table 9.1: List of Mentors along with the number of students (EX)

S.No.	Name of mentor	No. of Students
II year (2020–21)		
1	Mr. Shyam Chandani	20
2	Mr. Akhilesh Dwivedi	20
3	Ms. Poonam Khatarkar	20
4	Mr. Anant Thakur	20
5	Mr. Jyoti Bansal	20
6	Mr. Avinash Kumar Rai	20
III year (2020–21)		
1	Mr. Ajit Kumar Mishra	20
2	Mr Pankaj Mandve	20
3	Mr. Rahul Malviya	20
4	Ms. Vidhi Rawat	20
5	Mr. Sandeep Pandey	20

IV year (2020-21)		
1	Mr. Rahul Mishra	20
2	Ms. Pratibha Achintya	20
3	Mr. Manish Agrawal	20
4	Ms. Namrata Shrivastava	20
5	Mr. Saurabh Mishra	20

S.No	Name of the mentor	No. of student
II year (2019-2020)		
1	Mr. Shyam Chandnani	20
2	Mr. Vijay Anand Bharti	20
3	Mr. Akhilesh Dwivedi	20
4	Ms. Poonam Khatarkar	20
5	Mr. Anant Thakur	20
6	Ms. Jyoti Bansal	20
III year (2019-20)		
1	Mr. Ajit Kumar Mishra	20
2	Mr. J P Sharma	20
3	Mr. Rahul Malviya	20

4	Dr. Arun Shandilya	20
5	Dr. Brajesh Mohan Gupta	20
6	Mr. Sandeep Pandey	20

S.No	Name of the mentor	No. of student
II year (2018-2019)		
1	Mr. Ajit Kumar Mishra	20
2	Mrs. Jyoti Bansal	20
3	Mr. Anant Thakur	20
4	Mr. Kumar Prabhakar	20
5	Ms. Poonam Khatarkar	20
6	Mr. Padam Singh	20
III year (2018-19)		
1	Mr. Sandeep Pandey	20
2	Mr. J P Sharma	20
3	Ms. Rahul Malviya	20
4	Mr. Akhilesh Dwivedi	20
5	Mr. Pallav Singh	20
6	Mr. Tarun Agarwal	20

Impact of Mentor Teaching-Learning system

1. Reduced absenteeism.
2. Improvement in overall performance.
3. Improvement in personality.
4. Increased participation in co curricular activities.
5. Improvement in behaviour and attitudes
6. Improved interpersonal relationship with elders and peers.
7. Becoming conscious and worthy citizen.
8. Improvement in performance of weak students.

9. Improvement in campus selection ratio.

10. Receiving awards and recognition

9.2 Feedback analysis, rewards and Corrective Measures taken, if any (10)

A. Methodology being followed for analysis of feedback and its effectiveness

The Department continually seeks to review and improve the quality of its teaching and learning by reviewing the feedback about the courses, programs, teaching-learning processes and facilities from students, parents, alumni, employers and passing out students.

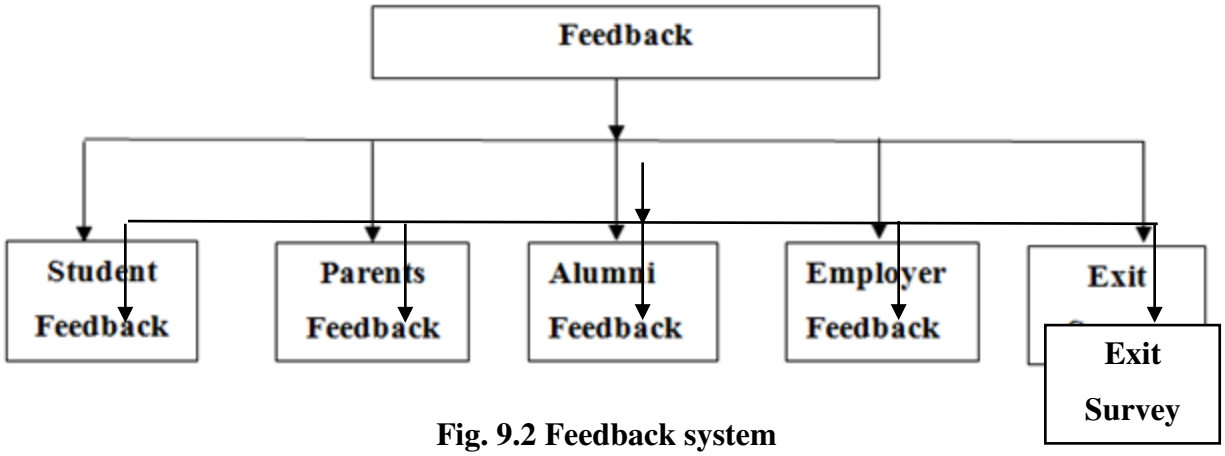


Fig. 9.2 Feedback system

Feedback system is well-established in the learning system with a reason to:

- Enhance the students learning skills
- Monitor and review the quality and standards
- Ensure the effectiveness of teaching learning method adopted
- Know good practices and its implementation

The entire process is executed in following three stages

- Feedback collection
- Feedback analysis
- Reward /corrective measures

- **Feedback Collection Process**

Feedback is collected offline/online mode from the student's twice in a semester, from the parents, alumni, employers and passing out students once in a year. Feedbacks are taken from the parents in hard copy provided by the Mentors to them through mentees which is further filled by the parents and submitted to the Mentors through students. Feedback from Alumni and employers are collected by TNP cell either during their visits to college or through emails. Exit surveys are collected by the Mentors from final year students during final semesters. These feedback collected are then evaluated and assessed for corrective actions on the basis of certain parameters discussed later in this section.

- **Feedback on Teaching-Learning by Students:**

Feedback is taken from students on the effectiveness of teaching and subject learning twice during the semester. Initially, feedback is taken from representative students and selected students those having attendance more than 90 % from each class by HoD/senior faculty member (appointed by Principal) after 15 to 20 days of commencement of classes. If students are facing difficulty in any subject, the concerned faculty member is informed of the same. Necessary guidance and support is given by HoD and another senior subject faculty member. This consists of asking the faculty member to give a mock class in presence of HoD and another senior subject faculty, giving guidelines for improvement, reviewing the lecture notes and offering necessary support in the subject. At the end of the semester the feedback is taken again in offline/online mode from students in that subject for necessary action

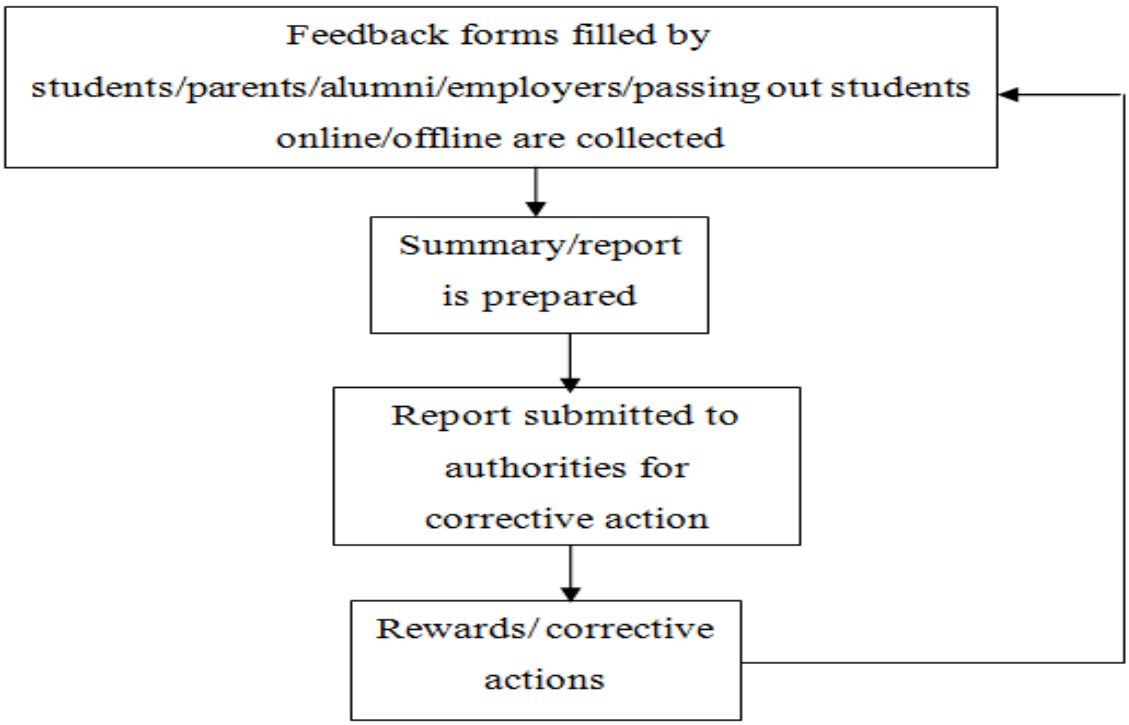


Fig. 9.3 Feedback process

Sample of student feedback form:

IES COLLEGE OF TECHNOLOGY, BHOPAL

DEPARTMENT OF ----------

Student Feedback Form

Class/Semester---------- Session: ----------

S No	Questions	Subject Code				
1	Course Objective near clear	Yes/No	Yes/No	Yes/No	Yes/No	Yes/No
2	Does the teacher have sound knowledge of the subject that he/she teaches?	Yes/No	Yes/No	Yes/No	Yes/No	Yes/No
3	How simulates the lecture	Yes/No	Yes/No	Yes/No	Yes/No	Yes/No
4	Speed delivery	Yes/No	Yes/No	Yes/No	Yes/No	Yes/No
5	Does the teacher have a well - prepared lesson plan for every class?	Yes/No	Yes/No	Yes/No	Yes/No	Yes/No
6	Does the teacher communicate well in the classroom? skill	Yes/No	Yes/No	Yes/No	Yes/No	Yes/No
7	Does the teacher develop the creativity of the students?	Yes/No	Yes/No	Yes/No	Yes/No	Yes/No
8	Temperament of encouraging student in the class while asking question	Yes/No	Yes/No	Yes/No	Yes/No	Yes/No
9	Presentation	Yes/No	Yes/No	Yes/No	Yes/No	Yes/No
10	Voice Modulation	Yes/No	Yes/No	Yes/No	Yes/No	Yes/No
11.	Accessibility of the teacher in and out of the class	Yes/No	Yes/No	Yes/No	Yes/No	Yes/No
12	Interest/ Motivation generates by the teacher	Yes/No	Yes/No	Yes/No	Yes/No	Yes/No

Note: For given response, please cut yes or no which is not applicable.

Signature of the Student

Feedback from Alumni:

1. Alumni fill feedback forms whenever they visit the department or the institute.
2. Alumni feedback collected during Alumni meet which held annually in the month of December/January of every year.
3. Feedback received through e-mail or hard copy.
4. Sample of Alumni feedback form is shown below:

IES COLLEGE OF TECHNOLOGY, BHOPAL

Alumni feedback form

Dear Alumni,

We are glad that you have successfully graduated from IES College of Technology, Bhopal. You will be pleased to know that the Institute of which you are Alumni has grown to be one of the leading Institutes. We would like to place on record that your co-operation and support as Alumni of this Institute has contributed in deciding Institute Vision & Mission.

We shall be very much appreciate and be thankful if you can spare some of your valuable time to fill up this feedback form and give us suggestions for further improvement of teaching learning process of the Institute.

Name of the Student: **Branch of student:**

Contact No: **Address:**

Current Employer: **Designation:**

Q1. Which type of profession you are following after graduation?

a) Job
b) Self Employed
c) Research
d) Higher Studies (Mention Higher Studies……..)

Q2. Suggest few technologies to be included as a part of academic curriculum to reduce the gap between institute and industry?

…….

Q3. Are you working/ worked on solution of any real life problem, which is facilitating others in society?

a) No
b) If yes,

Q4. Have you been involved in publishing?

a) White paper
b) Research paper in National/ International Journal
c) Book
d) Technical Magazines
e) Patent

Q5. Opinion about Institute's Vision & Mission:

…….

Q 6. Are you associated with any social activity/ association?

a) No
b) If yes,

Q 7. Have you undertaken multidisciplinary projects in your professional career?

a) No
b) Yes

Q 8. Mention how you got placement?

a) On Campus
b) Off Campus

Q 9. Have you been awarded/ received letter of appreciation at your work place?

a) No
b) If yes,

Q10. Which type of responsibilities you have held after graduation?

a) Managerial
b) Team Leader
c) Team Member
d) Scientists
e) Others, if any ……

Q 11. Have you Qualified GATE/GRE/NET/GMAT/… etc during your academic tenure at ICOT? If yes, mention details

…….

Q12: Feedback on Facilities

Q13. Suggestions (if any):

…….

Signature of the Alumni

Feedback from Parents:

1. Parent feedback form is given before vacation and collected at the time of registration.
2. Feedback is collected in hard- copy provided by the MENTORSs to the mentees to get it filled by the parents and submit it back to MENTORS.
3. Sample of feedback from parents is shown below:

IES COLLEGE OF TECHNOLOGY, BHOPAL

Parent feedback form

Name of the Parent: **Name of the Students:**

Branch /Semester of student: **Contact No:**

Year of Admission: **Year of Graduation:**

Address:

You are here by informed to give your healthy comment for the following

S.No.	Parameters	Excellent (4)	Very Good (3)	Good (2)	Satisfactory (1)
1.	How do you rate the quality of academic resource (such as teaching faculty, course material etc)				
2.	Any other suggestions for improving the Institute as a Institute of excellence.				
3.	Did your son/daughter got encouragement for participation in various co-curricular activities				
4.	Do you recommend IES as a Institute of your choice for admission to you siblings, friends, relatives etc.				
5.	Overall infrastructure of the Institute				

6.	How do you feel about infrastructural facilities such as library, laboratories, workshop, canteen, and other campus facilities				
7.	How do you rate the overall personality development of your son/daughter during their 4 years of stay in the institute				
8.	Your reaction about placement activities conducted.				
9.	Encouragement towards extracurricular activities (sports etc)				
10	Opinion about Institute's Vision & Mission				

Signature of the Parent

From Industry/Employers:

1. During on campus placements drive from the Industry.
2. From industry where IES alumni is/are working.
3. From IES alumnus who have turned entrepreneurs.
4. From industry during academic alliance meets.
5. From industry and academic expert during seminar, workshop organized by institute.
6. Sample of feedback from employer is shown below:

IES COLLEGE OF TECHNOLOGY, BHOPAL

Employer feedback form

Dear Employer,

Many graduates of our Institute are working in various esteemed organization and are grateful to you for providing them employment. We shall truly appreciate if you could spare some of your valuable time to give us your feedback. It will help us prepare our students so we give you better employees in future.

Tick the number that best describes your level of satisfaction at each question: 1 - far from satisfied, 2 - not satisfied, 3 - satisfied, 4 - happy, 5 - very happy.

Name of the Industry: **Email:**

Address : **Contact No:**

Name of the evaluating person with Designation:

How satisfied are you with the employee working in your organization / Industry, graduated from IES College of Technology		**1**	**2**	**3**	**4**	**5**
1.	Technical knowledge/skill					
2.	Developing practical solutions to work place problems					
3.	Creative in response to workplace challenges					
4.	Innovativeness, creativity					
5.	Ability to contribute to the goal of the organization					
6.	Involvement in social activities					
7.	Ability to contribute in sustainable solutions					

8.	Ability to manage professional skills					
9.	Working as part of a team					
10.	General communication skills					
11.	Their planning and organization skills					
12.	Self-motivated and taking on appropriate level of responsibility					

On a scale of 1 to 10 how do you rate your overall satisfaction with the outcome based teaching learning process of the student graduated from IES College of Technology, Bhopal.

1	2	3	4	5	6	7	8	9	10

How could our programs be improved? What specific comments do you have regarding the curriculum?

Any other comment(s):

Would you like to recruit more IES College students?	Yes □	No □
Would you refer us to other organization(s)?	Yes □	No □

Q13. Opinion about Institute's Vision & Mission:

…….

Q14. Suggestions (if any):

…….

Date **Signature of the Employer**

Feedback from the passing out students is filled in the final semester by MENTORSs in the form of Exit Survey. The report is submitted to the Head of the Department for necessary action.

IES COLLEGE OF TECHNOLOGY, BHOPAL

Course End Feedback Form/ Course end survey

Branch: **Session:** **Batch:**
Enrolment Number: **Name of Student:**

S. N.	Question	Need Improvement <=6	Level 1 (Satisfactory) <=7	Level 2 (Good) <= 8	Level 3 (Excellent) <=10
1.	Have all units of the syllabus suggested by university been covered properly?				
2.	Have you conducted all laboratory experiments up to your satisfaction?				
3.	Have the curriculum gaps if any were covered by the teacher properly?				
4.	Have all of your queries been answered by the teacher.				
5.	Have you been able to grasp the fundamentals of the course taught? (PO1)				
6.	To what level you think this course has enhanced your analytical abilities? (PO2)				
7.	To what extent this course has enriched your ability to design integrated solutions of complex engineering problems considering safety, societal, and environmental issues etc? (PO3)				
8.	To what extent this course has enriched your ability to conduct investigations, draw conclusion and present them for complex problems? (PO4)				
9.	How this course delivery has enriched your ability to use modern tools and practices for complex engineering activities? (PO5)				
10.	How this course delivery has enriched your ability to apply basic engineering reasoning to analyze societal issues like health, safety, legal and cultural and suggest a solution? (PO6)				
11.	How this course delivery has enriched your ability to analyze impact of suggested engineering solutions in societal and environmental contexts for sustainable development? (PO7)				
12.	How this course delivery has enriched your sensibility to apply professional ethics and norms.(PO8)				
13.	After this course delivery have you learned to work as a leader or member in a team? (PO 9)				
14.	To what extent this course has enriched your ability to communicate about, comprehend and write effective reports? (PO10)				
15.	To what extent this course has enriched your ability to				

	manage engineering projects in multidisciplinary environments as a leader or member in a team? (PO11)				
16.	To what extent this course motivates you towards life-long learning to cope up with technological changes? (PO12)				

.**Feedback Analysis Process:**

Report of the feedback related to course, program and teaching- learning and facilities is prepared according to different metrics. The feedback is shared with the authorities like student feedback, parents, alumni and exit survey report is shared by the MENTORSs with the Hods while the employer's feedback report is shared to the principal. Apart from these, informal feedbacks are also taken directly by the heads and Principal from time to time during the ongoing semester. A special emphasis is paid on transparency and impact of the feedback system.

Various parameters that are used for collecting the feedback data is as given below.

- Coverage of syllabus
- Lectures are interesting and informative
- Promptness in Evaluation of Tests, Assignments and Quizzes
- Punctuality of the faculty
- Recap of last lecture, assignments, quizzes, projects, discussion, case studies etc.
- Faculty takes initiative to answer the questions/queries asked by students
- Teacher encourages students to think independently
- Teacher gives real time examples and uses videos, visual labs or other ICT tools
- Teacher is approachable to students for Academic/ personal advice
- Teacher is enthusiastic about teaching
- Teacher provides course and lecture outline at the semester beginning
- Teacher suggests web-links related to the topics taught
- Teacher takes revision classes to ensure learning
- The course materials are helpful in learning the course
- Other facilities

B. Record of Rewards/Corrective Measures

The concerned faculty or team makes the report of the feedback. The feedback report is shared with the department Head. Department Head share report with the individual faculty member, Principal, IQAC and Chairperson as per requirement.

Based on the reports the faculty members are informed about their performance. The faculty members who perform well are appreciated and awarded along with the monitory benefit of increment/ certificates of appreciations in recognition of their commendable efforts for:

- Quality lecture notes, instructional material etc.
- Innovations in teaching and learning methods
- Mentoring work done by faculty
- Work done in academics, research and patenting
- Result of the faculty
- Other contribution in the department or other co-curricular activities

Necessary corrective actions are taken for the faculty members who perform not well as per the department/ college standards, as given below:

- As per feedback, Head of the department advise the faculty about handling and monitoring the class
- Improvement required in teaching and learning method of some faculties, HoD counsels the concerned faculties.
- Improvement required in facilities as feedback given by students, parents, aluminize and employers. Appropriate corrective actions taken according to feedback.
- Improvement required in academic performance of the weak/slow learner students. Corrective actions were taken for the improvement of academic performance of students.
- Encouraging faculty members to attend more Faculty Development Programs, Conference, Seminars etc.
- In extreme cases, where the faculty member is unable to improve up to the minimum desired standard, action is taken accordingly.
- The feedback is considered part of Annual Performance Appraisal of the faculty member.
- Faculty members will be rewarded by motivating them in weekly meetings or issuing Certificate of Appreciation for each course.

9.3 Feedback on Facilities (5)

Institute takes feedback on facilities from the students, parents, alumni and passing out students in the feedback forms. Apart from these department use departmental complaint registers also to be filled by the students, faculties etc. for the feedback. These facilities include library, training & placement, transportation, hostel, laboratories, medical facility and other general facilities etc. on Excellent, Good, Average basis. The evaluation process on facility feedback shall also be automated, then the corrective actions are taken by institute for the improvement.

1. Facility feedback taken through feedback form in online/offline mode from all the stake holders such as the employers, alumni, parents and students which the Program Objectives have been achieved.
2. Feedback on facility taken through departmental complaint registers by the students, faculties, parents and aluminise.

Table: 9.2 List of facilities at departmental/institute level for support of the students

S.No	Facility	Remarks
1.	Mentors facility	Mentor has been allotted to a group of students.
2.	Support provided to students from SC/ST, OBC and economically weaker sections	Help to acquire scholarship from central and/ or state government of India.
3.	Students with physical disabilities	Provide facility of the wheel chair, college van, ramp and hand bar in toilet etc.
4.	Students to participate in various competitions at National/International level	Relaxation in the attendance given those students which are participating in the different competitions.
5.	Medical assistance to students	● Facility of Medical room, Nurse Facility, doctor visits as per need. ● Availability of Ambulance in the campus and Tie-up with hospital (Sharda Hospital, Kotra, Bhopal)
6.	Organizing additional classes for professional improvement of students	● The additional classes are regularly conducted by Training & Placement Cell for the campus Placement. ● Study material providing towards students, whenever is required.
7.	Support for “slow learners”	● Remedial classes for slow learners. ● Mentoring facility is providing.
8.	Support for “Bright learners”	● To organised expert lectures. ● To provide study material.

		• To organised trainings, seminars and industrial visits.
9.	Skill development (spoken English, computer literacy, etc.,)	• Spoken English classes offered to the students for improvement in the communication skill. • For improvement of technical skill, offering the various online courses such as NPTEL, SWAYAM, IIT Bombay remote centre and value-added courses such as embedded system, MATLAB, PLC & SCADA, etc.
10.	Exposure of students to other institution for higher learning and internship	• Industrial training provided to the sixth semester students. • Interaction with the corporate world by interaction with guest lecturers from reputed institutions and industries. • Different training programs organised in the various reputed institutions.
11.	Anti-Ragging Committee	The committee is constituted to handle to ensure a ragging free environment in and outside the campus and address ragging related issues if any. It performs following roles and responsibilities: • To create the awareness about Anti Ragging act and punishments among the students and the appropriate law in force. • To create the awareness about Ragging constitutes (AICTE/UGC Regulation as per the directive of the Supreme Court Ragging CLAUSE 3). • To prohibit, prevent and eliminate the source of ragging including any conduct by any student or students whether by words spoken or written or by an act which has the effect of teasing, treating or handling with rudeness a fresher or any other student. • To prohibit undisciplined activities by any student or students this causes or is likely to cause hardship or psychological harm or to raise fear in any fresher.
12.	Library Facility	Central and Departmental libraries provides on line and offline access to a large number of full text journals, books, databases from various publishers and e-journals.
13.	Transportation Facility	The Institute self reliance in providing transport facility to the students. IES Provides bus transportation for major locations of town and campus. We have made arrangements for College buses for students as well as staff. This makes

		them free from mental tension of driving or taking public transport system, to come to the college and go back, so that they can fully concentrate on their studies.
14.	Mess and Canteen Facility	Canteen is a place where everyone i.e. students, teachers and other staff members can relax in a comfortable atmosphere. The college canteen is much more than merely an eating place. There is an attractive well equipped canteen on the South-eastern corner of the campus. The canteen provides healthy, tasty eatables fruit juices, hot and cold beverages to the students and faculties at subsidised rates.
15.	Hostel Facility	The institute believes that hostels help to develop group dynamics amongst student and widen their socio-cultural horizon as well. Keeping this in mind, we have made provision for excellent hostel facilities for students. The institution provides excellent play fields, gymnasium and cultural hall for extracurricular activities for the development of the student's personality. 1. In-House Pantry/Dining Halls. 2. Supervised with residential warden. 3. Recreational and Entertainment facilities. 4. Medical Aid. 5. Round the clock security.
16.	Green Campus	To aid institute in terms of sustainability, to give clean and Green Campus, various activities are conducted with an inclusive strategy to contribute towards betterment of society by aligning itself with National initiatives like Swachh Bharat, Solar Plant, and Plantation of trees, Waste management, water conservation, resource efficiency, and Green belt development.
17.	Wi-Fi Campus	Apart from computer laboratory with internet facility, the Wi-Fi for providing continuous and uninterrupted internet connectivity to students and faculty members is available in the campus.
18.	Open Auditorium and Conference Room	1. Institute provides Auditorium hall of 400 seating capacity & an open air theatre for the departmental activities. 2. The conference/Seminar hall is available for organising expert lectures & other programmes. 3. A well furnished fully Air-conditioned meeting room with equipped available for conducting of mock test, GD, industrial instruction and other T&P activities for students.

19.	NPTEL Local Chapter and IIT Bombay remote centre (RC ID 1200)	1. The NPTEL local chapter is available to help the engineering and core science courses. Additional web and video courses are created in all major branches of engineering/physical sciences at the undergraduate and posMentorsraduate levels and management courses at the posMentorsraduate level. 2. IIT Bombay remote centre offer workshops which are delivered by IIT faculty members. Video streamed workshops are well complimented by practical open discussion hands-on-sessions (both Tutorials and Labs) for students and faculties.
20.	Women's Grievance Cell	It helps women to gain control over their own lives and gives the ability to make strategic choices of life. This cell is constituted to create a harmonious environment and enable women to discharge their responsibilities at workplace with dignity. The functioning of following cell is given below: 1. Create social awareness about gender discrimination. 2. Motivate and improve confidence level amongst women staff members 3. Organize workshops and seminars for women development. 4. To promote personality development, leadership quality and role of women in the society.
21.	Research and development cell	Institute has promoted meaningful research and development activities; it is acting as the nodal centre for all research related activities.
22.	Entrepreneurship cell (EC)	The responsibility of EC is to encourage, inspire and nurture young students by supporting them to work with new ideas and innovation while they are in formative years. This cell is also highlight innovative projects carried out by institution's faculty and students.
23.	Housekeeping & maintenance	Housekeeping managers and staffs are there for housekeeping and maintenance
24.	Drinking water facilities & their maintenance	Proper drinking facilities are provided in the department

Fig. 9.4 Central Library

Smt. Anandiben Patel, Hon'ble Governor of M.P., Chief Guest, inaugurated 100 KW Solar Power Plant, the event witnessed in the presence of Shri Deepak Joshi, Hon'ble Minister of State for Technical Education & Skills Development (Independent charge) and School Education, Prof. (Dr.) Sunil Kumar Gupta, Hon'ble Vice Chancellor, RGPV, Bhopal with Er. B.S. Yadav, Group Chairman @ IES Group of Institutions on 5th April, 2018.

Fig. 9.5 Solar Plant Inauguration on 05-04-2018

A. Feedback collection, analysis and corrective actions

Table 9.3: Feedback collection, analysis and corrective actions

S.No.	facilities	Feedback parameters	Evaluation Process	Correction Action Taken
1	Hostel	**1.** Entry in the register **2.** Discussion with warden **3.** Written application	Evaluation by students. 1-Unsatisfactory 2- satisfactory 3- Excellent	1. Entry/Exit Timing are fixed but on demand as per permission is provided. 2. Maintenance Entry in register and corrective action will take. 3. Medical facility is provided.
2	Lab Maintenance	1. Lab records 2. safety guidelines and instructions 3. sign the manual /rough record 4. Cleaning and repairing of equipments	Evaluation by faculty and students. 1-Unsatisfactory 2- satisfactory 3- Excellent	1. Visited by the team of Scientech Technologies for maintenance. 2. It is checked before being put back to use. 3. Proper cleaning of equipments has been done two times in a week.

3	Transportation	1. Written application 2. Meeting with Bus In charge. 3. Committee for monitoring discipline and ragging in buses	Evaluation by faculty and students. 1-Unsatisfactory 2- satisfactory 3- Excellent	1. Recorded with bus in charge and appropriate action is Taken. 2. Collect the report from committee and corrective actions is taken.
4	Library	1. Time Management 2. Manage Entry register 3. Departmental feedback	Evaluation by departmental faculty and students. 1-Unsatisfactory 2- satisfactory 3- Excellent	1. Appropriate action taken by Library in-charge. 2. Schedule of library is incorporated with departmental time table.
5	Sports	1.Assigned co-ordinators 2. Requirements of kits 3. Sports incharge	Evaluation by students and management. 1-Unsatisfactory 2- satisfactory 3- Excellent	1. Sports incharge takes appropriation decision 2.Repairing and replacements of kits
6	Medical assistance	1. Maintain files 2. Appoint CAO 3. Tie-up with hospital	Evaluation by management. 1-Unsatisfactory 2- Satisfactory 3- Excellent	1. Medical OPD First aid Box 2. CAO is responsible
7	Mess and Canteen	1.Quality of food 2. Discipline 3. Cleaning and maintenance	Evaluation by students and faculty. 1-Unsatisfactory 2- Satisfactory 3- Excellent	1. Food quality checked by faculty and management 2. Monitoring of students 3. Feedback on maintenance and cleaning
8	Security Service	1. Meetings 2. Monitoring and controlling	Evaluation by management. 1-Unsatisfactory 2- Satisfactory 3- Excellent	Correct identified security deficiencies and action taken.

9.4 Self Learning (5)

Self-learning is encouraged in the department by implementing self-learning facilities and environments for students. Students are encouraged for self-learning by personal counselling and mentoring.

The following methods are used for self learning:

- Web based learning (teaching-learning course online NPTEL, SWAYAM, Webinars etc.)
- Central Library, Departmental library and Digital Library
- Learning through projects, internships, summer trainings etc.
- Assignments
- Professional bodies
- Club activities (cultural, sports, tech-fest etc. clubs)
- Virtual labs
- e-books and journals
- Open access software's
- Special assembly

Table 9.4: Following are the various modes of self-learning and facilities created in the department.

S.No	Self Learning Sources	Tools / Support
1	e-Books & digital books	Central and departmental Library, Internet
2	Books, magazines, journals, newspaper clippings	Central and departmental Library
3	Online Courses	NPTEL/ SWAYAM etc./uploaded lectures material 1. Swayam- https://swayam.gov.in/ 2. NPTEL- List of Websites which offers online certification courses. https://onlinecourses.nptel.ac.in/
4	Lectures, instructional materials by faculties	Online through links on websites, Google classrooms
5	Activities though professional bodies	Students are encouraged to become members of professional bodies like ISTE, IEEE, CSI etc. for the career enhancement and self learning.
6	Club Activities	Various students club activities are organized to enhance team work and inter-personal skills like sports, cultural, literary, tech-fest etc.
7	Assignments	It enables students to go through the topics in a more elaborate manner in order to explore the academic topic and enhances higher order thinking.
8	Internship, summer trainings, webinar and projects	Internships, summer trainings Project Based Learning offered to the students to enhance the real-time knowledge and exposure of the students.

1. Internship, summer trainings, webinar and projects

Webinars are designed as a flexible framework within which talent, innovation and growth would be nurtured rather than constrained by a rigid one-size-fits-all solution. Opportunities are provided to keep promising engineering interns on track academically, such as

"curriculum adjustment" which increases their general employability upon graduation. To ensure a successful internship experience, a small team supports its multiple aspects. This provides checks, balances, and a rich complex of relevant experiences to benefit the intern.

2. NPTEL materials

National Programme on Technology Enhanced Learning (NPTEL) is created to provide quality education at campus to anyone interested in learning from the IITs. Students are encouraged to register for various NPTEL courses and clear exams. In the month of every January and July, courses are offered online, free of cost for the students and faculties.

3. Virtual Labs are intended to augment the learning of subjects and labs through performing experiments virtually. Virtual labs are included in various courses in the department for better understanding of topics.

4. Open source software is software in which the source code used to create the program is freely available for the students to view, edit, and redistribute. They are easily accessible in labs for the students.

Table 9.5: Students completed NPTEL Certification

S.No	Students Name	Course Name
01	Salman Khan	Control Engineering
02	Ashutosh Prashant	Basic Electric circuits
03	Avinash Patel	Basic Electric circuits
04	Kishan Kumar	Control Engineering

B. Institutional level facilities for improvement of learning skills of the students

1. **Newspaper of regional languages:** The newspaper clippings are provided to the students for improving communication skill and general awareness.

2. 'Book bank' in library: Apart from central library department has its own library. Institute provide Book Bank facility for the students, which is very helpful in fulfilling student requirements for prescribed books on semester basis. Book Bank functions as one section of the library.

Distribution of books magazines**:**

- Book bank facilities are available for students
- E-book facility is also available in the departmental library.

- Technical magazines are also available in the library.

3**. E-notes for all subjects**: e-notes are provided regularly by faculties to supplement teaching-learning process.

4. **Access to Journals**: Students can also access the online free journals and get beneficial for publication of research papers and projects. They can access the IEEE digital library in the departmental computer Lab.

9.5 Carrier Guidance, Training and Placement (10)

Institute has Placement & Training Cell for career counselling and higher learning in Engineering & Technology fields. It has been set up for conducting value added training programs and enhances employability of students. The cell has been set up in the institute to give training and guidance to students on career related matters and assist them in exploring new opportunities. The student's abilities are evaluated individually and are advised the way forward accordingly. The cell organises training sessions that prepares the students to compete with the challenges in the industry. Career counselling programs are undertaken periodically by the placement cell to guide the students. Interactive sessions by the eminent persons with rich industry experience in respective fields are conducted regularly.

A. Availability of career guidance facilities

1. Prepare the students for placement and organize pre-placement training for them as well as guide for higher education.
2. Organize seminar for students to provide information about Career/Education related opportunities (current trends of industries, emerging areas, scholarship for higher studies India or abroad).
3. Help in building the self confidence of students and develop aptitude solving ability.
4. Help to the students in career selection.
5. The placement coordinator of each department prepares files of each students and review on regular basis, if it is required (especially weak students) meet with them individually to provide guidance and encourage for better career.
6. Conduct motivational address time to time for students and faculty those who are involved with students for the purpose of guiding.
7. Takes up Psychometric tests of students and on the basis of their results guide them for corrective measure.
8. The necessary infrastructure provided is given below:

Table 9.6: Infrastructure facilities

S.No	Facilities
1	Training and placement cell office
2	Auditorium
3	Seminar hall
4	Rooms for Group discussions
5	Interview rooms
6	Computer labs for online tests

Table 9.7: Events for Career Guidance of students:

S.no	Date	Name of Activity	Event detail/speaker	No. of students	Mapping
1	3rd July 2020	Scenario of Education Sector in Post Covid Era - Challenges and Opportunities	Mr. Ashish Gakrey (Founder, HR Shapers)	75	PO8,PO10,PO11,PO12,PSO1,PSO2,PSO3
2	8th July2020	"Emerging Trends in Automotive Industry - Digital Age"	Dr. Omkar Rai, DG STPI new Delhi	80	PO8,PO7, PO6, PSO1,PSO2,PSO3
3	08/11/ 2020	Organization Readiness to Reskills and Upskills Campus Talent	Shri Pranab Jyoti Chetia, Director, HR, Asia Pacific Region, Volvo Group Trucks Operations, Service Market Logistics	82	PO8, PO11,PO12,PSO1,PSO2,PSO3
4	7th Nov 2020	Preparation For Service Selection Board Interview And Tips	Mr. Ashish Gakrey, Founder, HR Shapers	76	PO8, PO7, PO6,
5	23/01/2021	Effective ways of writing Research Articles Live National Webinar	Dr. Mukta Martolia Assistant Professor School of Media, Film & Entertainment Sharda University	80	PO8, PO10,PO12,PSO1,PSO2
6	23/1/2021 (1 Day)	Virtual Visit of fablab AIC RNTU Bhopal	Dr. Deepak Motwani DGM-Corporate relations & enterpreneurship, Vice president	75	PO1,PO2, PO7,PO8,

			IIC RNTU		PO11,PO12
7	31/05/2020	Career Opportunities and Challenges in hiring post Covid Era	Ms. Anuradha Singh Head-HR & Admin NICHROME, Pune	75	P08,PSO1, PSO,PSO3
8	17/06/2020	Global Business and Career Opportunities for Students Arising Post COVID-19	Dr. Malay Nayak (Fellow Royal Society of Art UK)	80	PO1,PO2, PO7,PO8, PO11,PO12
9	20/06/2020	Job Opportunities in Post COVID-19 Scenario and Challenges thereafter	Mr. Venka Reddy (Global HR Partner Infosys Ltd.)	80	PO1,PO2, PO10,PO12
10	11-02-2019	Monday Special Assembly	Youth Parliament	52	PO7, PO11
11	18-02-2019	Monday Special Assembly	Incredible India	46	PO12
12	25-02-2019	Monday Special Assembly	Surgical Strike	43	PO6, PO11
13	12-03-2018	Special Assembly	About mobile addiction, Student-speak	45	PO7, PO12
14	04-05-2019	Motivational Program	Mr. Rajeev Agrawal	65	PO7, PO12
15	16-02-2019	Expert Lecture on Start-ups	Prof. Thillai Ranjan, IIT Madras	78	PO7, PO12
16	21-04 to 22-04-2018	Bhopal Smart City Hackathon	NA	34	PO1, PO5, PO7
17	27-02-2018	BMA Student Chapter	Shree Pradeep Karambelkar, MD, Vision Advisory Services Pvt. Ltd, Bhopal	40	PO6, PO7, PO12
18	10-01-2018	Open Invitation Motivational	Mr. Tanmay Bakshi, E-cell, RGPV, Bhopal	35	PO1, PO6

B. Counselling for the higher studies

The training and placement cell also does counselling of the students for the professional goals, selection of career and higher education. It also provides study material for preparation of GATE, GMAT, CAT, GRE etc if required. The cell motivates and guides the students for the higher

studies as per their area of interest, and also arranges the in house training classes on aptitude, general knowledge, technical subjects and others. The cell organises interactions to various Gate/ GRE/ GMAT etc. ranked holders through Expert lectures for the students. It also organise coaching classes in the institute for various competitive exams like GATE, CAT etc.

C. Pre-placement Training: Training and placement cell organises in-house training classes, conduct various contest and interactive sessions on pre-placement training from outside trainers. The cell conducts the training classes on communication skill, aptitude and reasoning, technical subjects, programming languages and others. It include following activities:

Table 9.8: Activity list of T&P Cell

Activity list of T&P Cell 2020-2021							
S.no	**Date**	**Name of Activity**	**Resource Person**	**Company/Designation**	**Year**	**Duration**	**Mapping**
1	8/07/20	"Emerging Trends in Automotive Industry - Digital Age"	DG STPI new Delhi	Dr. Omkar Rai,	2020	1	PO1,PO2, PO5,PSO1 ,PSO2,PS O3
2	7/11/2020	Preparation For Service Selection Board Interview And Tips	Shri Krishna Agnihotri	Shri Krishna Agnihotri, Senior HR Manager, TCS, UK	2020	1	PO5,PO12
3	8/11/2020	Organization Readiness to Re-skills and Up-skills Campus Talent	Shri Pranab Jyoti Chetia	Director, HR, Asia Pacific Region, Volvo Group Trucks Operations, Service Market Logistics	2020	1	PO10, PO12, ,PSO1,PS O2,PSO3
4	23/01/2021	Effective ways of writing Research Articles Live National Webinar	Dr. Mukta Martolia	Assistant Professor School of Media, Film & Entertainment Sharda University	2021	1	PO5,PO10

5	03/07/2020	"Scenario of Education Sector in Post Covid Era - Challenges and Opportunities "	Shri Krishna Agnihotri Shri Pranab Jyoti Chetia,	Senior HR Manager, TCS, UK Director, HR, Asia Pacific Region, Volvo Group Trucks Operations, Service Market Logistics	2020	1 Day	PO2, PO6, PO11, PO12
6	30/05/2021	Live National Workshop Prototype Validation: Converting Prototype Into a Start Up	Prof. Kiran Talele	Assistant Professor Sardar Patel Institute of Technology, Mumbai	2021	1 Day	PO1, PO2, PO7, PO12

Activity list of T&P Cell 2019-2020							
S.no	**Date**	**Name of Activity**	**Resource Person**	**Company/Designation**	**Year**	**Duration**	**Mapping**
01	22-07 to 29-07-2019	AWS Training	Mr. Ajeet Pal	NA	2019	8 Days	PO1, PO2, P03, PO10, PO12
02	01-10-2019	Apache Pig and Hive	Dr. Akhtar Rasool	Assistant Professor, MANIT Bhopal	2019	1 Day	PO1, PO2, PO3, PO11
03	15-01-2020	KPIT SPARKLE-2020	NA	IIT Bombay	2020	NA	PO1, PO2, PO7, PO12
04	21-01 to 22-01-2020	Industry 4.0 future skills	Mr. Rajeev Kumar, Member secretary, AICTE India	TEQIP-3 RGPV	2020	2 Day	PO2, PO6, PO11, PO12
Activity list of T&P Cell 2018-2019							

S. N	Date	Name of Activity	Resource Person	Company/Designation	Year	Duration	Mapping
01	15-12-2018	ATOS -IT Challenge	NA	ATOS- IT	2018	1 Day	PO1, PO2, PO9
02	21-12-2018 to 03-01-2019	C Language training	Mr. Ajeet Pal	Ind Eyes Infotech Pvt. Ltd.	2019	13 Days	PO2, PO4, PO7, PO12
03	30-03-2019	TCS-Enginx: Digital Eminence: Making things smart	NA	NA	2019	1 Day	PO2, PO3, PO10
04	01-04 to 02-04-2019	Infosys Tech fest	NA	NA	2019	2 Days	PO1, PO2, PO10, PO12

Activity list of T&P Cell 2017-2018

S.N	Date	Name of Activity	Resource Person	Designation	Company/Designation	Remarks	Mapping
1	03-10 to 04-10-2017	Capgemini Tech-Challenge	NA	Manager, Capgemini	Capgemini	2 Days	PO1, PO7, PO9
2	03-10 to 06-10-2017	Accenture Innovation Challenge	NA	Manager, Accenture	Accenture	4 Days	PO1, PO2, PO7
3	23-01 to 18-02-2018	College to Corporate Program	Dr. Deepak B. Phatak	Professor, IIT Bombay	IIT Bombay	27 Days	PO3, PO5, PO7
4	12-01-2018	Capgemini Tech-Challenge	NA	Manager, Capgemini	Capgemini	1 Day	PO2, PO6, PO12
5	30-08-2017	KPIT Sparkle	NA	NA	KPIT Technologies	1 Day	PO2, PO7, PO12

Table 9.9 Achievements:

National Level Competition						
COMPANY NAME	CONTEST NAME	VENUE	PARTICIPANTS DETAILS	BRANCH/BATCH	PROJECT NAME	RESULT
MPCST	Vigyan Mela	Bhopal	Amit Kumar Abhishek Kumar Anurag Kumar Brijesh Kumar	EX-2019	Vehicle monitoring System	Winner

D. Placement Process and support

The training and placement cell is established, it is responsible for campus placement (including off campus). This cell provides various training of students which can improve technical, aptitude, communication, and personality development skills. It also provides the infra-structural facility to conduct group discussion, mock test, online/offline tests, and interviews besides catering to other logistics.

1. The institute interacts with beneficiaries through Career guidance cell, Academic council and Industry- Institute Partnership Cell.
2. The Training and Placement Cell maintains professional relations with the representatives of industry.
3. It assists development of graduates with balanced set of communication, technical and interpersonal skills with positive attitude towards life.
4. HR managers of various companies are invited to the college campus to interact with the students.
5. Institute also has various student Clubs which are a group of students with a similar interest/talents for a technical innovation, social, literary, or other common purpose. Students have the opportunity to choose join these groups for: pursuit of individual interests, career networking opportunities, leadership skills development and social networking.
6. The cells invites companies for campus interviews and provides them necessary facilities for conducting written test, Group discussion, Technical and HR interview etc. as well as arrange industrial visit and training for final year and pre-final year students.

9.6 Entrepreneurship Cell (5)

This cell is launched with a view to encourage students to consider self employment as a career option, provide training in Entrepreneurship through modular courses and increase the relevance of Management particularly in the non-corporate and under managed sectors.

A. Entrepreneurship initiatives

Institute has a cell which improves entrepreneurship development skills in the students by doing activities as seminar, workshops and awareness camps.

The entrepreneurship cell has following roles & responsibilities:

- To nurture the student ideas and to develop innovative products.
- To support the student projects with funding.
- To establish & maintain incubation centre.
- To create entrepreneurs echo system for students.
- To maintain data relevant to entrepreneurship program.

The ED cell include the training modules are developed to describe employer requirements, behaviour and environment of different industries. This module covers the following skills:

1. Leadership Skills
2. Business Development skills
3. Marketing skills
4. Managerial skills
5. Communication /Soft skills
6. Team- building skills.

Table 9.10 A. : Events organized under Entrepreneurship Development Cell

S. No.	Day/Date	Programme	Resource person/ Sponsored by	Mapping
01	1 Day (08-01-2021)	Expert talk on "Entrepreneurship Activity Fund Supports Available for Incubates".	Shri Kishor Kumar Tolani Financial Literacy Counsellor, Bank of India, Bhopal	PO1, PO6, PO12
02	1 Day (15-02-2021)	Students Dilemma: Employment or Entrepreneurship? Live National Webinar	Institute Innovation Cell	PO1, PO6, PO12
03	1 Day 20/01/2021	Live National Expert talk on: "Things should know by innovators about IP".	Mr. Parag M More, IPR Consultant and advisor	PO1,PO2,PO8,PO11,PO12
04	09.08.2020 (1 Day)	Intellectual Property Right	Dr. Ajay Thakur, Assisstant Controller Patents and Designs, Mumbai ,Ms. B. Ritika Reddy, IPR Attorney, Legal Issues and Act, Chennai	PO1,PO2, PO12, PSO2,PSO3
05	25/06/2020 (1 Day)	Start up and Entrepreneurial Opportunities Post COVID	Mr. Praveen Kamath K.	PO1,PO2,PO3,PO6,PO7, PO12,PSO1, PSO2,PSO3
06	3 Days (02-03 to 04-03-2020)	EAC Program on Innovative Business Model	NSTEDB	PO1, PO6, PO12
07	3 Days (29-01 to 31-01-2020)	EAC Program	DST-NIMAT	PO6, PO7, PO12
08	2 Weeks (18-11 to 30-11-2019)	FDP on Entrepreneurship Program	NSTEDB	PO1, PO6, PO8, PO12

09	3 Days (11-03 to 13-03-2019)	Entrepreneurship Awareness Camp	NSTEDB, DST GOI	PO6, PO7, PO9, PO11
10	1 Day (16-02-2019)	Session on Entrepreneurship and startups	By Thillai Rajan, IIT Madras	PO1, PO8, PO12
11	3 Days (27-09 to 29-09-2018)	EAC Program	NSTEDB	PO6, PO12
12	3 Days (13-03 to 15-03-2018)	EAC Program	NSTEDB	PO7, PO11
13	3 Days (26-01 to 28-01-2018)	E-summit IIT Bombay	e-Cell IIT Bombay	PO8, PO 12
14	3 Days (11-01 to 13-01-2018)	EAC Program	NSTEDB	PO1, PO6, PO8, PO12
15	1 Day (20-06-2017)	National convention on Entrepreneurship	Bhopal smart city corporation	PO1, PO5, PO7, PO9

Fig.9.6 Entrepreneurship Development Cell activities

B. Data on students benefitted

Table 9.10 B Star-Up Details

S.No.	Name of Student	Branch	Start up Project
01	Mr. Ambuj Tiwari	EX	Ms/Khushbu Travels pvt.ltd
02	Mr. Manish Kumar	EX	MS/ Jai Mata Di enterprises (www.jiamatadienterprises.com)

9.7 Co-Curricular and Extra-Curricular Activities (10)

Institute has always been playing a leading role in co-curricular and extra-curricular activities in multiple directions, such as social services including rural development and up-liftment, extension of literacy and issues related to national and international importance, games and sports, blood donations, promotion of cultural activities, arts and science, welfare and promotional activities related to different classes of society.

A. Availability of sports and cultural facilities

Extracurricular activities form a vital part of experience in institute, creating unique opportunities for students. They get plenty of platforms for representing the college and to develop sporting skills. As an integral part of the curriculum there is a balanced Scheme of Physical Education which teaches skills, develops overall fitness and complements the games programme. College aims to help students to understand benefits and enjoy regular Yoga, Kho-kho, and exercise to get confidence in team and individual sport. The playing fields for basketball, football, cricket or athletics are used according to the season.

Fig.9.7 Outdoor sports

Sports Facility:

To ensure Physical fitness of students sports facilities have been created within the campus which comprises of indoor and outdoor games as detailed below in tabular form, as an integral part of the curriculum there is a balanced Scheme of Physical Education that teaches skills, develops overall fitness and complements the games programme. College aims to help students to understand the benefits and enjoyment of regular exercise and feel confident in team and individual sport.

Every year the RGPV University nominates our Institute as a nodal centre for various games like.

- Cricket
- Basket Ball
- Volley Ball

IES 22nd Inter-press Cricket Tournament- 2018
Hon'ble Shri Shivraj Singh Chouhan, Chief Minister, M.P. with Er. B.S. Yadav, Chairman,IES Group of Institutions & IES students during Opening Ceremony @ Old Campian Ground on 3rd Jan. 2018.

Fig.9.8 Inter press cricket tournament

Fig.9.9 Indoor sports

Indoor sports: Students can choose from Table tennis, Carom, chess, Badminton, etc. among indoor activities to engage themselves to remain physically and mentally fit.

Table 9.11: Sports Facilities

S. No.	Category	Game	Dimension
01	Outdoor	Cricket	As per Standard Games Norm
02		Volley Ball	
03		Basket Ball	
04		Kho-Kho	
05		Kabaddi	
06		Foot Ball	
07		Athlatics	
08		Hand-Ball	
09		Hockey	
10	Indoor	Table tennis	
11		Badminton	
12		Chess	
13		Carom	
14		Judo	
15		Gymnasium	

Table 9.12: Students participation in sports

S.No.	Name of Students	Tournament	Level Played	Year	Result/Participation
1.	Sunil Kumar Parida	Football	Nodal	2017-18	Participated
2.	Ankush Kumar	Football	Nodal	2017-18	Participated
3.	Munna Kumar Kushwaha	Kabbadi	Nodal	2017-18	Participated
4.	Priya Patel	Netball	State Level	2017-18	Participated
5.	Buland Akhtar	Swimming	State Level	2017-18	Participated

Table 9.13 Participation in Inter-Institute technical events by Students

S.No.	Name of Students	Event	Date	Organized by	Event outcomes
1	Amit Kumar Abhishek Kumar Anurag Kumar Brajesh Kumar	Vigyan Mela	Feb 2019	(Vigyan Bharti MPCST)	Certificate
2	Manish Thapa	KPIT Sparkle	March 2019	KPIT, Pune	Certificate
3	Jitendra Ahirwar	3 Days STTP on Cyber Security & Ethical Hacking	30 Jan 2019 - 01 Feb 2020	UIT- RGPV TEQIP - III	Certificate
4	Keshav Ahirwar				
5	Lalit				
6	Ashish Raj				
7	Md Attaullah				
8	Abhishek Kumar	Workshop on Wireless Communication	15-09-2019	Indeyes Infotech Pvt. Ltd	Certificate
9	Charitra Prakash				
10	Ashish Raj				
11	Manish Kumar Thapa				
12	Lalit				
13	Jitendra Ahirwar				
14	Raj Kumar Singh	Industrial Training on	15-01- 2019 to 03-02-2019	WebTek Lab Pvt. Ltd.	Certificate
15	Ram Prakash				

16	Prem Prakash Mourya	Amazon Web Services Training			
17	Md Attaullah				
18	Jitendra Ahirwar	Workshop on Matlab	May 2019	Indeyes Infotech Pvt. Ltd	Certificate
19	Keshav Ahirwar				
20	Lalit				
21	Abhishek Kumar				
22	Md. Ayaz akhtar				
23	Manish Kumar Thapa				
24	Md Attaullah				
25	Priya Patel				
26	Shashi Alpana				
27	Aishwary Masih				
28	Ayushi Pareriya				
29	Raj Kumar Singh				
30	Rahul Kumar				

Table 14. Participation in Inter-Institute Sports Events by Students

S.No.	Name of Students	Tournament	Year	Organized By	Result
1.	Indrajeet Singh	Nodal RGPV Cricket Tournament	2015, 2016, 2017	Radharaman College (RGPV) Bhopal	Participated
2.	Suraj Kumar Hela	Nodal RGPV Football	2019	RGPV Bhopal	Participated
3.	Suraj Kumar Hela	Nodal RGPV Badminton	2019	RGPV Bhopal	First runner-up
4.	Buland Akhtar	Nodal RGPV Football	2018	ICOT/ RGPV Bhopal	Participated

5.	Buland Akhtar	Nodal RGPV Swimming	2019	Prakash Tarun Pushkar RGPV Bhopal	First Position
6.	Buland Akhtar	State RGPV Swimming	2019	RGPV Bhopal	Second Position
7.	Ankush Kumar	Nodal RGPV Football	2018	ICOT/ RGPV Bhopal	Participated
8.	Priya Patel	Nodal RGPV Netball	2019	ICOT/ RGPV Bhopal	Participated
9.	Munna Kumar Kushwaha	Nodal RGPV Kabaddi	2019	RGPV Bhopal	Participated

Cultural:

College has been organising large number of cultural activities throughout the year to provide a platform to the college students to exhibit their talents.

Udaan 2K18 @ IES Campus on7th April 2018

IES Mega Decade Celebration 2K17

Felicitating IES Students for Outstanding Achievements in Academics, National level Technical Contests, Sports, Cultural & many more @ IES Campus on 21st April 2017

Inforia 2K18

Students were felicitated for spectacular musical act performance of Inforia 2018 @ IES Campus on 28th – 29th March 2018

IES Mega Decade Celebration 2K17

Open Band Stage Program @ IES Campus on 21st April 2K17

B. NCC, NSS and other clubs

NCC/NSS Committee basically focus on extra-curricular activities and holistic personality development of students & also include rural outreach programs.

Roles & Responsibilities:

- Develop a sense of social and civic responsibility amongst students.
- Utilize student's knowledge in finding practical solution to individual and community problems.
- Train students to acquire leadership qualities and democratic attitude.

- Develop community service attitude for handling emergencies and natural disasters.
- Develop character, comradeship, discipline, secular outlook, the spirit of adventure and ideals of selfless service amongst young citizens.

Following activities are organized with deep and active participation of the students.

1. National Cadet Corps Scheme (NCC)
2. National Service Scheme (NSS)
3. Corporate Social Responsibility (CSR)
4. Blood Donation
5. Village adoption for over all awareness development.
6. Tobacco free campus awareness program

Institute conducts Orientation Programmes through Program Officers and committee every year and through it new students register as volunteers and present message to others. NSS Coordinator and District level officer like the Collector and Commissioner are invited to grace the occasion. They provide information related to CSR activities and motivate them.

Table 9.15: The various NSS activities

S. No.	Particular of Event	Detail of Event
01	NSS	Students are motivated through personality development and encouraged to participate in activities for social and community service. In our institute NSS implements the issues in society such as tree-plantation, eradication of child labour and other issues in rural areas
02	Blood donation	The college is regularly organizing bloods donation camp under the patronage of RED CROSS in the campus in which large number of students donates blood voluntarily & play their part in lending helping hand to people in the region.
03	Village adoption for over- all awareness development.	A village, BERKHEDI, near the college has been adopted by the Institute; Support for the growth of villagers is being given by providing various facilities.
04	Tobacco free campus awareness program	Regular Programmes are organized on issues of National and International importance such as National Security, Cancer eradication, effect of smoking and relief from smoking and relief from chewing tobacco etc by explaining to students its harmful effect. Drug addiction eradication programs also organised.

Table 9.16: The various NCC activities include during assessment year

Detail of NCC activities (EXE Department)					
Sn	Activity	Details	Date	Person	No. of Students participated
1	NCC 'B' Certificate Examination 2017-18	NCC 'B' Certificate Examination at NCC Unit 1 MP CTR Bhopal	20,21 Feb 2018	Under Supervision of Col. O P Mishra (Commanding Officer) 1 MP CTR	3
2	NCC 'C' Certificate Examination 2017-18	NCC 'C' Certificate Examination at NCC Unit 1 MP CTR Bhopal	27,28 Feb 2018	Under Supervision of Col. O P Mishra (Commanding Officer) 1 MP CTR	3
3	International yoga day	10 Cadets of IES College Participated in Yoga Day program of Chief minister at Lal Parade ground	21-Jun-18	Akhilesh Dwivedi (NCC Caretaker), R S Dhumketi (PI Staff)	3
4	Combined Annual Training Camp	Combined Annual Training Camp is Compulsory activity of NCC. Each cadet attend at least 1 NCC Camp	10 - 19 June 2018	under 2 MP Air Squadren	2
5	Enrollment of NCC 2018 (Selection Process)	Enrollment of Students done once in year under the supervision of NCC Unit 1MP-CTR Bhopal (To maintain the enrolled strength 50)	14-Aug-18	Akhilesh Dwivedi (NCC Caretaker), Sub S D Pandey, JCO, Sub R P Chavan NCO	5
6	Swachhta Pakhwada	Under Swachhta Bharat Mission NCC Celebrated Swachhta Pakhwada 15 days Program in which daywise activities are scheduled like Cleanliness drive, Awareness Rally etc.	15 Sept -02 Oct 2018	Akhilesh Dwivedi (NCC Caretaker), Sarthak NGO representative.	1
7	NCC 'B' Certificate Examination 2018-19	NCC 'B' Certificate Examination at NCC Unit 1 MP CTR Bhopal	23-24 Feb 2019	Under Supervision of Col. O P Mishra (Commanding Officer) 1 MP CTR	4
8	NCC 'C' Certificate Examination 2018-19	NCC 'C' Certificate Examination at NCC Unit 1 MP CTR Bhopal	19-20 Feb 2019	Under Supervision of Col. O P Mishra (Commanding Officer) 1 MP CTR	1
9	Enrollment of NCC 2019 (Selection Process)	Enrollment of Students done once in year under the supervision of NCC Unit 1MP-CTR Bhopal (To maintain the enrolled strength 50)	12-Aug-19	Akshay Varkale (NCC Incharge) & PI Staff	1

10	No Plastic Awareness Campaign	Under Unnat Bharat Abhiyaan the NCC & NSS Volunteers team of IES College of Technology organized No Plastic Awareness Campaign at adopted village Berkhedi Vzyaft	16-Sep-19	Akhilesh Dwivedi (NCC Caretaker), Prof. R C Maheshwari	6
11	Combined Annual Training Camp	Combined Annual Training Camp is Compulsory activity of NCC. Each cadet attend at least 1 NCC Camp	14 - 23 Jan 2020	2 MP AIR SQN NCC Bhopal	1
12	Swachhta Pakhwada	Under Swachhta Bharat Mission NCC Celebrated Swachhta Pakhwada 15 days Program in which daywise activities are scheduled like Cleanliness drive, Awareness Rally etc.	15 Sept -02 Oct 2019	Akhilesh Dwivedi (NCC Caretaker), Sarthak NGO representative.	8
13	Combined Annual Training Camp at BIST Bhopal	Combined Annual Training Camp is Compulsory activity of NCC. Each cadet attend at least 1 NCC Camp	14 - 23 June 2019	Akhilesh Dwivedi (Associate NCC Officer) & 1MPCTR Bhopal (Col. N P Semalti, Commanding Officer)	1
14	Firing Practice	Firing by .22 Rifle at firing range Sukhi Sevaniya Bhopal	13-14 Dec 2019	Akhilesh Dwivedi (Associate NCC Officer) & NCC Unit - 1MPCTR Bhopal (Col. N P Semalti, Commanding Officer)	4
15	Combined Annual Training Camp at BIST Bhopal	Combined Annual Training Camp is Compulsory activity of NCC. Each cadet attend at least 1 NCC Camp	20 Dec to 29 Dec 2019	Akhilesh Dwivedi (Associate NCC Officer) & 1MPCTR Bhopal (Col. N P Semalti, Commanding Officer)	2
16	Army Attachement Camp	Attachement of NCC Cadets with regular Army (68 Engineers regiments, Bairagarh)	14-29 Jan. 2020	68 Engineers Regiment Bhopal	1
17	NCC 'B' Certificate Examination 2019-20	NCC 'B' Certificate Examination at NCC Unit 1 MP CTR Bhopal	18 - 19 Feb. 2020	Under Supervision of Col. N P semalti (Commanding Officer) 1 MP CTR	6

18	Online Inauguration Ceremony of National Constitution Day	Organized by Ministry of Defence & Youth and sports ministry at Directorate NCC (MP&CG) Chief Guest : Rajnath Singh (Defence Minister) & Guest of Honour : Kiran Rijiju (Youth & Sports Minister)	18-Nov-20	Akhilesh Dwivedi (Associate NCC Officer) & ADG NCC Directorate Bhopal (MP&CG)	1
19	Expert Lecture	Expert Lecture on National Constitution Day	26 November 2020	Justice Alok Verma Appellate Authority, AFRC Bhopal, Former Judge MP High court	35
20	CATC-XIII Camp at 1MP-CTR Bhopal	CATC-XIII Camp at 1MP-CTR Bhopal	08 Feb to 12 Feb 2021	CO & PI Staff of 1MP-CTR Bhopal	3
21	CATC-XX Camp at 1MP-CTR Bhopal	CATC-XX Camp at 1MP-CTR Bhopal	15 Feb to 17 Feb 2021	CO & PI Staff of 1MP-CTR Bhopal	1

Blood Donation Camp: IES College of Technology, Bhopal has been participating regularly in blood donation camps conducted by our group of Institutes.

Various Blood Donation activities include:

Table 9.17: Detail of Blood donation camp

S.No.	Date	Activity	Contribution	Mapping
1	06-02-2020	Blood Donation Camp by Ghandhi Medical College Bhopal	5 students are participated from EX Branch	PO6, PO7
2	01-10-2018	National Blood Donation Day Camp	36 Students of IES College of Technology Participated and donated blood	PO6, PO7, PO12
3	16-01-2015	Blood Donation	Students participated in blood donation organized by Dainik Bhaskar Group	PO6, PO9
4	28-02-2015	Donor Motivation & Recruitment for Voluntary Blood Donation	Our Faculty motivated students for Blood donation program	PO7, PO12

MODEL STATE OF ART BLOOD BANK

Gandhi Medical College & Hamidia Hospital, Bhopal

Tel.: 0755 - 4050148 Fax : 0755 - 2540051

No. 336 BB / HH / BPL / 2020 Dated 13/06/2020

Certificate of Appreciation

This is to certify that Ninety Four (94) Students and Staff of IES College of Technology Voluntarily Donated Blood at a Voluntary Blood Donation Camp held at IES Campus Ratibad, Bhopal on 06th February 2020.

We look forward to the continuous engagement and partnership in future as well with IES College of Technology, Bhopal in this noble cause.

Dr. U. M. Sharma
Blood Bank Officer I/C
GMC & Hamidia Hospital, Bhopal

To,
Prof. Sonu Lal
IES College of Technology
Bhopal

Fig.9.11 Blood donation camp at IES College of Technology Bhopal

Table 9.18: Sports activities hosted by IES

S.no	Activity	Date	Year	Mapping
1	Judo Nodal level Tournament	23-06-2019	2019	PO6, PO9
2	West Zone inter University Cricket Tournament	15-05-2019	2019	PO9, PO12
3	Basketball State level Tournament Male/Female	24-11-2018	2018	PO6, PO9, PO12
4	Basketball Nodal level Male/Female Tournament	11-02-2018	2018	PO9, PO12
5	Cricket State level Tournament	03-01-2018	2018	PO6, PO9
6	Nodal level Football Tournament	14-09-2017	2017	PO6, PO12
7	Cricket Nodal level Tournament	04-08-2017	2017	PO6,PO12
8	Nodal Level Yoga	05-03-2017	2017	PO9, PO12
9	Sports Day (Three leg Race, Frog Race, Skipping Race, Push-ups, Relay Race)	01-11-2017	2017	PO7, PO9, PO12

Table 9.19: Cultural activities at IES

S. No.	Particular of Event	Detail of Event
01	IES Inter School Singing and Dancing Competition	Inter school singing and dancing competition were organized to promote young boys and girls since last 3 years
02	AGAZ	Dedicated for fresher's Students
03	UTKARSH	Annual function
04	UDAAN	Farewell to final year students
05	SPIC MACAY (Society for the Promotion of Indian Classical Music And Culture Amongst	Student chapter in association with MANIT has been organizing minimum 4/5 functions each year with a contribution of National/ Padmashri level artists.

	Youth)	
06	INFOREA	Inter college Technical festival organized by students independently.
07	Diwali Carnival	Celebration of Diwali prior to the holidays.
08	Rangoli	Institute organizes rangoli event to environmental awareness and carry out poverty eradication generate programme in the civil society through youth awareness all levels of the society.
09	Mehendi	It is organized to offer a chance for participants to gain substantial experience, showcase skills, dissect and appraise outcomes and unearth personal aptitude. It also encourages students to adopt innovative techniques and develop their ideas and creative skills.
10	Painting	The aim of the drawing competition is to engage students in a creative exercise to identify their hopes and dreams for the future. It allows complete self expression and supports their creativity and innovative expression through art.

CRITERION 10	Governance, Institutional Support and Financial Resources	120

10. GOVERNANCE, INSTITUTIONAL SUPPORT AND FINANCIAL RESOURCES

10.1. Organization, Governance and Transparency

10.1.1. State the Vision and Mission of the Institute

Vision of the Institute

"To develop as a reputed technical institution by imparting quality education coupled with human values for ensuring the overall personality development of engineering students".

Mission of the Institute:

- **M-1:** To provide the best facilities, environment, and infrastructure for the achievement of objectives.
- **M-2:** To ensure the availability of intellectual assets in terms of qualified faculty committed to the cause of developing competent engineers and managers.
- **M-3:** To put in dedicated efforts for inculcating human values in the students coupled with overall personality development.
- **M-4:** To provide value-added courses and projects through Industry-Institute interactions for effective learning and better career opportunities.
- **M-5:** To tie-up with Industries and Institutions for developing innovative and entrepreneurial skills of students.

10.1.2. Governing body, administrative setup, functions of various bodies, service rules, procedures, recruitment and promotional policies

Governing Body

Table 10.1 The members of Governing Body for the session 2020-21

S. No.	Name	Designation	Designation in the Governing body
1	Er.B.S.Yadav	Chairman, Infotech Education Society, Bhopal	Chairman
2	Dr. Sunita Singh	Secretary, Infotech Education Society, Bhopal	Member
3	Mr. Devansh Singh	Treasurer, Infotech Education Society, Bhopal	Member
4	Dr R K Singhai	AICTE Representative	Member
5	Dr. Y K Agrawal	DTE Representative	Member
6	Dr.S S Kushwaha	RGPV Representative	Member
7	Prof. Kalika Yadav	Educationist	Member
8	Mr. R C Maheshwari	Assistant Professor, IES College of Technology, Bhopal	Member
9	Dr. D K Gupta	Professor, IES College of Technology, Bhopal	Member
10	Mr. Manoj Modi	Industrialist, Founder and Managing Director, Nexcity Solutions Pvt. Ltd, Bhopal.	Member
11	Dr. G K Pandey	Principal, IES College of Technology, Bhopal	Member Secretary

Functions of the Governing Body:

- The Governing Body has been constituted as per AICTE norms and is the supreme administrative body of the institution.
- To participate and approve the vision and strategic mission statements of the Institute.
- To formulate the policies of the institution with regard to academics and other activities.
- To discuss and approve the annual budgetary allocations of Institute.

- To review the progress of academic and other related activities of the Institute.
- To approve the important decisions and amendments as required by the Institute.
- To review the implementation of the policies of the Institution.

Frequency of meet: Biannually

Table 10.2 Minutes of the last meeting is annexed as below

S. No.	Academic Year	No. of meetings conducted
1	2020-21	2
2	2019-20	3
3	2018-19	2
4	2017-18	3

MINUTES OF THE MEETING OF GOVERNING BODY OF IES COLLEGE OF TECHNOLOGY HELD ONLINE ON 21/09/2020 AT 4.00 PM

Dr. G K Pandey, Member Secretary-Governing Body, extended a warm welcome to all the members present online.

The following members attended the online meeting of Governing Body:

Sr. no.	Name	Designation	Designation in the Governing Body
1	Er.B.S.Yadav	Chairman, Infotech Education Society, Bhopal	Chairman
2	Dr. Sunita Singh	Secretary, Infotech Education Society, Bhopal	Member
3	Mr. Devansh Singh	Treasurer, Infotech Education Society, Bhopal	Member
4	Dr R. K. Singhai	AICTE Representative	Member
5	Dr. Y.K. Agrawal	DTE Representative	Member
6	Prof S. S. Kushwaha	RGPV Representative	Member
7	Prof. Kalika Yadav	Educationist	Member
8	Mr. R.C.Maheshwari	Asst. Prof. IES College of Technology, Bhopal	Member
9	Dr. D.K. Gupta	Prof. IES College of Technology, Bhopal	Member
10	Mr. Manoj Modi	Industrialist, Founder and Managing Director, Nexcity Solutions Pvt. Ltd, Bhopal.	Member
11	Dr. G. K. Pandey	Principal, IES College of Technology, Bhopal	Member Secretary

Member Secretary, Governing Body further took up following agenda items for discussion and deliberation:

Agenda Item 1: To confirm the minutes of the previous meeting held on 14/03/2020

Resolution: Governing Body confirmed the minutes of the previous meeting and approved the action taken on the minutes of the last meeting held on 14/03/2020.

Agenda Item 2: Regarding submission of pre-qualifier for Engineering and Technology discipline

Resolution: Dr G. K. Pandey, Principal, presented the filled-up proforma of pre-qualifier for Engineering and Technology disciplines of Mechanical Engineering, Computer Science and Engineering, Electrical and Electronics Engineering, and Electronics and Communication Engineering before the Governing Body members for their information and further direction. All members of the committee unanimously decided to submit the pre-qualifier for these programs.

Agenda Item 3: To present the result of B. Tech 8th semester

Resolution: Dr G.K. Pandey, Principal presented the results of B.Tech. 8th semester, which was 100 % for all branches. Committee members congratulated the principal, teaching and non-teaching staff for their contribution in excellent results by our students in RGPV examinations, and further motivated to perform even better in next exams.

Attached as per Annexure-I

Agenda 4: To present the academic and other important activities and events of the college from 01-01-2020 till date

Resolution: Dr. G. K. Pandey, Principal, presented various academic and other important activities and events of the college from 01-01-2020 to 20-08-2020.

Students' achievements in Job oriented Training Programs organized by different departments were also highlighted. Committee members acknowledged that conducting various academic, co-curricular, and placement activities in such testing circumstances demanded extraordinary focus and determination. Expressing their satisfaction over the response of College authorities in the current situation, the members appreciated the Principal, HODs & faculty for their efforts.

Agenda 5: To present the information regarding the grant of Extension of Approval by AICTE for the year 2020-2021

Resolution: Dr. G.K. Pandey, Principal, shared with committee members that Extension of Approval of AICTE has been obtained without any issues for all the existing courses for the year 2020-2021. All members congratulated Dr. Pandey for the above achievement.

Agenda 6: Approval of teaching staff recommended by Selection Committee

Resolution: Dr G K Pandey presented the information regarding recommendation of Selection Committee for staff appointments and the Governing Body approved the same.

Attached as per Annexure-II

Agenda 7: To present the plan of action for campus working w.e.f. August/ September 2020

Resolution: Dr G K Pandey presented the following plan of action for conduct of class work w.e.f. August/ September 2020 in view of COVID-19.

- All employees and visitors must follow the Home Ministry SOPs and directions regarding Covid.
- Wearing mask in the campus to be made mandatory.
- Maintaining social distance
- Every student and employee entering the premises to be subjected to thermal screening and sanitization at the main entrance.
- All important spaces to be sanitized by sodium hypo-chloride.
- Observing *COVID Appropriate Behaviour* in the Campus premises.

Agenda 8: Online classes for all years in the current semester of 2020-2021:

Resolution: Dr. G.K. Pandey apprised the members that for running online classes as per Government guidelines, requisite facilities were available in the campus such as high speed broadband internet facility with 100 MBPS speed, Microsoft Teams and related support infrastructure for online learning. Expressing satisfaction over the available resources, all members unanimously agreed to the conduction of online classes in view of COVID-19 pandemic.

The Chairman thanked all the members for their active participation and wished all good health.

Member Secretary

IES College of Technology, Bhopal

Member Secretary
Governing Body
IES College of Technology, Bhopal

Administrative Set up

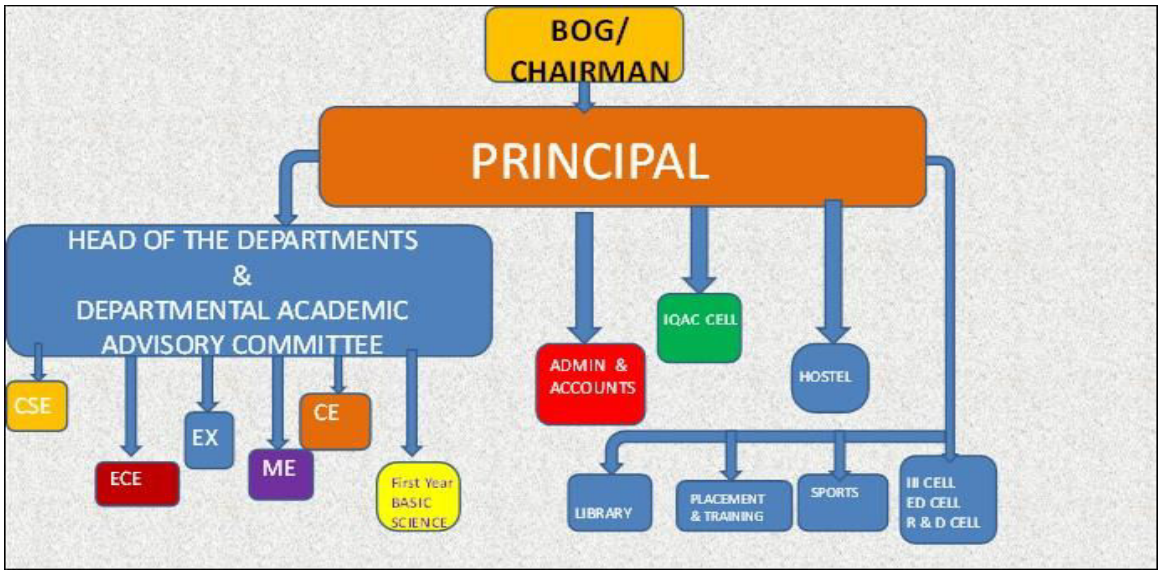


Table 10.3 Roles and Responsibilities:

Position	Functions
Chairman, Governing Body	• Chairman is the Chief Mentor of the Institution, and heads the Governing Body (GB). • He is the final authority to approve all policy matters on expansions, collaborations, financial outlays, budgetary allocations and admin related decision. • He approves the recruitment of senior management staff.
Principal	The Principal is the head of the Institution and responsible for: • Planning of the establishment of various departments and the various administrative units of the college. • Coordination of various activities connected with admissions, teaching, conduct of examinations, collection of fees, publishing course files and manuals. • Identification and recruitment of suitable persons to man the various departments and administrative units. • Development of various laboratories, Computer centre and library of an educational Institution. • Maintaining cordial relationship with the university authorities, Directorate of technical education, AICTE and such other policy making bodies who matter. • Preparation of the minutes of meetings o Preparation of the budget for approval of

	management o Regularly apprising the management about the various activities. • Planning of functions like Annual Day, Fresher's Day • Steering organization of seminars, symposia, short-term training programme and Faculty Developments Programmes.
Head of Departments	The Head of departments is responsible for: • Administration of the department in respect of regularity, punctuality, distribution of teaching work and laboratory work among the staff. • The HOD should be well informed about the activities and programs of other professional colleges and institutions. HOD should keep good contacts with the faculty of IITs, other Universities and colleges in the country and to the extent possible, Universities abroad. • Preparation of class-wise timetables. • Maintain laboratory-wise stock registers • Organizing special lectures by experts, technical staff, seminars & conferences and refresher courses. • Encourage the faculty and staff to improve their academic qualifications without effecting normal curriculum. • Encourage students to develop communication skills, report writing, debating and group discussions etc. • Maintaining cordial relations with local industries and also develop contacts in general with industry. • Extend all possible help to students of the department for training/project work/professional employment. • Efforts are to be put in to enhance the computing skills of the students of the department.
Account & Admin	• Recording and reporting the cash flows. • Accounts receivable &Accounts payable • Payroll & Financial controls
Industry Institute Interaction Cell	• To create a platform for industry institute interaction. • To establish inter-relationship between Institute &Industry through know-how and MOU's. • To facilitate student/faculty internships at industries.

	• To organize industrial visits for the students. • To organize technical talks for the students from the industry experts.
Entrepreneurship Development Cell	• To nurture the student ideas and to develop innovative products. • To support the student projects with funding. • To establish & maintain incubation centre. • To create entrepreneurs echo system for students. • To maintain data relevant to entrepreneurship programmes. • To encourage & establish start-up companies.

INTERNAL QUALITY ASSURANCE CELL

The Internal Quality Assurance Cell (IQAC) ensures the effective implementation of quality initiatives through continuous reviews and periodic meetings. The IQAC works towards attaining excellence in all academic and administrative endeavors of the institution. The IQAC is meant for planning, guiding and monitoring Quality Assurance (QA) and Quality Enhancement (QE) activities of the college.

Table 10.4 The members of Internal Quality Assurance Cell for the session 2020-21

S.No.	Name	Designation	Designation in IQAC
1	Dr. G. K. Pandey	Principal, IES College of Technology Bhopal	Chairman
2	Dr. Sunita Singh	Secretary Promoting Society (Management Representative)	Member
3	Dr. Meera Bansal	Principal, IES College of Education (Local Society Representative)	Member
4	Ms. Monika Singh	Society Representative	Member
5	Mr. Surendra Raghuvanshi	Administrative officer	Member

6	Dr. Rajesh Nema	Professor & Head, Department of Electronics & Communication Engineering, IES College of Technology, Bhopal	Member
7	Dr. Nikhat Raza	Associate Professor & Head, Department of Computer Science & Engineering, IES College of Technology, Bhopal	Member
8	Dr. Pallavee Bhatnagar	Professor & Head, Department of Electrical & Electronics Engineering, IES College of Technology Bhopal	Member
9	Prof. R C Maheshwari	Assistant Professor & Head, Department of Civil Engineering, IES College of Technology Bhopal	Member
10	Mr. Neeraj Agrawal	Associate Professor & Head, Department of Mechanical Engineering, IES College of Technology Bhopal	Member
11	Dr. Rashmi Shrivastava	Associate Professor & First Year I/C Department of Basic Science, IES College of Technology Bhopal	Member
12	Mr. Niket Chandrawanshi (Senior Cloud Automation Engineer-FIS Global)	Entrepreneur, IBS Bhopal	Member
13	Mr. Roshan Chourasia (CSE)	Student Representative	Member
14	Mr. C P Sharma CEO-Daulatram	Industry Representative	Member

	Industries		
15	Mr. Veerapajee Shivanna	(Head-Campus Hiring Hexaware Technologies) Industrial Representative	Member
16	Mr. Siddharth Prakash	(Principal Research Program Manager at Microsoft Research) Industrial Representative	Member
17	Mr. Subhag Singh Rajput F/O Ms. Lalnee Rajput (Students CSE)	Parents Representative	Member

Functions and Responsibilities:

- Development and implementation of quality benchmarks parameters for various academic research and administrative activities of the institution.
- To take decision about the academic plan, implementation of academic strategies, quality improvement decision, etc.
- Provide guidance and advice to the college in maintaining a high academic standard.
- Review of feedback response from students, parents and other stakeholders on quality-related institutional processes.
- Dissemination of information on various quality parameters to all stakeholders
- Approval of inter and intra-institutional workshops, seminars on quality related themes and promotion of quality circles.
- Documentation of the various programs /activities leading to quality improvement
- Annually conduct of Academic and Administrative Audit and its follow-up.

Departmental Academic Advisory Committee

The Departmental Academic Advisory Committee has been framed with the objective of remaining up to date with the latest requirements of the industry and incorporating necessary components in the curriculum as much as possible.

Table 10.5 Members of Departmental Academic Advisory Committee for the session 2020-21

S.No.	Name	Designation	Role in Departmental Academic Advisory Committee
1	Dr. Pallavee Bhatnagar	Professor & Head, Department of Electrical & Electronics Engineering, IES College of Technology, Bhopal	Chairperson
2	Ms.Poonam Khatarkar	Assistant Professor, Department of Electrical & Electronics Engineering, IES College of Technology, Bhopal	Member
3	Mrs. Jyoti Bansal	Assistant Professor, Department of Electrical & Electronics Engineering, IES College of Technology, Bhopal	Member
4	Mr. Rahul Malviya	Assistant Professor, Department of Electrical & Electronics Engineering, IES College of Technology, Bhopal	Member
5	Mr. Akhilesh Dwivedi	Assistant Professor, Department of Electrical & Electronics Engineering, IES College of Technology, Bhopal	Member
6	Dr. Bhupendra Singh	Associate Professor, Department of Electrical Engineering RGPV - Bhopal	External Academic Advisor

Roles and responsibilities:

- Aligning of CO's to the mission statements and defining program specific outcomes.
- Suggest improvement in academic plans for attainment of POs & PSOs.
- To identify and suggest thrust areas to conduct various activities (final year projects, training courses and additional experiments to meet PSOs.
- Encourage for industry-institute interactions to bridge up curriculum/industry gap and suggest quality improvement initiatives to enhance employability.
- To propose necessary action plan for skill development of students, required for entrepreneurship development and quality improvement.

Institute Innovation Cell

Institutions Innovation Cell (IIC) at institute is a unique model based on Hub-Spoke and coherence approach to align with the innovation and entrepreneurship promotion and support programs to ensures round the year activities in campus for effective engagement, learning and practicing innovation and entrepreneurship among student and faculty community. IIC is approved by AICTE & granted 4 Star rating during 2019-20.

Table 10.6 The members of Institute Innovation Cell for the session 2020-21

S.No.	Name	Designation	Designation in IIC Cell
1	Dr. G. K. Pandey	Principal, IES College of Technology, Bhopal	President
2	Mr. Sonu Lal	Assistant Professor, Department of Electronics & Communication Engineering, IES College of Technology, Bhopal	Vice-president
3	Mr. Anubhav Sharma	Assistant Professor, Department of Computer Science & Engineering, IES College of Technology, Bhopal	Convener
4	Ms. Khushbu Kriplani	Assistant Professor, Department of Computer Science & Engineering, IES College of Technology, Bhopal	Innovation activity Coordinator
5	Mr. Jagdish Prasad	Assistant Professor, Department of Mechanical Engineering, IES College of Technology, Bhopal	Startup activity Coordinator

6	Mr. Anshul Sarawagi	Assistant Professor, Department of Computer Science & Engineering, IES College of Technology, Bhopal	Internship Coordinator
7	Mr. Deepak Mishra	Assistant Professor, Department of Electronics & Communication Engineering, IES College of Technology, Bhopal	IPR Activity Coordinator
8	Mr. Surendra Raghuwanshi	Administrative Officer	Social Media Coordinator
9.	Mr. Anubhav Sharma	Assistant Professor, Department of Computer Science & Engineering, IES College of Technology, Bhopal	ARII Coordinator
10.	Mr. Nitin Chourasia	Assistant Professor, Department of Management, IES College of Technology, Bhopal	NIRF Coordinator
11.	Mr. Vijay Dhote	Assistant Professor, Department of Computer Science & Engineering, IES College of Technology, Bhopal	Member
12.	Mr. Deepan Banoriya	Assistant Professor, Department of Mechanical Engineering, IES College of Technology, Bhopal	Member
13.	Mr. Rakesh Yadav	Assistant Professor, Department of Mechanical Engineering, IES College of Technology, Bhopal	Member
14.	Mr. Ashish Raghuwanshi	Assistant Professor, Department of Electronics & Communication Engineering, IES College of Technology, Bhopal	Member
15.	Mr. Anwar Ahmed	Student Coordinator	IPR Coordinator
16	Mr. Anshul Suman	Student Coordinator	Social Media Coordinator
17	Ms.Shweta Singh	Student Coordinator	Start-up Coordinator
18	Mr.Aditya Shankar	Student Coordinator	Innovation Coordinator

Roles and responsibilities:

- To ensure the activities circulated by AICTE IIC Council and MIC and identify the activity at institution level related to innovation, incubation and entrepreneurship.

Research & Development Committee

The Quality Mandate of institution policy to emphasize importance of promoting quality research by the faculty and creating new knowledge. Number of research articles published in reputed journals is one of globally accepted indicators considered for various academic purpose

.High quality publications in reputed journal help in achieving ranks and overall improvements of quality of education. It reviews DAAC recommendation in respect of research and project activities.

Table 10.7 The members of Research & Development Committee for the session 2020-21

S.No.	Name	Designation	Designation in Research & Development Committee
1	Dr. G. K. Pandey	Principal, IES College of Technology Bhopal	Chairman
2	Dr. Pallavee Bhatnagar	Professor & Head, Department of Electrical & Electronics Engineering, IES College of Technology Bhopal	Convener
3	Dr. Rajesh Nema	Professor & Head, Department of Electronics & Communication Engineering, IES College of Technology, Bhopal	Member
4	Dr. Nikhat Raza	Associate Professor & Head, Department of Computer Science & Engineering, IES College of Technology, Bhopal	Member
5	Mr. Neeraj Agrawal	Associate Professor & Head, Department of Mechanical Engineering, IES College of Technology, Bhopal	Member
6	Mr. R.C. Maheshwari	Assistant Professor & Head, Department of Civil Engineering, IES College of Technology Bhopal	Member
7	Dr. Anil Kumar Yadav	Associate Professor, Department of Computer Science & Engineering, IES College of Technology Bhopal	Member

Roles & Responsibilities:

- To review research project proposals for grants / sponsorship.
- To support and encourage the faculties for research publication and consultancy.
- To approve facilities for research through collaboration / inter-disciplinary modes.
- To monitor student projects evaluation and review.

Training & Placement Committee

Training & Placement Committee provides career guidance about avenue open after graduation (Higher education, placements or entrepreneurship). It provides opportunity of recruitment to students and maintains good relations with recruiters & organizing Pre placement trainings.

Table 10.8 The members of Training & Placement Committee for the session 2019-20

S.No.	Name	Designation	Designation in Training & Placement Committee
1	Er. Kishore Purswani	Sr. Assistant Professor & Director (Training & Placement), IES College of Technology, Bhopal	Chairman
2	Ms. Khushbu Kriplani	Assistant Professor & Training & Placement Officer , Department of Computer Science & Engineering, IES College of Technology Bhopal	Convener
3	Dr. Pallavee Bhatnagar	Professor & Head, Department of Electrical & Electronics Engineering, IES College of Technology, Bhopal	Member
4	Mr. Anshul Sarawagi	Assistant Professor, Department of Computer Science & Engineering, IES College of Technology, Bhopal	Member
5	Mr. Deepak Mishra	Assistant Professor, Department of Electronics & Communication Engineering, IES College of Technology, Bhopal	Member
6	Mr. Deepan Banoriya	Assistant Professor, Department of Mechanical Engineering, IES College of Technology, Bhopal	Member
7	Mr. Pulkit Kumar	Student coordinator, IES College of Technology, Bhopal	Member
8	Mr. Shivam Kumar	Student coordinator, IES College of Technology, Bhopal	Member
9	Mr. Dev Maheshwari	Student coordinator, IES College of Technology, Bhopal	Member

Roles & Responsibilities:

- To organize& ensure imparting proper training skills to the students by the trainers.
- To organize placements drives.

- To organize skill development programs for students through internal & external experts.
- To maintain data of students placement & entrepreneurship.
- To organize periodical meets of alumni association.
- To publish placement data in institute website time to time.
- To arrange for carrier guidance.
- To enhance employability of students by empowering them with technical competencies, Domain Skills, leadership, techno-managerial qualities and communicative abilities to ensure they are industry ready.

Entrepreneurship Development Cell

This cell is launched with a view to encourage students to consider self-employment as a career option, provide training in Entrepreneurship through modular courses and increase the relevance of Management particularly in the non-corporate and under managed sectors.

Table 10.9 The members of Entrepreneurship Development Cell for the session 2019-20

S.No.	Name	Designation	Designation in Entrepreneurship Development Cell
1	Er. Kishor Purswani	Sr. Assistant Professor, Department of Mechanical Engineering, IES College of Technology Bhopal	Chairman
2	Mr. Anubhav Sharma	Assistant Professor, Department of Computer Science & Engineering, IES College of Technology, Bhopal	Convener
3	Mr Divyansh Singh	CEO, Innovative Business Solution, Bhopal	Member (Industry Expert)
5	Mr Shantanu Boss	CEO, ARG Technocrats, Noida, New Delhi	Member (Alumni)
6	Mr. Padmakar Pachorkar	Assistant Professor, Department of Mechanical Engineering, IES College of Technology, Bhopal	Member
7	Mr. Dhanesh Khalotia	Assistant Professor, Department of Civil Engineering, IES College of Technology Bhopal	Member

Roles & Responsibilities:

- To nurture the student ideas and to develop innovative products.

- To support the student projects with funding.
- To establish & maintain incubation centre.
- To create entrepreneurs echo system for students.
- To maintain data relevant to entrepreneurship program.

NCC/NSS Committee

NCC/NSS Committee basically focus on extra-curricular activities at institute level. It aims at holistic personality development of students & also includes rural outreach programs.

Table 10.10 The members of NCC/NSS Committee for the session 2020-21

S.No.	Name	Designation	Designation in NCC/NSS Committee
1	Dr. G.K.Pandey	Principal, IES College of Technology, Bhopal	Chairman
2	Mr. Akhilesh Dwivedi	Assistant Professor & Associate NCC Officer, Department of Electrical & Electronics Engineering, IES College of Technology, Bhopal	Convener
3	Dr. Pramod Patel	Assistant Professor, Department of Electronics & Communication Engineering, IES College of Technology, Bhopal	Member
4	Mr. Akshay Varkale	Assistant Professor, Department of Computer Science & Engineering, IES College of Technology, Bhopal	Member
5	Mr. Deepan Banoriya	Assistant Professor, Department of Mechanical Engineering, IES College of Technology, Bhopal	Member
6	Mr. Amit Pandey	Student Representative, IES College of Technology, Bhopal	Member
7	Mr. Abhishek Kumar	Student Representative, IES College of Technology, Bhopal	Member

Roles & Responsibilities:

- To develop a sense of social and civic responsibility amongst students.
- To utilize student's knowledge in finding practical solution to individual and community problems.
- To Train students to acquire leadership qualities and democratic attitude.

- To develop community service attitude for handling emergencies and natural disasters.
- To develop character, comradeship, discipline, secular outlook, the spirit of adventure and ideals of selfless service amongst young citizens.

Service rules, Procedures, Recruitment and Promotional Policies Recruitment Procedure

Based on statutory requirement as per All India Council for Technical Education Pay Scales, Service Conditions and Qualifications for the Teachers and other Academic Staff in Technical Institutions (Diploma) Regulations, 2010 and subsequent amendments/ new Regulations issued by AICTE from time to time, mentioned below, a document is prepared for publication with a view to recruit best possible talent available.

PARAGRAPH-I:

For Faculty members:- Faculty members are recruited on the basis of qualification presubscribed by AICTE for various cadres as for G.R. No. F-37-3/legal 2010 dt. 22/01/10.

Table 10.11 Cadres, Qualification & Experience

S.N.	Cadres	Qualification & Experience	Remark
1	Principal	As per AICTE Norms in force from time to time.	Qualifications as presented in paragraph I and as applicable for the post of Principal. Post PhD publications and guiding PhD students is highly desirable. Minimum of 10 years teaching and/or research and/or industrial experience of which at least 3 years should be at the level of Professor. Or Minimum of 13 years experience in teaching and/ or Research and/or Industry. In case of research experience, good academic record

			and books/research paper publications/ IPR/patents record shall be required as deemed fit by the expert members in Selection committee. If the experience in industry is considered, the same shall be at managerial level equivalent to Professor with active participation record in devising/designing, developing, planning, executing, analyzing, quality control, innovating, training, technical books/research paper publications/IPR/patents, etc. as deemed fit by the expert members in Selection committee. Flair for Management and Leadership is essential.
2	Professor	do	Qualifications as prescribed in paragraph I and as applicable for the post of Professor. Post PhD publications and guiding PhD students is highly desirable. Minimum of 10 years teaching and/or research and/or industrial experience of which at least 5 years should be at the level of Associate Professor. Or Minimum of 13 years experience in teaching and/ or Research and/or Industry. In case of research experience , good academic record and books /research paper publications /IPR / patents record shall be required as deemed fit by the expert members in Selection committee. If the experience in industry is considered, the same shall be at managerial level equivalent to Associate Professor with active participation record in devising/ designing, planning, executing, analyzing, quality control, innovating, training, technical books/research paper publications/IPR/patents, etc. as deemed fit by the expert members in Selection committee.
3	Associate Professor	do	Qualification as prescribed in paragraph I and as applicable for the post of Associate Professor and PhD or equivalent in appropriate discipline. Post Ph.D publications

			and guiding PhD students is highly desirable Minimum of 5 years experience in teaching and/or research and/or industry of which at least 2 years post PhD is desirable.
4	Assistant Professor	do	BE/BTech and ME/M.T.ech in relevant subject with First Class or equivalent either in BE/B.Tech or ME/M.Tech.

Service Rule

Service Rules

IES College of Technology has a firm belief that the contribution of its intellectual assets i.e. faculty members is the back bone of Organization's progress and prosperity.

The service rules have been designed keeping in view not only the organization objectives but also for ensuring empowerment of its employees in tandem with facility, authority and responsibility.

1.Pay scale will be as per AICTE norms and allowances shall be, as decided by the Society/College management from time to time.

2.Employee will have the freedom to work within Organization rules and regulations.

3.An employee will be on probation for a period of 1 year, which may be extended by the appointment authority if required. The regularization of the probation would depend upon the suitability of work performance during the period of probation. The decision of the appointing authority about the suitability of the confirmation/probation shall be final and binding.

4.Continuous unauthorized absence from the duty will be treated as an act of indiscipline and will lead to the termination of the services from the date of absence.

5.An Employee will not be allowed for teaching in any tuition/coaching class or running educational institute/coaching centre.

6.An employee intending to resign will have to give a notice of minimum 45 days in advance & will have to discharge his duties this period at work place compulsory failing which he /she will have to deposit salary equivalent to one month.

7.Exemplary behaviour is desirable.

8.Keeping the fast rate of knowledge explosion, faculty is supposed to keep their knowledge up to the Mark.

9.Faculty is given adequate opportunity for professional growth.

10.Knowledge Up gradation: IES College of Technology strongly believes that learning is a lifelong process. Hence ICOT encourages Faculty members to present papers in National / International Conferences / Seminars and get their research papers published in prestigious technical magazines. Facilities extended for accomplishment of this objective are enumerated below:

Table 10.12 College policies

S.No.	Particular	Facility
1	National Seminars/Workshop/FDP	1) 100 % Registration fee. 2) 3rd AC fare for Asst. Professors & by 2nd AC for Associate Professors & above. 3) Special Leave
2	International Seminars	R & D Committee decides as per the merit of the case
3	Seminars at Bhopal	Special Leave
4	Publication fee for SCI/Scopus/WoS Journals	1) All in house guidance & help for preparation 2) 50 % of amount payable for

		publication

Note: Over and above this if a paper is also presented in any prestigious event then R & D Cell may consider special award also on case to case basis based on the recommendations of Principal.

11. Membership of Professional Bodies: Faculty is encouraged to get themselves enrolled in professional Bodies. Subsidy to the extent possible is considered by R & D Cell on the recommendations of Principal.

- Higher Studies: Application of faculty members desirous of seeking higher studies are considered for Study Leave on case to case basis.

- Assessment and Increment: Annual increment is considered after completion of one year from the date of joining and shall be effective from the month of April, August, December- which ever month comes first after completion of one year. Increment is subject to satisfactory performance.

Over and above this if a paper is also presented in any prestigious event enumerated above then R & D Cell shall consider special cash award also on case to case basis based on the recommendation of Principal.

- **Leave Entitlement**

Leave entitlement is as below for Faculty & staff.

Table 10.13 Leave policies

S.No.	Type of Leave	Entitlement	Remark
1	Casual leave	08 CL / year 08 CL / year	Faculty Other Staffs
2	Short leave	06 / year	Faculty/ Staffs
3	Medical leave	05 / year	Faculty/ Staffs

4	Semester Break leave	05 / semester break	For faculty after completion of one year
5	Study Leave	After Completion of Minimum 02 years	Case to case basis
6	Maternity Leave	90 days	Only for female
7	Marriage leave Tragedy in blood relation	07 days 13 days	Faculty/ Staffs

An employee should apply for the leave in advance and get it sanctioned from the authority. In Case of any emergency faculty can inform the authorized person through message/call.

Authority for sanction of Leave: (CL/EL/SL/ML):

S.N.	Levels	Sanctioning Authority
1	Principal	Secretary, Infotech Education Society
2	HODs	Principal
3	Faculty/Lab I/C	HOD

Responsibilities of Employees

Responsibilities of the Principal:

The Principal shall be the head of the Institution and shall be responsible for:

i. Planning of the establishment of various departments and the various administrative units of the college.

ii. Coordination of various activities connected with admissions, teaching, conduct of examinations, and collection of fees, publishing course files, and manuals.

iii. Identification and recruitment of suitable persons to man the various departments and administrative units.

iv. Development of various laboratories, Computer centre, library and all other facilities required.

v. Maintaining cordial relationship with the university authorities, Directorate of technical education, AICTE and such other policy making bodies.

vi. a. Preparation of the minutes of meetings

b. Preparation of the budget for approval of management

c. Regularly apprising the management about the various activities.

vii. Planning of functions of Sports, Cultural & Technical events. Steering organization of seminars, symposia, short-term training programme and Faculty developments Programmes.

Responsibilities of Heads of Departments(HOD's):

i. Administration of the department in respect of regularity, punctuality, distribution of teaching work and laboratory work among the staff and ensure completion of syllabus in time as per academic calendar.

ii. Maintain the relevant topic-wise files and ensure "place for everything and everything in its place".

iii. The HOD should be well informed about the activities and programs of other professional colleges and institutions. HOD should maintain good professional contacts with the faculty of IITs, NITs and other reputed Universities and colleges in the country.

iv. Preparation of class-wise timetables.

v. Ensure compilation of student's attendance and sessional marks and maintain the relevant files and records for future reference.

vi. Coordinate the work in connection with the preparation of course files, laboratory manuals and such other documents and updation from time to time. Development of various laboratories and arrangements for regular maintenance, updation of the laboratories by procuring the equipment required to perform experiments listed in the syllabus.

vii. Maintain laboratory-wise stock registers one for capital equipments and the other for components & spares.

viii.Procure spares and components and stock them and maintain inventory laboratory-wise.

ix. Coordinate the activities of technical associates, ISTE, IETE, IEEE and such other professional associations.

x. Organize special lectures by experts, technical staff, seminars & conferences and refresher courses.

xi. Encourage the faculty and staff to improve their academic qualifications without effecting normal curriculum.

xii. Encourage students to develop communication skills, report writing, debating and group discussions etc.

xiii. Maintaining cordial relations with local industries and also develop contacts in general with industry and R & D organizations in the country.

xiv. Extend all possible help to students of the department for training/project work/professional employment.

xv. Enhance the computing skills of the students of the department and organize refresher courses to make up deficiencies.

Responsibilities of Teaching Staff:

Academic Responsibilities:

i. Classroom Instruction & Laboratory Instruction of high quality in line with the syllabus prescribed by RGPV and relevant advanced topics beyond syllabus.

ii. To develop curriculum, learning resource materials and laboratories.

iii. To actively participate in co-curricular and extra-curricular activities of the college and those organized by other institutions.

iv. Guidance and counseling to promote personal, ethical, moral and overall character of students.

v. To keep abreast of new knowledge and skills and dissemination of such knowledge through publication of papers, books and seminars etc.

vi. Self development through up-gradation of qualification and participation in professional activities.

Administration:

i. To participate actively in academic and administrative management of the institution and also in policy making.

ii. Planning, monitoring, evaluation and promotional activities at department and institutional level.

iii. To prepare project proposals for funding in vital areas of R & D.

iv. Laboratory development and modernization.

v. To monitor and evaluate academic and research activities.

vi. To participate in policy planning at the Regional/National level for development of technical education.

vii. To help mobilization of resources for the institution.

viii. To plan and implement staff developmental activities.

ix. To maintain accountancy and to conduct performance appraisal.

x. To provide non-formal modes of education for benefit of community.

xi. Any other relevant work assigned by the head of the Institution.

Research & Consultancy:

i. To actively involve in Research and Development activities, Research guidance and industries sponsored research.

ii. To provide consultancy and testing services by providing extension services and participating in community services.

iii. To promote the spirit of entrepreneurship with an aim of creation of jobs.

Ethical Standards for Teachers :

i. Shall live and lead by example in every sphere of conduct particularly to inculcate a noble culture in students.

ii. Respect parents, teachers and elders.

iii. Express the love of brotherhood to fellow students.

iv. Accept and extend due respect to every religion.

v. Respect and love the nation.

vi. Have a sense of belongingness to the institution.

vii. Total dedication to the teaching profession.

viii. An urge to excel in professional expertise.

A Teacher- Do's & Don't

i. Shall wear respectable attire, befitting the society's expectations and shall keep up immaculate personal hygiene at all times.

ii. Shall always listen to students with concern, whether it be in respect of doubts or it be relating to any personal help.

iii. Shall always motivate the students, giving them a feeling of comfort and encouraging them.

iv. Shall attend to parents as a true representative of the institution, clarify their doubts with concern and help understanding the system in a better manner. Assist them in solving the problem and guiding them properly on how and who to approach for further help.

v. Shall always give the parents authentic and correct information.

vi. Shall always accept the entire fellow teachers, honor their sentiments and respect their value system.

vii. Shall always endeavor to assist fellow teachers, either in their teaching practice or in any form of adjustment required for discharging their responsibilities.

viii. Shall never chew, smoke or consume alcoholic drinks.

ix. Shall never gossip or discuss unauthentic information with peers or other members of public which might provoke a sensation of ill feeling of any sort.

10.1.3. Decentralization in working and grievance redressal mechanism

Table 10.14 List of faculty members who are administrators/decision makers for various assigned responsibilities:

S. No.	Name	Designation	Administrative powers delegated
1	Dr. G. K. Pandey	Principal, IES College of Technology, Bhopal	• Academic operations. • Resource requirements. • Responsible for meeting Statutory and Regulatory requirements of the Government, AICTE and university(RGPV)
2	Dr. Nikhat Raza	Associate Professor & Head, Department of Computer Science & Engineering, IES College of Technology, Bhopal	• Assigning duties and monitor faculty performance. • Decide on departmental needs, propose yearly budget and arrange for compliance. • Planning academic activities and training programs. • Monitoring R&D and project activities of the department.
3	Mr. Neeraj Agrawal	Associate Professor & Head, Department of Mechanical Engineering, IES College of Technology Bhopal	
4	Mr. R.C. Maheshwari	Assistant Professor & Head, Department of Civil Engineering, IES College of Technology Bhopal	
5	Dr. Pallavee Bhatnagar	Professor & Head, Department of Electrical & Electronics Engineering, IES College of Technology Bhopal	
6	Dr. Rajesh Nema	Professor & Head, Department of Electronics &	

		Communication Engineering, IES College of Technology, Bhopal	
7	Er. Kishor Purswani	Sr.Assistant Professor & Director, Training & Placement, IES College of Technology, Bhopal	• Organizing Training and Placement activities for students.
8	Dr. G.K. Pandey	Chairman – Industry Institute Interaction cell, IES College of Technology, Bhopal	• Explore and identify common avenues of interaction with industry as per the requirements
9	Dr. G. K. Pandey	Head –Entrepreneurship Development cell, IES College of Technology, Bhopal	• To nurture the student ideas and to develop innovative products.
10	Ms. Preeti Pandey	Student welfare officer, IES College of Technology, Bhopal	• To address student welfare issues.

Women Grievance Cell headed by Ms. Preeti Pandey shall meet Bi-annually and depending on the date of receipt of any petition/complaint from anybody and take necessary action as deem fit and initiate necessary action for solving problem.

Women Grievance Cell

Women Empowerment is one of the multidimensional social processes addressing human rights and development, which helps women to gain control over their own lives and gives the ability

to make strategic choices of life. This cell is constituted to create a harmonious environment and enable women to discharge their responsibilities at workplace with dignity.

Table 10.15 The members of Women Grievance Cell for the session 2020-21

S.No.	Name	Designation	Designation in Women Grievance Cell
1	Dr. Preeti Pandey	Assistant Professor, Department of Basic Science, IES College of Technology, Bhopal	Chairman
2	Dr. Sonali Saha	Associate Professor, Department of Basic Science, IES College of Technology, Bhopal	Convener
3	Dr. Vineeta Jain	Professor, Department of Basic Science, IES College of Technology, Bhopal	Member
4	Mrs. Shweta Singh	Associate Professor, Department of Electronics & Communication Engineering, IES College of Technology, Bhopal	Member
5	Dr. D.K. Gupta	Professor, Department of Basic Science, IES College of Technology, Bhopal	Member
6	M r. R. C. Maheshwari	Assistant Professor & Head, Department of Civil Department, IES College of Technology, Bhopal	Member
7	Ms. Lalnee Rajpoot	Student (B.tech-4th Yr)	Member
8	Ms. Jahida Khanam	Student (B.tech-3rd Yr)	Member
9	Ms. Megha Pal	Student (B.tech-3rd Yr)	Member

Roles & Responsibilities:

- Create social awareness about gender discrimination.
- Motivate and improve confidence level amongst women staff members
- Organize workshops and seminars for women development.

- To promote personality development, leadership quality and role of women in the society.
- To reach and educate women in rural areas about social and legal rights.
- To handle all grievances related to gender discrimination or women harassment.

Internal Complaint Committee Prevention Sexual Harassment of Women at Workplace

The ICC committee under the provision of Section 4 of Sexual Harassment of Women at Workplace Prevention, Prohibition and Redressal Act, 2013.

Table 10.16 Internal Complaint Committee

S.No	Name	Designation	Position in Internal Complaint committee
1	Dr. Rashmi Shrivastav	Associate Professor, IES College of Technology, Bhopal	Presiding Officer
2	Ms. Preeti Pandey	Assistant Professor, IES College of Technology, Bhopal	Internal Member
3	Ms. Khushbu Kriplani	Assistant Professor, IES College of Technology, Bhopal	Internal Member
4	Mr.Brijesh Soni	Sr. Accountant, IES College of Technology, Bhopal	Internal Member
5	Mr. Pramod Dhakad	Admin coodinator, IES College of Technology, Bhopal	Internal Member
6	Ms.Shweta Singh	Student Representative, IES College of Technology, Bhopal	Student Member
7	Ms.Divya Vishwakarma	Student Representative, IES College of Technology, Bhopal	Student Member
8	Mr.Rajweer Raghuwanshi	Student Representative	Internal Member
9	Mr. Dipesh Singh Parmar	Secretary, Shri Ram Janki Rudra Shiksha Samiti, Bilkishganj, District, Sehore	Outside member

IES College of Technology, Bhopal

Minutes of the Meeting of 'Internal Complaint Committee for Prevention of Sexual harassment of Women at Workplace' held on 28/08/2020 in the Board Room of IES College of Technology at 3:00 pm

Meeting of 'Internal Complaints Committee for Prevention of Sexual harassment of Women at Workplace' of IES College of Technology was held on 28/08/2020 in the Board Room at 3:00 pm.

Members Present:

1. Dr. Rashmi Shrivastav, Presiding Officer
2. Ms. Khushbu Kriplani, Member
3. Mr.Brijesh Soni, Member
4. Mr. Pramod Dhakad, Member
5. Ms. Preeti Pandey, Member Secretary
6. Mr. Dipesh Singh Parmar, NGO External Member
7. Ms.Shweta Singh, Student Member-Connected Online
8. Ms. Divya Vishwakarma, Student Member-Connected Online
9. Mr.Rajweer Raghuwanshi, Student Member-Connected Online

Dr. Rashmi Shrivastava, Presiding Officer, welcomed the members present and requested Member Secretary Ms. Preeti Pandey to give her opening remarks and start discussions about the agenda items.

IES College of Technology

Agenda 1: Confirmation of the minutes of meeting of Internal Complaint Committee held on 30/08/2019

Resolution: Minutes of the Meeting of 'Internal Complaint Committee for Prevention of Sexual harassment of Women at Workplace' held on August 30, 2019 were read and unanimously passed by the committee.

Agenda 2: Presentation by Ms. Khushbu Kriplani on sexual harassment and their consequences.

Discussion: Ms. Khushbu Kriplani presented various issues regarding sexual harassment of women at workplace. Following were the highlights of the presentation:

1. Details of Indian Law on sexual harassment
2. Objectives of the committee
3. Duties of the employer
4. Details of constitution of Internal Complaints Committee
5. Responsibilities of Internal Complaint Committee
6. Definition of sexual harassment and its types
7. Response to sexual harassment
8. Awareness about 'How to prepare a report on sexual harassment'
9. Do's and Don'ts of sexual harassment at workplace
10. Redressal against sexual harassment at workplace

Committee members appreciated Ms. Khushbu for her efforts in gathering useful information about sexual harassment and practical means to prevent such incidents at workplace.

Agenda 3: To discuss any issue of sexual harassment at the work place.

Resolution: Ms. Preeti Pandey, Member Secretary, informed the committee that no incidence of sexual harassment was reported in the campus in last academic session. Dr. Rashmi Shrivastava expressed her satisfaction over the amicable and safe working conditions for women employees and students in IES Campus.

Agenda 4: Sensitization of non-teaching and other staff of the College

Discussion: Dr. Rashmi Shrivastava highlighted the need of sensitizing non-teaching and other staff of the College like housekeeping, gardening, and security services etc. about sexual harassment issues. After detailed discussion, committee members decided that a poster presentation or power point presentation in their mother tongue should be arranged to create awareness among such staff members. Members also opined that sensitization session for such employees should also create awareness about how to prevent sexual harassment/ how to file a complaint/ submit a report etc.

Agenda 5. Discussion on the proceedings of program on "Power of Women"

Resolution: Ms. Preeti Pandey informed that a two days' program on "Power of Women" was conducted on 4th & 5th March 2020 at IES Seminar Hall. The invitees for the programme were: Prof. Reeni Malik, Head Dept. of Pathology, Gandhi Medical College; Prof. S B Geeta Narhari, Acadmician and Psychologist; Dr. Amita Chand, President Bhopal Organ Donor Society; Ms. Richa Choubey, AIG Welfare, MP Police; and Ms. Mayanglambam Inaocha Devi, player from noted Canoeing International. Committee members desired that similar programs should be regularly conducted in campus to enhance confidence in our women employees and female students.

Agenda 6: Any other matter with the permission of the chair.

Resolution: Member Secretary Ms. Preeti Pandey further shared that discipline committee of the college had conducted surprise visits in the college bus, class rooms, and canteen time to time to keep vigil on any unwanted incident and ensure smooth functioning in campus.

All members expressed their satisfaction over the active functioning of the committee.
The meeting ended with vote of thanks by Member Secretary to all the members.

Dr. Rashmi Shrivastav	Ms. Preeti Pandey	Ms. Khushbu Kriplani
Presiding Officer	Member Secretary	Member

Member Secretary
Internal Complaints Committee
(Prevention Sexual Harassment of Women at Workplace)
IES College of Technology, Bhopal

IES College of Technology

Mr. Brijesh Soni,
Member

Mr. Pramod Dhakad
Member

Mr. Dipesh Singh Parmar
NGO External Member

IES College of Technology

Grievance Redressal Committee headed by Ms. Preeti Pandey shall meet within a month and depending on the date of receipt of any petition/complaint from anybody and take necessary action as deem fit and initiate necessary action for solving problem.

Grievance Redressal Committee

Grievance Redressal Committee has been constituted with an aim to address all the grievances of faculty members and students.

Table 10.17 The members of Grievance Redressal Committee for the session 2020-21

S.No.	Name	Designation	Designation in Grievance Redressal Committee
1	Dr. Preeti Pandey	Assistant Professor, Department of Basic Sciences, IES College of Technology, Bhopal	Chairperson
2	Dr. D. K. Gupta	Professor, Department of Basic Sciences, IES College of Technology, Bhopal	Convenor
3	Ms. Poonam Khatarkar	Assistant Professor, Department of Electrical and Electronics Engineering, IES College of Technology, Bhopal	Member
4	Ms. Shweta Singh	Associate Professor, Department of Electronics & Communication, IES College of Technology, Bhopal	Member
5	Mr. Anshul Sarawagi	Assistant Professor, Department of Computer & Science Engineering, IES College of Technology, Bhopal	Member

Roles & Responsibilities:

- To review, investigate and address complaints or grievances of faculty and students.
- To ensure proper redressal of all complaints and grievances.

Anti-Ragging Committee headed by Dr. G. K. Pandey shall meet Bi-annualy and depending on the date of receipt of any petition/complaint from anybody and take necessary action as deem fit and initiate necessary action for solving problem.

Anti-Ragging Committee

According to All India Council Technical Education (AICTE) notified regulation for prevention and prohibition of ragging in AICTE approved technical institutions vide No. 37-3/Legal/AICTE/2009 dated 01/07/2009, the Principal constituted the Anti-Ragging committee.

Table 10.18 Anti-Ragging Committee

S. No.	Name	Designation	Designation in Anti-Ragging Committee
1	Dr. G. K. Pandey	Principal, IES College of Technology, Bhopal	Chairman
2	Dr. Dhirendra Kumar Gupta	Professor, Department of Basic Sciences, IES College of Technology, Bhopal	Member Secretary
3	Mr. Deepak Mishra	Assistant Professor, Department of Electronics & Communication, IES College of Technology, Bhopal	Member
4	Mr. Ravindra Mohan	Assistant Professor, Department of Mechanical Engineering, IES College of Technology, Bhopal	Member
5	Ms. Aishwarya Mishra	Associate Professor, Department of Computer Science & Engineering, IES College of Technology, Bhopal	Member
6	Dr. Vineeta Jain	Professor, Department of Basic Sciences, IES College of Technology, Bhopal	Member
7	Mr. Deepan Adhikari	Assistant Professor, Department of Management, IES College of Technology, Bhopal	Member
8	Mrs. Pooja Mehta	NGO Abeer Life skills	Member
9	Mr. Rakesh Singh Gurjar	SHO Thana Ratibad, Bhopal	Member

Roles & Responsibilities:

- To create the awareness about Anti Ragging act and punishments among the students and the appropriate law in force.
- To create the awareness about Ragging constitutes (AICTE/UGC Regulation as per the directive of the Supreme Court Ragging CLAUSE 3).
- To prohibit, prevent and eliminate the source of ragging including any conduct by any student or students whether by words spoken or written or by an act which has the effect of teasing, treating or handling with rudeness a fresher or any other student.
- To prohibit undisciplined activities by any student or students this causes or is likely to cause hardship or psychological harm or to raise fear in any fresher.

Table 10.19 Anti-ragging squad:

S. No.	Name	Designation	Designation in Anti-ragging squad
1	Dr. Dhirendra Kumar Gupta	Professor, Department of Basic Sciences, IES College of Technology, Bhopal	Member
2	Mr. Akhilesh Dwivedi	Assistant Professor, Department of Electrical & Electronics Engineering, IES College of Technology, Bhopal	Member
3	Mr. Vijay Dhote	Assistant Professor, Department of Computer Science & Engineering, IES College of Technology, Bhopal	Member
4	Mrs. Preeti Pandey	Assistant Professor, Department of Basic Sciences, IES College of Technology, Bhopal	Member
5	Mr. Dhanesh Khalotia	Assistant Professor, Department of Civil Engineering, IES College of Technology, Bhopal	Member

Roles & Responsibilities:

- To conduct surprise checks in campus, classrooms, laboratories, canteen, hostel, play ground and buses etc.

- To ensure that no one indulges in ragging of junior students.
- To report any ragging related issues found during surprise checks to the anti-ragging committee.

10.1.4. Delegation of financial powers

IES has a firm belief in participative style of management and this is achieved by decentralizing & delegating its functions with empowerment at various levels in all spheres.

Delegation of Powers:

The empowerment up to the last level in the organization not only helps in effective & efficient functioning of the organization, but also generates self confidence and sense of responsibilities in the individual.

Table 10.20 Academics & Administration Powers

S.N.	Levels	Authority
1	Principal	Ensure implementation of MOM of Governing Body meetings & execute day to day academic activities.
2	HOD's	To follow Principal's Instructions & ensure progress on advisory board meeting objectives.
3	Faculty	Compliance of all work delegated by HOD/Principal in respect of day to day activities, daily lab performance etc.

Table 10.21 Expenditure (Annually) &Recurring:

S.N.	Levels	Authority
1	Secretary, Infotech Education Society	Full but not exceeding budget limit as approved by executive Committee. It is the responsibility of principal to take sanction of secretary for the expenses.
2	Principal	3,00,000/ For expenses more than 3,00,000/ approval of the society will be required after approval of executive committee.
3	HOD's	25,000/-
4	Coordinators/ Committee Heads	25,000/-

Table 10.22 Infrastructure development & maintenance (Recurring):

S.N.	Levels	Authority
1	Secretary, Infotech Education Society	Full but not exceeding budget limit as approved by executive Committee.

Table 10.23 Laboratory Instruments/Library / Computer Peripherals/ Infrastructure/ equipment:

S.N.	Levels	Authority
1	Secretary, Infotech Education Society	Full but not exceeding budget limit as approved by executive Committee.
2	Principal	3,00,000/ Decision of purchase committee and final purchase action to be informed to secretary by the Principal.
3	HOD's	25,000/

Table 10.24 Power for sanction of Leave: (CL/EL/SL/ML):

S.N.	Levels	Authority
1	Secretary, Infotech Education Society	Sanctioning authority of Leave for Principal
2	Principal	Full for HOD/ Faculty/ Staff(For more than 3 days leave)
3	HOD's	To sanction Leave upto 3 days for Faculty/ Lab I/C. Beyond this application & will be submitted to the Principal.

Table 10.25 Utilization of financial powers for each of the assessment years

Designation	**Decision Amount**	**2020-21**	**2019-20**	**2018-2019**
Principal	3,00,000/ Decision of purchase committee and final purchase action to be informed to secretary by the Principal.	To promote the growth of Academic activities. (like repairing of instruments, college level cultural, sports, technical events etc)	To promote the growth of Academic activities. (like repairing of instruments, college level cultural, sports, technical events etc)	To promote the growth of Academic activities. (like repairing of instruments, college level cultural, sports, technical events etc)
HODs	25,000/	To Spend for different departmental activities (like stationary, industrial visits expenditures, cultural events, models,	To Spend for different departmental activities (like stationary, industrial visits expenditures, cultural events, models,	To Spend for different departmental activities (like stationary, industrial visits expenditures, cultural events, models,

		projects, sports, lab manuals, charts etc.)	projects, sports, lab manuals, charts etc.)	projects, sports, lab manuals, charts etc.)
Coordinators/ Committee Heads	25,000/	To Spend for their committee activities (assembly activity gifts, T&P activities, scholarship tests gifts, Grievances etc.)	To Spend for their committee activities (assembly activity gifts, T&P activities, scholarship tests gifts, Grievances etc.)	To Spend for their committee activities (assembly activity gifts, T&P activities, scholarship tests gifts, Grievances etc.)

10.1.5. Transparency and availability of correct/unambiguous information in public domain

Information about the institute, infrastructure and facilities are being hosted on the institute Website: http://www.icot.co.in/ along with information of procedure related to admission, academic, & placement.

10.2. Budget Allocation, Utilization, and Public Accounting at Institute level (30)

10.2.1 Adequacy of Budget allocation (10)

Table 10.26 Adequacy of Budget allocation

S.No.	Financial Year	Request Budget	Approved Budget	Adequate/Not Adequate
1	2020-21	89875000	89875000	Adequate
2	2019-20	89650000	89650000	Adequate
3	2018-19	106967700	106967700	Adequate
4	2017-18	101015600	101015600	Adequate

10.2.2 Utilization of allocated funds (15)

Table 10.27 Utilization of allocated funds

S.No.	Financial Year	Approved Budget	Actual Expenditure	Percentage Utilization
1	2020-21	89875000	92154598	102.53%

2	2019-20	89650000	87260501	97.33%
3	2018-19	106967700	104935274	98.10%
4	2017-18	101015600	102025628	101.0%

Table 10.28 Summary of Current financial year's budget and actual expenditure incurred (for the institution exclusively) in the three previous financial years

Financial Year	Total Income				Actual expenditure			Total no. of students
	Fee	Govt	Grant	Other sources	Recurring including salaries	Non Recurring	Special Projects/ Any other, specify	Expenditure per student
2020-21	91128491	0	0	2273160	83093663	9060935	0	31865
2019-20	90105084	0	0	2558440	79288776	7971725	0	29302
2018-19	119916312	0	0	0	86310289	18624985	0	37733
2017-18	112430933	0	0	0	85355871	16669757	0	39560

Table 10.29 Actual expenditure incurred

Item	Budgeted 2020-21	Actual Expenses 2020-21	Budgeted 2019-20	Actual Expenses 2019-20	Budgeted 2018-19	Actual Expenses 2018-19	Budgeted 2017-18	Actual Expenses 2017-18
Infrastructure Built up	7000000	6680950	5000000	4500000	16000000	15999000	15000000	14549361
Library	750000	757640	1200000	1150000	700000	675329	600000	575711
Laboratory equipment	2700000	1622345	2400000	2321725	2000000	1950656	1600000	1544685
Laboratory Consumables	850000	762600	1000000	950525	850000	825000	800000	729050
Teaching and non teaching staff salary	41000000	40430630	38000000	37261930	28500000	28438628	26500000	26098142

Maintenance and spares	425000	359961	400000	313010	650000	600391	1050000	1025055
R & D	1150000	1023275	1000000	930250	800000	770250	600000	570260
Training & Travel	1000000	776945	2500000	2134619	3600000	3500191	3700000	3662105
Miscellaneous	1400000	1308333	2400000	2291762	7700000	7481494	2300000	1210302
Others	33600000	38431919	35750000	35406680	46167700	44694335	48865600	52060957
Total	89875000	92154599	89650000	87260501	106967700	104935274	101015600	102025628

10.2.3 Availability of the audited statements on the institutes website (5)

Audited statements for the financial years 2020-21,2019-20, 2018-19 and 2017-18 are available on College website www. http://www.icot.co.in/

10.3 Program Specific Budget Allocation, Utilization (30)

10.3.1 Adequacy of Budget allocation(10) Table 10.30 Adequacy of Budget allocation

S.No.	Financial Year	Request Budget	Approved Budget	Adequate/Not Adequate
1	2020-21	12485000	12485000	Adequate
2	2019-20	14351000	14351000	Adequate
3	2018-19	16140000	16140000	Adequate
4	2017-18	14160000	14160000	Adequate

10.3.2 Utilization of allocated funds (20)

Table 10.31 Utilization of allocated funds

S.No.	Financial Year	Approved Budget	Actual Expenditure	Percentage Utilization
1	2020-21	12485000	12901644	103.34%
2	2019-20	14351000	13961681	97.29%
3	2018-19	16140000	15740291	97.52%
4	2017-18	14160000	14283588	100.87%

Table 10.32 Summary of Current financial year's budget and actual expenditure incurred (for the institution exclusively)in the three previous financial years.

	Total Budget		Actual expenditure			
Financial Year	**Non Recurring**	**Recurring**	**Non Recurring**	**Recurring**	**Total no. of students**	**Expenditure per student**
2020-21	1463000	11022000	1268531	11633113	365	35347
2019-20	1376000	12975000	1275476	12686205	391	35708
2018-19	2805000	13335000	2793748	12946543	364	43243
2017-18	2408000	11752000	2333766	11949822	299	47771

Table 10.33 actual expenditure incurred

Item	Budgeted 2020-21	Actual Expenses 2020-21	Budgeted 2019-20	Actual Expenses 2019-20	Budgeted 2018-19	Actual Expenses 2018-19	Budgeted 2017-18	Actual Expenses 2017-18
Laboratory equipment	105000	106070	192000	184000	105000	101299	84000	80600
Software	100000	82180	125000	99320	150000	101851	75000	44324
Laboratory Consumables	119000	106764	160000	152084	127500	123750	112000	102067

Maintenance and spares	60000	50395	64000	50082	97500	90059	147000	143508
R & D	161000	143259	160000	148840	120000	115538	84000	79836
Training & Travel	140000	108772	400000	341539	540000	525029	518000	512695
Miscellaneous expenses	11800000	12304205	13250000	12985816	15000000	14682766	13140000	13320559
Total	12485000	12901644	14351000	13961681	16140000	15740291	14160000	14283588

10.4. Library and Internet

10.4.1. Quality of learning resources (hard/soft)

Institutes has library which is well stocked with books, journals, e-book, e journals. Students are allowed to go to the library in library hour as mentioned in time table and thus encourage reading habit. Beside this library is also open after college hour to facilitate its optimum use. The following process is used to meet the criteria.

1. A wide range of reading materials, learning resources and information helps to support the Development of successful learners and confident individuals.
2. Promoting independent learning skills supports lifelong learning and encourages students to grow as responsible citizens.
3. Every year books, magazines, journals are added as per the needs of staff and students. for research. Introduction of e-journals for faculty and students.
4. Library hours are mentioned in the time table.
5. Wi-Fi enabled campus.

Library details:

Zero deficiency report was received by the Institution for all the assessment years.

Table 10.34 Digital Library

Availability of Digital Library Contents: Yes Following digital contents are made available	
Content	Accessibility
NPTEL Video Lecture	Access Provided to NPTEL Video Lecture Content
National Digital Library of India (NDL) IIT Kharagpur	Membership to NDL Digital Library of India
Departmental Library	Available
Access to RGPV Library	Access provided to open source Journals & e-Books.
Institutional Repository	Access provided to open source e-Books, e-Journals , previous year question papers, faculty publications etc.

Note: Library books issued at a time to faculty – 2 and for students – 5.

DELNET: By using DELNET software, students and faculty will get HOD and concerned subject faculty recommends the books to be purchased for the college before commencement of each semester.

Computer & internet facility:

Institution has total 492 computer nodes with 100 Mbps BSNL Leased line facilities. The Central computer Lab is on ground floor in which all the facilities are maintained. This central computer lab has different labs according to the programs and need of students. The total nodes of this central computer lab are 492.

Another Computer lab is on First Floor which has with dual core 50 nodes. The Specification of nodes is:

60 Computers with 3.2 GHz Processor dual core

- HDD: 320GB
- RAM: 2 GB
- Monitor: 15''TFT
- Keyboard: Multimedia
- Mouse: Optical

100 Computers with 2.4 GHz Processor dual core

- HDD: 160GB
- RAM: 2 GB
- Monitor:18.5''TFT
- Keyboard: Multimedia
- Mouse: Optical

70 Computers with 3.2 GHz Processor Dual Core

- HDD: 500 GB
- RAM: 4 GB
- Monitor:18.5''TFT
- Keyboard: Multimedia
- Mouse: Optical

60 Computers with 3.2 GHz Processor Core I3

- HDD: 500 GB
- RAM: 4 GB
- Monitor:18.5''TFT

- Keyboard: Multimedia
- Mouse: Optical

60 Computers with 2.8 GHz Processor Dual Core

- HDD:250 GB
- RAM : 2 GB
- Monitor: 18.5” TFT
- Keyboard: Multimedia
- Mouse: Optical

100 Computers with 2.8 GHz Processor Dual Core

- HDD:250 GB
- RAM : 2 GB
- Monitor: 18.5” TFT
- Keyboard: Multimedia
- Mouse: Optical

50 Computers 2.2 GHz Dual Core Processor

- HDD: 80GB
- RAM: 1 GB
- Monitor: 15’’TFT
- Keyboard: Multimedia
- Mouse: Optical

Institution has servers for facilitating the service to different labs.

2 Servers with

- Prolient G7 HP
- HDD: 500GB
- RAM: 8 GB
- Monitor:17’’TFT
- Keyboard: Multimedia
- Mouse: Optical
- LAN Port -2

1-Server -Intel Xeon 2.0 GHz (2700 SO)

- HDD: 250GB
- RAM: 4 GB
- Monitor:15’’LCD
- Keyboard: Multimedia
- Mouse: Optical
- LAN Port -2

1-Server -Intel Xeon 2.0 GHz (1000 AH)

- HDD: 250GB
- RAM: 4 GB
- Monitor:15’’LCD
- Keyboard: Multimedia
- Mouse: Optical
- LAN Port -2

Computer-student ratio:

Institution has provided a facility of labs for practical knowledge development in computer science department as well as other departments. As per the schedule for the academics, we have ratio of 1:4 for UG students & 1:2 for PG students.

Stand alone facility

- Institution has standalone facilities like FAX & Photocopy Machine for immediately facilitating the work.
- All the labs are Air conditioned.
- Center having UPS and DG (Diesel Generator) for Power backup

LAN facility

- LAN facility is available in college on class A & B with range of IP address.
- 172.16.0.1 onwards with 500 users
- 10.0.0.1 onwards with 500(Required if one link fails)*Wi-Fi facility
- Institution has Wi-Fi facilities specific area of the campus.

Licensed software

System Software:

- Microsoft Visual Studio 2016

- Windows Server (2008, 2012 R2 - Standard)
- Windows 10 (Professional)
- Windows 7
- Windows Vista (Business and Enterprise)
- Microsoft SQL Server (2008,2012)

Application Software:

- Dev C/ C++
- Borland C/C++
- Oracle 11g
- Quick Heal Total Security
- Communicative English Language (KVAN Software)

Open Source:

- Ubuntu 14.0.4
- JDK 7.4.1
- Eclipse
- Code-block
- Windows SDK
- Sun java wireless toolkit 2.5.2_01 for cldc
- Mozilla fire fox
- Winrar
- Acrobat reader
- Python software

Number of nodes/ computers with Internet facility

All 492 Computers have internet facility.

Institution has facilities for power backup comprising of UPS & power generator. All computers are attached with power backup system. All Labs have individual Air Conditioners. Moreover, some of the labs are certified & assigned to the work for:

- Centre of Excellence (COE) of IBM (India)
- Microsoft Innovation Centre (MIC) by Microsoft (India)
- I IT Bombay Remote Centre

Support to students for self-learning activities

- College is conducting Subject Expert webinars.
- Special E- Board Lectures to the students.
- Teachers liberally take help of the ICT resources to enrich their prescribed curriculum.
- College is providing on line NPTEL video material.
- Faculty members are provided with computers with internet browsing facility for preparation of teaching/learning materials in their respective departments.
- Multimedia projectors, OHPs are available within the college for the use of faculty.
- College has seminar halls equipped with projectors and are available as and when requested by a particular teacher.

- For completion of assignment, students browse the information from internet and self learning facilities are also available at the library.
- Given online quizzes on internet and assessments.
- Lab like IBM (Centre of Excellence), MIC(Microsoft Innovation Centre), Remote centre(IIT Bombay & Kharagpur) have been established and on the basis of these various certifications programs and Seminars are organized on regular basis.

Internet service is available in the college for faculty and students. Institution has two internet lines for availing the facility:

- BSNL Leased Line (100 Mbps)
- Jio (10 Mbps)

The campus is Wi-Fi enabled & internet is secured with firewall for all the connections. These connections are used alternatively & in case are link goes down, then another link is used to resume the facilities of Internet. For off campus students, the internet facility with password is provided. For any type of information / updates Group has its own website www.icot.co.in

There are separate lab facilities available for all departments with Vodafone & BSNL line Internet connectivity. Also all department HODs, staff rooms, Examination Room and different cells have the facility of high speed internet connectivity.

Library is equipped with 12 nos. of PCs with high internet & Del-net facility systems and the area is fully Wi-Fi zone.

For the security purpose the firewall have been installed in all the PCs and some where main points the quick heal antivirus have also installed for the security purpose.

10.4.2. Internet

- Name of the Internet provider: **BSNL & Jio**
- Available bandwidth: **100 Mbps & 10 Mbps**
- Wi-Fi availability: **Yes**
- Internet access in labs, classrooms, library and offices of all Departments: **Yes**
- Security arrangements: **Yes**

Declaration

The head of the institution needs to make a declaration as per the format given below: I undertake that, the institution is well aware about the provisions in the NBA's accreditation manual concerned for this application, rules, regulations, notifications and NBA expert visit guidelines in force as on date and the institute shall fully abide by them. It is submitted that information provided in this Self-Assessment Report is factually correct. I understand and agree that an appropriate disciplinary action against the Institute will be initiated by the NBA in case any false statement/information is observed during pre-visit, visit, post visit and subsequent to grant of accreditation.

Date: 22/09/2021

Signature & Name

PRINCIPAL
IES College of Technology
BHOPAL

Place: Bhopal

Dr. Gyanendra Kumar Pandey

Head of the Institution with seal