IQAC works effectively towards quality achievement, enhancement and sustenance by establishing all procedures in curricular aspects, teaching-learning processes, research activities, learning resources, student support services and progression, governance, leadership and management activities etc. and ensures the implementation, review and evaluation of all the policies, procedures and contributes significantly. IQAC quality initiatives, IQAC minutes of meeting during the year and Outcomes-based Education (OBE) faculty manual are attached below:

1. IQAC initiatives-2020-21

ADITYA COLLEGE OF ENGINEERING

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IQAC QUALITY INITIATIVES

A Y: 2020-21

1. To conduct orientation programme for the first year students
2. Signing of MOAs/MOUs with Industries/NGOs/Research Institutions
3. To participate in various College Rankings-NIRF & ARIIA
4. To establish Centre of Excellences in various departments
5. Conducting Workshops/Guest Lectures/FDPs/Conferences/Sports Activities
6. Technical Skill Trainings to Students for Placements
7. To implement Mentor Mentee System
8. To conduct SWAYAM/MOOCs workshop on how to create ICT lectures
9. To conduct soft skill training for UG Students
10. To conduct gender sensitization to all the faculty and students
11. Signing of MOAs/MOUs with Industries/NGOs/Research Institutions
12. Laboratory equipment and library procurements
13. Preparation of research project proposals & writing scientific/research articles
14. Review of result analysis of first semester
15. Internships for pre-final year students
16. Placement for the pre-final year students and higher education
17. Start-ups and Incubation centers to all the UG Students
18. Redressel of grievances received by stake holders
19. To take the Performance Appraisals of Teaching and Non-TeachingMembers
20. Preparation of annual report and conduct of Academic Administrative Audit.

inator-IQAC

Principal

PRINCIPAL
Aditya College of Engineering
SURAMPALEM-533 437

2. IQAC Minutes - 2020-21

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Ref: ACOE/IQAC/2020-21/Constitution of IQAC

30-03-2020

CIRCULAR

The undersigned is pleased to constitute the Internal Quality Assurance Cell (IQAC) with the following members for the academic year 2020-21:

S. No.	Name of the person	Designation	Role
1	Dr A. Ramesh	Professor of EEE & Principal	Chairman
2	Sri N. Satish Reddy	President, Sarojini Educational Society	Management Member
3	Dr M. Srinivasa Reddy	Educationist	Member
4	Dr Pullela S.V.V.S. R. Kumar	Dean (A & A)	Member
5	Prof. G. Rama Krishna	HoD-ECE	Member
6	Prof. K. Manoj Kumar Reddy	HoD-EEE	Member
7	Prof. G.S.N. Murty	HoD-CSE	Member
8	Prof. Y.K.S. Subba Rao	HoD-ME	Member
9	Prof. G. Naresh	HoD-CE	Member
10	Prof. V. Anil Kumar	HoD-PT	Member
11	Prof. N. Punnapu Chandrudu	HoD-Management Studies (MBA)	Member
12	Prof. M. Srinivasu	HoD-H&BS	Member
13	Dr G. Meenakshi Sundaram	Professor-ECE	Senior staff Member
14	Sri T. Veeraaju	Associate Professor-CSE	Senior staff Member
15	Sri Kunche Raja	Sarpanch/Secretary-Gandepalli Panchayat	Local Community Member
16	Sri Karri Rama Reddy	General Manager, Vinayaka Boards, Peddapuram	Industry Nominee
17	Smt. Pilli Sumalatha	Asst. Manager, Poorna Textiles, Peddapuram	Industry Nominee
18	Sri Krishna Reddy	CEO & MD, Krify Software Technologies Pvt. Ltd.	Industry Member
19	Sri T.N.V.S. Rama Chandran	Administrative Officer	Member
20	Mr B. Chandra Mouli	--	Parent Member
21	Mr P. Aditya Sashank	IV Year B. Tech. (CSE)	Student Member
22	Ms V. Swathi Sri Valli	II year B. Tech. (ECE)	Student Member
23	Mr E. Ramakrishna Chaitanya	Alumni	Alumni Member
24	Dr D.V.S.S.S.V. Prasad	Professor-ME	Coordinator

Functions of the committee:

1) Development and application of quality benchmarks /parameters for various academic and administrative activities of the institution.
2) Facilitate the creation of a learner-centric environment conducive to quality education and faculty maturation to adopt the required knowledge and technology for the participatory teaching and learning process.
3) Arrangement for feedback response from students, parents and other stakeholders on quality-related processes of institution.
4) Dissemination of information on various quality parameters of higher education.

5) Organize inter and intra institutional workshops, seminars on quality related themes and promotion of quality circles.
6) Documentation of the various programmes/activities leading to quality improvement.
7) Act as a nodal agency of the institution for coordinating quality-related activities including adoption and dissemination of best practices.
8) Development and maintenance of institutional database through MIS for the purpose of maintain/enhance the institutional quality.
9) Development of quality culture in the institution.
10) Preparation of the Annual Quality Assurance Report (AQAR) as per the guidelines and parameters of NAAC and to be submitted to NAAC.

PRINCIPAL

Cc to Members of IQAC

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Ref: ACOE/IQAC/2020-21/1/Circular

30-03-2020

CIRCULAR

All the members of the IQAC are hereby informed that online meeting will be held on 01st April 2020 at 10 AM with the following agenda:

AGENDA

1) Welcome address by Chairman
2) Review of academics and other related activities during pandemic situation
3) Re-accreditation work of NAAC
4) Any other point

Therefore, all the members of IQAC are requested to join the meeting using Microsoft Teams and the meeting link will be shared soon.

PRINCIPAL

Cc to: All members of IQAC

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Ref: ACOE/IQAC/2020-21/1/Minutes

02-04-2020

MINUTES OF IQAC
AY 2020-21

Date of meeting	01st April 2020	Duration	10 AM to 11 AM
Venue	Microsoft Teams Online meeting		
Reference	Ref: ACOE/IQAC/2020-21/1/Circular dated 30th March 2020		

The meeting of IQAC of Aditya College of Engineering held with the following agenda:

AGENDA

1) Welcome address by Chairman
2) Review of academics and other related activities during pandemic situation
3) Re-accreditation work of NAAC Any other point
4) Any other point

The online meeting of IQAC Cell was commenced with the welcome note by Coordinator-IQAC to all the members present. The Convener presented the agenda along with recommendations and requested the Chairman to take over the session. The points of the agenda were discussed and the resolutions were made.

The Chairman-IQAC welcomed all the members to first ever online meeting of IQAC. Further, Chairman reviewed the situation and discussed about the points of agenda.

- Government of India imposed the restrictions and complete lockdown amid COVID-19
- Class work is suspended by the university till further instructions
- Syllabus coverage for AY 2019-20 semester 2 is on the verge of completion
- Semester-end examinations of semester 2 of AY 2019-20 are postponed
- Campus is closed and all the students and staff members who are residing in hostels have been asked to vacate and stay safe at their homes as COVID-19 has become more contagious now and most of the people are infected
- WhatsApp groups are created for all the teaching and non-teaching staff members to pass on any information.

MINUTES & RESOLUTIONS

Members discussed and noted the points and seriousness of the situation and the following resolutions are made:

1) Members discussed about the class work and resolved that classes should be conducted online using Microsoft Teams application as the physical presence of staff and students is not possible.

2) The Chairman enquired about the coverage of syllabus and it is resolved that the left-over syllabus for all classes should be completed online.

3) The Chairman discussed and advised all the members to attend all the meetings online only

4) Members discussed about the meetings with stakeholders and resolved to organize meetings with stakeholders online. Chairman advised all heads of the departments to monitor and organize the meetings carefully.

5) Chairman advised to organize all the seminars, guest lectures and workshops online only and the same is resolved.

6) The Chairman proposed about the global certifications and the members discussed about the courses being offered by the organizations and it is resolved to encourage students and staff members to take up online certifications from NPTEL-SWAYAM, CoursEra, Udemy, Alison etc.

7) Members unanimously resolved that heads of the departments and staff members should be in touch with each other and review the situation and health condition of staff members and students.

8) Apart from global certifications, it was discussed by the members that T-Hub can conduct online training sessions for all the students and The Chairman accepted and issue necessary instructions to the concerned.

9) Members discussed about the availability of laptops with all the students and it is resolved that all the students should procure laptops to attend online trainings/classes. Further, the Chairman advised to heads of departments to check the availability of laptops with the students and submit a report soon.

10) The Chairman stated that vaccine is not available for COVID-19 and still under development and advised everyone to be safe and take necessary precautions.

11) The Chairman advised that all the staff members are to continue NAAC re-accreditation work at their homes and review will be conducted online.

The meeting was concluded with thanks to the Chair.

Members attended the meeting on 01st April 2020

S. No.	Name of the person	Role	Signature
1	Dr A. Ramesh	Chairman	
2	Sri N. Satish Reddy	Management Member	N. Satish Reddy
3	Dr M. Srinivasa Reddy	Member	
4	Dr Pullela S.V.V.S. R. Kumar	Member	
5	Prof. G. Rama Krishna	Member	
6	Prof. K. Manoj Kumar Reddy	Member	
7	Prof. G.S.N. Murty	Member	
8	Prof. Y.K.S. Subba Rao	Member	
9	Prof. Ch. Naresh	Member	
10	Prof. T. Anil Kumar	Member	
11	Prof. N. Punnapu Chandrudu	Member	
12	Prof. M. Srinivasu	Member	

13	Dr G. Meenakshi Sundaram	Senior staff Member	
14	Sri T. Veeraaju	Senior staff Member	
15	Sri Kunche Raja	Local Community Member	
16	Sri Karri Rama Reddy	Industry Nominee	
17	Smt. Pilli Sumalatha	Industry Nominee	
18	Sri Krishna Reddy	Industry Member	
19	Sri T.N.V.S. Rama Chandran	Member	
20	Mr B. Chandra Mouli	Parent Member	
21	Mr P. Aditya Sashank	Student Member	
22	Ms V. Swathi Sri Valli	Student Member	
23	Mr E. Ramakrishna Chaitanya	Alumni Member	
24	Dr D.V.S.S.S.V. Prasad	Coordinator	

Coordinator-IQAC

PRINCIPAL

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Ref: ACOE/IQAC/2020-21/2/Circular

03-11-2020

CIRCULAR

All the members of the IQAC are hereby informed that a meeting will be held on 10th November 2020 at 10.30 AM in the Principal's chamber with the following agenda:

AGENDA

1) Review of resolutions made in previous meeting
2) Proposal to apply for NAAC reaccreditation
3) Permanent affiliation awarded by the University
4) Review of Academic and R &D activity
5) Apply for Approved Research Centre in our college
6) Review of results
7) Organize meetings with the stakeholders
8) Organize academic audits
9) Plan to conduct Workshop/Seminar on IPR, Gender Equality, innovative practices
10) Plan to offer more skill-based certificate courses through APSSDC/T-Hub
11) Plan to encourage students to take up internships during summer
12) Requirement of faculty members and facilities as per R19 regulations
13) Plan for training to increase placements as well as in domain areas
14) Encourage students and staff members to appear for NPTEL-SWAYAM courses
15) Recommendations from IQAC
16) Any other point

Therefore, all the members of IQAC are requested to attend the meeting.

PRINCIPAL

Cc to: All members of IQAC

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Ref: ACOE/IQAC/2020-21/2/Minutes

10-11-2020

MINUTES OF IQAC
AY 2020-21

Date of meeting	10th November 2020	Duration	10.30 AM to 11.30 AM
Venue	Principal's chamber		
Reference	Ref: ACOE/IQAC/2020-21/2/Circular dated 03.11.2020		

The meeting of IQAC of Aditya College of Engineering held with the following agenda:

AGENDA

1) Review of resolutions made in previous meeting
2) Proposal to apply for NAAC reaccreditation
3) Permanent affiliation awarded by the University
4) Apply for Approved Research Centre in our college
5) Review of Academic and R &D activities
6) Review of results
7) Organize meetings with the stakeholders
8) Organize academic audits
9) Plan to conduct Workshop/Seminar on IPR, Gender Equality, innovative practices
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12) Requirement of faculty members and facilities as per R19 regulations
13) Plan for training to increase placements as well as in domain areas
14) Encourage students and staff members to appear for NPTEL-SWAYAM courses
15) Recommendations from IQAC
16) Any other point

The meeting of IQAC was commenced with the welcome note by the Chairman.

MINUTES & RESOLUTIONS

Members discussed the points of agenda elaborately and the following resolutions are made:

1) The Chairman reviewed the resolutions made based on the points of agenda in the earlier meeting.

2) The Chairman enquired about the NAAC work and reviewed the work progress and advised all the members to be ready for NAAC reaccreditation and it is resolved to apply for NAAC reaccreditation.

3) The Chairman notified to all the members that permanent affiliation status was granted by Jawaharlal Nehru Technological University (JNTUK).

4) The Coordinator-IQAC proposed to apply for approved research centre and the Chairman and all the members unanimously resolved to apply for the same to the University. Further, Chairman advised the heads of the departments to check for the eligibility and other conditions and submit the relevant information.

5) The Chairman enquired about the academic and R & D activities during the academic year and the members presented the review of online class work and about the R & D Activities that are happened.

6) The Chairman notified the members that the academic year got delayed due to pandemic and IV Year B. Tech. Semester 2 end examinations were conducted during September 2020 and the results were declared during October 2020 and department wise results were reviewed.
The pass percentage of CE-98.21%; EEE-85.06%; ME-93.5%; ECE-74.47%; CSE-78.07% and PT-90% and overall pass percentage at college level is 83.5%.
The Chairman appreciated all the heads of departments and faculty members for their efforts and anticipated the same in future.

7) Members proposed to organize meetings with stakeholders and the Chairman accepted and advised to organize the meetings with stakeholders online. The same is resolved unanimously.

8) The Chairman alerted all the members about the teaching-learning processes, conduct of examinations and evaluation. Further, it is anticipated by the Chair that all the marks and attendance particulars are to be noted properly and these processes will be subjected to Academic Audit internally first. Teams will be constituted for this purpose to conduct audit smoothly.

9) Heads of the departments submitted to the chair the details of Seminars/workshops/certificate courses/internships/industrial visits conducted/organized. The Chairman advised to follow the same trend in organizing various activities. Further, he advised to organize seminars/lectures on IPR/Gender equality/Innovative practices online by inviting experts.

10) Members proposed that T-Hub should offer training programmes to UG students and the Coordinator-IQAC suggested few courses to offer which were discussed by the members and all the courses were accepted and approved by the Chairman.

11) IQAC Coordinator proposed to encourage and motivate the students to take up online internships during pandemic situation as well as during the summer also. Members discussed about internships and Chairman advised the members to motivate the students to take up the internships and the same has been resolved.

12) The Chairman reviewed the current scenario of faculty strength and facilities in the college as per R19 academic regulations and advised the heads of the departments to submit the information soon.

13) Members proposed to offer training to increase placements which attract more number of admissions and discussed elaborately. Chairman accepted that training will be provided by T-Hub regularly and advised to offer training in emerging areas of respective domains which helps the students to gain technical knowledge further.

14) IQAC Coordinator proposed to increase registrations of NPTEL-SWAYAM courses and the Chairman readily accepted and advised the members to motivate the students and staff members to take up NPTEL-SWYAM online courses to gain more exposure and knowledge.

15) IQAC Coordinator recommended the following:
    - All the activities should be conducted either online or offline, if possible
    - To introduce skill-based certificate courses
    - To increase research publications
    - To improve the quality in projects
    - To increase the Professional Bodies memberships along with reimbursement/incentive

Members discussed all the above recommendations of IQAC elaborately and the Chairman advised to organize the activities, skill-based certificate courses and further advised the members to encourage faculty members to publish their research work and the same is resolved.
Further, The Chairman asked the members to focus on the projects and their quality and advised to plan for working models to be prepared by students to gain hands-on experience.

Chairman advised the members to associate with domain-specific professional bodies by taking the memberships to gain the exposure to outside world. Further, he added that the proposal of reimbursement of membership fee will be notified shortly.

16) The Chairman enquired and discussed with the parent and students about the teaching and learning process and about the other facilities of the college to improve the system further.

Finally, the Coordinator and the Chairman thanked all the members present and appreciated their effort and commitment exhibited towards accreditation process and anticipated the same in future also.

The meeting was concluded with thanks to the Chair.

Members attended the meeting

S. No.	Name of the person	Role	Signature
1	Dr A. Ramesh	Chairman	
2	Sri N. Satish Reddy	Management Member	
3	Dr M. Srinivasa Reddy	Member	
4	Dr Pullela S.V.V.S. R. Kumar	Member	
5	Prof. G. Rama Krishna	Member	
6	Prof. K. Manoj Kumar Reddy	Member	
7	Prof. G.S.N. Murty	Member	
8	Prof. Y.K.S. Subba Rao	Member	
9	Prof. Ch. Naresh	Member	
10	Prof. T. Anil Kumar	Member	
11	Prof. N. Punnapu Chandrudu	Member	
12	Prof. M. Srinivasu	Member	
13	Dr G. Meenakshi Sundaram	Senior staff Member	
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18	Sri Krishna Reddy	Industry Member	
19	Sri T.N.V.S. Rama Chandran	Member	
20	Mr B. Chandra Mouli	Parent Member	
21	Mr P. Aditya Sashank	Student Member	
22	Ms V. Swathi Sri Valli	Student Member	
23	Mr E. Ramakrishna Chaitanya	Alumni Member	
24	Dr D.V.S.S.S.V. Prasad	Coordinator	

Coordinator-IQAC

PRINCIPAL

3. Outcome based Education(OBE) faculty hand book

OUT COME - BASED EDUCATION

Outcomes-based Education (OBE): It is a comprehensive approach to organizing and operating a curriculum that is focused on and defined by the successful demonstrations of learning sought from each learner. The term clearly means focusing and organizing everything in an education system around "what is essential for all learners to be able to do successfully at the end of their learning experiences".

OBE ultimately implies emerging with a vivid idea of what is important for learners to be able to do thereafter developing the programmes for learning, implementing it and assessing the learner on a continuous basis to ensure that learning has ultimately taken place. The outcomes-based approach to education requires developing a clear set of outcomes organized into the system's subjects and Establishing conditions and opportunities within the system to enable and encourage learners to achieve these outcomes.

The Shift from Content-based Education to Outcome-based Education The aim of education is to prepare learners for life in society and for performing tasks. It is the intention of the outcomes-based approach to focus as much on the process of learning and the final outcome or result, as on the knowledge and skills. In this way, the process of achieving outcomes during the process of learning can be related directly to the way in which outcomes are achieved in the world of work. The purpose of OBE is to increase the knowledge and skills of the learners. By introducing OBE, opportunities may arise for who's academic or career paths were stifled due to their prior knowledge not being assessed and certified.

Focus and Benefits of OBE: OBE addresses the following key questions:

- What do we want the students to have or be able to do?
- How can we best help students achieve it?
- How will we know whether they students have achieved it?
- How do we close the loop for further improvement (Continuous Quality Improvement?

Benefits of OBE:

- Graduates will be more "relevant" to industry & other stakeholders (more well rounded graduates)
- Continuous Quality Improvement (CQI) is in place. OBE shifts from measuring input and process to include measuring the output (outcome).

OBE System

Some important aspects of the Outcome Based Education:

1. Course: It is defined as a theory, practical or theory cum practical subject studied in a semester. For Eg. Engineering Mathematics

2. Course Outcome (CO): Course outcomes are statements that describe significant and essential learning that learners have achieved, and can reliably demonstrate at the end of a course. Generally three or more course outcomes may be specified for each course based on its weightage.

3. Programme: It is defined as the specialization or discipline of a Degree. It is the interconnected arrangement of courses, co-curricular and extracurricular activities to accomplish predetermined objectives leading to the awarding of a degree. For Example: B.E., Marine Engineering

4. Programme Outcomes (POs): Program outcomes are narrower statements that describe what students are expected to be able to do by the time of graduation. POs are expected to be aligned closely with Graduate Attributes.

5. Program Educational Objectives (PEOs): The Programme Educational Objectives of a program are the statements that describe the expected achievements of graduates in their career, and also in particular, what the graduates are expected to perform and achieve during the first few years after graduation.

6. Programme Specific Outcomes (PSO): Programme Specific Outcomes are what the students should be able to do at the time of graduation with reference to a specific discipline. Usually there are two to four PSOs for a programme.

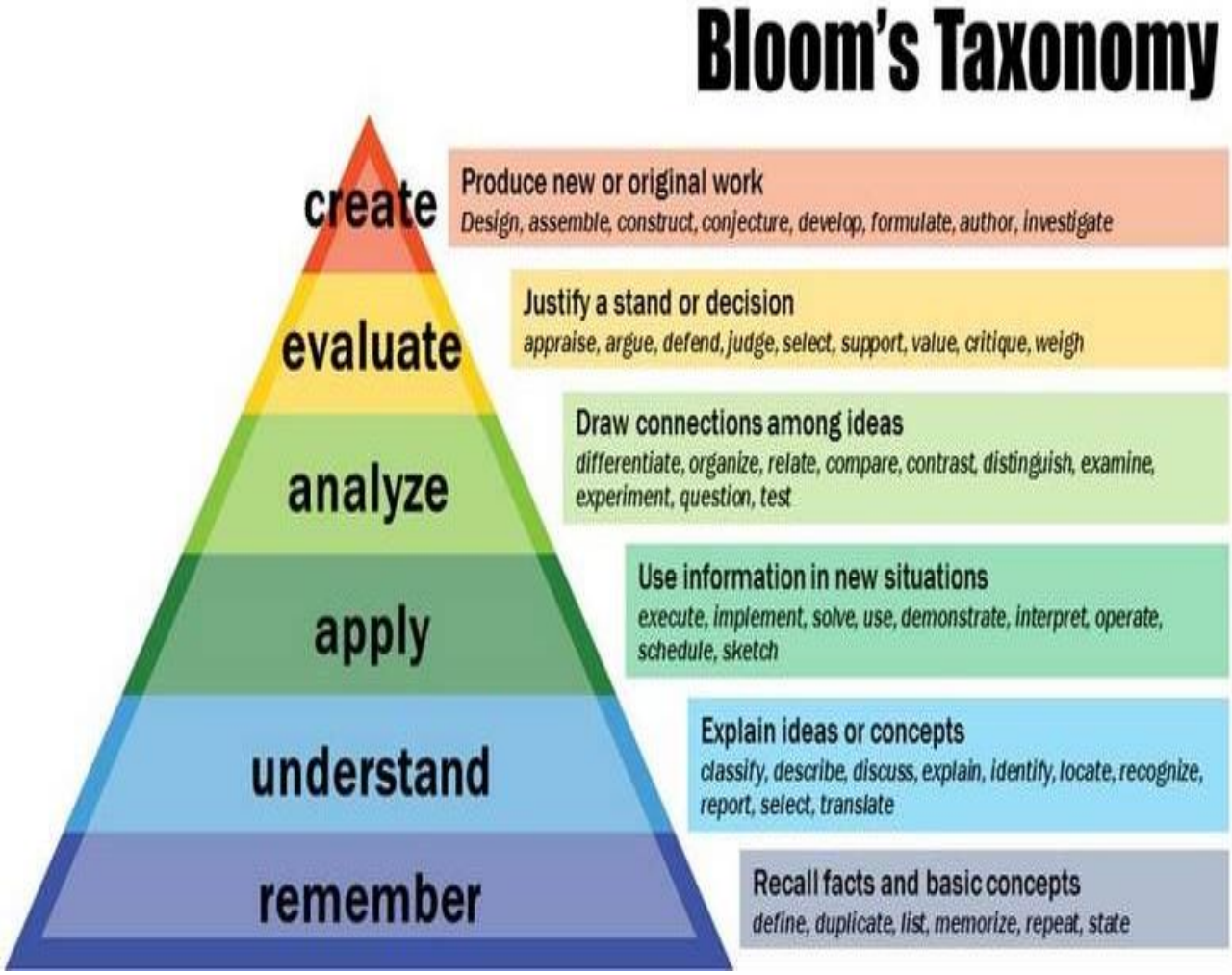
7. Graduate Attributes (GA): The graduate attributes, 12 in numbers are exemplars of the attributes expected of a graduate from an accredited programme

PROGRAM OUTCOMES (POs):

PO1	Engineering knowledge	An ability to apply knowledge of mathematics (including probability, statistics and discrete mathematics), science, and engineering for solving Engineering problems and Knowledge.
PO2	Problem analysis	An ability to design, simulate and conduct experiments, as well as to analyze and interpret data including hardware and software components.
PO3	Design / development of solutions	An ability to design a complex electronic system or process to meet desired specifications and needs.
PO4	Conduct investigations of complex Problem	An ability to identify, formulate, comprehend, analyze, design synthesis of the information to solve complex engineering problems and provide valid conclusions.
PO5	Modern tool usage	An ability to use the techniques, skills and modern engineering tools necessary for engineering practice
PO6	The engineer and society	An understanding of professional, health, safety, legal,
PO7	Environment and sustainability	The broad education necessary to understand the impact of engineering solutions in a global, economic, environmental and demonstrate the knowledge need for sustainable development
PO8	Ethics	Apply ethical principles, responsibility and norms of the engineering practice.
PO9	Individual and team work	An ability to function on multi-disciplinary teams.
PO10	Communication	An ability to communicate and present effectively
PO11	Project management and finance	An ability to use the modern engineering tools, techniques, skills and management principles to do work as a member and leader in a team, to manage projects in multi- disciplinary environments
PO12	Life-long learning	A recognition of the need for, and an ability to engage in, to resolve contemporary issues and acquire lifelong learning

BLOOM'S TAXONOMY

Bloom's Taxonomy was created in 1956 under the leadership of educational psychologist Dr Benjamin Bloom in order to promote higher forms of thinking in education, such as analyzing and evaluating concepts, processes, procedures, and principles, rather than just remembering facts. It is most often used when designing educational, training, and learning processes.



Domain	Keywords	Example
Remembering: Recall or retrieve previous learned information.	defines, describes, identifies, knows, labels, lists, matches, names, outlines, recalls, recognizes, reproduces, select, state.	Recite a policy. Quote Prices from memory to a customer. Recite the safety rules.
Understanding: Comprehending the meaning, translation, interpolation, and interpretation of instructions and problems. State a problem in one's own words.	comprehends, converts, defends, distinguishes, estimates, explains, extends, generalizes, gives an example, infers, interprets, paraphrases, predicts, rewrites, summarizes, translates	Rewrite the principles of test Writing. Explain in one's own words The steps for performing a complex task. Translate an equation into a Computer spread sheet.
Analyzing: Separates material or concepts into component parts so that its Organizational structure may be understood. Distinguishes between facts and inferences.	analyzes, breakdown, compares, contrasts, diagrams, deconstructs, differentiates, discriminates, distinguishes, identifies, illustrates, infers, outlines, relates, selects, separates	Troubleshoot a piece of equipment By using logical deduction. Recognize logical fallacies in reasoning. Gathers information from a department and selects the required tasks for training.

Evaluating: Make judgments about the value of ideas or materials.	appraises, compares, concludes, contrasts, criticizes, critiques, defends, describes, discriminates, evaluates, explains, interprets, justifies, relates, summarizes, supports	Select the most effective solution. Hire the most qualified candidate. Explain and justify a new budget.
Creating: Build a structure or pattern from diverse elements. Put parts together to form a whole, with emphasis on creating a new meaning or structure.	categorizes, combines, compiles, composes, creates, devises, designs, explains, generates, modifies, organizes, plans, rearranges, reconstructs, relates, reorganizes, revises, rewrites, summarizes, tells, writes	Write a company operations or process manual. Design a machine to perform as specific task. Integrate straining from several sources to solve a problem. Revises and process to improve the outcome.

COURSE OUTCOME STATEMENT

Course Outcomes (COs):

Statements indicating what a student can do after the successful completion of a course. Every Course leads to some Course Outcomes. The CO statements are defined by considering the course content covered in each module of a course. For every course there may be 5 or 6 COs. The keywords used to define COs are based on Bloom's Taxonomy.

CO – PO AND CO – PSO MAPPING OF COURSES

All the courses together must cover all the POs (and PSOs). For a course we map the COs to POs through the CO-PO matrix and to PSOs through the CO-PSO matrix as shown below. The various correlation levels are:

"1" – Slight (Low) Correlation

"2" – Moderate (Medium) Correlation

"3" – Substantial (High) Correlation

"-" indicates there is no correlation.

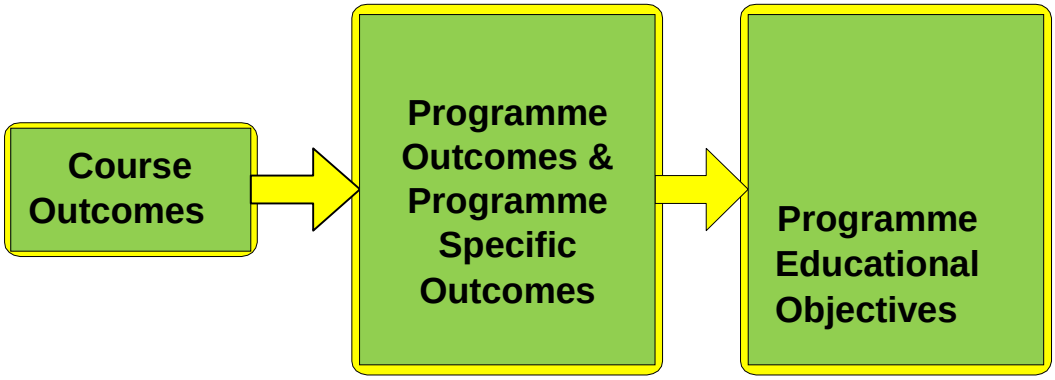
Levels of Outcomes

There are four levels of outcome such as Course Outcome (CO), Program Outcome (PO), Program Specific Outcome (PSO) and Program Educational Objective (PEO). Course Outcomes are the statements that declare what students should be able to do at the end of a course. POs are defined by Accreditation Agencies of the country (NBA in India), which are the statements about the knowledge, skills and attitudes, graduate attributes of a formal engineering program should have. Graduates Attributes (GAs) are the components indicative of the graduate's potential to acquire competence to practice at the appropriate level. GAs form a set of individually assessable outcomes of the program. The NBA laid down the graduate attributes relating to program outcomes and is to be derived by program.

The Program outcomes reflect the ability of graduates to demonstrate knowledge in fundamentals of Basic Sciences, Humanities and Social Sciences, Engineering Sciences and apply these principles in understanding and practically apply the knowledge in professional core subjects, electives and projects which enables the graduates to be competent at the time of graduation. The graduates must adhere to professional and ethical responsibilities in the pursuit of their careers and also for the benefit of the society.

The proper definition and the attainment of POs contribute to the attainment of Program Educational Objectives which will help the graduate to perform his/ her duties, professional responsibilities, design, development, production and testing of novel products, ability to deal with finances and project management during his/her early professional careerof 3 to 4 years.

Program Specific Outcomes are the statements that assert what the grandaunts of a specific engineering program should do what they can able to do. Program Educational Objectives are the broad statements which describe in detail about the career and professional accomplishments after significant years of graduation that the program prepares thegrandaunts to achieve.



Relating the outcomes (CO-PO&PSO-PEO)

After CO statements are developed by the course in-charge, CO will map with any possible PO's based on the relationship exist between them. But the PO's are not necessarily mapped with any one CO and it may be left blank. Anyhow, it is mandatory that all POs should be mapped with any one of PSO and PEO which are specified in the program.

Process involved in CO-PO Mapping

After the course (subject) allotment from the department, the course in-charge of the course has to write appropriate COs for their corresponding course. It should be narrower and measurable statements. By using the action verbs of learning levels, CO's will be designed. CO statements should describe what the students are expected to know and able to do at the end of each course, which are related to the skills, knowledge and behavior that students will acquire through the course.

After writing the CO statements, CO will be mapped with PO of the department. If the department is having more than one section in a year or the same course is available for more than one program of the same institute in a semester, the

subject expert will be nominated as course coordinator of the corresponding course. The role of the course coordinator is to review the CO statements and the CO-PO mapping which has been done by course in-charge. The year wise coordinator has to consolidate the CO's of the respectiveyear and maintain the documentation of the CO attainment level of the respective year courses as well as documentation of the individual student's extra-curricular and co- curricular activities. These details will hand over to the Department Academic Committee in order to evaluate PO attainment of the individual student as well as individual course at the end of the eighth semester. The Department Academic Committee has to evaluate the PO attainment of individual student through direct and indirect method after the student completing their program.

Assessment process:

Assessment Process for CO Attainment:
For the evaluation and assessment of CO's and PO's, rubrics are used. The rubrics consideredhere are given below:

(i). CO Assessment Rubrics:

Course Outcome is evaluated based on the performance of students in internal assessments and in university examination of a course. Internal assessment contributes 30%and university assessment contributes 70% to the total attainment of a CO.

(ii) CO-Assessment Process:

- Assessment Parameters: The performance of a student in each semester shall be evaluated course - wise with a maximum of 100 marks for theory course and 100 marks for laboratory.

1. Theory course:

- ✓ Pattern for Internal Midterm Examinations: For theory courses of each semester there shall be two midterm descriptive & objective exams. Each descriptive & objective exam consists of 80 minutes. The mid exams will be taken for the assessment of internal marks. The first Midterm examination will be conducted usually after 7 weeks of instruction; the second Midterm examination will be conducted at the end of the semester.
- ✓ CO-wise assessment Rubrics: Every mid-exam question and every assignment is mapped to a specific CO. Thereafter, a CO -wise cut-off value is taken based on the highest mark secured for that CO and the number of students with their internal mark above the cut- off value is considered for rating the CO attainment(Example):

✓ No. of students having marks > cut-off	✓ Rating in 3 scale (I)
✓ >=60%	✓ 3
✓ 50% to 59%	✓ 2
✓ 40% to 49%	✓ 1

- ✓ Pattern for External End Examinations: There shall be an external examination

for every theory course and consists of two parts (part- A and part-B). The

duration of the time for this end examination is 3 hours.

- ✓ Assessment Rubrics: An overall cut-off value is taken for all CO's commonly based on the highest mark secured and the number of students with their external mark above the cut-off value is considered for rating all CO attainments. (Example):

✓ No. of students having marks > ✓ cut-off	✓ Rating in 3 scale (E)
>=60%	3
50% to 59%	2
40% to 49%	1

Overall Attainment: The Final CO attainment is calculated by combining the internal attainment and External attainment in a ratio of 25: 75.

Final Value (V) = 30% of Internal Level (I) + 70% of External Level (E) (**R20** regulation)

2. Laboratory Course:

Pattern for Lab Examinations: For practical subjects, there shall be continuous internal evaluation during the semester for 35 marks. 15 marks for day to day work, 5 for record and total 50 marks to be awarded by conducting laboratory test and for 5 marks for Viva- voce.

CO-wise assessment Rubrics (Example):

No. of students having marks > cut-off	Rating in 3 scale (E)
>=60%	3
50% to 59%	2
40% to 49%	1

Project Work Evaluation: Mini-Project:

There shall be an industry-oriented Mini-Project, in collaboration with an industry of their specialization, to be taken up during the vacation after III-year II Semester examination. However, the mini-project and its report shall be evaluated along with the project work in IV- year II Semester. The industry oriented mini-project shall be submitted in a report form and presented before the committee. It shall be evaluated for 50 marks. The committee consists of an external examiner, head of the department, the supervisor of the mini-project and a senior faculty member of the department. There shall be no internal marks for industry-oriented mini-project.

Major project:

- ✓ Project batches are formed as per the instruction given by project coordinators.
- ✓ Synopsis will be submitted to the project coordinators for scrutinizing. Project Batches are allotted to the internal guides based on the specialization and competency

- ✓ skills of the faculties.
- ✓ Each internal guide will continuously monitor their students on a weekly basis to observe the progress of the work.
- ✓ The project guide along with project coordinator conduct 3 project reviews as per the rubrics, which is set by the Department and the submit the Internal Assessment marks to the Head of Department.
- ✓ External Project Viva voce is conducted by the panel of examiners deputed by the University.
- ✓ Based on the viva voce the marks are awarded to the students and submitted to university.
- ✓ The department will encourage students to participate in technical Expo and the project guides motivate and guide the students to publish in standard conference/journal forums.

Attainment of Program Outcomes and Program Specific Outcomes: The following are the Assessment **Tools**:

Several tools are described for assessing course outcomes. The program outcomes are based on the course outcomes. Thus, the tools remain the same for assessing the program outcomes. In addition, the tools of survey based on the alumni and exit surveys are considered.

1. The tools broadly are
2. End of course surveys (half yearly)
3. Student exit surveys
4. Alumni surveys yearly
5. Staff surveys – yearly
6. Higher education and placement – student publications.

Internal Assessment Tools

Component	Evaluation Components	Nature of Exam
Theory	MCQ's	Multiple choice questions
	First Mid Exam	Short essay and long essay questions
	End Mid exam	Multiple choice questions
	MCQ's	Short essay and long essay questions
	Daily evaluation	Planning, analysis of labskills, finishing The experiment

Practical	Practical examination	Synopsis, spotting andviva-voce, major experiment and minorexperiment
	Laboratory manual	Communication, datainterpretation
Beyond syllabus	Conducting 02experiments	
Overall Evaluation	External exam –semester wise	

University examinations:

Component	Components of Evaluation	Nature of exam
Theory	University end exams	Short essays, long essays, numerical Problems
Practical	University end exams	Synopsis, spotting, major experiment,minor experiment, interpretation, data analysis, viva voce, communication

Assessment process:

The assessment tools are direct and indirect methods for evaluating the attainment of POs. Direct methods:

Through the internal and external assessment, the teacher can focus on the PO's. The question papers include, short answers, short essay and long essay type. In addition, MCQs examinations are conducted on each unit test. Assignments are given for some extension of syllabus. In case of laboratory examination, synopsis, major experiment, minor experiment, viva voce, reports, etc., are the components. While setting a question paper, each question is framed based on the POs in order to attain them to a large extent. A few POs of minor

importance may not be accommodated. It is necessary that a question has to cover 60% of 'essentials to know', 30% 'better to know' and 10% are 'nice to know'. Therefore, special attempts are made to attain these objectives.

The subjects are also categorized as professional core subjects, basic science subjects (mathematics, science, computing, and humanities) and Engineering Sciences. Accordingly, the POs have assumed adequate importance. Having set the question papers, the answer papers are being evaluated from the same perspectives. The students are given feedback and POs are highlighted. Data are gathered after scrutinizing the answer for course outcomes. The course outcomes are translated to POs. Attainment of POs is considered from the data of all students.

1. Indirect method: Survey is conducted from two levels: alumni and exit survey.
2. Direct method: Given below:

S. No.	Direct Assessment	Method Description
1.	Internal Assessment Test	The Internal Assessment marks in a theory paper shall be based on two tests generally conducted at the end of 8 and 16 weeks of each semester (20) and assignment (5). An improvement test may be conducted for the desirous students 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 w.r.t course objectives. Average of the two tests marks obtained shall be the Internal Assessment Marks for the relevant subject.
2	Assignment	Assignment is a metric to mainly assess student's knowledge/skills/attitude with their designing capabilities.
3	Lab Assignments	Lab Assignment can be one of the measuring criteria to mainly assess student's practical knowledge with their designing capabilities. In case of Practical, the IA marks shall be based on day to work in the lab (10) and one practical exam (15).
4	Theory Semester Examination	Semester examination (theory or practical) are the metric to assess whether all the course outcomes are attained or not framed by the course owner. Semester Examination is more focused on attainment of course outcomes and uses a descriptive exam. Practical semester examination focuses on conduction of experiments and viva-voce.
5	Practical Semester Examination	
6	Seminar	The IA marks in the case of mini projects, projects and seminars in the final year shall be based on theevaluation at the end of 8th semester by a committee consisting of the Head of the concerned Department and two senior faculty members of the Department, one of whom shall be the project / seminar guide.
7	Mini project	
8	Major Project	

IQAC Coordinator

Dean (Academics & Administration)

Principal

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