SAR : Decoding for PEVs

Dr. R. V. Ranganath
Professor,
Department of Civil Engineering,
BMS College of Engineering, Bangalore -19
rvranganath.civ@bmsce.ac.in

SAR Context

- Provides preparedness status at I/P level for the NBA visit,
- Provides the first impression about the I/P to the evaluation team,
- Presents crisp program status to the evaluation team and addresses process and the extent to which, a program meets each criterion,
- Provides documented evidences, which the evaluation team maps/matches with the visual /oral evidences during the visit.

SAR Contents

PART A	Institutional Information
PART B	**Criteria Summary**
Criteria No.	**Program Level Criteria**
1	Vision, Mission and Program Educational Objectives
2	Program Curriculum and Teaching-Learning Processes
3	Course Outcomes and Program Outcomes
4	Students' Performance
5	Faculty Information and Contributions
6	Facilities and Technical Support
7	Continuous Improvement

Contd.

Criteria No.	Institute Level Criteria
8	First Year Academics
9	Student Support Systems
10	Governance, Institutional Support and Financial Resources
PART C	**Declaration by the Institution**
Annexure-I	Program Outcomes (POs) & Program Specific Outcomes (PSOs)

PART A:Institutional Information

PART A: Institutional Information

1. **Name and Address of the Institution:**

2. **Name and Address of the Affiliating University:**

3. **Year of establishment of the Institution:**

4. **Type of the Institution:**

University	☐
Deemed University	☐
Government Aided	☐
Autonomous	☐
Affiliated	☐

PART A:Institutional Information

5. Ownership Status:

- Central Government ☐
- State Government ☐
- Government Aided ☐
- Self - Financing ☐
- Trust ☐
- Society ☐
- Section 25 Company ☐
- Any Other (Please specify) ☐

Provide Details:

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

Name of the Institution(s)	Year of Establishment	Programs of Study	Location

***Table A.6* Note:** Add rows as needed.

PART A:Institutional Information

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

S. No.	Program Name	Name of the Department	Year of Start	Intake	Increase in intake, if any	Year of increase	AICTE Approval	Accreditation Status*

Table A.7

* ***Write applicable one:***

- Applying first time
- Granted provisional accreditation for two /three years for the period(specify period)
- Granted accreditation for 5 /6 years for the period (specify period)
- Not accredited (specify visit dates, year)
- Withdrawn (specify visit dates, year)
- Not eligible for accreditation
- Eligible but not applied

PART A:Institutional Information

8. Programs to be considered for Accreditation vide this application:

S. No.	Program Name
1.	
N.	

Table A.8

9. Total number of employees in the institution:

A. Regular Employees (Faculty and Staff):

Items		CAY		CAY*m*1		CAY*m*2	
		Min	Max	Min	Max	Min	Max
Faculty in Engineering	M						
	F						
Faculty in Maths, Science & Humanities	M						
	F						
Non-teaching staff	M						
	F						

Table A.9a

Note: **Minimum 75% should be Regular/Full Time faculty and the remaining shall be Contractual Faculty as per AICTE norms and standards.**

PART A:Institutional Information

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 Student Faculty Ratio

CAY – Current Academic Year

CAYm1- Current Academic Year minus1 = Current Assessment Year

CAYm2 - Current Academic Year minus2=Current Assessment Year minus 1

B. Contractual Staff Employees (Faculty and Staff): (Not covered in Table A):

Items		CAY		CAY*m*1		CAY*m*2	
		Min	Max	Min	Max	Min	Max
Faculty in Engineering	M						
	F						
Faculty in Maths, Science & Humanities	M						
	F						
Non-teaching staff	M						
	F						

Table A.9b

PART A:Institutional Information

10. Total number of Engineering Students:

Item	CAY	CAY*m*1	CAY*m*2
Total no. of boys			
Total no. of girls			
Total no. of students			

Table A.10

(Instruction: The data may be categorized in tabular form separately for undergraduate, postgraduate engineering, other program, if applicable)

Note: *In case the Institution is running AICTE approved additional courses such as MBA, MCA in the first shift, engineering courses in the second shift, Polytechnic in Second shift etc., separate tables with the relevant heading shall be prepared.*

PART A:Institutional Information

11. Vision of the Institution:

12. Mission of the Institution:

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

i. Name:

Designation:

Mobile No:

Email id:

ii. NBA coordinator, if designated:

Name:

Designation:

Mobile No:

Email id:

PART B: Criteria Summary

Criteria No.	Criteria	Mark/Weightage	
	Program Level Criteria	Tier 2	Tier 1
1.	Vision, Mission and Program Educational Objectives	60	50
2.	Program Curriculum and Teaching – Learning Processes	120	100
3.	Course Outcomes and Program Outcomes	120	175
4.	Students' Performance	150	100
5.	Faculty Information and Contributions	200	200
6.	Facilities and Technical Support	80	80
7.	Continuous Improvement	50	75
			780

PART B: Criteria Summary

	Institute Level Criteria	Tier 2	Tier 1
8.	First Year Academics	50	50
9.	Student Support Systems	50	50
10.	Governance, Institutional Support and Financial Resources	120	120
	Total	220 **1000**	**1000**

CRITERION-1: Vision, Mission and Program Educational Objectives (PEOs)

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

- Vision statement typically indicates aspirations and Mission statement states the broad approach to achieve aspirations
- Should be written in a simple language, easy to communicate and should define objectives which are out of reach in the present context
- Department Vision and Mission statements shall be consistent with the Institute Vision and Mission statements

Vision and Mission Statements

(as per NBA document)

Vision is a futuristic statement that the institution would like to achieve over a long period of time, and Mission is the means by which it proposes to move toward the stated Vision

Example..

Vision:

To emerge as one of the nation's finest Institutions in the field of Technical Education and Research through focused, effective and sustained monitoring of its programmes and resources.

Action verb ??

Mission:

To develop high quality professionals ingrained in ethics, wisdom and creativity for the betterment of the society.

Department Vision and Mission Statements

(Sample)

- Vision:

To be an excellent centre for imparting quality higher education in Civil Engineering for a constantly changing societal needs with credibility, integrity and ethical standards.

Mission:

Accomplish excellence in curricular, co-curricular activities with a committed faculty through teaching and research which creates technically competent and dedicated civil engineers to serve their surroundings with pride.

Evaluation

A. Availability of the Vision and Mission statements of the Department (1)

B. Appropriateness/Relevance of the Statements (2)

C. Consistency of the Department statements with the Institute statements (2)

(Here Institute Vision and Mission statements have been asked to ensure consistency with the department Vision and Mission statements; the assessment of the Institute Vision and Mission will be done in Criterion 10)

Exhibits/Context to be Observed/Assessed:

A. Vision & Mission Statements

B. Correctness from definition perspective

C. Consistency between Institute and Department statements

Contd.

1.2. State the Program Educational Objectives (PEOs) (5)

Define the PEOs under the following broad categories:

i. Preparation : Employment/Higher studies

ii. Core competence : Discipline knowledge

iii. Professionalism : Professional value - knowledge development

iv. Life long learning : Environment

A. *Listing of the Program Educational Objectives (3 to 5) of the program under consideration (5)*

Exhibits/Context to be Observed/Assessed:

A. Availability & correctness of the PEOs statements

PEOs (Samples)

Graduates after 3-5 years, will be able to:

PEO1:

Compete on a global platform to pursue their professional career in Electrical Engineering and allied disciplines.

PEO2:

Pursue higher education and/or engage in continuous up gradation of their professional skills.

PEO3:

Communicate effectively while working in diverse team.

PEO4:

Demonstrate concern for society and environment.

Contd.

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

- Availability on Institute website under relevant program link
- Availability at department notice boards
- Department website, if available
- Availability in department level documents
- Documentary evidence

A. Adequacy in respect of publication & dissemination (2)

B. Process of dissemination among stakeholders (2)

C. Extent of awareness of Vision, Mission and PEOs among the stakeholder (6)

Contd.

Exhibits/Context to be Observed/Assessed:

A. ***Adequacy***

Department Vision, Mission and PEOs: Availability on Institute website under relevant program link; Availability at department notice boards, HoD Chamber, department website, if Available; Availability in department level documents/course of study

B. ***Process of dissemination***

Documentary evidence to indicate the process which ensures awareness among internal and external stakeholders with effective process implementation

C. ***Extent of Awareness***

Based on interaction with internal and external stakeholders

Contd.

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

Process to ensure:

- Effective participation of Stakeholders
- Effective Process implementation
- Documentary evidence

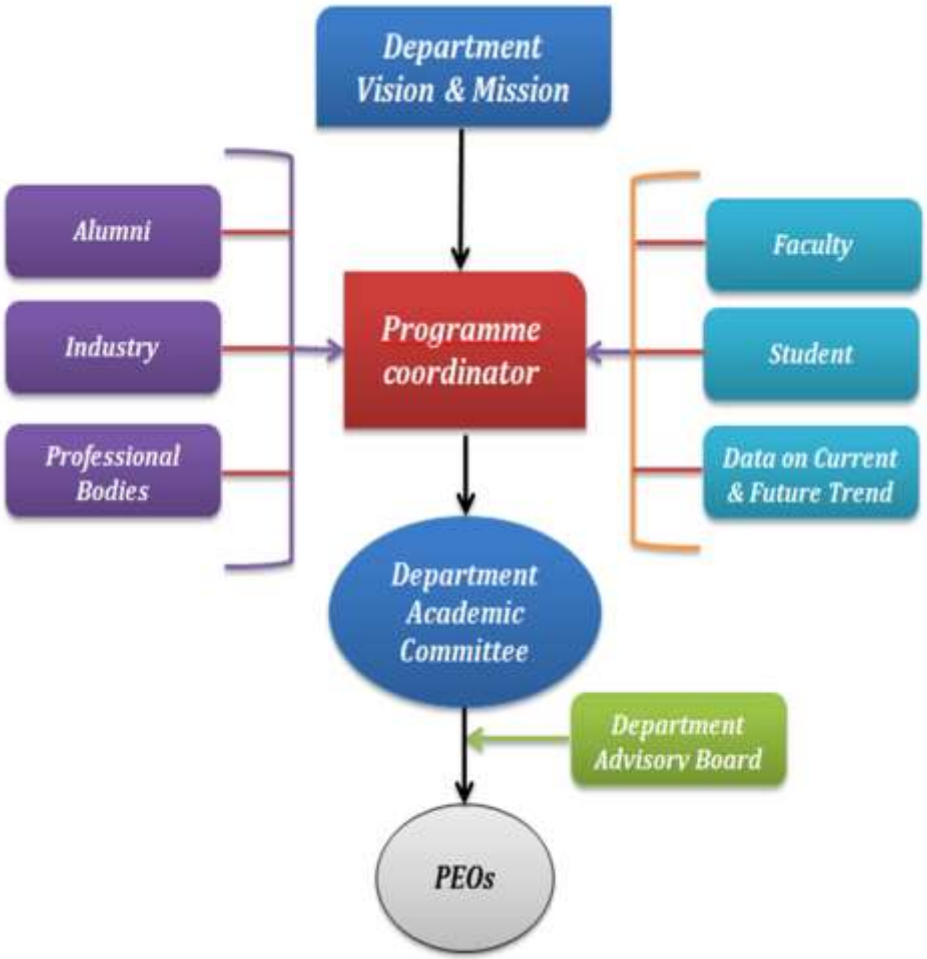
A. ***Description of process involved in defining the Vision, Mission of the Department (10)***

B. ***Description of process involved in defining the PEOs of the program (15)***

Exhibits/Context to be Observed/Assessed:

Documentary evidence to indicate the process which ensures effective participation of internal and external department stakeholders with effective process implementation

Processes for PEOs



- Feedback format for collecting data from stakeholders
- A process by which PEOs are created and reviewed periodically
- A process to evaluate to what extent PEOs are attained.

Contd.

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

Generate a "Mission of the Department – PEOs matrix" with justification and rationale of the mapping:

PEO Statements	M1	M2	……	Mn
PEO 1				
PEO 2				
PEO 3				
PEO 4				

Note: M1, M2, . . Mn are distinct elements of Mission statement.

Enter correlation levels 1, 2 or 3 as defined below:

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

If there is no correlation, put "-"

Mission of the Department:

- M1: Make competent Civil Engineers with high level of professional, moral and ethical values
- M2:Impart highest standards in theoretical as well as practical knowledge and skill set
- M3:Establish Center of Excellence in major areas of Civil Engineering to respond to the current and future needs of the industry

- PEO1: Graduates will have successful career in the field of Civil Engineering
- PEO2: Graduates will respond to growing demands of society through professional and ethical practices
- PEO3: Graduates will pursue lifelong learning including higher studies in the field of Civil Engineering

What is Expected here ?

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

Generate a "Mission of the Department – PEOs matrix" with justification and rationale of the mapping

PEO Statements	M1	M2	……	Mn
PEO 1	3/2/1 ?	3/2/1 ?		
PEO 2				
PEO 3	3/2/1 ?			

A. Preparation of a matrix of PEOs and elements of Mission statement (5)

B. Consistency/justification of co-relation parameters of the above matrix (10)

Exhibits/Context to be Observed/Assessed:

A. Availability of a matrix having PEOs and Mission elements

B. Justification for each of the elements mapped in the matrix

Program Level Criteria - To be Assessed by Evaluator

Name of the Institution _____

Name of the Program _____

Criterion 1: Vision, Mission and Program Educational Objectives (60)							
S.No.	**Sub Criteria**	**Max. Marks**	**Evaluation Guidelines (Marks)**	**Marks Awarded**		**Overall Marks**	**Observations of Evaluators (Provide Justifications/ Reasons)**
				Marks	**Total**		
1.1.	State the Vision and Mission of the Department and Institute	5	A. Availability of statements of the Departments (1)			Overall Marks for 1.1	
			B. Appropriateness/Relevance of the Statements (2)				
			C. Consistency of the Department statements with the Institute statements (2)				
1.2.	State the Program Educational Objectives (PEOs)	5	Program Educational Objectives (3 to 5) (5) Appropriateness			Overall Marks for 1.2	
1.3.	Indicate where and how the Vision, Mission and PEOs are published and disseminated among stakeholders	10	A. Adequacy in respect of publication & dissemination (2)			Overall Marks for 1.3	
			B. Process of dissemination among stakeholders (2)				
			C. Extent of awareness of Vision, Mission & PEOs among the stakeholder (6)				
1.4.	State the process for defining the Vision and Mission of the Department, and PEOs of the program	25	A. Description of process for defining the Vision, Mission of the Department (10)			Overall Marks for 1.4	
			B. Description of process for defining the PEOs of the program (15)				
1.5.	Establish consistency of PEOs with Mission of the Department	15	A. Preparation of a matrix of PEOs and elements of Mission statement (5)			Overall Marks for 1.5	
			B. Consistency/justification of co-relation parameters of the above matrix (10)				
Total of Criterion 1:		**60**	**Overall Marks for Criterion 1:**				

CRITERION-2: Program Curriculum and Teaching – Learning Processes (TLP)

2.1. Program Curriculum (20)

2.1.1. State the process used to identify extent of compliance of the University curriculum for attaining the Program Outcomes and Program Specific Outcomes as mentioned in Annexure-I. Also mention the identified curricular gaps, if any (10)

- State the process details
- Mention identified curricular gaps
- Extent of compliance

Exhibits/Context to be Observed/Assessed:

A. *Documentary evidence to indicate the process which ensures mapping/compliance of University Curriculum with the POs & PSOs; Identification of gaps; if any.*

B. *Identified Curricular gaps and its Appropriateness*

Contd.

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

Details of the following for the attainment of POs & PSOs

- Additional course
- Learning material/Content
- Laboratory experiments
- Projects etc.

Institute to provide inputs to the Affiliating University regarding curricular gaps and possible addition of new content/add-on courses in the curriculum to better attain program outcome(s)

Curriculum- Tier 2

- Analyze the University Curriculum
  - Determine the Gaps in Attainment of POs
  - Design Extra {modules} / {Assessments} to Bridge these gaps
  - **Could need a few iterations**

- Analysis may indicate that not all POs are *Attainable with the Given Curriculum.*

- May need some additional modules and Design of In-Sem evaluation and assessment to take care of the gaps.

- A record of all this work is needed.

A. Steps taken to get identified gaps included in the curriculum. (e.g. letter to university/BOS) (2)

B. Delivery details of content beyond syllabus (5)

C. Mapping of content beyond syllabus with the POs & PSOs (3)

(Provide details of the additional course/learning material/content/laboratory experiments/projects etc., arising from the gaps identified in 2.1.1 in a tabular form in the format given below)

CAYm1

S.No.	Gap	Action taken	Date-Month-Year	Resource Person with designation	% of students	Relevance to POs, PSOs

Table B.2.1.2a

Exhibits/Context to be Observed/Assessed:

A. Documentary evidence of steps taken at regular interval

B. Delivered details – documentary evidence for at least one sample per assessment year to be verified

C. Availability and appropriateness of Mapping table between contents delivered and Program outcomes/Program specific outcomes (Course outcomes)

Tier 1:

CRITERION 2	Program Curriculum and Teaching –Learning Processes	100

2.1. Program Curriculum (30)

2.1.1. State the process for designing the program curriculum (10)

(Describe the process that periodically documents and demonstrates how the program curriculum is evolved considering the POs and PSOs)

2.1.2. Structure of the Curriculum (5)

Course Code	Course Title	Total Number of contact hours				Credits
		Lecture (L)	Tutorial (T)	Practical# (P)	Total Hours	
Total						

Table B.2.1.2

2.1.3. State the components of the curriculum (5)

Program curriculum grouping based on course components

Course Component	Curriculum Content (% of total number of credits of the program)	Total number of contact hours	Total number of credits
Basic Sciences			
Engineering Sciences			
Humanities and Social Sciences			
Program Core			
Program Electives			
Open Electives			
Project(s)			
Internships/Seminars			
Any other (Please specify)			
Total number of Credits			

2.1.4. State the process used to identify extent of compliance of the curriculum for attaining the Program Outcomes and Program Specific Outcomes as mentioned in Annexure I (10)

(State the process details)

Contd.

2.2. Teaching-Learning Processes.

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

Processes may include adherence to academic calendar and implementation of pedagogical initiatives such as -

- Real life examples
- Collaborative learning
- Quality of laboratory experience with regard to conducting experiments
- Recording observations
- Analysis of data etc.
- Encouraging bright students
- Assisting weak students etc.
- ICT supported learning
- Interactive classrooms

A. *Adherence to Academic Calendar (3)*

B. *Use of various instructional methods and pedagogical initiatives (3)*

C. *Methodologies to support weak students and encourage bright students(4)*

D. *Quality of classroom teaching (Observation in a Class) (3)*

E. *Conduct of experiments (Observation in Lab) (3)*

F. *Continuous Assessment in the laboratory (3)*

G. *Student feedback of teaching learning process and actions taken (6)*

Exhibits/Context to be Observed/Assessed:

A. *Availability of Academic Calendar based on University academic calendar and its effective compliance*

B. *Documentary evidence to support implementation of pedagogical initiatives such as real life examples, collaborative learning, ICT supported learning, interactive class rooms etc.*

C. *Guidelines to identify weak and bright students; post identification actions taken; impact observed*

D. *Class room ambience; efforts to keep students engaged (also to be verified during interaction with the students)*

E. *Quality of laboratory experience with respect to conducting, recording observations, analysis etc.(also to be verified during interaction with the students)*

F. *Internal Semester examination and internal marks thereof, Practical record books, each experiment assessment, final marks based on assessment of all the experiments and other assessments; if any*

G. *Feedback format, frequency, analysis and actions taken (also to be verified during interaction with students)*

Contd.

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

Mention the initiatives, Implementation details and analysis of learning levels related to –

a. Quality of Semester Question papers
b. Assignments
c. Evaluation
d. Relevance to COs

Exhibits/Context to be Observed/Assessed:

A. *Process of internal semester question paper setting, model answers, evaluation and its compliance*
B. *Question paper validation to ensure desired standard from outcome attainment perspective as well as learning levels perspective*
C. *Mapping of questions with the Course outcomes* ***Course files***
D. *Assignments to promote self-learning, survey of contents from multiple sources, assignment evaluation and feedback to the students, mapping with the Cos*

Contd.

2.2.3. Quality of Student Projects (25)

Consideration to factors including, but not limited to –

- Environment & Safety
- Ethics
- Cost
- Type (application, product, research, review etc.)
- Standards
- Processes related to project identification, allotment, continuous monitoring and evaluation
- Demonstration of working prototype sand enhancing the relevance of projects.
- Mention Implementation details including details of POs and PSOs addressed with justification

Look for evidence of solving Complex Engineering Problems/Activities.

Exhibits/Context to be Observed/Assessed:

A. Projects identification and guide allocation Process

B. Projects classification (application, product, research, review etc.) consideration to factors such as environment, safety, ethics, cost, standards and mapping with program outcomes and program specific outcomes

C. Continuous monitoring mechanism and evaluation

D. Methodology (Appropriately documented) to assess individual contribution/ understanding of the project as well as collective contribution/understanding

E. Based on Projects demonstration

F. Quality of place (host) where the paper has been published /quality of competition in which award has been won

Contd.

2.2.4. Initiatives related to industry interaction (15)

- Industry supported laboratories.
- Industry involvement in the program design and partial delivery of any regular courses for students.
- Impact analysis of industry institute interaction and actions taken thereof

Exhibits/Context to be Observed/Assessed:

A. Type of Industries, Type of Labs, objectives, utilization and effectiveness

B. Documentary evidence

C. Analysis and actions taken thereof

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

- Industrial training/tours for students.
- Industrial / internship / summer training of more than two weeks and post training Assessment.
- Impact analysis of industrial training.
- Student feedback on initiatives

Exhibits/Context to be Observed/Assessed:

A. & B. *Type of Industries, planned or non-planned activity, objectives clearly defined, no. of students participated, relevant area of training, visit report documented*

C.& D. *Impact analysis and feedback format, analysis and actions taken (also to be verified during interaction with students)*

Criterion 2: Program Curriculum and Teaching – Learning Processes (120)							
S.No.	Sub Criteria	Max. Marks	Evaluation Guidelines	Marks Awarded		Overall Marks	Observations of Evaluators (Provide Justifications/ Reasons)
				Marks	Total		
2.1.	**Program Curriculum**	20					
2.1.1.	State the process used to identify extent of compliance of the University curriculum for attaining the Program Outcomes (POs) & Program Specific Outcomes (PSOs), mention the identified curricular gaps, if any	10	A. Process used to identify extent of compliance of University curriculum for attaining POs & PSOs (6)			Overall Marks for 2.1	
			B. List the curricular gaps for the attainment of defined POs & PSOs (4)				
2.1.2.	State the delivery details of the content beyond the syllabus for the attainment of POs & PSOs	10	A. Steps taken to get identified gaps included in the curriculum.(letter to university/BOS) (2)				
			B. Delivery details of content beyond syllabus (5)				
			C. Mapping of content beyond syllabus with the POs & PSOs (3)				
2.2.	**Teaching-Learning Processes**	100					
2.2.1	Describe the Process followed to improve quality of Teaching Learning	25	A. Adherence to Academic Calendar (3)			Overall Marks for 2.2	
			B. Use of various instructional methods and pedagogical initiatives (3)				
			C. Methodologies to support weak students and encourage bright students(4)				
			D. Quality of classroom teaching (Observation in a Class) (3)				
			E. Conduct of experiments (Observation in Lab)(3)				
			F. Continuous Assessment in the laboratory (3)				
			G. Student feedback on teaching learning process and actions taken (6)				

CRITERION 3: Course Outcomes and Program Outcomes

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

3.1.1. Course Outcomes (COs)

SAR should include course outcomes of One course/Semester (3rd to 8th) of study, however, should be prepared for all courses and made available as evidence

Exhibits/Context to be Observed/Assessed:

A. Appropriateness of the statements shall be seen for atleast one course each from 2nd, 3rd and final year of study

Program Outcomes

- POs are statements about the knowledge, skills and attitudes (attributes) the graduate of a formal engineering program should have.
- Profile of the Graduates reached through POs - Target
- POs are defined by Accreditation Agencies of the country (NBA in India)
- Defining these is the Starting Point

Program Outcomes (POs)

1. **Engineering Knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
2. **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.
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
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.

5. **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.
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.
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.
8. **Ethics**: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

9. **Individual and Team Work**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
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.
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.
12. **Life-long Learning**: Recognize the need for, and have the preparation and ability to engage in independent and lifelong learning in the broadest context of technological change.

PROGRAM SPECIFIC OUTCOMES (PSO)

- These outcomes are specific to a program in addition to NBA defined POs, namely, Civil, Mechanical, Chemical, Computer science etc.,(2-4)

ELECTRICAL & ELECTRONICS ENGINEERING

At the end of the program, students will have the ability to:

PSO1

- Develop models, analyze and assess the performance of different types of generation, transmission, distribution and protection mechanisms in power systems.

PSO2

- Design, develop, analyze and test electrical and electronics systems; deploy control strategies for power electronics related and other applications.

PSO3

- Measure, analyze, model and control the behavior of electrical quantities associated with constituents of energy or allied systems.

Programme Specific Outcomes

- There should not be any repetition of POs already defined by NBA.
- Specific to the particular program
- 2 to 4 in number
- Must have a process for arriving at them

CRITERION 3: Course Outcomes and Program Outcomes

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)

A. Explanation of table to be ascertained (5)

Exhibits/Context to be Observed/Assessed:

A. Mapping to be verified for atleast two matrices

Contd.

Note: Enter correlation levels 1, 2 or 3 as defined below:

1: Slight (Low)

2: Moderate (Medium)

3: Substantial (High)

3.1.3. Program level Course-PO matrix of all courses INCLUDING first year courses

- It may be noted that contents of Table 3.1.2 must be consistent with information available in Table 3.1.3 for all the courses.

Exhibits/Context to be Observed/Assessed:

A. *Mapping to be verified for atleast one course per year of study; program outcomes and program specific outcomes getting mapped with the core courses are also to be verified*

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)

Note: Number of Outcomes for a Course is expected to be around 6.

Course Name: Ciii Year of Study: YYYY – YY; for ex. C202 Year of study 2013-14

C202.1	<Statement>
C202.2	<Statement>
C202.3	<Statement>
…	<Statement>
C202.N	<Statement>

Table B.3.1.1

C202 is the second course in second year and '.1' to '.6' are the outcomes of this course.

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	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
C202.1												
C202.2												
C202.3												
…												
C202.N												
C202												

Table B.3.1.2

Course Outcomes

Engineering Physics (Not a Good Example)

CO1: Understand the knowledge of basic quantum mechanics, to set up one-dimensional Schrodinger's wave equations and its application to few physical problems.

CO2: Understand the fundamental aspects of crystallography, able to recognize various planes in a crystal and have knowledge of structure determination using x-rays.

CO3: Understand the role of free electrons in determining the properties of metals, the concept of Fermi energy, and the domain formation in ferromagnetic materials.

CO4: Understand the basic laser physics, working of lasers, holography and principle of propagation of light in optical fibers.

CO5: Understand the theory of free, damped and forced vibrations of a particle and also the concept of resonance and its applications in ESR & NMR.

What level of BLOOM,s Taxonomy you want your students to achieve?

Course Title: Strength of Materials

Course Outcomes: Example

At the end of the course, student is able to:

Action Verb

1. **Apply** laws of physics (eg..Hook's law, etc.,) to compute different types of response (stress and deformation) in the given materials. (PO 1)

Learning Statement

2. **Analyse** structural elements for different force systems to compute design parameters (BM and SF) (PO2)
3. **Design** compression elements using engineering principles to resist any given loads. (PO3)
4. **Conduct** experiments to validate physical behaviour of materials/components.(PO4)
5. **Prepare** laboratory reports on interpretation of experimental results (P10)

CO-PO Relationship

- Each CO can be identified to address a subset of POs
- Based on the number of COs and the sessions dedicated to them it is possible to identify the strength of mapping (1, 2 or 3) to POs
- Based on these strengths of selected POs a CO matrix can be established.

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

Example Situation 1:

CO3: Able to understand mix proportioning techniques for field applications.

Assessment for CO3: (Question in Tests)

Briefly explain the various methods of mix proportioning techniques.

- ***Does this CO reflects the intended measurement from PO1?***
- ***Does the assessment correlates well with the CO?***

Mapping: CO3- PO1.

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.**

Example Situation 3:

CO3: Able to *Design* concrete mix for field applications using characteristics of mix constituents and relevant IS codes.

Assessment:/ASIGNMENT/ *ABC Construction Company is entrusted with manufacturing of precast elements for elevated express way. The precast elements are required to attain 40 MPa in 7 days. Design a mix for least cost. The mix should comply with the requirements of IS 10262 and IS 456.*

- ***Is CO reflects the intended measurement from PO2, PO3 ?***
- ***Does the assessment correlates well with the CO?***

Remarks:
CO2 – PO2, PO3

Is this mapping correct ?

Course Title: Concrete Technology

Course Outcomes	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
Uunderstand mix proportioning techniques for field applications.	3											
Apply mix proportion principles to proportion a concrete mix for field applications.	**3**											
Design concrete mix for field applications using characteristics of mix constituents and relevant IS codes.		**2**	**3**									
Prepare a comprehensive report on new knowledge in any one of the topic related to concrete technology									**2**	**3**		**3**

Example Situation 1:

CO3: Able to understand mix proportioning techniques for field applications.

Assessment for CO3: (Question in Tests)

Briefly explain the various methods of mix proportioning techniques.

- *Does this CO reflects the intended measurement from PO1?*
- *Does the assessment correlates well with the CO?*

Mapping: CO3- PO1.

Table 3.3 COURSE OUTCOMES OF ME6503-Design of Machine Elements

ME6503	ME6503- Design of Machine Elements	K-Level
ME6503.1	Students will **understand** various steps involved in the Design Process, principles involved in evaluating the shape and dimensions of a component to satisfy functional and strength requirements.	Understand
ME6503.2	Students will be able to **apply** the concepts for design of shafts and couplings using standard practices and standard data	Apply
ME6503.3	Students will **apply** standard practices and standard data while designing temporary and permanent fasteners.	Apply
ME6503.4	Students will **apply** standard practices and standard data while designing energy storing elements and familiarize with usage of catalogues and standard machine components.	Apply
ME6503.5	Students will **apply** standard practices and standard data and to use catalogues while designing bearings.	Apply
ME6503.6	Students can able to successfully design and analyze machine components.	Apply

8.50 x 11.00 in

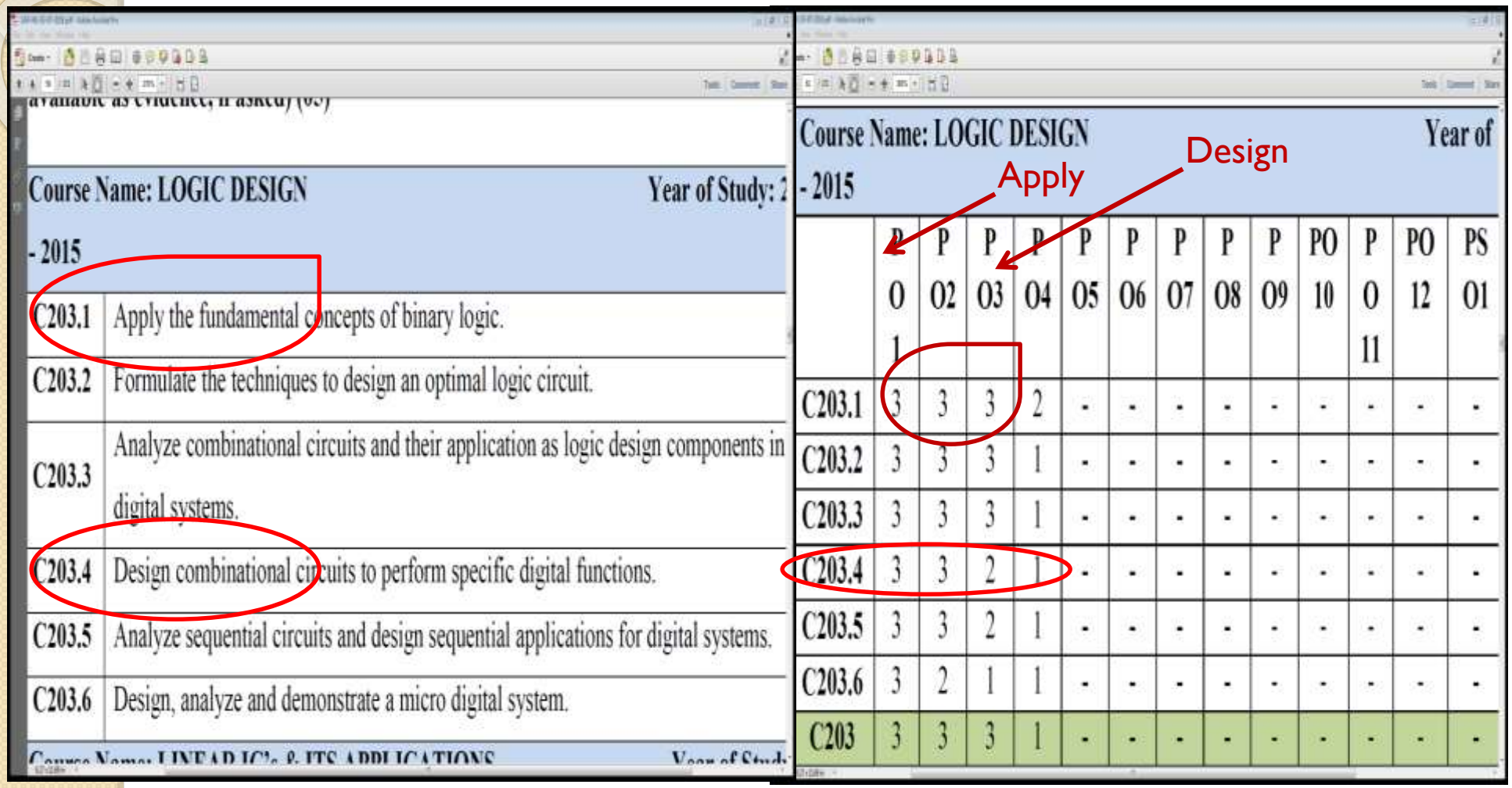
Course Name : ME6503-Design of Machine Elements

Communicati on

Table 3.9 CO PO MATRIX OF ME6503-Design of Machine Elements

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
ME6503.1	3	3	2	2	2	3	2	2	2	3	2
ME6503.2	3	3	2	2	2	3	2	2	2	3	2
ME6503.3	3	3	2	2	2	3	2	2	2	3	2
ME6503.4	3	3	2	2	2	3	2	2	2	3	2
ME6503.5	3	3	2	2	2	3	2	2	2	3	2
ME6503.6	3	3	3	2	2	3	2	2	2	3	2
ME6503	**3**	**3**	**2.16**	**2**	**2**	**3**	**2**	**2**	**2**	**3**	**2**

CO-PO mapping ??



Course Name: LOGIC DESIGN Year of Study: 2

- 2015

C203.1	Apply the fundamental concepts of binary logic.
C203.2	Formulate the techniques to design an optimal logic circuit.
C203.3	Analyze combinational circuits and their application as logic design components in digital systems.
C203.4	Design combinational circuits to perform specific digital functions.
C203.5	Analyze sequential circuits and design sequential applications for digital systems.
C203.6	Design, analyze and demonstrate a micro digital system.

Course Name: LINEAR IC's & ITS APPLICATIONS Year of Study:

Course Name: LOGIC DESIGN Year of

- 2015

Apply

Design

	P01	P02	P03	P04	P05	P06	P07	P08	P09	PO10	P011	PO12	PS01
C203.1	3	3	3	2	-	-	-	-	-	-	-	-	-
C203.2	3	3	3	1	-	-	-	-	-	-	-	-	-
C203.3	3	3	3	1	-	-	-	-	-	-	-	-	-
C203.4	3	3	2	1	-	-	-	-	-	-	-	-	-
C203.5	3	3	2	1	-	-	-	-	-	-	-	-	-
C203.6	3	2	1	1	-	-	-	-	-	-	-	-	-
C203	3	3	3	1	-	-	-	-	-	-	-	-	-

CO-PO Relationship

COURSE	COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
Analysis of structures II	CO1	3	3	-	-	-	-	-	-	-	-	-	-
	CO2	3	3	-	-	-	-	-	-	-	-	-	-
Environmental Engineering I	CO1	3	2	-	3	-	3	3	-	-	-	-	-
	CO2	3	3	-	-	-	3	3	-	-	3	-	-
	CO3	-	-	3	-	-	-	3	3	-	3	-	-
Geotechnical Engineering II	CO1	3	3	-	-	-	-	-	-	-	-	-	-
	CO2	3	3	-	-	-	-	-	-	-	-	-	-
	CO3	3	3	-	-	-	-	-	-	-	-	-	-
	CO4	3	3	2	-	-	3	-	-	-	-	-	-
Concrete Technology	CO1	3	-	-	-	-	-	-	-	-	-	-	-
	CO2	-	3	3	-	-	-	-	-	-	-	-	-
	CO3	-	3	3	-	-	-	-	-	-	-	-	-
	CO4	-	-	-	-	-	-	-	3	3	-	-	-
Hydrology and water resources	CO1	3	3	-	-	-	-	-	-	-	-	-	-
	CO2	3	3	-	-	-	-	-	-	-	-	-	-
	CO3	3	3	3	-	-	-	-	3	-	-	-	-
Quantity Surveying and Costing	CO1	3	3	-	1	-	-	-	-	-	-	-	-
	CO2	3	3	-	-	2	2	-	-	-	-	-	-
	CO3	3	3	-	-	-	-	-	-	-	-	-	-
	CO4	2	3	2	-	-	3	-	-	-	-	-	-
Alternate Building Material & Technology	CO1	3	-	-	-	-	-	3		-	-	-	1
	CO2		3	-		-	-	3		-	-	-	3
	CO3		-	-	-		-	3		-	-	-	2
	CO4			3	-	2	-	2	3	-	-	-	-
Major Project Phase II	CO1	-	-	-	-	-	-	3	-	3	-	-	-
	CO2	3	3	3	3	-	-	-	3	3	-	-	3
	CO3	-	-	-	-	3	-	-	-	3	-	-	-
	CO4	-	-	-	-	-	-	-	-	3	3	2	-

Contd.

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)

- Examples of data collection processes may include, but are not limited to-
  - Specific exam/tutorial questions
  - Assignments
  - Laboratory tests
  - Project evaluation
  - Student portfolios
- A portfolio is a collection of artifacts that demonstrate skills, personal characteristics, and accomplishments created by the student during study period, internally developed assessment exams, project presentations, oral exams etc.

Exhibits/Context to be Observed/Assessed:

A. & B. Evidence for appropriate assessment processes including data collection, verification, analysis, decision making

Contd.

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

- Program shall have set Course Outcome attainment levels for all courses
- The attainment levels shall be set considering average performance levels in the University Examination or any higher value set as target for the assessment years
- Attainment level
  - Student performance in internal assessments with respect the Course Outcomes
  - Performance in the University Examination

Exhibits/Context to be Observed/Assessed:

A. Methodology to define set levels and its compliance; data collection, verification, analysis and decision making; details for one course per year of study to be verified

Contd.

Measuring Course Outcomes attained through University Examinations

Example related to attainment levels Vs. targets:

(The examples indicated are for reference only. Program may appropriately define levels)

Attainment Level 1: 60% *students scoring more than University average percentage marks or set attainment level in the final examination*

Attainment Level 2: 70% *students scoring more than University average percentage marks or set attainment level in the final examination*

Attainment Level 3: 80% *students scoring more than University average percentage marks or set attainment level in the final examination*

Contd.

- *Attainment is measured in terms of actual percentage of students getting set percentage of marks*
- *If targets are achieved then all the course outcomes are attained for that year Program is expected to set higher targets for the following years as a part of continuous improvement*
- *If targets are not achieved the program should put in place an action plan to attain the target in subsequent years*

Measuring CO attainment through Internal Assessments:

Target may be stated in terms of percentage of students getting more than class average marks or set by the program in each of the associated COs in the assessment instruments (midterm tests, assignments, mini projects, reports and presentations etc. as mapped with the COs

CO – Attainment

Attainment Target ??

Target ??

Tier 2

Attainment Level 1: 60% students scoring more than 50% marks out of the relevant maximum marks in internal assessment tools.

Attainment Level 2: 70% students scoring more than 50% marks out of the relevant maximum marks in internal assessment tools.

Attainment Level 3: 80% students scoring more than 50% marks out of the relevant maximum marks in internal assessment tools.

Example of CO-attainment for a course

Course Name :	Concrete Technology
Course Code :	CV 41
Session of Course	Batch-2013, Sep-Dec'2013
L : T : P -	
Semester :	I
Credits :	4
Batch :	2013
Faculty :	R V Ranganath

Grading Scale	
SCORE : < 50%	1
50% - < 70%	2
> =70%	3

50%

70%

75%	**Percent of Students should score > 70% of marks for Attainment**

CO	CO Decription	T1	T2	A1	A2		LAB
CO1	**Identify** constituent of concrete material characteristics and different types of concrete for their appropriate use in construction. [K 2](PO1)	Q1.a, b, Q2 a,b		-	-	-	-
CO2	**Compare behaviour of concrete properties with known materials for design applications**(PO2, PO3)			A1	-	-	-
CO3	**Analyse characteristics of mix constituents and *design* a concrete mix for field applications.** { PO2, PO3)		Q1, Q2	-	A2 -	-	
CO4	**Prepare** a comprehensive report on new knowledge in any one of the topic related to concrete technology [K5] (PO8, PO9)			-		-	lab-

Example of CO-attainment for a course

	Program Outcomes	PO1																					
	Max Marks	10	10	10	10				40							5				5				
	Course Outcomes	CO1							TOTAL OBTAINED	TOTAL MARKS ATTEMPTED	PERCENT, %	SCORES OR GRADING BASED ON SCALE OF 3	Target > =70%	CO2				TOTAL OBTAINED	TOTAL MARKS ATTEMPTED	PERCENT, %	SCORES OR GRADING BASED ON SCALE OF 3	Target > =70%
USN	Name	T1-Q1.a	T1-Q1.b	T1-Q2.a	T1-Q2.b									Assignment-1									
1BM13CCT01	ANUSHA S. B.	8	7	8					23	30	77%	3	Y	3			3	5	60.00%	2	
1BM13CCT02	BHAVISH DAS (discontinued after I sem)	5	6	12	8				31	40	78%	3	Y	4			4	5	80.00%	3	Y
1BM13CCT03	DEEPA M NAIK			8	7				15	20	75%	3	Y	5			5	5	100.00 %	3	Y
1BM13CCT04	GOLLAPALLI NIRANJAN REDDY			9	7				16	20	80%	3	Y	4			4	5	80.00%	3	Y
1BM13CCT05	JHANSI RAMA PRIYA			9	9				18	20	90%	3	Y	4			4	5	80.00%	3	Y
1BM13CCT06	NIRANJANA N	7	6	9	3				25	40	63%	2		4			4	5	80.00%	3	Y
1BM13CCT07	PAVAN J.			9	9				18	20	90%	3	Y	4			4	5	80.00%	3	Y
1BM13CCT08	PRAMOD B. V.			10	9				19	20	95%	3	Y	3			3	5	60.00%	2	
1BM13CCT09	PRAVEEN GONGACHI	4	7						11	20	55%	2		4			4	5	80.00%	3	Y
1BM13CCT10	RAJESH A.			9	7				16	20	80%	3	Y	4			4	5	80.00%	3	Y
1BM13CCT11	SALMAN PASHA	7	7	6					20	30	67%	2		4			4	5	80.00%	3	Y
1BM13CCT12	SHARATH R.	7	7	8	8				30	40	75%	3	Y	3			3	5	60.00%	2	
1BM13CCT13	SHRINATH			9	8				17	20	85%	3	Y	4			4	5	80.00%	3	Y
1BM13CCT14	SOWMYA H. V.			9	7				16	20	80%	3	Y	4			4	5	80.00%	3	Y
1BM13CCT15	SUNIL KUMAR B. M.		2	7	7				16	30	53%	2		3			3	5	60.00%	2	
1BM13CCT16	VIKAS PRABHAKAR ATTIGERI			9	8				17	20	85%	3	Y	4			4	5	80.00%	3	Y
1BM13CCT17	VIKRAM C GATEGAR			7	8				15	20	75%	3	Y	4			4	5	80.00%	3	Y
1BM13CCT18	VILASKUMAR S. LONIMATH			8	8				16	20	80%	3	Y	5			5	5	100.00 %	3	Y
											SUM	50	14						SUM	50	14
											AVG GRADING	2.78							AVG GRADING	2.78	

Example of CO-attainment for a course

10	10	10	10				40			
CO3							TOTAL OBTAINED	TOTAL MARKS ATTEMPTED	PERCENT, %	SCORES OR GRADING BASED ON SCALE OF 3	Target > =70%
T1-Q3.a	T1-Q3.b	T2-Q2.a	T2-Q2.b								
8	7						15	20	75.00%	3	Y
		5	12				17	20	85.00%	3	Y
6	8	8	5				27	40	67.50%	2	
	9						9	10	90.00%	3	Y
9	9						18	20	90.00%	3	Y
-	-	-	-				0	40	0.00%	1	
-	-	-	-				0	40	0.00%	1	
8	8						16	20	80.00%	3	Y
8	8						16	20	80.00%	3	Y
6	8						14	20	70.00%	3	Y
		7	7				14	20	70.00%	3	Y
-	-	-	-				0	40	0.00%	1	
8	9	8	7				32	40	80.00%	3	Y
9	9						18	20	90.00%	3	Y
5	6						11	20	55.00%	2	
9	8	8	8				33	40	82.50%	3	Y
7	8	8					23	30	76.67%	3	Y
8	9						17	20	85.00%	3	Y
									SUM	46	13
								AVG GRADING		2.56	

Example of CO-attainment for a course

COURSE OUTCOMES	GRADING AVG ON SCALE OF 3	DISTRIBUTION %		
		3	2	1
CO1	2.78	14 / 18 = 77.77%	4 / 18 = 22.22%	0 / 18 = 0%
CO2	2.78	14 / 18 = 77.77%	4 / 18 = 22.22%	0 / 18 = 0%
CO3	2.56	13 / 18 = 72.22%	2 / 18 = 11.11%	3 / 18 = 16.66%
CO4	2.56	10 / 18 = 55.55%	8 / 18 = 44.44%	0 / 18 = 0%

TARGET is > = More than 75% of Students Must Achieve 70% Marks.

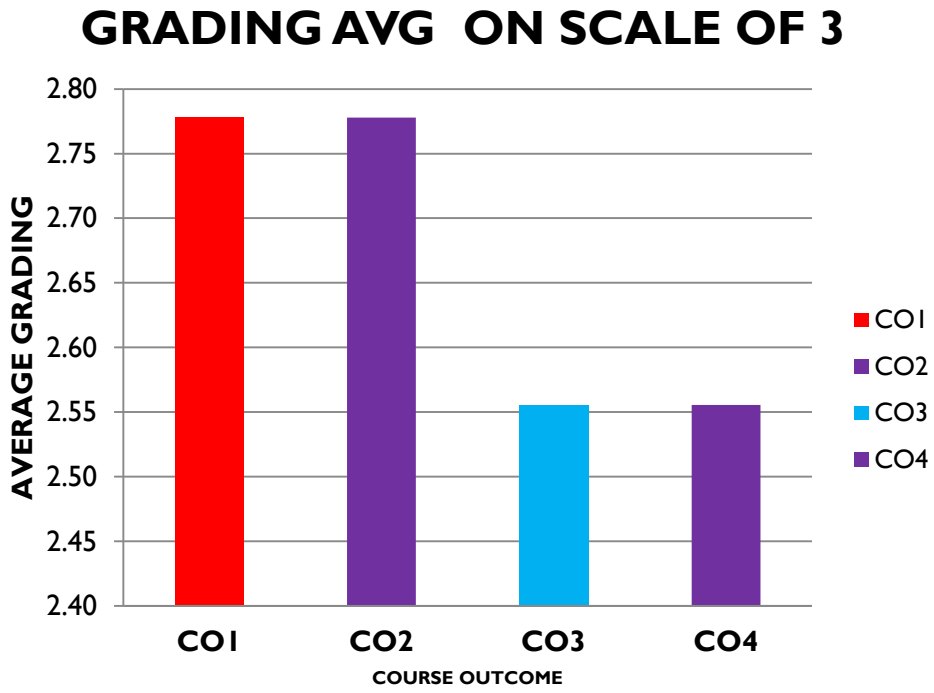
PO AND CO SCALE	3	Strongly Related
	2	Moderate
	1	Low

NUMBER OF STUDENTS SCORING > =70%

COURSE OUTCOMES	% OF STUDENTS ACHIEVED CO	CO RESULT
CO1	77.78%	Y
CO2	77.78%	Y
CO3	72.22%	N
CO4	55.56%	N

Example of CO-attainment for a course

COURSE OUTCOMES	GRADING AVG ON SCALE OF 3	DISTRIBUTION %		
		3	2	1
CO1	2.78	77.78%	22.22%	0.00%
CO2	2.78	77.78%	22.22%	0.00%
CO3	2.56	72.22%	11.11%	16.67%
CO4	2.56	55.56%	44.44%	0.00%



CO Attainment

- The assessments should be in alignment with the COs
- Question paper should be so set to assess all COs
- The average marks obtained in assessments against items for each CO will indicate the CO attainment.
- Instructors can set targets for each CO of his/her course.
- Attainment gaps can therefore be identified.
- Instructor can plan to reduce the attainment gaps or enhance attainment targets.

S.No.	Sub Criteria	Max. Marks	Evaluation Guidelines	Marks Awarded		Overall Marks	Observations of Evaluators (Provide Justifications/ Reasons)
				Marks	Total		
3.1.	**Establish the correlation between the courses and the POs & PSOs**	**20**				Overall Marks for 3.1	
3.1.1.	Course Outcomes	5	Evidence of COs being defined for every course (5)				
3.1.2.	CO-PO/PSOs matrices of courses selected in 3.1.1 (six matrices)	5	Explanation of table to be ascertained (5)				
3.1.3.	Program level Course-PO/PSOs matrix of ALL courses including first year courses	10	Explanation of tables to be ascertained (10)				
3.2.	**Attainment of Course Outcomes**	**50**				Overall Marks for 3.2	
3.2.1.	Describe the assessment processes used to gather the data upon which the evaluation of Course Outcome is based	10	A. List of assessment processes (2)				
			B. The quality /relevance of assessment processes & tools used (8)				
3.2.2.	Record the attainment of Course Outcomes of all courses with respect to set attainment levels	40	Verify the attainment levels as per the benchmark set for all courses (40)				
3.3.	**Attainment of Program Outcomes and Program Specific Outcomes**	**50**				Overall Marks for 3.3	
3.3.1.	Describe assessment tools and processes used for assessing the attainment of each of the POs & PSOs	10	A. List of assessment tools & processes (5)				
			B. The quality/relevance of assessment tools/processes used (5)				
3.3.2.	Provide results of evaluation of each PO & PSO	40	A. Verification of documents, results and level of attainment of each PO/PSO (24)				
			B. Overall levels of attainment (16)				
Total of Criterion 3:		**120**	**Overall Marks for Criterion 3:**				

Contd.

3.3 **Attainment of POs and PSOs (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)

- Describe the assessment tools and processes used to gather the data upon which the evaluation of each of the Program Outcomes and Program Specific Outcomes is based indicating the frequency with which these processes are carried out
- Describe the assessment processes that demonstrate the degree to which the Program Outcomes and Program Specific Outcomes are attained and document the attainment levels

Exhibits/Context to be Observed/Assessed:

A.&B. Direct and indirect assessment tools & processes ; effective compliance; direct assessment methodology, indirect assessment formats-collection analysis; decision making based on direct and indirect assessment

Contd.

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

- Program shall set Program Outcome attainment levels for all POs and PSOs
- The attainment levels by direct (student performance) and indirect (surveys) are to be presented through Program level Course-PO & PSO matrix as indicated

PO Attainment: *Similar table is to be prepared for PSOs*

- Direct attainment level of a PO & PSO is determined by taking average across all courses addressing that PO and/or PSO.
- Indirect attainment level of PO & PSO is determined based on the student exit surveys, employer surveys, co-curricular activities, extra-curricular activities etc.

Exhibits/Context to be Observed/Assessed:

A. & B. Appropriate attainment level and documentary evidences; details for POs & PSOs attainment from core courses to be verified. Also atleast two POs & two PSOs attainment levels shall be verified

Contd.

Example:

1. It is assumed that a particular PO has been mapped to four courses C2O1, C3O2, C3O3 and C4O1
2. PO attainment level will be based on attainment levels of direct assessment and indirect assessment
3. For affiliated, non-autonomous colleges, it is assumed that while deciding on overall attainment level 80% weightage may be given to direct assessment and 20% weightage to indirect assessment through surveys from students(largely), employers (to some extent). Program may have different weightages with appropriate justification
4. Assuming following actual attainment levels

Contd.

Direct Assessment

- C201 –High (3)
- C302 – Medium (2)
- C303 – Low (1)
- C401 – High (3)

Attainment level will be summation of levels divided by no. of courses

3+2+1+3/4= 9/4=2.25

Indirect Assessment

- Surveys, Analysis, customized to an average value as per levels 1, 2 & 3.
- Assumed level – 2

5. PO Attainment level will be 80% of Direct Assessment + 20% of Indirect Assessment i.e. 1.8 + 0.4 = 2.2, Moderate/Medium level of attainment

Note: *Similarly for PSOs*

PO Attainment – Example..

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)

(Describe the assessment tools and processes used to gather the data upon which the evaluation of each of the Program Outcomes and Program Specific Outcomes is based indicating the frequency with which these processes are carried out. Describe the assessment processes that demonstrate the degree to which the Program Outcomes and Program Specific Outcomes are attained and document the attainment levels)

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

Program shall set Program Outcome attainment levels for all POs & PSOs.

(The attainment levels by direct (student performance) and indirect (surveys) are to be presented through Program level Course – PO & PSO matrix as indicated).

PO Attainment

Course	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
C101												
C102												
…												
….												
….												

Attainment of Pos:

Course Name	COs	CO Attainment, %	CO Result	PO1	PO2	PO3	PO 4	PO5	PO6	PO 7	PO8	PO9	PO1 0	PO1 1	PO1 2
Analysis of Structures-II	CO1	86.00%	YES	86%	86%	-	-	-	-	-	-	-	-	-	-
	CO2	78.00%	YES	78%	78%	-	-	-	-	-	-	-	-	-	-
Environmental Engineering-I	CO1	85.96%	YES	86%	57%	-	86 %	-	86%	86 %	-	-	-	-	-
	CO2	77.19%	YES	77%	77%	-	-	-	77%	77 %	-	-	77%	-	-
	CO3	91.23%	YES	-	-	91%	-	-	-	91 %	91%	-	91%	-	-
Geotechnical Engineering-II	CO1	70.00%	NO	-	-	-	-	-	-	-	-	-	-	-	-
	CO2	74.00%	NO	-	-	-	-	-	-	-	-	-	-	-	-
	CO3	100.00%	YES	100%	100%	-	-	-	-	-	-	-	-	-	-
	CO4	75.00%	YES	75%	75%	50%	-	-	75%	-	-	-	-	-	-
Concrete Technology	CO1	77.78%	YES	77.78 %	-	-	-	-	-	-	-	-	-	-	-
	CO2	77.78%	YES	-	77.7 8%	77.7 8%	-	-	-	-	-	-	-	-	-
	CO3	72.22%	NO	-	-		-	-	-	-	-	-	-	-	-
	CO4	55.56%	NO	-	-	-	-	-	-	-	-	-	-	-	-
Hydrology & Water Resources	CO1	83.00%	YES	83%	83%	-	-	-	-	-	-	-	-	-	-
	CO2	78.00%	YES	78%	78%	-	-	-	-	-	-	-	-	-	-
	CO3	68.00%	NO	-	-	-	-	-	-	-	-	-	-	-	-

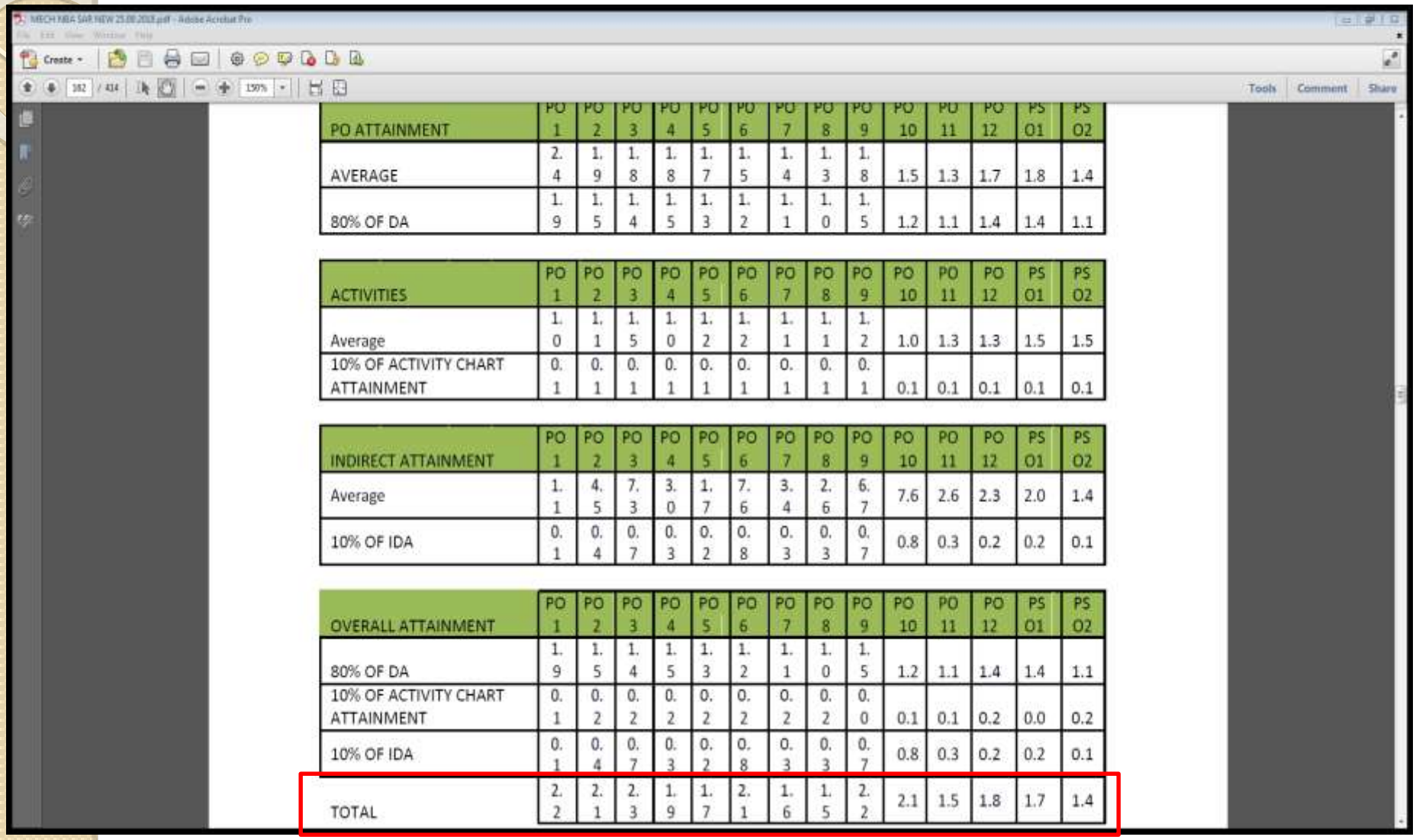
Contd...

Course Name	COs	CO Attainment, %	CO Result	PO1	PO2	PO3	PO4	PO5	PO6	PO 7	PO8	PO9	PO1 0	PO1 1	PO1 2
Quantity Surveying and Costing	CO1	95.00%	YES	95%	95%	-	32%	-	-	-	-	-	-	-	-
	CO2	35.00%	NO	-	-	-	-	-	-	-	-	-	-	-	-
	CO3	89.00%	YES	89%	89%	-	-	-	-	-	-	-	-	-	-
	CO4	24.00%	NO	-	-	-	-	-	-	-	-	-	-	-	-
Alternate Building Materials & Technology	CO1	75.00%	YES	75%		-	-	-	-	75 %		-	-	-	25%
	CO2	75.00%	YES		75%	-	-	-	-	75 %		-	-	-	75%
	CO3	75.00%	YES		-	-	-		-	75 %		-	-	-	50%
	CO4	75.00%	YES			75%	-	50%	-	50 %	75%	-	-	-	-
Major Project Phase - II	CO1	100.00%	YES	-	-	-	-	-	-	100 %	-	100%	-	-	-
	CO2	100.00%	YES	100%	100%	100%	100%	-	-	-	100 %	100%	-	-	100 %
	CO3	100.00%	YES	-	-	-	-	100 %	-	-	-	100%	-	-	-
	CO4	100.00%	YES	-	-	-	-	-	-	-	-	100 %	100 %	67%	-
			PO Attainment	**80%**	**78%**	**72%**	**84%**	**72%**	**83%**	**71 %**	**69%**	**98%**	**84%**	**67%**	**82%**

Example Weightages for PO Attainment

PO No.	Method of Assessment / Weightage / PO Description	Direct Assessment (CIE)	Direct Assessment (SEE)	Student Exit Survey	Course End Survey	Faculty Survey	PO Attainment, %
	Weightage	50%	30%	10%	5%	5%	
PO 1	Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.	38%	22%	7%	4%	4%	76%
PO 2	Identify, formulate, research literature, and analyz e complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.	37%	22%	7%	4%	4%	75%
PO 3	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.	32%	23%	7%	3%	3%	68%
PO 4	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.	39%	23%	7%	4%	3%	77%

PO-Attainment: What next ?



PO ATTAINMENT	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2
AVERAGE	2.4	1.9	1.8	1.8	1.7	1.5	1.4	1.3	1.8	1.5	1.3	1.7	1.8	1.4
80% OF DA	1.9	1.5	1.4	1.5	1.3	1.2	1.1	1.0	1.5	1.2	1.1	1.4	1.4	1.1

ACTIVITIES	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2
Average	1.0	1.1	1.5	1.0	1.2	1.2	1.1	1.1	1.2	1.0	1.3	1.3	1.5	1.5
10% OF ACTIVITY CHART ATTAINMENT	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1

INDIRECT ATTAINMENT	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2
Average	1.1	4.5	7.3	3.0	1.7	7.6	3.4	2.6	6.7	7.6	2.6	2.3	2.0	1.4
10% OF IDA	0.1	0.4	0.7	0.3	0.2	0.8	0.3	0.3	0.7	0.8	0.3	0.2	0.2	0.1

OVERALL ATTAINMENT	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2
80% OF DA	1.9	1.5	1.4	1.5	1.3	1.2	1.1	1.0	1.5	1.2	1.1	1.4	1.4	1.1
10% OF ACTIVITY CHART ATTAINMENT	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.0	0.1	0.1	0.2	0.0	0.2
10% OF IDA	0.1	0.4	0.7	0.3	0.2	0.8	0.3	0.3	0.7	0.8	0.3	0.2	0.2	0.1
TOTAL	2.2	2.1	2.3	1.9	1.7	2.1	1.6	1.5	2.2	2.1	1.5	1.8	1.7	1.4

PO Attainment

- All POs can be adequately addressed through the selection of core courses and their COs
- Attainable targets can be selected for each of the CO.
- If assessment is in alignment with COs the performance of the students indicates the CO attainment.
- These measurements provide the basis for continuous improvement in the quality of learning.

S.No.	Sub Criteria	Max. Marks	Evaluation Guidelines	Marks Awarded		Overall Marks	Observations of Evaluators (Provide Justifications/ Reasons)
				Marks	Total		
3.1.	**Establish the correlation between the courses and the POs & PSOs**	**20**				Overall Marks for 3.1	
3.1.1.	Course Outcomes	5	Evidence of COs being defined for every course (5)				
3.1.2.	CO-PO/PSOs matrices of courses selected in 3.1.1 (six matrices)	5	Explanation of table to be ascertained (5)				
3.1.3.	Program level Course-PO/PSOs matrix of ALL courses including first year courses	10	Explanation of tables to be ascertained (10)				
3.2.	**Attainment of Course Outcomes**	**50**				Overall Marks for 3.2	
3.2.1.	Describe the assessment processes used to gather the data upon which the evaluation of Course Outcome is based	10	A. List of assessment processes (2)				
			B. The quality /relevance of assessment processes & tools used (8)				
3.2.2.	Record the attainment of Course Outcomes of all courses with respect to set attainment levels	40	Verify the attainment levels as per the benchmark set for all courses (40)				
3.3.	**Attainment of Program Outcomes and Program Specific Outcomes**	**50**				Overall Marks for 3.3	
3.3.1.	Describe assessment tools and processes used for assessing the attainment of each of the POs & PSOs	10	A. List of assessment tools & processes (5)				
			B. The quality/relevance of assessment tools/processes used (5)				
3.3.2.	Provide results of evaluation of each PO & PSO	40	A. Verification of documents, results and level of attainment of each PO/PSO (24)				
			B. Overall levels of attainment (16)				
Total of Criterion 3:		**120**			**Overall Marks for Criterion 3:**		

PO 1-5

- POI. Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and 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.

- PO 3 Design/development of solutions: Design solutions for complex engineering problems and design system components, processes to meet the specifications with consideration for the public health and safety, and the cultural, societal, and environmental considerations.

- **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.
- **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.

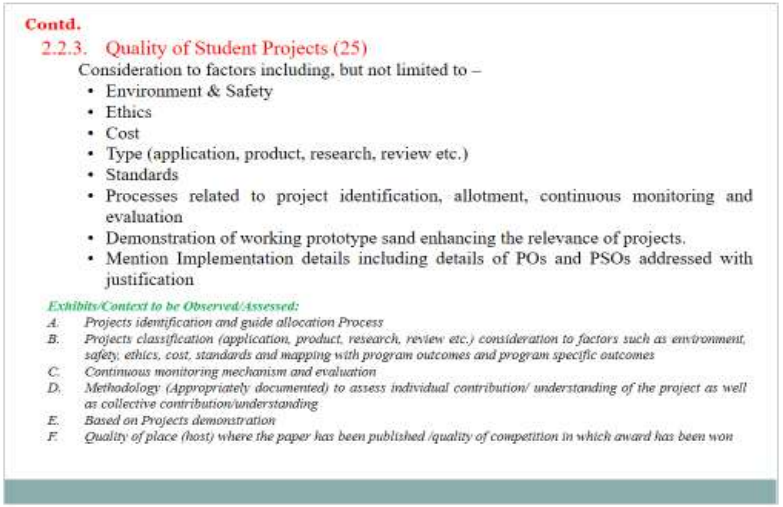
Complex Engineering Problem-CEP

1. Problems not the kind generally encountered at the ends of text book chapters. (These often test if the contents of the chapter have been understood)

2. These are problems that have not been completely framed and leave at least a few* choices for the student to make.

3. Problems may require use of laws of physics, or bring in some mathematical tools in which the problem can be framed.

- **What are the ways for PEVs to verify evidence of solving complex engineering problems for PO attainment?**



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2.2.3. Quality of Student Projects (25)

Consideration to factors including, but not limited to –

- Environment & Safety
- Ethics
- Cost
- Type (application, product, research, review etc.)
- Standards
- Processes related to project identification, allotment, continuous monitoring and evaluation
- Demonstration of working prototype sand enhancing the relevance of projects.
- Mention Implementation details including details of POs and PSOs addressed with justification

Exhibits/Context to be Observed/Assessed:

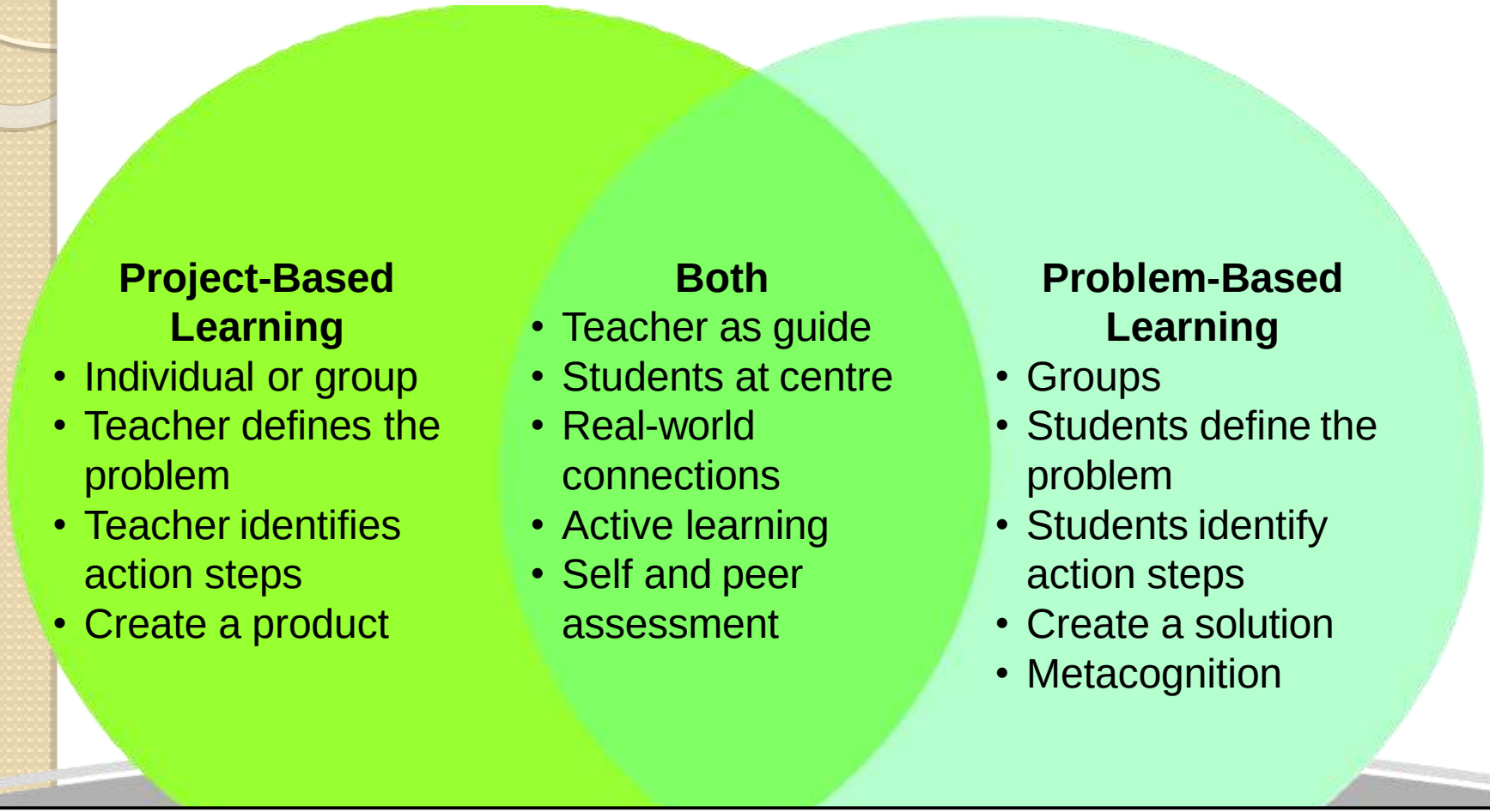
A. Projects identification and guide allocation Process
B. Projects classification (application, product, research, review etc.) consideration to factors such as environment, safety, ethics, cost, standards and mapping with program outcomes and program specific outcomes
C. Continuous monitoring mechanism and evaluation
D. Methodology (Appropriately documented) to assess individual contribution/ understanding of the project as well as collective contribution/understanding
E. Based on Projects demonstration
F. Quality of place (host) where the paper has been published /quality of competition in which award has been won

- **Can PBL help ?**
- **What about Projects ?**
  - **–Integrated Design Projects**
    - **-Research Projects**

(Look for rubrics and the targeted POs.)

Problem-Based Learning

What's the Difference?



Bottom Line: **In Problem-Based Learning, students have more control over their own learning and the processes involved.**

Advantages of Problem Based Learning

- Can be incorporated in any course
- Learner-centred
- Students acquire content knowledge, skills and attitudes
- Facilitates measurement of skill based Programme Out comes namely, Team work, Communication, Life long learning…

Sample Problem

Problem Definition

BMS Construction Company has been in the forefront of concrete construction in India. It specializes in construction of Infrastructure and Buildings. The company wants to hire construction engineers who can take proactive role in the future projects of the company and build their career along with the company. Following are the requirements of the concrete engineer who will be responsible for the *sourcing of materials, quality control of materials, proportioning of concrete mixes using locally available materials for different applications, evaluation of its properties (fresh, hardened and durability) pertaining to appropriate codes.*

Expected Out Comes

- The candidate should be well versed with the current trends of materials innovation, quality assurance practices, concrete production and testing methods and standards. Further, candidate is required to apply/demonstrate skills for **communication, social concern and capacity to learn independently and reflect** and implement new concreting requirement for the projects.

PBL - Example

- Problem:

Development of Pervious concrete for pavements

Assessment strategy

Rubric for Evaluating Self Study

Course: 16CVCT1CCM- Advances in Construction Materials

Problem – Develop a concrete mix for field applications

Batch No: **Title :**

Performance Indicators ↓	Unsatisfactory (2)	Developing (6)	Satisfactory (8)	Exemplary (10)	Score
Identifying Problem & Materials characteristics for possible solutions (PO1)					
Choice of complexities of field requirement and identification of material characteristics (CO1-PO1)				Identified problem is complex and relevant to field application. All the characterization of material is carried out.	
Research Analysis & Mix proportioning (PO2)					
Identifying research gaps, setting objectives and Proportioning of mixes using standard methods (CO2-PO2)					
Design of experiments (PO4)					
Choice of Experiments to arrive at solutions. (CO3- PO4)					
Communication and Life long learning (PO10, PO12)					
Presentation and Reporting of work (CO4-PO10, PO12)					
				Total Score(Maximum, 40)	

S.No.	Sub Criteria	Max. Marks	Evaluation Guidelines	Marks Awarded		Overall Marks	Observations of Evaluators (Provide Justifications/ Reasons)
				Marks	Total		
3.1.	**Establish the correlation between the courses and the POs & PSOs**	**20**				Overall Marks for 3.1	
3.1.1.	Course Outcomes	5	Evidence of COs being defined for every course (5)				
3.1.2.	CO-PO/PSOs matrices of courses selected in 3.1.1 (six matrices)	5	Explanation of table to be ascertained (5)				
3.1.3.	Program level Course-PO/PSOs matrix of ALL courses including first year courses	10	Explanation of tables to be ascertained (10)				
3.2.	**Attainment of Course Outcomes**	**50**				Overall Marks for 3.2	
3.2.1.	Describe the assessment processes used to gather the data upon which the evaluation of Course Outcome is based	10	A. List of assessment processes (2)				
			B. The quality /relevance of assessment processes & tools used (8)				
3.2.2.	Record the attainment of Course Outcomes of all courses with respect to set attainment levels	40	Verify the attainment levels as per the benchmark set for all courses (40)				
3.3.	**Attainment of Program Outcomes and Program Specific Outcomes**	**50**				Overall Marks for 3.3	
3.3.1.	Describe assessment tools and processes used for assessing the attainment of each of the POs & PSOs	10	A. List of assessment tools & processes (5)				
			B. The quality/relevance of assessment tools/processes used (5)				
3.3.2.	Provide results of evaluation of each PO & PSO	40	A. Verification of documents, results and level of attainment of each PO/PSO (24)				
			B. Overall levels of attainment (16)				
Total of Criterion 3:		**120**			**Overall Marks for Criterion 3:**		

CRITERION 4: Students' Performance

Item (Information-cumulatively for all the shifts with explicit headings)	**CAY**	**CAYm1**	**CAYm2**
Sanctioned intake of the program (N)			
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 (N1)			
Number of students admitted in 2nd year in the same batch via lateral entry (N2)			
Separate division students, if applicable (N3)			
Total number of students admitted in the Program (N1 + N2 + N3)			

Data Entry

For Example from data entry perspective:

Item (Information to be provided cumulatively for all the shifts with explicit headings, wherever applicable)	**CAY (2016-17)**	**CAY*m*1 (2015-16)**	**CAY*m*2 (2014-15)**
Sanctioned intake of the program (*N*)	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)	100	100	110
Number of students admitted in 2nd year in the same batch via lateral entry (*N*2)	Nil	24	24
Separate division (*N3)*	Nil	Nil	Nil
Total number of students admitted in the Program (*N*1 + *N*2 + N3)	100	124	134

Contd.

Year of entry	N1 + N2 + 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					
CAYm1					
CAYm2					
CAYm3 (LYG)					
CAYm4 (LYGm1)					
CAYm5 (LYGm2)					

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

Year of entry	*N*1 + *N*2 + N3 (As defined above)	Number of students who have successfully graduated (Students with backlog in stipulated period of study)			
		I Year	II Year	III Year	IV Year
CAY (2016-17)	100(100+0+0)				
CAYm1 (2015-16)	124(100+24+0)	40			
CAY*m2* (2014-15)	124 (100+24+0)	50	45+4		
CAY*m3* (2013-14)	134 (110+24+0)	20	20+4	15+3	
CAY*m4* (LYG) (2012-13)	124 (100+24+0)	0	0+4	5+4	5+4
CAY*m5* (LYG*m*1) (2011-12)	130 (120+10+0)	30	30+10	25+4	50+10
CAY*m6* (LYG*m*2) (2010-11)	144 (120+24+0)	30	25+5	25+5	20+5

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			
		I Year	II Year	III Year	IV Year
CAY (2016-17)	100 (100+0+0)				
CAYm1 (2015-16)	124(100+24+0)	60			
CAY*m*1 (2014-15)	124 (100+24+0)	50	40+20		
CAY*m*2 (2013-14)	134 (110+24+0)	90	80+20	70+20	
CAY*m*3 (LYG) (2012-13)	124 (100+24+0)	100	90+20	85+18	85+15
CAY*m*4 (LYG*m*1) (2011-12)	130 (120+10+0)	80	70+10	60+10	50+10
CAY*m*5 (LYG*m*2) (2010-11)	144 (120+24+0)	70	60+15	54+10	50+10

Contd.

4.1. Enrolment Ratio (20)

Enrolment Ratio= N1(Admitted)/N (Sanctioned)

Item (Students enrolled at the First Year Level on average basis during the period of assessment)	Marks
>= 90% students	**20**
>= 80% students	**18**
>= 70% students	**16**
>= 60% students	**14**
Otherwise	**0**

Exhibits/Context to be Observed/Assessed:

A. B. & C. Data to be verified for each of the assessment years

Contd.

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 actually 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

Item	Last Year of Graduate, LYG (CAY*m4*)	Last Year of Graduate minus 1, LYG*m1* (CAY*m5*)	Last Year of Graduate minus 2, LYG*m2* (CAY*m6*)
Number of students admitted in the corresponding First Year + admitted in 2nd year via lateral entry and separate division, if applicable			
Number of students who have graduated without backlogs in the stipulated period			
Success Index (SI)			
Average SI			

Exhibits/Context to be Observed/Assessed:

Data to be verified for each of the assessment years

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 actually 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×AverageSI

Table B.4.2.1 Success Rate without Backlogs

Item	Last Year of Graduate, LYG (CAYm4) 2015-16	Last Year of Graduate minus 1, LYGm1 (CAYm5) 2014-2015	Last Year of Graduate minus 2, LYGm2 (CAYm6) 2013-2014
Number of students admitted in the corresponding First Year + admitted in 2nd year via lateral entry and separate division, if applicable	**150**	**148**	**157**
Number of students who have graduated without backlogs in the stipulated period	**23**	**49**	**46**
Success Index (SI)	**0.15**	**0.33**	**0.29**
Average SI	**0.256**		

Success rate without backlogs in any year of study= 25 × 0.256 = 6.4

Contd.

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 actual 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

Item	Last Year of Graduate(LYG) (CAY*m4*)	Last Year of Graduate minus 1, LYG*m*1(CAY*m5*)	Last Year of Graduate minus 2 LYG*m*2(CAY*m6*)
Number of students admitted in the corresponding First Year + admitted in 2nd year via lateral entry and separate division, if applicable			
Number of students who have graduated with backlog in the stipulated period			
Success Index (SI)			
Average Success Index			

Exhibits/Context to be Observed/Assessed:

Data to be verified for each of the assessment years

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.

Table B.4.2.2 Success Rate with Backlogs

Item	Last Year of Graduate, LYG (CAYm4)	Last Year of Graduate minus 1, LYGm1 (CAYm5)	Last Year of Graduate minus 2, LYGm2 (CAYm6)
Number of students admitted in the corresponding First Year + admitted in 2nd year via lateral entry and separate division, if applicable	**150**	**148**	**157**
Number of students who have graduated without backlogs in the stipulated period	**90**	**95**	**109**
Success Index (SI)	**0.6**	**0.64**	**0.69**
Average SI	**0.643**		

Success rate = 15× 0.643 = 9.65

Contd

4.4. Academic Performance in Second Year (15)

*Academic Performance Level = 1.5 * Average API (Academic Performance Index)*

***API** = ((Mean of 2nd Year Grade Point Average of all successful Students on a 10 point scale) or (Mean of the percentage of marks of all successful students in Second Year/10)) x (number of successful students/number of students appeared in the examination)*

Successful students are those who are permitted to proceed to the Third year.

Academic Performance	CAYm1	CAY*m2*	CAY*m3*
Mean of CGPA or Mean Percentage of all successful students (X)			
Total no. of successful students (Y)			
Total no. of students appeared in the examination (Z)			
API = X* (Y/Z)	AP 1	AP 2	AP 3
Average API = (AP1 + AP2 + AP3)/3			

Exhibits/Context to be Observed/Assessed:

Data to be verified for atleast one of the assessment years.

4.4. Academic Performance in Second Year(15)

Academic Performance Level = 1.5 * Average API (Academic Performance Index)
API= ((Mean of 2nd Year Grade Point Average of all successful Students on a 10 point scale) or (Mean of the percentage of marks of all successful students in Second Year/10)) x (number of successful students/number of students appeared in the examination) Successful students are those who are permitted to proceed to the third year.

Table B: 4.4 Academic Performances in Second Year

Academic Performance	CAYm1 2018-19	CAYm2 2017-18	CAYm3 2016-17
Mean of CGPA or Mean Percentage of all successful students (X)	**6.74**	**7.19**	**5.87**
Total No. of successful students (Y)	**120**	**123**	**110**
Total No. of students appeared in the examination (Z)	**129**	**126**	**119**
API = X* (Y/Z)	**6.26**	**7.01**	**5.42**
Average API = (AP1 + AP2 + AP3)/3	**6.23**		

Academic Performance Level = 1.5 * 6.23=9.345

Contd

4.3. Academic Performance in Third Year (15)

*Academic Performance = 1.5 * Average API (Academic Performance Index)*

***API** = ((Mean of 3rd Year Grade Point Average of all successful Students on a 10 point scale) or (Mean of the percentage of marks of all successful students in Third Year/10)) x (number of successful students/number of students appeared in the examination)*

Successful students are those who are permitted to proceed to the final year.

Academic Performance	CAYm1	CAY*m2*	CAY*m3*
Mean of CGPA or Mean Percentage of all successful students (X)			
Total no. of successful students (Y)			
Total no. of students appeared in the examination (Z)			

API = x* (Y/Z)	AP 1	AP 2	AP 3
Average API = (AP1 + AP2 + AP3)/3			

Exhibits/Context to be Observed/Assessed:

Data to be verified for atleast one of the assessment years.

Contd.

4.5. Placement, Higher Studies and Entrepreneurship

Assessment Points = 40 × average placement

Item	CAY	CAYm1	CAYm2
Total No. of Final Year Students (N)			
No. of students placed in companies or Government Sector (x)			
No. of students admitted to higher studies **with valid qualifying scores** (GATE or equivalent State or National Level Tests, GRE, GMAT etc.) (y)			
No. of students turned entrepreneur in **engineering / technology** (z)			
x + y + z =			
Placement Index : (x + y + z)/N	**P1**	**P2**	**P3**
Average placement= (P1 + P2 + P3)/3			

Exhibits/Context to be Observed/Assessed:

Data to be verified for atleast one of the assessment years.

Contd.

4.6. Professional Activities

4.6.1. Professional societies/chapters and organizing engineering events

Relevant documentary evidences

- Professional Society/Chapters
- No. and Quality of Engineering events organized

(Level - Institute/State/National/International)

Exhibits/Context to be Observed/Assessed:

Self -Explanatory.

4.6.2. Publication of technical magazines, newsletters, etc.

The Department publications along with the names of the editors, publishers, etc.

- Quality and relevance of the contents and print material
- Participation of students from the program

Contd.

Exhibits/Context to be Observed/Assessed:

A. Documentary evidence

B. Documentary evidence - Students participation (also to be confirmed during interaction with the students)

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

Awards in the events/conferences organized by other institutes

- Within the State
- Outside the State
- Prized/Awards received

Exhibits/Context to be Observed/Assessed:

A.B.& C. Quality of events and documentary evidence

			Marks	Total	Marks	
Placement, Higher studies and Entrepreneurship	**20**	Assessment Points = 20 × average placement , i.e., (P1+P2+P3)/3 Placement Index (P) =[(x + y + z)/N]; where, x = Number of students placed in companies or Government sector y = Number of students pursuing Ph.D. / JRF/ SRF z = No. of students turned entrepreneur in engineering/technology N = Total number of students admitted in first year	10	10	**10**	Placement % = (38+55+55)/3 = 49%: Assessment Points -= 20 x0 .49= 9.8 = 10.
Professional Activities	**15**				**8**	There is no evidence of participation of students in professional society activities in organising events. Majority of the Student projects have been translated into publications in various conferences/journals.
Student's participation in Professional societies/chapters and organizing engineering events	5	A. Availability & activities of professional societies/chapters (3)	0	0		
		B. Number, quality of engineering events (organized at institute) Level- Institute/State/ National/ International Levels) (2)	0			
Student's publications	10	A. Quality & Relevance of the contents and Print Material (3)	2	8		
		B. Participation of Students from the program (2)	2			
		C. List the publications along with the names of the authors and publishers, etc.(5)	4			

CRITERION 5: Faculty Information and Contributions

Name of the Faculty Member	Qualification			Association with the Institution	Designation	Date on which Designated as Professor/ Associate Professor	Date of Joining the Institution	Department	Specialization	Academic Research			Currently Associated (Y/N) Date of Leaving (In case Currently Associated is ("No")	Nature of Association (Regular/Contract)
	Degree (highest degree)	University	Year of attaining higher qualification							Research Paper Publications	Ph.D. Guidance	Faculty Receiving Ph.D. during the Assessment Years		

Contd.

5.1. Student-Faculty Ratio (SFR)

(To be calculated at **Department** Level)

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

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

No. of Students in UG 2nd Year= u1

No. of Students in UG 3rd Year= u2

No. of Students in UG 4th Year= u3

No. of Students in PG 1st Year= p1

No. of Students in PG 2nd Year= p2

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)

Student Teacher Ratio (STR) = S / F

Year	CAY	CAYm1	CAYm2
u1.1			
u1.2			
u1.3			
UG1	u1.1+u1.2+u1.3	u1.1+u1.2+u1.3	u1.1+u1.2+u1.3
…			
$u_n.1$			
$u_n.2$			
$u_n.3$			
UGn	$u_n.1+u_n.2+u_n.3$	$u_n.1+u_n.2+u_n.3$	$u_n.1+u_n.2+u_n.3$
p1.1			
p1.2			
PG1	p1.1+p1.2	p1.1+p1.2	p1.1+p1.2
…..			
pm.1			
pm.2			
PGm	pn.1+pn.2	pn.1+pn.2	pn.1+pn.2
Total No. of Students in the Department (S)	UG1 + UG2 +.. +UGn + PG1 + …PGn	UG1 + UG2 + .. +UGn + PG1+… + PGn	UG1 + UG2 + .. +UGn + PG1+… + PGn
No. of Faculty in the Department (F)	F1	F2	F3
Student Faculty Ratio (SFR)	SFR1=S1/F1	SFR2= S2/F2	SFR3= S3/F3
Average SFR	SFR=(SFR1+SFR2+SFR3)/3		

Student Faculty Ratio (SFR) = S / F

Year	CAY(2019-20)	CAYm1(2018-19)	CAYm2 (2017-18)
u1.1	198	216	216
u1.2	216	216	216
u1.3	216	216	216
UG1	u1.1+u1.2+u1.3	u1.1+u1.2+u1.3	u1.1+u1.2+u1.3
…	630	648	648
p1.1	18	18	18
p1.2	18	18	18
PG1	p1.1+p1.2	p1.1+p1.2	p1.1+p1.2
…..	36	36	36
P2.1	18	18	18
P2.2	18	18	18
PG2	P2.1+p2.2	P2.1+p2.2	P2.1+p2.2
	36	36	36
Total No. of Students in the Department (S)	**UG1 + PG1 +PG2=S1**	**UG1 + PG1 +PG2=S2**	**UG1 + PG1 +PG2=S3**
	702	**720**	**720**
No. of Faculty in the Department (F)	**40**	**44**	**51**
Student Faculty Ratio	**SFR1=S1/F1=17.55**	**SFR2= S2/F2=16.36**	**SFR3= S3/F3=14.40**
Average SFR	**SFR=(SFR1+SFR2+SFR3)/3=16.10**		

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

< = 20 - 20 Marks
< = 25 - 10 Marks
> 25 - 0 Marks

Exhibits/Context to be Observed/Assessed:

- *SFR is to be verified considering the faculty of the entire department.*
- *No. of Regular faculty calculation considering Regular faculty definition*; Faculty appointment letters, time table, subject allocation file, salary statements.*
- *No. of students calculation as mentioned in the SAR(please refer table under criterion 5.1)*
- *Faculty Qualification as per AICTE guidelines shall only be counted*

** Note: Minimum 75% should be Regular/ full time faculty and the remaining shall be Contractual Faculty as per AICTE norms and standards.*

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 Student Faculty Ratio.

S.No.	Sub Criteria	Max. Marks	Evaluation Guidelines	Marks Awarded		Overall	Observations of Evaluators (Provide Justifications/ Reasons)
				Marks	Total	Marks	
4.1.	**Student-Faculty Ratio (SFR)**	**10**	Marks to be given proportionally from a maximum of 10 to a minimum of 5 for average SFR between 15:1 to 20:1, and zero for average SFR higher than 20:1. (Refer calculation in SAR) **▪ Number of Regular faculty will be calculated as per the definition given below:** Minimum 75% should be Regular/Full Time faculty and the remaining shall be Contractual Faculty* as per AICTE norms and standards. *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 Student Faculty Ratio. ▪ Faculty to be calculated Department wise as per the format given in SAR.	10	10	**10**	Total students, cay=388, caym1=391,caym2=393, Total faculty in the dept. 25, 28,26, SFR, 388/25=15.52, 391/28=13.96, 393/26=15.15, **Avg=14.87**

Contd.

5.2. Faculty Cadre Proportion

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

$$\text{Cadre Proportion Marks} = \left\{ \left[\frac{AF1}{RF1} \right] + \left[\frac{AF2}{RF2} \times 0.6 \right] + \left[\frac{AF3}{RF3} \times 0.4 \right] \right\} \times 12.5$$

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

Example: Intake = 180; Required number of Faculty: total students as per 5.1/20 =702/20 = 35., ; RF1= 1/9 x35 =4, RF2=2/9x35=8 and RF3=6/9x35= 23.

Case 1: AF1/RF1= 1; AF2/RF2 = 1; AF3/RF3 = 1;

Cadre proportion marks = (1+0.6+0.4) x12.5 = 25

Case 2: AF1/RF1= 1; AF2/RF2 = 9/8; AF3/RF3 = 22/23;

Cadre proportion marks = (1+0.7+0.4) x12.5 = **limited to 25**

Case 3: AF1/RF1=0; AF2/RF2=1/2; AF3/RF3=11/9; **To be observed carefully**

Cadre proportion marks = (0+0.3+0.49) x12.5 = 9.87

Contd.

5.2. Faculty Cadre Proportion

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

$$\text{Cadre Proportion Marks} = \left\{ \left[\frac{AF1}{RF1} \right] + \left[\frac{AF2}{RF2} \times 0.6 \right] + \left[\frac{AF3}{RF3} \times 0.4 \right] \right\} \times 12.5$$

- 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

Exhibits/Context to be Observed/Assessed:

(Faculty Qualification and experience required for cadre posts shall only be considered as per AICTE norms/guidelines)

- *Cadre wise No. of faculty available; Faculty qualification and experience and eligibility; Appointment/Promotion orders*
- *Cadre wise no. of faculty required as per AICTE guidelines (refer calculation in SAR)*

Contd.

5.3. Faculty Qualification

FQ = 2.5 x [{10X +4Y}/F] where

X is no. of faculty with Ph.D.,

Y is no. of faculty with M.Tech,

F is no. of faculty required to comply 1:20 Faculty Student ratio

(no. of faculty and no. of students required to be calculated as per 5.1)

Exhibits/Context to be Observed/Assessed:

Documentary evidence – Faculty Qualification

Contd.

5.4. Faculty Retention

No. of regular faculty members in CAYm2= CAYm1= CAY=

Item (During the period of assessment keeping CAYm3 as base year)	Marks
>=90% of required Faculty members retained	25
>=75% of required Faculty members retained	20
>=60% of required Faculty members retained	15
>=50% of required Faculty members retained 10	10
<50% of required Faculty members retained	0

Exhibits/Context to be Observed/Assessed:

Faculty date of joining; atleast three month (July-April-May) salary statement for each of the assessment years

Contd.

5.5. Innovations by the Faculty in Teaching and Learning

Contributions to teaching and learning are activities that contribute to the improvement of student learning. These activities may include innovations not limited to-

- Use of ICT
- Instruction delivery
- Instructional methods
- Assessment
- Evaluation and inclusive class rooms that lead to effective, efficient and engaging instruction

Exhibits/Context to be Observed/Assessed:

A. Availability on Institute website; awareness among faculty and students of the department

B.& C. Self –explanatory

D. Innovations that contribute to the improvement of student learning, typically include use of ICT, instruction delivery, instructional methods, assessment, evaluation etc.

Contd.

5.6. Faculty as participants in Faculty development / training activities/ STTPs

- A Faculty scores maximum five points for participation
- Participation in 2 to 5 days Faculty development program: 3 Points
- Participation >5 days Faculty development program: 5 points

Name of the Faculty	Max. 5 per Faculty		
	CAY	CAYm1	CAYm2
Sum			
***RF*= Number of Faculty required to comply with 20:1 Student-Faculty ratio as per 5.1**			
Assessment = 3 × (Sum/0.5RF) (Marks limited to 15)			
Average assessment over three years (Marks limited to 15) =			

Exhibits/Context to be Observed/Assessed:

- *Relevance of the training/development programme*
- *No. of days; No. of faculty*

Contd.

5.7. Research and Development

5.7.1. Academic Research

Academic research includes research paper publications, Ph.D. guidance, and faculty receiving Ph.D. during the assessment period.

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

Exhibits/Context to be Observed/Assessed:

A. Quality of publications; publications copy

B. Documentary evidence

Contd.

5.7.2. Sponsored Research

- Funded research from outside
- Provide a list with Project Title, Funding Agency, Amount and Duration

Funded research from outside; Cumulative during CAYm1, CAYm2 and CAYm3 Amount > 20 Lakh – 5 Marks

Amount >= 16 Lakh and <= 20 Lakh – 4 Marks

Amount >= 12 Lakh and < 16 Lakh – 3 Marks

Amount >= 8 Lakh and < 12 Lakh – 2 Marks

Amount >= 4 Lakh and < 8 Lakh – 1 Mark

Amount < 4 Lakh – 0 Mark

Exhibits/Context to be Observed/Assessed:

Documentary evidence; Funding agency, Amount, Duration, Research progress; Outcome

Contd.

5.7.3. Development activities

Provide details:

- Product Development
- Research laboratories
- Instructional materials
- Working models/charts/monograms etc.

Exhibits/Context to be Observed/Assessed:

Self explanatory

5.7.4. Consultancy (from Industry)

Provide a list with Project Title, Funding Agency, Amount and Duration

Consultancy; (Cumulative during CAYm1, CAYm2 and CAYm3) Amount > 10 Lakh – 5 Marks
Amount >= 8 Lakh and <= 10 Lakh – 4 Marks
Amount >= 6 Lakh and < 8 Lakh – 3 Marks
Amount >= 4 Lakh and < 6 Lakh – 2 Marks
Amount >= 2 Lakh and < 4 Lakh – 1 Mark
Amount < 2 Lakh – 0 Mark

Contd.

Exhibits/Context to be Observed/Assessed:

Documentary evidence; Funding agency, Amount, Duration, Research progress; Outcome

5.8. Faculty Performance Appraisal and Development System (FPADS)

The assessment is based on:

- A well-defined system for faculty appraisal for all the assessment years
- Its implementation, transparency and effectiveness

Exhibits/Context to be Observed/Assessed:

A. *Notified performance appraisal and development system; Appraisal Parameters; Awareness*

B. *Implementation, Transparency and Effectiveness*

Contd.

5.9. Visiting/Adjunct/Emeritus Faculty etc.

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 inviting visiting/adjunct /Emeritus faculty
- Minimum 50 hours per year interaction with adjunct faculty from industry/retired professors etc.

Exhibits/Context to be Observed/Assessed:

Documentary evidence

CRITERION 6: Facilities and Technical Support

6.1. Adequate and well equipped laboratories, and technical manpower

S N	Name of the Laboratory	No. of students per setup (Batch Size)	Name of the Important equipment	Weekly utilization status (all the courses for which the lab is utilized)	Technical Manpower support		
					Name of the technical staff	Designation	Qualification
1.							
N.							

A. Adequate well-equipped laboratories to run all the program-specific curriculum (20)
B. Availability of adequate technical supporting staff (5)
C. Availability of qualified technical supporting staff (5)

Exhibits/Context to be Observed/Assessed:

A. Adequacy; well-equipped laboratories; utilization
B. & C. Self - explanatory

Contd.

6.2. Additional facilities created for improving the quality of learning experience in laboratories

Sr. No.	Facility Name	Details	Reason(s) for creating facility	Utilization	Areas in which students' are expected to have enhanced learning	Relevance to POs/PSOs
1.						
N.						

A. Availability and relevance of additional facilities(10)
B. Facilities utilization and effectiveness (10)
C. Relevance to POs and PSOs (5)

Exhibits/Context to be Observed/Assessed:

Self-explanatory

6.3. Laboratories: Maintenance and overall ambiance

Maintenance and overall ambience

Self-Explanatory

Contd.

6.4. Project laboratory

Mention facility & Utilization

6.5. Safety measures in laboratories

Sr. No.	Name of the Laboratory	Safety measures
1.		
N.		

CRITERION 7: Continuous Improvement

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

- 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

Examples of analysis and proposed action

Sample 1:

- Course outcomes for a laboratory course did not measure up, as some of the lab equipment did not have the capability to do the needful (e.g., single trace oscilloscopes available where dual trace would have been better, or, non availability of some important support software etc.)
- Action taken-Equipment up-gradation was carried out (with details of upgradation)

Contd.

Sample 2:

- In a course on EM theory student performance has been consistently low with respect to some COs
- Analysis of answer scripts and discussions with the students revealed that this could be attributed to a weaker course on vector calculus
- Action taken-revision of the course syllabus was carried out (instructor/text book changed too has been changed, when deemed appropriate)

Sample 3:

- In a course that had group projects it was determined that the expectations from this course about PO3 (like: “to meet the specifications with consideration for the public health and safety, and the cultural, societal, and environmental considerations”) were not realized as there were no discussions about these aspects while planning and execution of the project
- Action taken- Project planning, monitoring and evaluation included in rubrics related to these aspects

Contd.

POs & PSOs Attainment Levels and Actions for improvement – CAY

	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.			
Action 1: **Action n:**			
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			

Similar Tables should be presented for all POs & PSOs

Exhibits/Context to be Observed/Assessed:

Documentary evidence in respect of each of the POs

Contd.

7.2. Academic Audit and actions taken thereof during the period of Assessment

- Assessment shall be based on conduct and actions taken in relation to Continuous Improvement

Exhibits/Context to be Observed/Assessed:

Academic Audit assessment criteria, frequency, conduct mechanism, action plan based on audit, implementation and effectiveness

7.3. Improvement in Placement, Higher Studies and Entrepreneurship

Assessment is based on improvement in:

- Placement: number, quality placement, core industry, pay packages etc.
- Higher studies: performance in GATE, GRE, GMAT, CAT etc., and admissions in premier institutions
- Entrepreneurs

Exhibits/Context to be Observed/Assessed:

A. *B. & C. Nos. in each year of the assessment; improvement considering CAYm3 as a base year*

Contd.

7.4. Improvement in the quality of students admitted to the program

Assessment is based on improvement in terms of ranks/score in qualifying-

- State level/National level entrances tests
- Percentage marks in Physics, Chemistry and Mathematics in 12th Standard
- Percentage marks of the lateral entry students

Exhibits/Context to be Observed/Assessed:

A. Documentary evidence – list of students admitted; admission authority guidelines; ranks/scores; comparative status considering CAYm3 as a base year

CRITERION 8: First Year Academics

8.1. First Year Student-Faculty Ratio (FYSFR)

Assessment = (5 × 15)/Average FYSFR (Limited to Max. 5)

For each year of assessment = (5 × 20)/ FYSFR

(Limited to Max. 5) Average of Assessment of data in CAY, CAYm1 and CAYm2

*Note: If FYSFR is greater than 25, then assessment equal to zero.

Exhibits/Context to be Observed/Assessed:

- *No. of Regular faculty calculation considering Regular faculty definition and fractional load; Faculty appointment letters; Salary statements*
- *No. of students calculation as mentioned in the SAR*

CRITERION 8: First Year Academics

8.2. Qualification of Faculty Teaching First Year Common Courses

Assessment of qualification = (5x +3y)/RF

x= Number of Regular Faculty with Ph.D

y = Number of Regular Faculty with Post-graduate qualification

RF= Number of faculty members required as per SFR of 20:1

Exhibits/Context to be Observed/Assessed:

Documentary evidence – Faculty Qualification

8.3. First Year Academic Performance

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

Exhibits/Context to be Observed/Assessed:

Data to be verified for atleast one of the assessment years

Contd.

8.4. Attainment of Course Outcomes of first year courses

8.4.1. Describe the assessment processes used to gather the data upon which the evaluation of Course Outcomes of first year is done

Examples of data collection processes may include, but are not limited to –

- Specific exam questions
- Laboratory tests
- Internally developed assessment exams
- Oral exams
- Assignments
- Presentations
- Tutorial sheets etc.

Exhibits/Context to be Observed/Assessed:

A. & B. Direct and indirect assessment(if applicable), tools & processes; effective compliance; direct assessment methodology, indirect assessment formats-collection-analysis; decision making

Contd.

8.4.2. Record the attainment of Course Outcomes of all first year courses

Program shall have set attainment levels for all first year courses.

- *The attainment levels shall be set considering average performance levels in the University Examination or any higher value set as target for the assessment years.*
- *Attainment level is to be measured in terms of student performance in internal assessments with respect the COs of a subject plus the performance in the University examination*

A. Verify the records as per the benchmark set for the courses (5)

Exhibits/Context to be Observed/Assessed:

Documentary evidence – Attainment for atleast 3 courses

Contd.

8.5. Attainment of Program Outcomes of all first year courses

8.5.1. Indicate results of evaluation of each relevant PO and/or PSO, if applicable

- The relevant program outcomes that are to be addressed at first year need to be identified by the institution
- Program Outcome attainment levels shall be set for all relevant POs and/or PSOs through first year courses

COURSE	COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
C101												
C102												
...												
...												
Direct Attainment												

Exhibits/Context to be Observed/Assessed:

A. & B. Documentary evidence for each relevant PO/PSO

Contd.

8.5.2. Actions taken based on the results of evaluation of relevant POs

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

	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.			
Action 1: **Action n:**			
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			

Note: PSOs, if applicable to be added appropriately

Exhibits/Context to be Observed/Assessed:

A. & B. Documentary evidence for each relevant PO/PSO

CRITERION 9: Student Support Systems

9.1 Mentoring system to help at individual level

- Type of mentoring: Professional guidance / career advancement / course work specific / laboratory specific / all-round development
- Number of faculty mentors
- Number of students per mentor
- Frequency of meeting

Exhibits/Context to be Observed/Assessed:

A. Mentoring system terms of reference; implementation; effectiveness (also to be verified during interaction with the students)

CRITERION 9: Student Support Systems

9.2. Feedback analysis and reward /corrective measures taken, if any

- Feedback collected for all courses: YES/NO
- Feedback questionnaire
- Specify the feedback collection process
- Average Percentage of students who participated
- Specify the feedback analysis process
- Basis of reward / corrective measures, if any: Indices used for measuring quality of teaching and learning
- Summary of the index values for all courses/teachers
- Number of corrective actions taken

Exhibits/Context to be Observed/Assessed:

A. Feedback questions, collection process, analysis, actions taken, effectiveness

Contd.

9.3. Feedback on facilities

Assessment is based on -

- Feedback collection
- Analysis and corrective action taken

9.4. Self Learning

The institution needs to specify –

- Facilities
- Materials
- Scope for self-learning / learning beyond syllabus
- Webinars
- Podcast
- MOOCs
- Evaluate effectiveness

Contd.

9.5. Career Guidance, Training, Placement

The institution may specify –

- Facility
- Management
- Effectiveness for career guidance including counseling for higher studies
- Campus placement support
- Industry interaction for training/internship/placement, etc.

Exhibits/Context to be Observed/Assessed:

Availability, implementation, effectiveness (also to be verified during interaction with the students)

9.6. Entrepreneurship Cell

The institution may specify –

- Facility
- Management
- Effectiveness in encouraging entrepreneurship and incubation
- Success stories for each of the assessment years

Exhibits/Context to be Observed/Assessed:

Availability, implementation, effectiveness (also to be verified during interaction with the students)

Contd.

9.7. Co-curricular and Extra-curricular Activities

The institution may specify –

- Co-curricular and extra-curricular activities

A. Availability of sports and cultural facilities (3)

B. NCC, NSS and other clubs (3)

C. Annual students activities (4)

Exhibits/Context to be Observed/Assessed:

Availability, implementation, effectiveness (also to be verified during interaction with the students)

CRITERION 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 statement typically indicates aspirations and Mission statement states the broad approach to achieve aspirations

- Availability
- Appropriateness/relevance

Exhibits/Context to be Observed/Assessed:

A. ***Institute Vision and Mission statements****: Availability of statements on Institute website; Availability at Central facilities such as Library, Computer Center, Principal Chamber etc. Availability of one set of statements in each of the departments; Availability in Institute level documents*

B. *Correctness from definition perspective*

CRITERION 10: Governance, Institutional Support and Financial Resources

10.1.2. Governing body, administrative setup, functions of various bodies, service rules, procedures, recruitment and promotional policies

- List the governing, senate, and all other academic and administrative bodies; their memberships, functions, and responsibilities; frequency of the meetings; and attendance therein
- The published rules including service rules, policies and procedures; year of publication shall be listed
- Minutes of the meetings, Action taken reports, extent of awareness among the employees/students

Exhibits/Context to be Observed/Assessed:

Self explanatory

Contd.

10.1.3. Decentralization in working and grievance redressal mechanism

- List the names of the faculty members who have been delegated powers for taking administrative decisions
- Grievance Redressal cell
- Action taken report for the above point

Exhibits/Context to be Observed/Assessed:

A. B. & C. Documentary evidence

10.1.4. Delegation of financial powers

- Institution should explicitly mention financial powers delegated to the Principal, Heads of Departments and relevant in-charges
- Demonstrate the utilization of financial powers for each year of the assessment years

Exhibits/Context to be Observed/Assessed:

A. Circulars notifying financial powers

B. Documentary evidence to exhibit utilization at each levels during assessment years

Contd.

10.1.5. Transparency and availability of correct/unambiguous information in public domain

- Information on policies, rules, processes and dissemination of this information to stakeholders is to be made available on the web site
- Disseminating of information about student, faculty and staff

Exhibits/Context to be Observed/Assessed:

A. & B. Website and Documentary evidence

Contd.

10.2. Budget Allocation, Utilization, and Public Accounting at Institute level

Summary of current financial year's budget and actual expenditure incurred (for the institution exclusively) in the three previous financial years.

Total Income at Institute level: For CFY, CFYm1, CFYm2 & CFYm3

For CFY: Similar tables are to be prepared for CFYm1, CFYm2 & CFYm3

Total Income				**Actual expenditure (till …)**			**Total No. of students**:
Fee	**Govt.**	**Grant(s)**	**Other Sources (specify)**	**Recurring including Salaries**	**Non recurring**	**Special Projects/Any other, specify**	**Expenditure per student**

Contd.

Items	Budgeted in CFY	Actual expenses in CFY (till …)	Budgeted in CFYm1	Actual Expenses in CFYm1	Budgeted in CFYm2	Actual Expenses in CFYm2	Budgeted in CFYm3	Actual Expenses in CFYm3
Infrastructure Built-Up								
Library								
Laboratory equipment								
Teaching and non-teaching staff salary								
R&D								
Laboratory consumables								
Maintenance and spares								
Training and Travel								
Miscellaneous expenses								
Others Specify								
Total								

Contd.

10.2.1 Adequacy of budget allocation

- The institution needs to justify that the budget allocated over the years was adequate

A. Quantum of budget allocation for three years (5)

B. Justification of budget allocated for three years (5)

Exhibits/Context to be Observed/Assessed:

A. Budget formulation, finalization and approval process

B. Requirement – allocation –adequacy – justification thereof

10.2.2 Utilization of allocated funds

- The institution needs to state how the budget was utilized during assessment years

Exhibits/Context to be Observed/Assessed:

A. Balance sheet; effective utilization; random verification for atleast two of the three assessment years

Contd.

10.2.3 Availability of the audited statements on the institute's website

- The institution needs to make audited statements available on its website.

Exhibits/Context to be Observed/Assessed:

A. Website

10.3 Program Specific Budget Allocation, Utilization

Total Budget at program level: For CFY, CFYm1, CFYm2 & CFYm3

10.3.1. Adequacy of budget allocation

Program needs to justify that the budget allocated over the assessment years was adequate for the program

Exhibits/Context to be Observed/Assessed:

A. Budget formulation, finalization and approval process

B. Requirement – allocation –adequacy – justification thereof

Contd.

10.3.2. Utilization of allocated funds

Program needs to state how the budget was utilized during the last three assessment years

Exhibits/Context to be Observed/Assessed:

A. *Balance sheet; effective utilization; random verification for atleast two of the three assessment years*

10.4. Library and Internet

- AICTE zero deficiency report for all the assessment years
- Effective availability
- Purchase records
- Utilization of facilities
- Documentation

Contd.

10.4.1. Quality of learning resources (hard/soft)

- Relevance of available learning resources including e-resources
- Accessibility to students

Exhibits/Context to be Observed/Assessed:

Availability; Adequacy; Effectiveness
(Also to be verified during interactions with the faculty and students)

10.4.2. Internet

- Name of the Internet provider
- Available bandwidth
- Wi Fi availability
- Internet access in labs, classrooms, library and offices of all Departments
- Security arrangements

Exhibits/Context to be Observed/Assessed:

Availability as per AICTE norms; Adequacy; Effectiveness
(Also to be verified during interactions with the faculty and students)

Explicit observations about the program

(Please use additional sheets if necessary to elaborate)

Program title_____

Strengths:

1. _____
2. _____
3. _____
4. _____

Weakness/Areas of improvement:

1. _____
2. _____
3. _____
4. _____

Deficiencies:

1. _____
2. _____
3. _____
4. _____

Other Observations, if any:

1. _____
2. _____
3. _____

Department/Programme Specific Criteria:

S.no.	Criteria	Max. Marks	Marks Awarded	Remarks
1.	Vision, Mission and Program Educational Objectives	60		
2.	Program Curriculum and Teaching-Learning Processes	120		
3.	Course Outcomes and Program Outcomes	120		
4.	Students' Performance	150		
5.	Faculty Information and Contributions	200		
6.	Facilities and Technical Support	80		
7.	Continuous Improvement	50		
TOTAL		780		

Signature
(Program Evaluator 1)

Signature
(Program Evaluator 2)

AWARD OF ACCREDITATION

ENGINEERING PROGRAMS

	Full Accreditation for **Six** years			
Sl. No.	Parameters	Undergraduate (UG) Programs		PG Programs
		TIER I	TIER II	
1.	Maximum Marks/ Grade required	# 'Y' shall be >=7 # 'W' and # 'D' shall be Zero (0), C – in other criteria.	Scoring a minimum of 750 points in aggregate out of 1000 points with minimum score of 60% in mandatory fields (criteria 4 to 6)	Qualifying marks shall be greater than 375 with 60% in each criteria
2	Minimum percentage (%) of Ph. D. required in the department for previous two academic years including Current Academic Year	**30%**	**30%**	**30%**
3	Minimum percentage (%) of admissions required in the UG program at the **program level** (averaged over previous three academic years including Current Academic Year)	75%	**75%**	-
5	The required Faculty Student Ratio (FSR) in **the department** (averaged for the previous three academic years including current academic year)	1:20	1:20	1:20
6	The required number of Professors & Associate Professors (on a full-time/regular basis with Ph.D.) in the respective department for previous two academic years including current academic year	At least 2 Professors or 1 Professor and 1 Associate Professor	At least 2 Professors or 1 Professor and 1 Associate Professor	At least 1 Professor and 1 Associate Professor (having expertise in the domain of the program under consideration)
7	HOD of the program under consideration shall possesses Ph.D. degree	√	√	√

SAR Context

- Provides preparedness status at I/P level for the NBA visit,
- Provides the first impression about the I/P to the evaluation team,
- Presents crisp program status to the evaluation team and addresses process and the extent to which, a program meets each criterion,
- Provides documented evidences, which the evaluation team maps/matches with the visual /oral evidences during the visit.

THANK YOU