Annexure III

SELF ASSESSMENT REPORT (SAR) FORMAT

UNDERGRADUATE ENGINEERING PROGRAMS (TIER-I)

FIRST TIME ACCREDITATION

NBCC Place, 4th Floor East Tower, Bhisham Pitamah Marg,
Pragati Vihar New Delhi 110003
P: +91(11)24360620-22, 24360654
Fax: +91(11) 24360682
E-mail: membersecretary@nbaind.org
Website: www.nbaind.org
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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:**

Institution of National Importance	☐
University	☐
Deemed-to-be-University	☐
Autonomous	☐
Any other (Please specify)	☐

Note:

1. In case of Autonomous and Deemed University, mention the year of grant of status by the authority.
2. In case of University Constituent Institution, please indicate the academic autonomy status of the Institution as defined in 12th Plan guidelines of UGC. Institute should apply for Tier 1 only when fully academically autonomous.

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.

7. Details of all the Programs being Offered by the Institution under Consideration

Sl. No.	Program Name	Name of the Department	Year of Start	Intake	Increase/ Decrease in Intake, if any	Year of Increase/ Decrease	AICTE Approval	Accreditation Status*

Table A.7

**** Write applicable one:***

Applying first time

- Granted accreditation for two / three years for the period (specify period)
- Granted accreditation for five / six 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- Withdrawn (specify visit dates, year)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

Note: Add rows as needed.

8. Programs to be Considered for Accreditation vide this Application

Sl. No.	Program Name
1	
N.	

Table A.8

9. Total Number of Employees

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 teaching in Engineering Programs	**M**						
	F						
Non-teaching staff	**M**						
	F						

Table A.9a

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

1. ***Shall have the AICTE prescribed qualifications and experience.***
2. ***Shall be appointed on full time basis and worked for consecutive two semesters during the particular academic year under consideration.***
3. ***Should have gone through an appropriate process of selection and the records of the same shall be made available to the visiting team during NBA visit.***

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.9a)

Items		**CAY**		**CAYm1**		**CAYm2**	
		Min	**Max**	**Min**	**Max**	**Min**	**Max**
Faculty in Engineering	**M**						
	F						
Faculty in Maths, Science & Humanities teaching in Engineering Programs	**M**						
	F						
Non-teaching Staff	**M**						
	F						

Table A.9b

10. Total Number of Engineering Students

Item	CAY	CAYm1	CAYm2
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 programs other than engineering programs, a separate table giving similar details is to be included.*

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

Name of the Program _____

Criteria No.	Criterion No.	Marks/Weightage
Program Level Criteria		
1.	Vision, Mission and Program Educational Objectives	50
2.	Program Curriculum and Teaching –Learning Processes	100
3.	Course Outcomes and Program Outcomes	175
4.	Students' Performance	100
5.	Faculty Information and Contributions	200
6.	Facilities and Technical Support	80
7.	Continuous Improvement	75
Institution Level Criteria		
8.	First Year Academics	50
9.	Student Support Systems	50
10.	Governance, Institutional Support and Financial Resources	120
	Total	**1000**

PART B: Program Level Criteria

CRITERION 1	Vision, Mission and Program Educational Objectives	50

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

(Vision statement typically indicates aspirations and Mission statement states the broad approach to achieve aspirations)

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

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

(State the PEOs (3 to 5) of program seeking accreditation)

1.3. Indicate where the Vision, Mission and PEOs are published and disseminated among stakeholders (15)

(Describe where (websites, curricula, posters, etc.) the Vision, Mission and PEOs are published and detail the process which ensures awareness among internal and external stakeholders with effective process implementation)

(Internal stakeholders may include Management, Governing Board Members, faculty, support staff, students etc. and external stakeholders may include employers, industry, alumni, funding agencies, etc.)

1.4. State the process for defining the Vision and Mission of the Department, and PEOs of the program (15)

(*Articulate the process involved in defining the Vision and Mission of the department and PEOs of the program.*)

1.5. Establish consistency of PEOs with Mission of the Department (10)

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

PEO Statements	M1	M2	….	Mn
PEO1:				
PEO2:				
PEON:				

Table B.1.5

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 "-"*

Note: Wherever the word "process" is used in this document its meaning is process formulation, notification to all the concerned, and implementation

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

Seminars, project works may be considered as practical

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			

Table B.2.1.3

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 Appendix I of SAR (10)

(State the process details)

2.2. Teaching-Learning Processes (70)

2.2.1. Describe Processes followed to Improve Quality of Teaching & Learning (15)

(Processes may include adherence to academic calendar and improving instruction methods using pedagogical initiatives such as real world 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. The implementation details and impact analysis need to be documented)

2.2.2. Quality of End Semester Examination, Internal Semester Question Papers, Assignments and Evaluation (15)

(Mention the initiatives, implementation details and analysis of learning levels related to quality of semester tests, assignments and evaluation)

2.2.3. Quality of Student Projects (20)

(Quality of the project is measured in terms of consideration to factors including, but not limited to, environment, safety, ethics, cost, type (application, product, research, review, etc.) and standards. Processes related to project identification, allotment, continuous monitoring, evaluation including demonstration of working prototypes and enhancing the relevance of projects. Mention Implementation details including details of POs and PSOs addressed through the projects with justification)

2.2.4. Initiatives related to Industry Interaction (10)

(Give details of the industry involvement in the program such as industry-attached laboratories, partial delivery of appropriate courses by industry experts, etc. Mention the initiatives, implementation details and impact analysis)

2.2.5. Initiatives related to Industry Internship/Summer Training (10)

(Mention the initiatives, implementation details and impact analysis)

CRITERION 3	Course Outcomes (CO) and Program Outcomes (PO)	175

3.1. Establish the Correlation between the Courses and the Program Outcomes (POs) & Program Specific Outcomes (25)

- NBA defined Program Outcomes (POs) as mentioned in Appendix I of SAR and Program Specific Outcomes (PSOs) as defined by the Program. Six to ten matrices of core courses are to be mentioned with at least one per semester.
- Select core courses to demonstrate the mapping/correlation with all POs and PSOs.
- Number of Outcomes for a Course is expected to be around 6.

Program Articulation Matrix

Course	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
C101												
C202												
C303												
….												
….												
C4…												

Table B.3.1a

Course Articulation Matrix

CO	Statement	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
C202.1													
C202.2													
C202.n													
C202													

Table B.3.1b

Add and delete rows for Course Outcomes (Cos) as needed

Note

1. 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 "-"

2. Add more columns for PSOs

3. The tables B.3.1a and B.3.1b can be prepared in landscape mode, if required.

3.2. Attainment of Course Outcomes (75)

3.2.1. Describe the Assessment Tools and Processes used to gather the Data upon which the Evaluation of Course Outcome is based (10)

Describe different assessment tools (semester end examinations, mid-semester tests, laboratory examinations, student portfolios, etc) to measure the student learning and hence attainment of course outcomes. *(Student portfolio is a collection of artifacts that demonstrate skills, personal characteristics and accomplishments created by the student during study period.)*

The process adopted to map the assessment questions, parameters of assessment rubrics, etc. to the course outcomes to be explained with examples. The process of data collection from different assessment tools and the analysis of collected data to arrive at CO attainment levels need to be explained with examples

3.2.2. Record the Attainment of Course Outcomes of all Courses with respect to set Attainment Levels (65)

Program shall set Course Outcome attainment levels for all courses.

Measuring Course Outcomes Attained through Semester End Examinations (SEE)

Target may be stated in terms of percentage of students getting equal or more than the target set by the Program in SEE for each CO.

Measuring CO Attainment through Cumulative Internal Examinations (CIE)

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)

3.3. Attainment of Program Outcomes and Program Specific Outcomes (75)

3.3.1. Describe Assessment Tools and Processes used for Measuring the Attainment of each Program Outcome and Program Specific Outcome (10)

(Describe the assessment tools and processes used to gather the data upon which the evaluation of each of the Program Outcome and Program Specific Outcome 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 (65)

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

PO Attainment

Course	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
C101												
C102												
…												
…												
C409												
Direct Attainment												

Table B.3.3.2a

Survey	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
Survey 1												
Survey 2												
Survey 3												
…..												
Indirect Attainment												

Table B.3.3.2b

Note: Add more columns as needed for *PSOs.*

Mention the type of survey conducted and the location of its source.

C101, C102 are indicative courses in the first year. Similarly, C409 is final year course. First numeric digit indicates year of study and remaining two digits indicate course nos. in the respective year of study.

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

CRITERION 4	Students' Performance	100

Item (Information to be provided cumulatively for all the shifts with explicit headings, wherever applicable)	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 (*N*1)			
Number of students admitted in 2nd year in the same batch via lateral entry (*N*2)			
Separate division students, if applicable (N3)			
Total number of students admitted in the Program (*N*1 + *N*2 + N3)			

Table B.4a

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 **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					
CAYm4 (LYG)					
CAYm5 (LYGm1)					
CAYm6 (LYGm2)					

Table B.4b

Year of entry	N1 + N2 + 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					
CAYm1					
CAYm2					
CAYm3					
CAYm4 (LYG)					
CAYm5 (LYGm1)					
CAYm6 (LYGm2)					

Table B.4c

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

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+00+0)				
CAYm1 (2015-16)	124(100+24+0)	60			

CAY*m2* (2014-15)	134 (110+24+0)	50	40+20		
CAY*m3* (2013-14)	134 (110+24+0)	90	80+20	70+20	
CAY*m4* (LYG) (2012-13)	124 (100+24+0)	100	90+20	85+18	85+15
CAY*m5* (LYG*m*1) (2011-12)	130 (120+10+0)	80	70+10	60+10	50+10
CAY*m6* (LYG*m*2) (2010-11)	144 (120+24+0)	70	60+15	54+10	50+10

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

4.1. Enrolment Ratio (20)

Enrolment Ratio= N1/N

Item (Students enrolled at the First Year Level on average basis during the previous three academic years starting from current academic year)	**Marks**
>=90% students enrolled	20
>=80% students enrolled	18
>=70% students enrolled	16
>=60% students enrolled	14
Otherwise	0

Table B.4.1

4.2. Success Rate in the Stipulated Period of the Program (20)

4.2.1. Success Rate without Backlogs in any Semester/Year of study (15)

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 semester/year of study = 15 × Average SI

Item	**Last Year of Graduate , LYG**	**Last Year of Graduate minus 1, LYGm1**	**Last Year of Graduate minus 2, LYGm2**
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)			

Table B.4.2.1

4.2.2. Success rate in stipulated period of study [Total of with backlog + without backlog] (5)

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 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 = 5 × Average SI

Item	Last Year of Graduate, LYG (CAYm4)	Last Year of Graduate minus 1, LYG*m*1 (CAYm5)	Last Year of Graduate minus 2, LYG*m*2 (CAYm6)
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 backlogs in the stipulated period			
Success Index (SI)			
Average Success Index			

Table B.4.2.2

Note: If 100% students clear without any backlog then also total marks scored will be 20 as both 4.2.1 & 4.2.2 will be applicable simultaneously

4.3. Academic Performance in Second Year (10)

Academic Performance = Average API (Academic Performance Index), where

***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)	AP1	AP2	AP3
Average API = (AP1 + AP2 + AP3)/3			

Table B.4.3

4.4. Placement, Higher Studies and Entrepreneurship (30)

Assessment Points = 30 × average placement

Item	**CAYm1**	**CAY*m2***	**CAY*m3***
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			
Assessment Points = 30 × average placement			

Table B.4.4

4.4a. Provide the Placement Data in the below mentioned Format with the Name of the Program and the Assessment Year:

Programs Name and Assessment Year				
Sl. No.	**Name of the Student Placed**	**Enrollment No.**	**Name of the Employer**	**Appointment Letter Reference No. with Date**

Table B.4.4a

4.5. Professional Activities (20)

4.5.1. Professional Societies/Chapters and Organizing Engineering Events (5)

(The Department shall provide relevant details)

4.5.2. Publication of Technical Magazines, Newsletters, etc. (5)

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

4.5.3 Participation in Inter-institution Events by Students of the Program of Study (10)

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

CRITERION 5	Faculty Information and Contributions	200

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	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		

Table B.5

Note: *Please provide details for the faculty of the department, cumulative information for all the shifts for all academic years starting from current year in above format in Annexure – II (B.3).*

5.1. Student-Faculty Ratio (SFR) (20)

(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+UG3+PG1+PG2*

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

Student Faculty Ratio (SFR) = 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.1+pm.2**		
pm.2			
PGm		**pm.1+pm.2**	**pm.1+pm.2**
Total No. of Students in the Department **(S)**	**UG1 + UG2 +.. +UGn + PG1 + …PGm=S1**	**UG1 + UG2 + .. +UGn + PG1+… + PGm=S2**	**UG1 + UG2 + .. +UGn + PG1+… + PGm=S3**
No. of Faculty in the Department **(F)**	**F1**	**F2**	**F3**
Student Faculty Ration (SFR)	**SFR1=S1/F1**	**SFR2= S2/F2**	**SFR3= S3/F3**
Average SFR	**SFR=(SFR1+SFR2+SFR3)/3**		

Table B.5.1

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

< = 15 - 20 Marks
< = 17 - 18 Marks
< = 19 - 16 Marks
< = 21 - 14 Marks
< = 23 - 12 Marks
< = 25 - 10 Marks
> 25.0 - 0 Marks

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

1. *Shall have the AICTE prescribed qualifications and experience.*
2. *Shall be appointed on full time basis and worked for consecutive two semesters during the particular academic year under consideration.*
3. *Should have gone through an appropriate process of selection and the records of the same shall be made available to the visiting team during NBA visit.*

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

	Total number of regular faculty in the department	**Total number of contractual faculty in the department**
CAY		
CAYm1		
CAYm2		

Table 5.1.1

5.2. Faculty Cadre Proportion (20)

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

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

F2: Number of Associate Professors required = 2/9 x Number of Faculty required to comply with 20:1 Student-Faculty ratio based on no. of students (N) as per 5.1

F3: Number of Assistant Professors required = 6/9 x Number of Faculty required to comply with 20:1 Student-Faculty ratio based on no. of students (N) as per 5.1

Year	Professors		Associate Professors		Assistant Professors	
	Required F1	Available	Required F2	Available	Required F3	Available
CAY						
CAY*m*1						
CAYm2						
Average Numbers	RF1=	AF1=	RF2=	AF2=	RF3=	AF3=

Table B.5.2

$$\text{Cadre Ratio Marks} = \left[\left[\frac{AF1}{RF1} \right] + \left[\frac{AF2 \times 0.6}{RF2} \right] + \left[\frac{AF3 \times 0.4}{RF3} \right] \right] \times 10$$

- If AF1 = AF2= 0 then zero marks
- Maximum marks to be limited if it exceeds 20

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 10 = 20

Case 2: AF1/RF1= 1; AF2/RF2 = 3/2; AF3/RF3 = 5/6; Cadre proportion marks = (1+0.9+0.3) x 10 = limited to 20

Case 3: AF1/RF1=0; AF2/RF2=1/2; AF3/RF3=8/6; Cadre proportion marks = (0+0.3+0.53) x 10 = 8.3

5.3. Faculty Qualification (20)

FQ = 2.0 x [(10X +4Y)/F)] where x is no. of regular faculty with Ph.D., Y is no. of regular faculty with M. Tech., F is no. of regular faculty required to comply 20:1 Faculty Student ratio (no. of faculty and no. of students required are to be calculated as per 5.1)

	X	**Y**	**F**	**FQ = 2.0 x [(10X +4Y)/F)]**
CAY				
CAYm1				
CAYm2				
Average Assessment				

Table B.5.3

5.4. Faculty Retention (10)

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

Item (% of faculty retained during the period of assessment keeping CAYm2 as base year)	**Marks**
>= 90% of required Faculty members retained during the period of assessment keeping CAY*m2* as base year	10
>=75% of required Faculty members retained during the period of assessment keeping CAY*m2* as base year	08
>= 60% of required Faculty members retained during the period of assessment keeping CAY*m2* as base year	06
>= 50% of required Faculty members retained during the period of assessment keeping CAY*m2* as base year	04
< 50% of required Faculty members retained during the period of assessment keeping CAY*m2* as base year	0

Table B.5.4

5.5. Faculty Competencies in Correlation to Program Specific Criteria (10)

(List the program specific criteria and the competencies (specialization, research publications, course developments, etc.) of faculty to correlate the program specific criteria and competencies)

5.6. Innovations by the Faculty in Teaching and Learning (10)

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

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. Any contributions to teaching and learning should satisfy the following criteria:

- *The work must be made available on Institute website*
- *The work must be available for peer review and critique*
- *The work must be reproducible and developed further by other scholars*

The department/institution may set up appropriate processes for making the contributions available to the public, getting them reviewed and for rewarding. These may typically include statement of clear goals, adequate preparation, use of appropriate methods, significance of results, effective presentation and reflective critique

5.7. Faculty as Participants in Faculty Development/Training Activities/STTPs (15)

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

Name of the Faculty	**Max. 5 per Faculty**		
	CAY*m*1	**CAYm2**	**CAYm3**
Sum			
***RF*= Number of Faculty required to comply with 20:1 Student-Faculty ratio as per 5.1**			
Assessment = 3 × (Sum/0.5 RF) **(Marks limited to 15)**			
Average assessment over last three years (Marks limited to 15) =			

Table B.5.7

5.8. Research and Development (75)

5.8.1. Academic Research (20)

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. (15)
- Ph.D. guided /Ph.D. awarded during the assessment period while working in the institute (5)

All relevant details shall be mentioned.

5.8.2. Sponsored Research (20)

- Funded research from outside:

(Provide a list with Project Title, Funding Agency, Amount and Duration)
Funding Amount (Cumulative during CAYm1, CAYm2 and CAYm3):

Amount > 50 Lakh – 20 Marks,
Amount > 40 and $\leq$ 50 Lakh – 15 Marks,
Amount > 30 and $\leq$ 40 Lakh – 10 Marks,
Amount $\geq$ 15 and $\leq$ 30 Lakh – 5 Marks,
Amount < 15 Lakh – 0 Marks

5.8.3. Development activities (15)

Provide details:

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

5.8.4. Consultancy (from Industry) (20)

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

Funding Amount (Cumulative during CAYm1, CAYm2 and CAYm3):

Amount >10 Lacs – 20 Marks,

Amount $\leq$10 and $\geq$ 8 Lakh – 15 Marks,

Amount < 8 and $\geq$ 6 Lakh – 10 Marks,

Amount < 6 and $\geq$ 4 Lakh – 5 Marks,

Amount < 4 and $\geq$ 2 Lakh – 2 Marks,

Amount < 2 Lakh – 0 Mark

5.9. Faculty Performance Appraisal and Development System (FPADS) (10)

Faculty members of Higher Educational Institutions today have to perform a variety of tasks pertaining to diverse roles. In addition to instruction, faculty members need to innovate and conduct research for their self-renewal, keep abreast with changes in technology, and develop expertise for effective implementation of curricula. They are also expected to provide services to the industry and community for understanding and contributing to the solution of real life problems in industry. Another role relates to the shouldering of administrative responsibilities and co-operation with other Faculty, Heads-of-Departments and the Head of Institution. An effective performance appraisal system for faculty is vital for optimizing the contribution of individual Faculty to institutional performance.

The assessment is based on:

- A well-defined system for faculty appraisal for all the assessment years (5)
- Its implementation and effectiveness (5)

5.10. Visiting/Adjunct/Emeritus Faculty, etc. (10)

Adjunct faculty also includes Industry experts. Provide details of participation and contributions in teaching and learning and /or research by visiting/adjunct/Emeritus faculty, etc. for all the assessment years:

- Provision of visiting/adjunct faculty (1)
- Minimum 50 hours per year interaction with adjunct faculty from industry/retired professorsetc.(9) (Minimum 50 hours interaction in a year will result in 3 marks for that year; 3marks x 3years=9mar

CRITERION 6	Facilities and Technical Support	80

6.1 Adequate and well equipped laboratories, and technical manpower (40)

Sl. No.	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.							

Table B.6.1

6.2. Laboratories Maintenance and Overall Ambiance (10)

(Self-Explanatory)

6.3. Safety Measures in Laboratories (10)

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

Table B.6.3

6.4. Project Laboratory (20)

(Mention facilities & Utilization)

CRITERION 7	Continuous Improvement	75

7.1. Action Taken based on the Results of Evaluation of each of the COs, POs & PSOs (30)

Identify the areas of weaknesses in the program based on the analysis of evaluation of COs, POs & PSOs attainment levels. Measures identified and implemented to improve POs& PSOs attainment levels for the assessment year including curriculum intervention, pedagogical initiatives, support system improvements, etc.

Action to be written as per table in **3.3.2**

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 up-gradation)

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 (instructions / text books have 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.

POs & PSOs Attainment Levels and Actions for improvement – CAY only

POs	Target Level	Attainment Level	Observations
PO1: Statement as mentioned in Annexure I			
PO1			
Action 1: **Action N:**			
PO2: Statement as mentioned in Annexure I			

PO2			
Action 1: **Action N:**			
PO3: Statement as mentioned in Annexure I			
PO3			
Action 1: **Action N:**			
PO4: Statement as mentioned in Annexure I			
PO4			
Action 1: **Action N:**			
PO5: Statement as mentioned in Annexure I			
PO5			
Action 1: **Action N:**			
PO6: Statement as mentioned in Annexure I			
PO6			
Action 1: **Action N:**			
PO7: Statement as mentioned in Annexure I			
PO7			
Action 1: **Action N:**			
PO8: Statement as mentioned in Annexure I			
PO8			
Action 1: **Action N:**			
PO9: Statement as mentioned in Annexure I			

PO9				
Action 1: **Action N:**				
PO10: Statement as mentioned in Annexure I				
PO10				
Action 1: **Action N:**				
PO11: Statement as mentioned in Annexure I				
PO11				
Action 1: **Action N:**				
PO12: Statement as mentioned in Annexure I				
PO12				
Action 1: **Action N:**				
Similar information is to be provided for PSOs				

Table B.7.1

7.2. Academic Audit and Action Taken thereof during the Period of Assessment (15)

(Academic Audit system/process and its implementation in relation to Continuous Improvement)

7.3. Improvement in Placement, Higher Studies and Entrepreneurship (10)

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*

7.4. Improvement in the quality of students admitted to the program (20)

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 and percentage marks of the lateral entry students.

Item		CAY	CAYm1	CAYm2
National Level Entrance Examination (Name of the Entrance Examination)	**No. of Students admitted**			
	Opening Score/Rank			
	Closing Score/Rank			
State/Institution/Level Entrance Examination/Others (Name of the Entrance Examination)	**No. of Students admitted**			
	Opening Score/Rank			
	Closing Score/Rank			
Name of the Entrance Examination for Lateral Entry or lateral entry details	**No. of Students admitted**			
	Opening Score/Rank			
	Closing Score/Rank			
Average CBSE/Any other Board Result of admitted students (Physics, Chemistry & Mathematics)				

Table B.7.4

CRITERION 8	First Year Academics	50

8.1. First Year Student-Faculty Ratio (FYSFR) (5)

Data for first year courses to calculate the FYSFR:

Year	Number of students (approved intake strength)	Number of faculty members (considering fractional load)	FYSFR	*Assessment = (5 ×20)/ FYSFR (Limited to Max. 5)
CAY				
CAY*m*1				
CAYm2				
Average				

Table B.8.1

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

8.2. Qualification of Faculty Teaching First Year Common Courses (5)

Assessment of qualification = (5*x* +3*y*)/*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, Faculty definition as defined in 5.1

Year	*x*	*Y*	*RF*	Assessment of faculty qualification (5*x* + 3*y*)/*RF*
CAY				
CAY*m*1				
CAY*m*2				
Average Assessment				

Table B.8.2

8.3. First Year Academic Performance (10)

Academic Performance = ((Mean of 1st Year Grade Point Average of all successful Students on a 10 point scale) or (Mean of the percentage of marks in First Year of all successful students/10)) x *(number of successful students/number of students appeared in the examination)*

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

8.4. Attainment of Course Outcomes of First Year Courses (10)

8.4.1. Describe the Assessment Processes used to Gather the Data upon which the Evaluation of Course Outcomes of First Year is Done (5)

(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.)

8.4.2. Record the Attainment of Course Outcomes of all First Year Courses (5)

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

(The attainment levels shall be set considering average performance levels in the institution level 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 to the COs of a subject plus the performance in the institution level examination)

Refer to 3.1.1 for further details

8.5. Attainment of Program Outcomes from First Year Courses (20)

8.5.1. Indicate Results of Evaluation of each <u>Relevant</u> PO and/or PSO, if applicable (10)

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.*

(Describe the assessment processes that demonstrate the degree to which the Program Outcomes and Program Specific Outcomes are attained through first year courses and document the attainment levels. Also include information on assessment processes used to gather the data upon which the evaluation of each Program Outcome is based indicating the frequency with which these processes are carried out)

PO/PSO Attainment: Mention first year courses

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

Table B.8.5.1.

- **Add more columns for PSOs, if needed.**

- **If necessary, present the table in Landscape format**

8.5.2. Actions Taken based on the results of evaluation of relevant POs and PSOs (10)

(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 only – Mention for relevant POs

POs	Target Level	Attainment Level	Observations
PO1: Statement as mentioned in Annexure I			
PO1			
Action 1: **Action N:**			
PO2: Statement as mentioned in Annexure I			
PO2			
Action 1: **Action N:**			
PO3: Statement as mentioned in Annexure I			
PO3			
Action 1: **Action N:**			
PO4: Statement as mentioned in Annexure I			
PO4			
Action 1: **Action N:**			
PO5: Statement as mentioned in Annexure I			
PO5			
Action 1: **Action N:**			
PO6: Statement as mentioned in Annexure I			
PO6			

Action 1: **Action N:**				
PO7: Statement as mentioned in Annexure I				
PO7				
Action 1: **Action N:**				
PO8: Statement as mentioned in Annexure I				
PO8				
Action 1: **Action N:**				
PO9: Statement as mentioned in Annexure I				
PO9				
Action 1: **Action N:**				
PO10: Statement as mentioned in Annexure I				
PO10				
Action 1: **Action N:**				
PO11: Statement as mentioned in Annexure I				
PO11				
Action 1: **Action N:**				
PO12: Statement as mentioned in Annexure I				
PO12				
Action 1: **Action N:**				

Table B.8.5.2

Write similar action statements for relevant PSOs

CRITERION 9	Student Support Systems	50

9.1 Mentoring System to Help at Individual Level (5)

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:

(The institution may report the details of the mentoring system that has been developed for the students for various purposes and also state the efficacy of such system)

9.2. Feedback Analysis and Reward /Corrective Measures Taken, if any (10)

Feedback collected for all courses: YES/NO

Specify the feedback collection process; Average Percentage of students who participate; Specify the feedback analysis process; Basis of reward/ corrective measures, if any; Indices used for measuring quality of teaching& learning and summary of the index values for all courses/teachers; Number of corrective actions taken.

9.3. Feedback on Facilities (5)

Assessment is based on student feedback collection, analysis and corrective action taken.

9.4. Self-Learning (5)

(*The institution needs to specify the facilities, materials and scope for self-learning / learning beyond syllabus, Webinars, Podcast, MOOCs, etc. and evaluate their effectiveness)*

9.5. Career Guidance, Training, Placement (10)

(The institution may specify the facility, its management and its effectiveness for career guidance including counseling for higher studies, campus placement support, industry interaction for training/internship/placement, etc.)

9.6. Entrepreneurship Cell (5)

(*The institution may describe the facility, its management and its effectiveness in encouraging entrepreneurship and incubation*) *(Success stories for each of the assessment years are to be mentioned)*

9.7. Co-curricular and Extra-curricular Activities (10)

(*The institution may specify the co-curricular and extra-curricular activities*) *(Quantify activities such as NCC, NSS, etc.)*

CRITERION 10	Governance, Institutional Support and Financial Resources	120

10.1. Organization, Governance and Transparency (55)

10.1.1. State the Vision and Mission of the Institute (5)

(Vision statement typically indicates aspirations and Mission statement states the broad approach to achieve aspirations)

10.1.2. Availability of the Institutional Strategic Plan and its Effective Implementation and Monitoring (25)

10.1.3. Governing Body, Administrative Setup, Functions of Various Bodies, Service Rules, Procedures, Recruitment and Promotional Policies (10)

List the governing, senate, and all other academic and administrative bodies; their memberships, functions, and responsibilities; frequency of the meetings; and attendance therein, in a tabular form. A few sample minutes of the meetings and action-taken reports should be annexed.

The published rules including service rules, policies and procedures; year of publication shall be listed. Also state the extent of awareness among the employees/students.

10.1.4. Decentralization in Working and Grievance Redressal Mechanism (5)

List the names of the faculty members who have been delegated powers for taking administrative decisions. Mention details in respect of decentralization in working. Specify the mechanism and composition of grievance redressal cell including Anti Ragging Committee & Sexual Harassment Committee.

10.1.5. Delegation of Financial Powers (5)

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

10.1.6. Transparency and Availability of Correct/Unambiguous Information in Public Domain (5)

(Information on policies, rules, processes and dissemination of this information to stakeholders is to be made available on the web site)

10.2. Budget Allocation, Utilization, and Public Accounting at Institution Level (15)

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

Total Income at Institutional Level: For CFY, CFYm1, CFYm2 & CFYm3

CFY: Current Financial Year – CFYm1 (Current Financial Year minus 1), CFYm2 (Current Financial Year minus 2), CFYm3 (Current Financial Year minus 3)

For CFY

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

Table B.10.2a

Note: Similar tables are to be prepared for CFYm1, CFYm2 & CFYm3.

Items	Budgeted in CFY	Actual expenses in CFY (till …)	Budgeted in CFY*m*1	Actual Expenses in CFY*m*1	Budgeted in CFY*m*2	Actual Expenses in CFY*m*2	Budgeted in CFY*m*3	Actual Expenses in CFY*m*3
Infrastructure Built-Up								
Library								
Laboratory equipment								
Laboratory consumables								
Teaching and non-teaching staff salary								
Maintenance and spares								
R&D								

Training and Travel								
Miscellaneous expenses *								
Others, specify								
Total								

Table B.10.2b

*** Items to be mentioned.**

10.2.1. Adequacy of Budget Allocation (5)

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

10.2.2. Utilization of Allocated Funds (5)

(The institution needs to state how the budget was utilized during the last three years)

10.2.3. Availability of the Audited Statements on the Institute's Website (5)

(The institution needs to make audited statements available on its website)

10.3. Program Specific Budget Allocation, Utilization (30)

Total Budget at program level: For CFY, CFY*m1*, CFY*m2* & CFY*m3*

CFY: Current Financial Year – CFY*m1* (Current Financial Year minus 1) CFY*m2* (Current Financial Year minus 2) CFY*m3* (Current Financial Year minus 3)

For CFY

Total Budget in CFY		**Actual expenditure in CFY (till …)**		**Total No. of students in CFY**
Non recurring	**Recurring**	**Non Recurring**	**Recurring**	**Expenditure per student**

Table B.10.3a

Note: Similar tables are to be prepared for CFYm1, CFYm2 & CFYm3.

Items	Budgeted in CFY	Actual expenses in CFY (till …)	Budgeted in CFY*m*1	Actual Expenses in CFY*m*1	Budgeted in CFY*m*2	Actual Expenses in CFY*m*2	Budgeted in CFY*m*3	Actual Expenses in CFY*m*3
Laboratory equipment								
Software								
Laboratory consumable								
Maintenance and spares								
R & D								
Training and Travel								
Miscellaneous expenses *								
Total								

Table B.10.3b

*** Items to be mentioned.**

10.3.1. Adequacy of Budget Allocation (10)

(Institution needs to justify that the budget allocated over the assessment years was adequate for the program)

10.3.2. Utilization of Allocated Funds (20)

(Institution needs to state how the budget was utilized during the last three assessment years)

10.4. Library and Internet (20)

(Indicate whether zero deficiency report was received by the Institution for all the assessmentyears. Effective availability/purchase records and utilization of facilities/equipment etc. to be documented and demonstrated)

10.4.1. Quality of Learning Resources (hard/soft) (10)

- Relevance of available learning resources including e-resources
- Accessibility to students
- Support to students for self-learning activities

10.4.2. Internet (10)

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

Declaration

The head of the Institution needs to make a declaration as per the format given below:

I undertake that, the institution is well aware about the provisions in the NBA's accreditation manual concerned for this application, rules, regulations, notifications and NBA expert visit guidelines in force as on date and the institution shall fully abide by them.

It is submitted that information provided in this Self-Assessment Report is factually correct. I understand and agree that an appropriate disciplinary action against the Institution will be initiated by the NBA in case any false statement/information is observed during pre-visit, visit, post visit and subsequent to grant of accreditation.

Date: **Signature & Name**

Place: **Head of the Institution with seal**

Appendix I of SAR

(A) PROGRAM OUTCOMES

Engineering Graduates will be able to:

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 life-long learning in the broadest context of technological change.

(B) PROGRAM SPECIFIC OUTCOMES (PSOs)

Program should specify 2-4 Program Specific Outcomes.