CRITERION 3	COURSE OUTCOMES AND PROGRAM OUTCOMES	175/175

3. COURSE OUTCOMES AND PROGRAM OUTCOMES

Note: Program Outcomes and Program Specific Outcomes attainment are computed for Batches from 2016 to 2020

3.1 Establish the correlation between the courses and the Program Outcomes (POs) and Program Specific Outcomes (PSOs) (25/25)

Program Outcomes (POs): As mentioned in Annexure I.

Program Specific Outcomes (PSOs): As defined by the Program which is given below:

PSOs	Statement
PSO1	Apply the knowledge of basic sciences, Mathematics and Mechanical Engineering to real-life problems.
PSO 2	Inculcate the advance level skills in academic and research pursuits relevant to Mechanical Engineering and other interdisciplinary streams.
PSO 3	Ability to integrate major Mechanical Engineering streams with innovative and entrepreneurial activities ensuring high standards of professional ethics.

A. Evidence of COs being defined for every course (5/5)

A.1 Course Outcomes (COs)

The course outcomes for each course are mentioned in syllabi of the program. Course outcome formed should meet the following guidelines:

- Follows Bloom's taxonomy.
- Reflects the whole syllabus prescribed by the Institute for each course.
- Key topic of each unit is taken as one course outcome.
- Number of COs for each course should not exceed six.
- On successful completion of this course, students should be able to

Table 1. COs of one course per semester from 3rd to 8th Semester

Semester: 3rd	**Course: Mechanics of Materials-I (MEC 302)**
C302.1	Explain stress-strain, relate & evaluate them for different planes in structural members subjected to various loading conditions.
C302.2	Compute deformation in pressure vessels.
C302.3	Describe various theories of failure, compare them & propose the appropriate one for particular material/situation.
C302.4	Estimate bending stresses & deflection of beams/columns under various loading/end conditions.
Semester: 4th	**Course: Theory of Machines-I (MEC 403)**
C403.1	Evaluate the velocity & acceleration of links in a mechanism or machine.
C403.2	Explain the working principle of different machines.
C403.3	Design linkages & gear mechanisms for a given motion or a given input/output motion relationship.
C403.4	Apply the laws of friction in applications of mechanisms and machines.
Semester: 5th	**Course: Heat Transfer (MEC 504)**
C504.1	Identify, formulate and solve steady, transient and multidimensional heat conduction problems.
C504.2	Understand the phenomenon of convection and be able to evaluate heat transfer coefficients for natural and forced convection.
C504.3	Calculate radiation heat exchange between black as well as non-black surfaces.
C504.4	Solve a wide range of real-world problems involving conduction, convection and radiation.

Semester: 6th	**Course: Fundamentals of Tribology (MEC 603)**
C603.1	Understand the field of tribology, its historical development and comprehend the surface phenomena related to relative motion and the nature of friction.
C603.2	Identify the role of tribology in industry and also comprehend the basics of friction.
C603.3	Analyze friction, wear, and understand the techniques to measure and control them.
C603.4	Grasp the concept of lubrication, lubricant types, comparison of boundary, mixed and hydrodynamic lubrication and materials for tribological applications.

Semester: 7th	**Course: Industrial Engineering-II (MEC 703)**
C703.1	Grasp the concept of organizational design with emphasis on organization principles & work design.
C703.2	Analyze & design facility location and layout using various techniques and softwares.

C703.3	Demonstrate the ability to use the methods of statistical quality control and process control for effective designing of Industrial Quality Monitoring Systems.
C703.4	Demonstrate the ability to apply the techniques of material management and inventory control for effective designing and systematic implementation of various MM methods and inventory systems in manufacturing set-up.

Semester: 8th	**Course: Power plant engineering (MEC 804)**
C804.1	Identify the different types of power plants and understand the layout of steam power plant.
C804.2	Appreciate and understand the details of Hydroelectric Power plant and their relevance with different types of power plants.
C804.3	Able to describe the working operations of Nuclear, Diesel, Gas and Steam power plants.
C804.4	Apply and analyze the economics of power plant.

C. Explanation of course articulation matrix table (5/5)

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

The various correlation levels are:

- **"1"** – Weak (Low) Correlation
- **"2"** – Moderate (Medium) Correlation
- **"3"** – Substantial (High) Correlation
- **"-"** indicates there is no Correlation

Table 2. Course Articulation Matrix

Semester: 3rd	**Course: Mechanics of Materials-I (MEC 302)**														
COs	**POs**												**PSO**		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
C302.1	3	2	2			1						1	1	2	
C302.2	3	2	2			1						1	2	2	
C302.3	2	3	3			2						2	3	1	
C302.4	2	3	2			1						2	3	2	
Average	**2.75**	**2.5**	**2.25**			**1.25**						**1.5**	**2.25**	**1.75**	

Semester: 4th	Course: Theory of Machines-I (MEC 403)														
COs	**POs**												**PSO**		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
C302.1	3	2	1	2	1	1	1				1	2	1	1	2
C302.2	2	3	3	2	1		1		1		1	2	3	2	2
C302.3	2	3	2	2	1	1					1	1	2	3	2
C302.4	2	2	2	1	1		1					1	1	1	2
Average	**2.25**	**2.5**	**2**	**1.75**	**1**	**1**	**1**		**1**		**1**	**1.5**	**1.75**	**1.75**	**2**

Semester: 5th	Course: Heat Transfer (MEC 504)														
COs	**POs**												**PSO**		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
C504.1	3	3	3	2	2	1	2	2				2	3	2	3
C504.2	3	3	3	2	2	1	2	2				2	3	2	3
C504.3	3	3	3	2	2	1	2	2				2	3	2	3
C504.4	3	3	3	3	2	1	2	2				2	3	2	3
Average	**3.00**	**3.0**	**3.0**	**2.25**	**2.00**	**1.00**	**2.00**	**2.00**				**2.00**	**3.00**	**2.00**	**3.00**

Semester: 6th	Course: Fundamentals of Tribology (MEC 603)														
COs	**POs**												**PSO**		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
C603.1	3	3	3	1		3						3	3	3	2
C603.2	3	3	3	1		3						2	3	3	2
C603.3	3	3	3	2	1	3						3	3	3	2
C603.4	3	2	3	2	1	3	1					2	3	3	2
Average	**3**	**2.75**	**3**	**1.5**	**1**	**3**	**1**					**2.5**	**3**	**3**	**2**

Semester: 7th	Course: Industrial Engineering-II (MEC 703)														
COs	**POs**												**PSO**		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**

C703.1	2	2	2	2	2	3	3	1	2	2	2	2	2	2	2
C703.2	3	3	3	3	3	3	3	1	2	2	2	2	2	2	2
C703.3	3	3	3	3	3	2	2		2	2	3	2	3	2	2
C703.4	2	3	3	3	3	3	3	1	2	2	3	2	3	2	2
Average	**2.5**	**2.75**	**2.75**	**2.75**	**2.75**	**2.75**	**2.75**	**1**	**2**	**2**	**2.5**	**2**	**2.5**	**2**	**2**

Semester: 8th	**Course: Power Plant Engineering (MEC 804)**														
COs	**POs**												**PSO**		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
C804.1	3	2	2		2	1	2	2				2	3	2	3
C804.2	3	2	2		2	2	2	2				2	3	2	3
C804.3	3	2	2		2	2	2	2				2	3	2	3
C804.4	3	3	3			3	1	2			3	2	3	1	3
Average	**3**	**2.25**	**2.25**		**2**	**2**	**1.75**	**2**			**3**	**2**	**3**	**1.75**	**3**

D. Explanation of Program articulation matrix table **(10/10)**

Program level Course-PO/PSO Matrix of all courses BY TAKING AVERAGE OF CO-PO/PSO correlation matrix for all subjects INCLUDING First Year courses.

Table 3. Program articulation matrix

Subject	Course Code	POs												PSO		
		1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1st Semester																
Elements of Mechanical Engineering	MEL100	**3**	2	2							2		3	3	2	3
Engineering Physics	PHL100	**3**	2.75	2.5	1.25	1.5							1.33			
Engineering Mechanics	CIL100	**3**	3	1.8	1.8		2	1						2	1	1.8
Basic English and Communication Skills	HUL100						2			2.33	3	2	2.5			
Environmental Studies	CYL101	**2.75**	2.5	3		1.75	2.75	3			2	1.5	2.25	2.25	1.5	2
Mathematics-I	MAL100	**2.4**	1.8	2.6								1		2.6	2.4	1.2
Language Laboratory	HUP100									3	3	3	2			
Physics Laboratory	PHP100	**3**	2.75	2.5	1.25	1.5							1.33			
Work shop Practice	WSP100	**3**	1	1		2	2	2	2	3	2		3	2	1	1
2nd Semester																
Advanced English CommSkills& Organizational Behavior	HUL101						2.5			2.33	3	2	2			
Basic Electrical Engineer	EEL100	**3**	2.8	2	2									2	2.67	1

Computer Programming	TL100	**1**	3	2.75		3								2	2	
Engineering Chemistry	CYL100	**2.25**	2	2	1		1.25	2	1	1	2	2	2.25	2.25	2.5	1.75
Engineering Drawing	CIV 102	**3**	3	3	3	2	2	2		3	3	2	2	3	3	3
Mathematics II	MAL101	**2.2**	2.6	2.2	2.2						1		1	1.8	2.4	1
Basic Electrical Engineering Laboratory	ELP100	**3**	2		2		3	2.5				2	2	2	2.75	1
Chemistry Laboratory	CYP100	**2.5**	2	2.25	1		1.5	2	1	1	2	2	2.5	2	2.5	1.75
Computer Programming Laboratory	ITP100	**2.5**	2.5	2.75	2.33	2.5				1			3	1	2.5	1
3rd Semester																
Fundamental Dynamics	MEC 301	**2.75**	2.25	1.75							2.25		2.5	2	2.25	1
Mechanics of Materials-I	MEC 302	**2.75**	2.5	2.25			1.25						1.5	2.25	1.75	
Fluid Mechanics	MEC 303	**2.5**	2	2.75	2	1			1				1.5	2	1	-
Engineering Thermodynamics	MEC 304	**2.75**	2.5	2	2						2.25		2.5	2	2.25	1
Manufacturing Technology	MEC 305	**3**	2	2.5	2	2	3	2.25	2	2	2	2	3	1.75	1.75	2
Engineering Graphics & Computer Modelling	MEC 306	**2.75**	2.75	2.5	2.25	2.75	2.25	2.67	2.25	1.67	1.75	2.33	2.5	2.75	2.5	2.5
Mathematics	MTH 304	**2.8**	2.4	2.2	2	2.6	2	1		1	2.25	2	2.8	2.6	2.6	1.8
Mechanics of Materials-I Lab	MEC 302P	**1.75**	1	1						1				2.25	1.75	
Manufacturing Technology Lab-I	MEC 305P	**3**	2	2	2	2.33	3	2.33	2	2.33	2	2	2.75	2.25	2	1.5

Fluid Mechanics Lab	MEC 303P	**2**	2	1.67	3	1				1			1	2	1	
4th Semester																
Material Science	MEC 401	**2.5**	2.25	1.75							2.25		2.5	2	2.25	1
Mechanics of Materials-II	MEC 402	**2.75**	2.25	2.75			1						1	1.75	2	
Theory of Machines-I	MEC 403	**2.25**	2.5	2	1.75	1	1	1		1		1	1.5	1.75	1.75	2
Applied Thermodynamics-I	MEC 404	**3**	2.75	2	2.5	1.5	1.5	1.5			2		2	1.67	2	1
CAM & Industrial Automation	MEC 405	**3**	2.25	2.5	1.33	2.5	2.33	3	2	2	2	2	3	2.75	2	1.5
Electrical Engineering Technology	ELE 406	**3**	2.8	2	2									3	2.67	1
Theory of Machines-I Lab	MEC 404P	**2.33**	2.67	2	1.33	1.67	1	1	2	2	1.33	1.67	2.33	1.33	2	2
Applied Thermodynamics-I Lab	MEC 404P	**2.6**	2.75		2		2	2.25		3			3	3	1	2.2
CAM & Industrial Automation Lab	MEC 405P	**3**	1.33	3	2	2.5	2	2	2	2.33	2		3	3	1.67	2
Electrical Engineering Technology Lab	ELE 406P	**3**	2		2		3	2.5					2		2	2.75
5th Semester																
Theory of Machines -II	MEC 501	**3**	3	1	1									3	3	1
Machine Design-I	MEC 502	**2.5**	2.75	3	2.5	1							1.25	3	1.25	1
Hydraulic Machinery	MEC 503	**3**	2.75	2.5	2.25	1.25	2	1		1.33	1		1	2	2.5	
Heat Transfer	MEC 504	**3**	3	3	2.25	2	1.25	2	2				2	3	2	3

Industrial Engineering-I	MEC 505	**3**	2.75	2.75	2.25	2	2.5	2.75	2	2.5	1.5	2	2	2.75	3	2.25
Industrial Electronics	ECE 508 / 507	**2.25**	1.5	2.25	1.5	1.67	2	2.25		1.5			3	2.25	2.25	2
Theory of Machines II-Lab.	MEC 501P	**2.5**	2	1	1	1			1	3	2.25	2	1.5	1	2	
Heat Transfer Lab.	MEC 504P	**3**	3	3	2.25	2	1.25	2	2	2	2	2	2	3	2	3
Industrial Engineering -I Lab.	MEC 505P	**3**	3	2.75	2.75	2.75	2.75	2.75	1	1.75	1.75	2.5	2	2.5	2	2
Industrial Electronics Lab.	ECE 508P	**2.75**	2	2.5	3	2.75	2.5	1.2	3	3	2.75	2	3	3	3	3
6th Semester																
Automatic Control	MEC 601	**3**	2.6	2.6	2									2.2	3	1.6
Machine Design-II	MEC 602	**3**	3	3	2.75	1.33	1.33	3	1.67	1.33	1.67	1.33	2.67	3	2.25	2.75
Fundamentals of Tribology	MEC 603	**3**	2.75	3	1.5	1	3	1					2.5	3	3	2
Linear Optimization in Engineering	MEC 604	**3**	3	3	3	2.5	2	2	1	2	2	3	2	2.5	2.25	2
Introduction to Mechatronics	MEC 605	**2.2**	2	2	1.6									2.4	2	2.2
Seminar	MEC 606	**1.25**	2	1	1.25	2	1	2	1		2.33		2	1.5	1.5	1.5
Fundamentals of Tribology Lab	MEC 603P	**2**	1	1	2	2.5	1	1	2.75	1.5	1.5	1.5	2.33	2.25	3	2
Mechatronics Lab	MEC 605P	**2**	1	1	2	2.5	1.33	1	2.75	1.5	1.5	1.5	1.75	2.25	3	2
7th Semester																
Basic Fracture Mechanics	MEC 701	**2.5**	2.25	1.5	2	1	1.5	1		1		1	1.5	2	1.5	1.25
Measurement & Instrumentation	MEC 702	**3**	2	1							2		2	2	1	1

Industrial Engineering-II	MEC 703	**2.5**	2.75	2.75	2.75	2.75	2.75	2.75	1	2	2	2.5	2	2.5	2	2
Applied Thermodynamics-II	MEC 704	**3**	3	2.5	2.5	2	1.75	3	2		2.75	2.75	3	3	3	3
Computer Applications in Mech. Engg (CAME)	MEC 705	**3**	3		1								2	1	1	
Industrial Engineering-II Lab	MEC 703P	**3**	2.75	2.75	2.25	2	2.5	2.75	1.25	2.5	1.5	2	2	2.75	3	2.25
CAME Lab	MEC 705P	**3**	3		1								2	1	1	
Final Year Project	MEC 706	**2**	2.5	1.75	1	2	1	2	1	3	1.75	3	3	1.75	2	2
Practical Training & Professional Viva	MEC 707	**1.75**	1.25	2	1.75	2	2	2	2	2.25	2	2	2	1.75	1.25	2
8th Semester																
Production & Operation Management	MEC 801	**2.75**	2.5	2.66	2	2.66	1.66	1.75	1.75	2	2	1.3	1.5	2.33	1	1.66
Internal Combustion Engines	MEC 802	**3**	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Departmental Elective-I (Power plant engineering)	MEC 803	**3**	2.25	2.25		2	2	1.75	2			3	2	3	1.75	3
Departmental Elective-II	MEC 804	**2**	2.5	2.25	2.5								1.25	3	3	
(Theory of Elasticity)																
Final Year Project	MEC 805	**2**	2.33	2.66	2.33	1.8	2	2.33	2	3	2.8	3	3	2	2.33	1.75
IC Engine Lab	MEC 802P	**3**	3	3	3	3	3	3	3	3	3	3	3	3	3	3
TARGET VALUES OF PO's & PSO's		**2.67**	**2.38**	**2.24**	**2.00**	**1.99**	**1.99**	**2.03**	**1.82**	**2.03**	**2.10**	**2.08**	**2.17**	**2.29**	**2.11**	**1.89**

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 Outcomes is based (10/10)

Assessment of course outcomes is a systematic and ongoing method of collecting, analyzing and using information about a course from various sources and measuring course outcomes in order to improve student learning. For assessing the course outcomes (COs), both direct and indirect assessments methods are considered.

A. List of assessment processes (2/2)

A.1. Direct CO Assessment:

Direct assessment consists of Mid-term examination/Major (End-term) examination/assignments. Marks obtained by students in these examinations are used to assess the CO attainment. AllCOs of theory courses are evaluated based on the performance of students in a mid-term examination, major examination and continuous assessment (in the form of assignments and quizzes).

Calculation of the attainment level of Course Outcomes (Direct Assessment) by considering the weightage of 60% for Major examination (End-term examination), weightage of 30% for Mid-term examinations and weightage of 10% for continuous assessment or assignments. The flow chart of the CO assessment for theory courses as shown in figure 1.

A.2 Indirect CO Assessment:

Indirect assessment (course outcome surveys) is carried out at the end of a course and the results are analyzed. In these surveys, responses are recorded on 3-point scale (**1**: Slight or Low, **2**: Moderate or Medium and **3**: Substantial or High Correlation), to obtain the assessment of students with respect to COs. The flow chart of the CO assessment for laboratory courses is shown in figure 2.

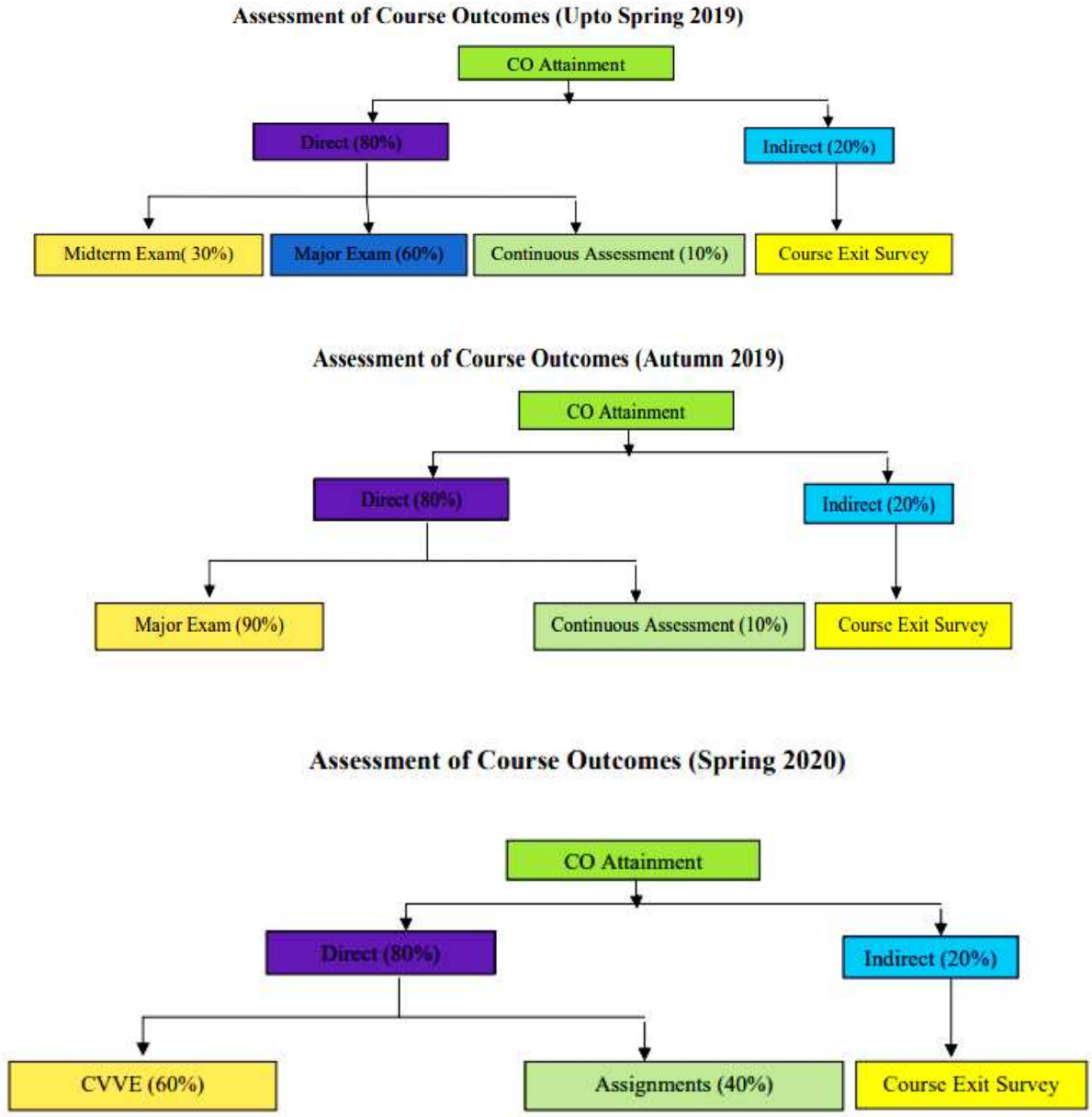

Figure.1: Course Outcome assessment of theory courses

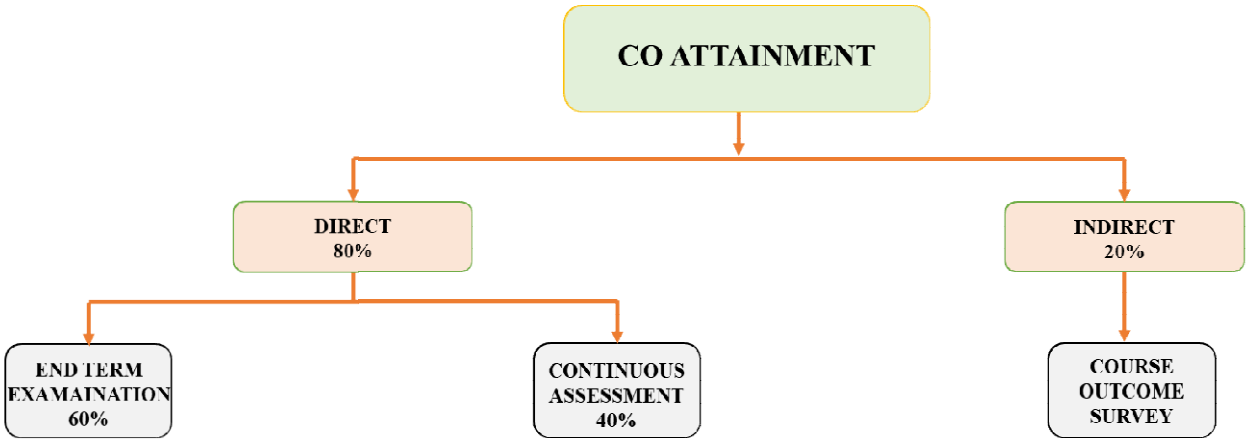

Figure 2: Course Outcome assessment of laboratory courses

B. Quality / Relevance of Assessment Process (8/8)

The various assessment tools, used to evaluate COs, and the frequency with which the assessment processes are carried out, are listed in Table 4.

Table 4: Various assessment tools used to evaluate COs and the frequency with which the assessment processes are carried out.

	Assessment Method	Assessment Tool	Frequency per Semester
Theory	Direct Method (80% weightage)	Mid-term Exams (30% Weightage)	Once
		Assignment (10% Weightage)	Once
		End Sem. Exam (60% Weightage)	Once
	Indirect Method (20% weightage)	Course outcome Feed back	Once
Lab	Direct Method (80% weightage)	Continuous Assessment (Report, Experiments) (40% weightage)	After Each Experiment (Daily)
		End-Term Exam (60% weightage) (Quiz, Demonstration & viva voice)	Once
	Indirect Method (20% weightage)	Course outcome Feed back	Once

Seminar/ Training viva		Direct method	Presentations	Twice/Course
			Report	Once/course
			Viva-voce	Once/course
Project	**7th Semester**	Direct method	Mid-Term Evaluation	Once/course
			End- Term Evaluation	Once/course
		Continuous Assessment (Supervisor)	Presentations & Reports	Weekly
	8th Semester	Direct method	Mid-Term Evaluation	Once/course
			End- Term Evaluation (Demonstration and evaluation by External Examiner)	Once/course
		Continuous Assessment (Supervisor)	Presentations & Reports	Weekly

Theory Courses:

Theory courses equip the students equip with the requisite fundamental and analytical concepts of the engineering courses. A syllabus of each course has 4 to 6 course outcomes. Assessment of each CO is evaluated through mid-term, major exam and continuous assessment.

- **Mid-Term Test:** One Mid-Term test serves to encourage students to keep up with subject matter covered in class. This test is of 1.5-hour duration and is evaluated for 30 marks. The questions are framed in such a way that they satisfy Bloom's taxonomy, wherein each question is mapped to the appropriate course outcome of the respective course, which is evaluated based on the set attainment levels.
- **Major or End term Examination:** Major exam is held at the end of each semester to evaluate the students' performance. The exam is of 3 hours duration and is evaluated for 60 marks. The questions are framed in such a way that they satisfy blooms taxonomy, wherein each question is mapped to the appropriate course outcome.
- **Continuous assessment:** Continuous assessment in the form of assignments, oral quizzes, MCQ quizzes are the qualitative performance assessment tools designed to assess students'

knowledge of engineering practices, framework and problem solving. Students are assigned course-related work, and their submissions are graded based on work quality and originality. Continuous assessment is evaluated for 10 marks. The questions in the assignment are mapped to the Course Outcomes of the subject.

Laboratory Courses:

Lab courses provide students with hands-on experience with course concepts and the opportunity to explore experimental methods used in their discipline.

- **Continuous assessment:** All the students are expected to be regular and learn the practical aspects of the subject and develop the necessary skills to become professionals. In order to facilitate interaction among the students and to develop team spirit, the students are expected to carry out experiments in groups. Performance assessment is based on the ability of the student to actively participate in the successful conduct of prescribed practical work and draw appropriate conclusions. The student submits a record of practical work performed in each class. Continuous assessment constitutes 40% of the total marks of a lab course.
- **Major lab exam:** A major lab exam of 3 hours duration is conducted to assess the ability of a student to perform a given task by integrating the knowledge gained from related theory course and regular lab sessions. The exam includes viva voce and performing a given experiment along with quiz. The weightage for the major lab exam is 60% of the total marks of a lab course as shown in figure 2 and table 4.

Seminar:

Seminar is a part of sixth semester curriculum. The student makes two seminar presentations (preliminary and a final one) on a topic of his/her choice and approved by the assigned faculty. Seminar presentation is planned for the duration of 30 minutes, including a question-answer session of 5 to 10 minutes. Seminar is evaluated based on the presentation by the students before an evaluation committee consisting of three faculty members including the Head of the Department. The committee evaluates the seminar based on following parameters.

- **Relevance:** The seminar power point presentation is oriented at covering the fundamentals as well as advanced topics in the appropriate branch of engineering, with reference to latest international journal papers. The significance of the seminar topic and the credibility of references cited are used as parameters to assess the relevance of the seminar.
- **Presentation:** The quality of the presentation and communication skill is assessed by the evaluation committee.
- **Viva-voce:** At the end of the presentation, the assessment panel and the student audience ask questions and seek clarifications on specific issues related to the seminar. The effectiveness of the student's response to these queries is assessed.
- **Report and Documentation:** A bona fide report on the seminar topic is submitted at the end of the semester. This report includes, in addition to the presentation materials, all relevant supplementary materials along with detailed answers to all the questions asked/clarifications sought during presentation. All references are to be given toward the end of the report. Students 'ability to comprehend and write effective reports and design documentation is assessed by evaluating the report.

1. Project:

The Project is intended to be a challenge to the intellectual and innovative abilities of the students and to provide them an opportunity to synthesize and apply the knowledge and analytical skills learnt in different subjects. The project work must be started in the seventh semester and is to be continued in the eighth semester.

i. Project – 7th Semester:

Students are expected to finalize the project themes/titles with the assistance of an identified faculty member as project guide during first half of the seventh semester. During this time the students are required to submit a project plan, relevance of the project proposed, literature survey, objectives, statement of how the objectives are to be tackled, time schedule and cost estimate.

Assessment tools used to evaluate the project work are:

- **Mid-Term Evaluation:** Mid-term evaluation is conducted at the mid of the semester and a project panel evaluates the work based on various parameters. The significance of the

work in societal and environmental context is used to assess the relevance of the project. The knowledge level and presentation skills of the students are evaluated by the panel and graded accordingly.

- **End Term Evaluation:** End-term evaluation is conducted at the end of the semester in the form of the presentation. The evaluation panel asks questions and seeks clarifications on specific issues related to the project. The effectiveness of the individual student's response to these queries is assessed.

ii. Project –8th SEMESTER

- **Mid-Term Evaluation:** The design part of the proposed work is evaluated. The students' communication skills and depth of knowledge in designing is assessed based on presentation and response to questions asked by the panel comprising of guide, Head of the Department and the project coordinator. The percentage of work completed, difficulties faced and how the students have tackled these difficulties are analysed to evaluate project progress. The individual involvement in project work is assessed based on response to questions asked by the panel.
- **End-Term Evaluation:** The end term evaluation includes demonstration and evaluation by the panel of examiners consisting of guide, senior professor, Head of the Department and external examiner.
    - **Demonstration:** Final demonstration is conducted at the end of the semester to evaluate the comprehensiveness and excellence of work done. At the end of the demonstration, the assessment panel asks questions and seeks clarifications on specific issues related to various stages of the project. Responses from each student to these queries are assessed.
    - **Evaluation by the panel:** The performance of individual student is evaluated by the panel of examiners, along with the project report submitted by a project group. The panel of examiners analyses the nature of the project and apart from the technical merit of the work, makes sure that the work is environment friendly, cost effective, ensures safety and ensures adherence to best ethical practices. The projects are classified into different areas and their relevance to PO's and PSO's

are identified to ensure its quality. Viva Voce is a part of assessing students' knowledge in engineering courses.

3.2.2 Record the attainment of Course Outcomes of all courses with respect to set attainment levels. (65/65)

Program shall have set Course Outcome attainment levels for all courses.

A. Attainment Levels as per the bench mark set for all Courses (50/50)

A.1. All Theory courses:

- **Course Outcome attainment levels (up to Spring semester 2020)**

Assessment Method	Level	Attainment Levels
Midterm Examination	1	50% of students scoring more than & equal to 40% marks
	2	60% of students scoring more than & equal to 40% marks
	3	75% of students scoring more than & equal to 40% marks
Major Examination	1	50% of students scoring more than & equal to 40% marks
	2	60% of students scoring more than & equal to 40% marks
	3	75% of students scoring more than & equal to 40% marks
Assignments or Continuous Assessment	1	50% of students scoring more than & equal to 50% marks
	2	60% of students scoring more than & equal to 50% marks
	3	75% of students scoring more than & equal to 50% marks

- **Course Outcome attainment levels (Autumn semester 2018 onwards)**

Assessment Method	Level	Attainment Levels
Midterm Examination	1	50% of students scoring more than & equal to 50% marks
	2	60% of students scoring more than & equal to 50% marks
	3	70% of students scoring more than & equal to 50% marks
Major Examination	1	50% of students scoring more than & equal to 50% marks
	2	60% of students scoring more than & equal to 50% marks
	3	70% of students scoring more than & equal to 50% marks
Assignments or Continuous Assessment	1	50% of students scoring more than & equal to 50% marks
	2	60% of students scoring more than & equal to 50% marks
	3	70% of students scoring more than & equal to 50% marks

A.2 Attainment of Course Outcomes of all Laboratory courses:

Assessment Method	Level	Attainment Levels
Continuous Assessment	1	60% of students scoring more than & equal to 50% marks
	2	70% of students scoring more than & equal to 50% marks
	3	80% of students scoring more than & equal to 50% marks
In Major Examination for Quiz	1	60% of students scoring more than & equal to 50% marks
	2	70% of students scoring more than & equal to 50% marks
	3	80% of students scoring more than & equal to 50% marks

Sample calculation of CO Attainment calculation of a Course

Power Plant Engineering (MEC 804) SESSION: SPRING-2019

CO-PO/PSO MAPPING MATRIX

COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	3	2	2		2	1	2	2				2	3	2	3
2	3	2	2		2	2	2	2				2	3	2	3
3	3	2	2		2	2	2	2				2	3	2	3
4	3	3	3			3	1	2			3	2	3	1	3
Average	3	2.25	2.25		2	2	1.75	2			3	2	3	1.75	3

Sample of Direct assessment for course outcome

(End semester examination + Mid Semester examination + Assignment)

Calculating the attainment level of Course Outcome (Direct Assessment) by considering the weightage of 60% for End Semester, weight age of 30% for Mid Semester Examinations and weightage of 10% for Assignments

Direct CO Attainment= 60% (End Semester) + 30% (Mid Semester) + 10% (Assignment)

S. No.	Course Outcome	Major CO Attainment	Minor CO Attainment	Assignment CO Attainment	Direct CO Attainment
1	**CO1**	3	3	3	3
2	**CO2**	3	1	3	2.4
3	**CO3**	3		3	2.1
4	**CO4**	3		3	2.1

Indirect assessment for course outcome

Course Outcome Survey

- If maximum number of students are saying that CO is Weakly attained ----Level-1
- If maximum number of students are saying that CO is Moderately attained ----Level-2
- If maximum number of students are saying that CO is **Strongly** attained ----Level-3

Given below is result of attainment of CO's for **Power Plant Engineering (MEC 804#)** based on course exit survey

Course Outcome	CO attainment
CO1	**2.66**
CO2	**2.59**
CO3	**2.51**
CO4	**2.34**

SAMPLE OF CO ATTAINMENT CALCULATION
(Direct Assessment + Indirect Assessment)

Calculating the attainment level of **Overall Course Outcome** (Direct Assessment + Indirect Assessment) by considering the weight age of 80% for direct assessment and weight age of 20% for indirect Assessment.

B. Overall levels of attainment **(15/15)**

Overall Course Outcome= 80% Direct + 20% Indirect

S. No	Course Outcome	CO attainment (Direct Assessment)	CO attainment (Indirect Assessment)	Overall CO attainment = 80% Direct + 20% Indirect
1	CO1	3	2.66	**2.9**
2	CO2	2.4	2.59	**2.4**
3	CO3	2.1	2.51	**2.2**

4	CO4	2.1	2.34	**2.1**

i. Direct assessment for COs of all courses

ACADEMIC YEAR 2017-2018

Course	C01	C02	C03	C04	C05
CHM-101	**2.8**	3	3	2.1	
CHM-101L	**3**	3	3	3	
IT101	**3**	3	2.1	2.1	
CIV-102	**3**	2.1	2.1	2.1	
HSS-101	**2**	2	1	2	
MTH-101	**3**	3	3	1.5	1.5
PHY101	**3**	3	1.5	2.1	
PHY 101P	**3**	3	3	3	
WSP-I	**3**	2.4	1.4	3	3
PHY201	**3**	2.4	2.4	0.3	
PHY201P	**3**	3	3	3	
CHM-201	**2.4**	3	3	2.1	
CHM-201P	**3**	3	3	3	
MTH201	**3**	3	2.4	2.1	1.5
MEC201	**3**	3	3	2.1	
HSS201	**2.7**	2.7	1.8	3	1.8
CSE201	**1.8**	3	2.1	0.9	
CSE 202P	**2.2**	3	3	2.2	
CIV201	**3**	2.1	2.1	2.7	1.5
WSPII	**3**	3	2.4	2.6	3
MEC 201	**3**	3	3	2.1	
MEC 301	**3**	2.1	2.3	3	2.4
MEC 302	**1.2**	3	1.8	1.2	
MEC 303	**2.4**	3	2.4	2.1	
MEC 304	**2.7**	3	3	1.8	
MEC 305	**2.4**	3	3	2.1	
MEC 306	**3**	3	2.1	2.8	
MTH 304	**2**	2.2	2	1.8	
MEC 302P	**3**	3	3	3	
MEC 303P	**3**	3	3	3	
MEC 305P	**3**	3	2.4	2.4	
MEC 401	**3**	2.4	2	2.1	

MEC 402	**3**	3	3	2.1	
MEC 403	**3**	3	3	2.1	
MEC 404	**3**	3	3	2.1	
MEC 405	**3**	3	2.1	1.8	
ELE 406	**3**	3	2.9	1.4	2
MEC 403P	**3**	3	3	3	
MEC 404P	**3**	3	3	3	
MEC 405P	**3**	3	3	3	
ELE 407P	**3**	3	3	3	
MEC 501	**2.7**	3	2.7	1.8	2.1
MEC 502	**2.4**	2.4	2.4	2.1	
MEC 503	**3**	3	3	2.1	
MEC 504	**3**	2.1	2.1	3	
MEC 505	**3**	3	2.7	2.1	
ECE 508	**3**	3	3	2.1	
MEC 501P	**3**	3	3	2.6	
MEC 504P	**3**	3	3	3	
MEC 505P	**3**	3	3	3	
ECE 508P	**3**	3	3	3	
MEC 601	**2.1**	1.5	1.5	0.9	0.6
MEC 602	**3**	1.8	1.8	2.1	
MEC 603	**3**	1.8	1.8	2.1	
MEC 604	**3**	2.7	2.7	2.1	
MEC 605	**3**	3	2.7	1.2	
MEC 606	**3**	3	3	3	
MEC 603P	**3**	3	3	3	
MEC 605P	**3**	3	3	3	
MEC 701	**2.4**	2.4	2.4	2.1	
MEC 702	**3**	3	3	2.1	
MEC 703	**2.9**	2.4	2.2	2.1	
MEC 704	**2.7**	3	3	2.1	
MEC 705	**3**	3	3	2.1	2.1
MEC 703P	**3**	3	3	3	
MEC 705P	**3**	3	3	3	1.2
MEC 801	**3**	3	3	2.1	3
MEC 802	**3**	3	2.1	2.1	3
MEC 803	**3**	2.1	2.4	2.1	
MEC 804	**3**	2.4	2.1	2.1	
MEC 802P	**3**	3	3	2.4	3

ACADEMIC YEAR 2018-2019

Course	C01	C02	C03	C04	C05
CHM-101	**3**	3	3	2.1	
CHM-101L	**3**	3	3	3	
IT101	**3**	3	2.1	2.1	
Civ-102	**0.9**	0.3	1.5	0.9	
HSS-101	**2.7**	2.7	3	1.8	
MTH-101	**3**	3	3	1.3	1.3
PHY101	**1.8**	1.2	0.3	0.3	
PHY 101P	**2.4**	3	3	2.4	
WSP-I	**3**	3	3	3	2
PHY201	**3**	3	2.1	0.3	
PHY201P	**3**	3	3	3	
CHM-201	**3**	3	3	2.1	
CHM-201P	**3**	3	3	2.1	
MTH201	**2.1**	2.1	3	3	3
MEC201	**1.8**	0.2	2.1	0.3	
HSS201	**2.7**	1.8	2.7	2.1	1.8
CSE201	**2.1**	2.7	1.5	1.5	
CSE 202P	**2.2**	3	3	2.2	
CIV201	**1.2**	2.1	0.3	1.2	1.2
WSPII	**3**	2.4	3	3	3
MEC 201	**1.8**	0.2	2.1	0.3	
MEC 301	**3**	2.4	2.1	2.1	2.1
MEC 302	**1.8**	2.7	2.1	1.2	
MEC 303	**1.8**	2.4	2.4	1.5	
MEC 304	**3**	3	2.4	2.1	
MEC 305	**2.1**	3	3	3	
MEC 306	**3**	2.1	2.1	2.1	
MTH 304	**2**	2.2	0.8	1.8	
MEC 302P	**3**	3	3	3	
MEC 303P	**3**	3	3	3	
MEC 305P	**3**	3	3	3	
MEC 401	**3**	2.4	2.1	2.1	
MEC 402	**1.5**	2.4	1.2	1.2	
MEC 403	**3**	2.1	2.4	1.5	
MEC 404	**3**	2.8	2.6	1.9	
MEC 405	**3**	3	1.8	1.2	
ELE 406	**2.4**	2.6	2.9	1.5	
MEC 403P	**3**	3	3	3	
MEC 404P	**3**	3	3	3	

MEC 405P	**2.4**	3	2.4	2.4	
ELE 407P	**3**	3	3	3	
MEC 501	**3**	2.4	2.3	2.1	2.1
MEC 502	**2.7**	2.4	2.4	1.5	
MEC 503	**3**	2.7	2.7	2.1	
MEC 504	**3**	2.1	2.1	3	
MEC 505	**2.4**	3	3	1.2	
ECE 508	**3**	2.4	3	2.1	
MEC 501P	**3**	3	3	2.6	
MEC 504P	**3**	3	3	3	
MEC 505P	**3**	3	3	3	
ECE 508P	**3**	3	3	3	
MEC 601	**2.7**	1.8	1.5	1.5	1.2
MEC 602	**3**	2.7	3	2.1	
MEC 603	**2.4**	2.4	2.1	0.9	
MEC 604	**3**	3	3	2.1	
MEC 605	**1.2**	2.4	1.2	2.4	1.8
MEC 606	**3**	3	3	2	
MEC 603P	**3**	3	3	3	
MEC 605P	**1.2**	2.4	1.2	2.4	1.8
MEC 701	**2.4**	2.1	2.1	2.1	
MEC 702	**3**	3	3	2.1	
MEC 703	**3**	2.4	2.1	2.1	
MEC 704	**1.8**	2.4	1.8	0.9	
MEC 705	**3**	3	3	2.1	2.1
MEC 703P	**3**	3	3	3	
MEC 705P	**3**	3	3	3	1.2
MEC 801	**2.3**	2.7	2.1	1.5	2.3
MEC 802	**3**	3	2.1	2.1	3
MEC 803	**1.8**	2.3	2.1	1.5	1.8
MEC 804	**3**	2.4	2.1	2.1	3
MEC 802P	**3**	3	3	2.6	3

ACADEMIC YEAR 2019-2020

Course	C01	C02	C03	C04	C05
MEL100	**2.1**	3	2.1	2.55	
PHL100	**3**	2.8	2.8	2.7	2.7
CIL100	**3**	3	3	2.1	1.8
HUL100	**2.7**	2.7	3	2.7	
CYL101	**3**	3	3	3	

MAL100	**3**	1	2.1	2.1	
HUP100	**3**	1.8	1.2	1.2	
PHP100	**3**	3	3	3	
WSP100	**3**	3	3	3	3
HUL101	**3**	3	3	1.8	
EEL100	**3**	3	3	3	3
ITL100	**2.1**	2.7	1.5	1.5	
CYL100	**3**	3	3	3	
CIV 102	**3**	2.1	2.1	1.8	
MAL101	**2.08**	2.4	2.4	2.4	2.4
ELP100	**3**	3	3	3	
CYP100	**3**	3	3	3	
ITP100	**2.2**	3	3	2.2	
MEC 201	**1.8**	0.2	1.2	0.3	
MEC 301	**3**	3	3	2.7	
MEC 302	**1.2**	0.3	1.2	1.2	
MEC 303	**3**	3	2.1	0.3	
MEC 304	**2.1**	3	2.1	2.55	
MEC 305	**0.6**	3	1.5	0.6	
MEC 306	**3**	3	3	3	
MTH 304	**2**	3	3	3	
MEC 302P	**3**	3	3	3	
MEC 303P	**3**	3	3	3	
MEC 305P	**3**	3	3	2.4	
MEC 401	**3**	3	3	2.7	
MEC 402	**3**	3	3	3	
MEC 403	**3**	3	3	2.1	
MEC 404	**3**	1.8	1.8	0.9	
MEC 405	**3**	3	3	2.4	
ELE 406	**2.4**	3	3	3	
MEC 403P	**3**	3	2	3	
MEC 404P	**3**	3	3	3	3
MEC 405P	**3**	3	2.4	2.6	
ELE 407P	**2.4**	3	3	3	
MEC 501	**3**	3	2	2.4	
MEC 502	**3**	3	3	3	
MEC 503	**3**	1.8	1.2	1.2	
MEC 504	**3**	3	3	2.1	
MEC 505	**3**	**3**	**3**	**2.1**	
ECE 508	**3**	3	2	3	
MEC 501P	**3**	3	2	3	

MEC 504P	**3**	3	3	3	
MEC 505P	**3**	2	2	3	
ECE 508P	**3**	3	3	3	
MEC 601	**2.7**	1.8	1.5	1.5	1.2
MEC 602	**2.2**	2.2	3	2.2	
MEC 603	**3**	3	3	3	
MEC 604	**3**	3	3	2.1	
MEC 605	**3**	3	3	3	3
MEC 606	**3**	3	3	3	
MEC 603P	**3**	3	3	3	
MEC 605P	**3**	3	3	3	
MEC 701	**3**	3	3	3	
MEC 702	**2.1**	2.1	1.2	2.1	
MEC 703	**3**	3	3	2.4	
MEC 704	**1.8**	2.4	1.8	0.9	
MEC 705	**3**	3	3	3	3
MEC 706	**3**	3	2	2	
MEC 707	**3**	2	2	2	
MEC 703P	**2**	3	2	2	
MEC 705P	**3**	2	3	2	
MEC 801	**2.3**	2.7	2.1	1.5	
MEC 802	**3**	2.4	2.1	2.1	
MEC 803	**1.8**	2.3	2.1	1.5	
MEC 804	**2.4**	3	3	2.1	
MEC 805	**2**	2	3	2	2
MEC 802P	**3**	3	3	2.7	

ii. Indirect Assessment of COs of all the courses

ACADEMIC YEAR 2017-2018

Course	C01	C02	C03	C04	C05
CHM-101	**3**	2	2	3	
CHM-101L	**2.7**	2.62	2.7	2.37	
IT101	**3**	3	3	2	
Civ-102	**2.66**	2.59	2.51	2.34	
HSS-101	**2.43**	2.56	2.43	2.47	
MTH-101	**2**	3	3	3	3
PHY101	**3**	2	3	2	
PHY 101P	**3**	3	3	3	
WSP-I	**2.61**	2.9	2.71	2.43	2.54
PHY201	**2**	3	3	2	

PHY201P	**2.5**	2	3	2	
CHM-201	**2.6**	2.6	2.5	2.3	
CHM-201P	**2.7**	2.6	2.6	2.2	
MTH201	**2**	3	2	3	3
MEC201	**2.3**	2.5	2.7	2.4	
HSS201	**2.47**	2.36	2.49	2.47	2.54
CSE201	**2**	3	3	2	
CSE 202P	**2.5**	2	3	2	
CIV201	**2**	3	3	2	3
WSPII	**2.49**	2.46	2.47	2.43	2.35
MEC 201	**2.3**	2.5	2.7	2.4	
MEC 301	**2.18**	2.35	2.37	2.22	2.22
MEC 302	**2.2**	2.7	2.2	2.2	
MEC 303	**2.52**	2.59	2.57	2.59	
MEC 304	**2.41**	2.54	2.52	2.46	
MEC 305	**2**	3	2	3	
MEC 306	**2.44**	2.57	2.43	2.43	
MTH 304	**2.81**	2.33	2.48	2.44	
MEC 302P	**2.7**	2.4	2.6	2.6	
MEC 303P	**2.46**	2.39	2.44	2.35	
MEC 305P	**3**	3	2	3	
MEC 401	**2.27**	2.45	2.24	2.2	
MEC 402	**2.2**	2.6	2.2	2.2	
MEC 403	**2.23**	2.38	2.3	2.33	
MEC 404	**2.3**	2.35	2.27	2.15	
MEC 405	**3**	3	3	2	
ELE 406	**2.25**	2.38	2.4	2.35	2.22
MEC 403P	**2.1**	2.08	2.38	2.2	
MEC 404P	**2.22**	2.38	2.27	2.17	
MEC 405P	**2**	3	3	2	
ELE 407P	**2.61**	2.43	2.5	2.72	
MEC 501	**2.63**	2.44	2.44	2.74	
MEC 502	**2.41**	2.44	2.78	2.37	
MEC 503	**2.67**	2.41	2.43	2.76	
MEC 504	**2.65**	2.35	2.49	2.77	
MEC 505	**2.67**	2.41	2.43	2.76	
ECE 508	**2.13**	2.27	2.35	2.35	
MEC 501P	**2.27**	2.45	2.24	2.2	
MEC 504P	**1.93**	2	2.17	2.03	
MEC 505P	**2.23**	2.38	2.3	2.33	
ECE 508P	**2.3**	2.35	2.27		

MEC 601	**2.18**	2.35	2.37	2.22	2.22
MEC 602	**3**	2	3	2	
MEC 603	**2.18**	2.35	2.37	2.22	
MEC 604	**2.25**	2.38	2.4	2.35	
MEC 605	**2.3**	2.1	2.1	2.2	
MEC 606	**2.33**	2.25	2.17	2	
MEC 603P	**2.46**	2.39	2.44	2.35	
MEC 605P	**2.13**	2.27	2.35	2.35	
MEC 701	**2.27**	2.45	2.24	2.2	
MEC 702	**2.64**	2.58	2.52	2.36	
MEC 703	**2.23**	2.38	2.3	2.33	
MEC 704	**2.3**	2.35	2.27	2.15	
MEC 705	**2.25**	2.38	2.4	2.35	2.6
MEC 703P	**2.52**	2.59	2.57	2.59	
MEC 705P	**2.41**	2.54	2.52	2.46	2.3
MEC 801	**2.81**	2.33	2.48	2.44	
MEC 802	**2.67**	2.41	2.43	2.76	
MEC 803	**2.13**	2.4	2.35	2.35	
MEC 804	**2.27**	2.45	2.24	2.2	
MEC 802P	**2.23**	2.45	2.7	2.45	

ACADEMIC YEAR 2018-2019

Course	C01	C02	C03	C04	C05
CHM-101	**2.68**	2.61	2.46	2.35	
CHM-101L	**2.5**	2.7	1.9	2.1	
IT101	**3**	3	3	2	
Civ-102	**2.6**	2.5	2.5	2.4	
HSS-101	**2.44**	2.36	2.43	2.45	
MTH-101	**2**	3	3	3	3
PHY101	**2**	3	2	3	
PHY 101P	**3**	3	2	2	
WSP-I	**2.807**	2.867	2.86	2.916	2.89
PHY201	**2**	3	2	3	
PHY201P	**3**	3	3	3	
CHM-201	**2.69**	2.63	2.51	2.41	
CHM-201P	**2.68**	2.59	2.5	2.39	
MTH201	**2**	3	2	3	3
MEC201	**2.9**	2.7	2.8	2.8	
HSS201	**2.55**	2.25	2.5	2.48	2.21
CSE201	**3**	3	3	2	
CSE 202P	**2.5**	2	3	2	

CIV201	**2.46**	2.6	2.5	2.44	2.46
WSPII	**2.61**	2.75	2.57	2.69	2.6
MEC 201	**2.44**	2.39	2.51	2.57	
MEC 301	**2.52**	2.45	2.77	2.38	2.76
MEC 302	**2.2**	2.7	2.7	2.2	
MEC 303	**2.61**	2.43	2.5	2.72	
MEC 304	**2.63**	2.44	2.44	2.74	
MEC 305	**2**	3	3	2	
MEC 306	**2.67**	2.41	2.43	2.76	
MTH 304	**2.65**	2.35	2.49	2.77	
MEC 302P	**2.7**	2.4	2.7	2.2	
MEC 303P	**2.66**	2.38	2.46	2.77	
MEC 305P	**2**	3	2	3	
MEC 401	**2.73**	2.41	2.38	2.63	
MEC 402	**2.7**	2.6	2.7	2.3	
MEC 403	**2.34**	2.45	2.44	2.44	
MEC 404	**2.59**	2.59	2.42	2.41	
MEC 405	**3**	3	2	2	
ELE 406	**2.55**	2.46	2.35	2.58	
MEC 403P	**2.39**	2.39	2.54	2.35	
MEC 404P	**2.51**	2.58	2.58	2.48	
MEC 405P	**2**	3	3	3	
ELE 407P	**2.46**	2.35	2.51	2.37	
MEC 501	**2.5**	2.5	2.54	2.46	2.54
MEC 502	**2.52**	2.59	2.57	2.59	
MEC 503	**2.41**	2.54	2.52	2.46	
MEC 504	**2.39**	2.33	2.39	2.46	
MEC 505	**2.44**	2.57	2.43	2.43	
ECE 508	**2.81**	2.33	2.48	2.44	
MEC 501P	**2.48**	2.48	2.57	2.46	
MEC 504P	**2.46**	2.39	2.44	2.35	
MEC 505P	**2.33**	2.31	2.39	2.43	
ECE 508P	**2.37**	2.35	2.43		
MEC 601	**2.44**	2.6	2.33	2.53	2.4
MEC 602	**3**	2	3	3	
MEC 603	**2.35**	2.27	2.2	2.22	
MEC 604	**2.29**	2.42	2.18	2.51	
MEC 605	**2.22**	2.76	2.33	2.2	2.18
MEC 606	**2.47**	2.35	2.35	2.04	
MEC 603P	**2.13**	2.27	2.35	2.35	
MEC 605P	**3**	2	2	2	2

MEC 701	**1.93**	2	2.17	2.03	
MEC 702	**2.23**	2.38	2.3	2.33	
MEC 703	**2.3**	2.35	2.27	2.15	
MEC 704	**2.18**	2.35	2.37	2.22	
MEC 705	**2.25**	2.38	2.4	2.35	2.22
MEC 703P	**2.1**	2.08	2.38	2.2	
MEC 705P	**2.22**	2.38	2.27	2.17	2.4
MEC 801	**2.52**	2.59	2.57	2.59	
MEC 802	**2.41**	2.54	2.52	2.46	
MEC 803	**2.39**	2.33	2.39	2.46	
MEC 804	**2.66**	2.59	2.51	2.34	
MEC 802P	**2.81**	2.33	2.48	2.44	

ACADEMIC YEAR 2019-2020

Course	C01	C02	C03	C04	C05
MEL100	**2**	3	3	2	
PHL100	**3**	3	3	3	3
CIL100	**2**	3	3	2	2
HUL100	**2.45**	2.54	2.42	2.52	
CYL101	**3**	3	3	3	
MAL100	**3**	3	3	3	3
HUP100	**2.45**	2.54	2.42	2.52	
PHP100	**3**	3	3	3	
WSP100	**3**	3	3	3	3
HUL101	**2.45**	2.53	2.43	2.52	
EEL100	**3**	3	3	2	2
ITL100	**3**	3	3	2	
CYL100	**3**	3	2	3	
CIV 102	**2.61**	2.53	2.49	2.39	
MAL101	**0.6**	0.6	0.6	0.6	0.6
ELP100	**3**	3	3	3	
CYP100	**3**	2	3	3	
ITP100	**2.5**	2	3	2	
MEC 201	**2.9**	2.7	2.8	2.8	
MEC 301	**2.52**	2.45	2.73	2.43	
MEC 302	**2.72**	2.4	2.62	2.5	
MEC 303	**2.4**	2.7	2.8	2.1	
MEC 304	**3**	3	2	3	
MEC 305	**3**	2	3	3	
MEC 306	**2.45**	2.33	2.46	2.4	

MTH 304	**2**	3	3	3	
MEC 302P	**2.76**	2.58	2.67	2.32	
MEC 303P	**2.8**	2.7	2.6	2.8	
MEC 305P	**2**	3	3	3	
MEC 401	**2.73**	2.41	2.38	2.63	
MEC 402	**2.8**	2.7	2.8	2.8	
MEC 403	**2.11**	2.42	1.94	2.26	
MEC 404	**3**	3	3	3	
MEC 405	**3**	3	3	2	
ELE 406	**3**	3	3	2	2
MEC 403P	**2**	2	3	2	
MEC 404P	**2.22**	2.38	2.27	2.17	2.3
MEC 405P	**3**	3	3	2	
ELE 407P	**2.4**	3	3	3	
MEC 501	**3**	3	2	3	
MEC 502	**2.3**	2.35	2.27	2.15	
MEC 503	**2.03**	2.25	2.22	2.29	
MEC 504	**2.5**	2.6	2.6	2.9	
MEC 505	**3**	**3**	**2**	**2**	
ECE 508	**2.5**	2.6	2.65	2.47	
MEC 501P	**3**	3	3	2	
MEC 504P	**3**	2	2	3	
MEC 505P	**2**	3	3	2	
ECE 508P	**2.69**	2.62	2.66	2.16	
MEC 601	**2.44**	2.6	2.33	2.53	2.4
MEC 602	**2**	3	3	3	
MEC 603	**3**	2	2	3	
MEC 604	**3**	3	2	2	
MEC 605	**3**	2	2	2	2
MEC 606	**2.58**	2.5	2.48	2.23	
MEC 603P	**3**	3	3	3	
MEC 605P	**3**	2	2	3	
MEC 701	**2**	3	2	2	
MEC 702	**2.65**	2.58	2.54	2.36	
MEC 703	**2.81**	2.55	2.43	2.27	
MEC 704	**2.66**	2.58	2.52	2.35	
MEC 705	**2.4**	2.4	2.35	2.3	2.5
MEC 706	**2**	2	3	3	
MEC 706	**2**	1	3	2	
MEC 703P	**3**	2	3	3	
MEC 705P	**2.11**	2.18	2.4	2.2	2.5

MEC 801	**2.64**	2.68	2.57	2.64	
MEC 802	**2.66**	2.59	2.51	2.34	
MEC 803	**2.66**	2.59	2.51	2.34	
MEC 804	**2.66**	2.59	2.51	2.34	
MEC 806	**3**	2	2	3	3
MEC 802P	**2.7**	2.6	2.5	2.3	

iii. Overall CO attainment of all the courses

ACADEMIC YEAR 2017-2018

Course	C01	C02	C03	C04	C05
CHM-101	**2.84**	2.8	2.8	2.28	
CHM-101L	**2.94**	2.924	2.94	2.874	
IT101	**3**	3	2.28	2.08	
Civ-102	**2.932**	2.198	2.182	2.148	
HSS-101	**2.086**	2.112	1.286	2.094	
MTH-101	**2.8**	3	3	1.8	1.8
PHY101	**3**	2.8	1.8	2.08	
PHY 101P	**3**	3	3	3	
WSP-I	**2.922**	2.5	1.662	2.886	2.908
PHY201	**2.4**	1.92	1.92	0.24	
PHY201P	**2.4**	2.4	2.4	2.4	
CHM-201	**2.44**	2.92	2.9	2.14	
CHM-201P	**2.94**	2.92	2.92	2.84	
MTH201	**2.8**	3	2.32	2.28	1.8
MEC201	**2.86**	2.9	2.94	2.16	
HSS201	**2.654**	2.632	1.938	2.894	1.948
CSE201	**1.84**	3	2.28	1.12	
CSE 202P	**2.26**	2.8	3	2.16	
CIV201	**2.8**	2.28	2.28	2.56	1.8
WSPII	**2.898**	2.892	2.414	2.566	2.87
MEC 201	**2.86**	2.9	2.94	2.16	
MEC 301	**2.836**	2.15	2.314	2.844	2.364
MEC 302	**1.4**	2.94	1.88	1.4	
MEC 303	**2.424**	2.918	2.434	2.198	
MEC 304	**2.642**	2.908	2.904	1.932	
MEC 305	**2.32**	3	2.8	2.28	
MEC 306	**2.888**	2.914	2.166	2.726	
MTH 304	**2.162**	2.226	2.096	1.928	
MEC 302P	**2.94**	2.88	2.92	2.92	
MEC 303P	**2.892**	2.878	2.888	2.87	

MEC 305P	**3**	3	2.32	2.52	
MEC 401	**2.854**	2.41	2.048	2.12	
MEC 402	**2.84**	2.92	2.84	2.12	
MEC 403	**2.846**	2.876	2.86	2.146	
MEC 404	**2.86**	2.87	2.854	2.11	
MEC 405	**3**	3	2.28	1.84	
ELE 406	**2.85**	2.876	2.8	1.59	2.044
MEC 403P	**2.82**	2.816	2.876	2.84	
MEC 404P	**2.844**	2.876	2.854	2.834	
MEC 405P	**2.8**	3	3	2.8	
ELE 407P	**2.922**	2.886	2.9	2.944	
MEC 501	**2.686**	2.888	2.648	1.988	1.68
MEC 502	**2.402**	2.408	2.476	2.154	
MEC 503	**2.934**	2.882	2.886	2.232	
MEC 504	**2.93**	2.15	2.178	2.954	
MEC 505	**2.934**	2.882	2.646	2.232	
ECE 508	**2.826**	2.854	2.87	2.15	
MEC 501P	**2.854**	2.89	2.848	2.52	
MEC 504P	**2.786**	2.8	2.834	2.806	
MEC 505P	**2.846**	2.876	2.86	2.866	
ECE 508P	**2.86**	2.87	2.854	2.4	
MEC 601	**2.116**	1.67	1.674	1.164	0.924
MEC 602	**3**	1.84	2.04	2.08	
MEC 603	**2.836**	1.91	1.914	2.124	
MEC 604	**2.85**	2.636	2.64	2.15	
MEC 605	**2.86**	2.82	2.58	1.4	
MEC 606	**2.866**	2.85	2.834	2.8	
MEC 603P	**2.892**	2.878	2.888	2.87	
MEC 605P	**2.826**	2.854	2.87	2.87	
MEC 701	**2.374**	2.41	2.368	2.12	
MEC 702	**2.928**	2.916	2.904	2.152	
MEC 703	**2.766**	2.396	2.22	2.146	
MEC 704	**2.62**	2.87	2.854	2.11	
MEC 705	**2.85**	2.876	2.88	2.15	2.2
MEC 703P	**2.904**	2.918	2.914	2.918	
MEC 705P	**2.882**	2.908	2.904	2.892	1.42
MEC 801	**2.962**	2.866	2.896	2.168	
MEC 802	**2.934**	2.882	2.166	2.232	
MEC 803	**2.826**	2.16	2.39	2.15	
MEC 804	**2.854**	2.41	2.128	2.12	
MEC 802P	**2.846**	2.89	2.94	2.41	

ACADEMIC YEAR 2018-2019

Course	C01	C02	C03	C04	C05
CHM-101	**2.936**	2.922	2.892	2.15	
CHM-101L	**2.9**	2.94	2.78	2.82	
IT101	**3**	3	2.28	2.08	
Civ-102	**1.24**	0.74	1.7	1.2	
HSS-101	**2.648**	2.632	2.886	1.93	
MTH-101	**2.8**	3	3	1.64	1.64
PHY101	**1.84**	1.56	0.64	0.84	
PHY 101P	**2.52**	3	2.8	2.32	
WSP-I	**2.9614**	2.9734	2.972	2.9832	2.178
PHY201	**2.8**	3	2.08	0.84	
PHY201P	**3**	3	3	3	
CHM-201	**2.938**	2.926	2.902	2.162	
CHM-201P	**2.936**	2.918	2.9	2.158	
MTH201	**2.08**	2.28	2.8	3	3
MEC201	**2.02**	0.7	2.24	0.8	
HSS201	**2.67**	1.89	2.66	2.176	1.882
CSE201	**2.28**	2.76	1.8	1.6	
CSE 202P	**2.26**	2.8	3	2.16	
CIV201	**1.452**	2.2	0.74	1.448	1.452
WSPII	**2.922**	2.47	2.914	2.938	2.92
MEC 201	**1.928**	0.638	2.182	0.754	
MEC 301	**2.904**	2.41	2.234	2.156	2.232
MEC 302	**1.88**	2.7	2.22	1.4	
MEC 303	**1.962**	2.406	2.42	1.744	
MEC 304	**2.926**	2.888	2.408	2.228	
MEC 305	**2.08**	3	3	2.8	
MEC 306	**2.934**	2.162	2.166	2.232	
MTH 304	**2.13**	2.23	1.138	1.994	
MEC 302P	**2.94**	2.88	2.94	2.84	
MEC 303P	**2.932**	2.876	2.892	2.954	
MEC 305P	**2.8**	3	2.8	3	
MEC 401	**2.946**	2.402	2.156	2.206	
MEC 402	**1.74**	2.44	1.5	1.42	
MEC 403	**2.868**	2.17	2.408	1.688	
MEC 404	**2.918**	2.758	2.564	2.002	
MEC 405	**3**	3	1.84	1.36	

ELE 406	**2.43**	2.572	2.79	1.716	
MEC 403P	**2.878**	2.878	2.908	2.87	
MEC 404P	**2.902**	2.916	2.916	2.896	
MEC 405P	**2.32**	3	2.52	2.52	
ELE 407P	**2.892**	2.87	2.902	2.874	
MEC 501	**2.9**	2.42	2.348	2.172	2.188
MEC 502	**2.664**	2.438	2.434	1.718	
MEC 503	**2.882**	2.668	2.664	2.172	
MEC 504	**2.878**	2.146	2.158	2.892	
MEC 505	**2.408**	2.914	2.886	1.446	
ECE 508	**2.962**	2.386	2.896	2.168	
MEC 501P	**2.896**	2.896	2.914	2.572	
MEC 504P	**2.892**	2.878	2.888	2.87	
MEC 505P	**2.866**	2.862	2.878	2.886	
ECE 508P	**2.874**	2.87	2.886	2.4	
MEC 601	**2.648**	1.96	1.666	1.706	1.44
MEC 602	**3**	2.56	3	2.28	
MEC 603	**2.39**	2.374	2.12	1.164	
MEC 604	**2.858**	2.884	2.836	2.182	
MEC 605	**1.404**	2.472	1.426	2.36	1.876
MEC 606	**2.894**	2.87	2.87	2.008	
MEC 603P	**2.826**	2.854	2.87	2.87	
MEC 605P	**1.56**	2.32	1.36	2.32	1.84
MEC 701	**2.306**	2.08	2.114	2.086	
MEC 702	**2.846**	2.876	2.86	2.146	
MEC 703	**2.86**	2.39	2.134	2.11	
MEC 704	**1.876**	2.39	1.914	1.164	
MEC 705	**2.85**	2.876	2.88	2.15	2.124
MEC 703P	**2.82**	2.816	2.876	2.84	
MEC 705P	**2.844**	2.876	2.854	2.834	1.44
MEC 801	**2.344**	2.678	2.194	1.718	
MEC 802	**2.882**	2.908	2.184	2.172	
MEC 803	**1.918**	2.306	2.158	1.692	
MEC 804	**2.932**	2.438	2.182	2.148	
MEC 802P	**2.962**	2.866	2.896	2.568	

ACADEMIC YEAR 2019-2020

Course	C01	C02	C03	C04	C05
MEL100	**2.08**	3	2.28	2.44	
PHL100	**3**	2.84	2.84	2.76	2.76
CIL100	**2.8**	3	3	2.08	1.84

HUL100	**2.65**	2.668	2.884	2.664	
CYL101	**3**	3	3	3	
MAL100	**3**	1.4	2.28	2.28	0.6
HUP100	**2.89**	1.948	1.444	1.464	
PHP100	**3**	3	3	3	
WSP100	**3**	3	3	3	3
HUL101	**2.89**	2.906	2.886	1.944	
EEL100	**3**	3	3	2.8	2.8
ITL100	**2.28**	2.76	1.8	1.6	
CYL100	**3**	3	2.8	3	
CIV 102	**2.922**	2.186	2.178	1.918	
MAL101	**1.784**	2.04	2.04	2.04	2.04
ELP100	**3**	3	3	3	
CYP100	**3**	2.8	3	3	
ITP100	**2.26**	2.8	3	2.16	
MEC 201	**2.02**	0.7	1.52	0.8	
MEC 301	**2.904**	2.89	2.946	2.646	
MEC 302	**1.504**	0.72	1.484	1.46	
MEC 303	**2.88**	2.94	2.24	0.66	
MEC 304	**2.28**	3	2.08	2.64	
MEC 305	**1.08**	2.8	1.8	1.08	
MEC 306	**2.89**	2.866	2.892	2.88	
MTH 304	**2**	3	3	3	
MEC 302P	**2.952**	2.916	2.934	2.864	
MEC 303P	**2.96**	2.94	2.92	2.96	
MEC 305P	**2.8**	3	3	2.52	
MEC 401	**2.946**	2.882	2.876	2.686	
MEC 402	**2.96**	2.94	2.96	2.96	
MEC 403	**2.822**	2.884	2.788	2.132	
MEC 404	**3**	2.04	2.04	1.32	
MEC 405	**3**	3	3	2.32	
ELE 406	**2.52**	3	3	2.8	0.4
MEC 403P	**2.8**	2.8	2.2	2.8	
MEC 404P	**2.844**	2.876	2.854	2.834	2.86
MEC 405P	**3**	3	2.52	2.48	
ELE 407P	**2.4**	3	3	3	
MEC 501	**3**	3	2	2.52	
MEC 502	**2.86**	2.87	2.854	2.83	
MEC 503	**2.806**	1.89	1.404	1.418	
MEC 504	**2.9**	2.92	2.92	2.26	
MEC 505	3	3	2.8	2.08	

ECE 508	**2.9**	2.92	2.13	2.894	
MEC 501P	**3**	3	2.2	2.8	
MEC 504P	**3**	2.8	2.8	3	
MEC 505P	**2.8**	2.2	2.2	2.8	
ECE 508P	**2.938**	2.924	2.932	2.832	
MEC 601	**2.648**	1.96	1.666	1.706	1.44
MEC 602	**2.16**	2.36	3	2.36	
MEC 603	**3**	2.8	2.8	3	
MEC 604	**3**	3	2.8	2.08	
MEC 605	**3**	2.8	2.8	2.8	2.8
MEC 606	**2.916**	2.9	2.896	2.846	
MEC 603P	**3**	3	3	3	
MEC 605P	**3**	2.8	2.8	3	
MEC 701	**2.8**	3	2.8	2.8	
MEC 702	**2.21**	2.196	1.468	2.152	
MEC 703	**2.962**	2.91	2.886	2.374	
MEC 704	**1.972**	2.436	1.944	1.19	
MEC 705	**2.88**	2.88	2.87	2.86	2.9
MEC 706	**2.8**	2.8	2.2	2.2	
MEC 707	**2.8**	1.8	2.2	2	
MEC 703P	**2.2**	2.8	2.2	2.2	
MEC 705P	**2.822**	2.036	2.88	2.04	0.5
MEC 801	**2.368**	2.696	2.194	1.728	
MEC 802	**2.932**	2.438	2.182	2.148	
MEC 803	**1.972**	2.358	2.182	1.668	
MEC 804	**2.452**	2.918	2.902	2.148	
MEC 707	**2.2**	2	2.8	2.2	2.2
MEC 802P	**2.94**	2.92	2.9	2.62	

3.3. Attainment of Program Outcomes (POs) and Program Specific Outcomes (PSOs) (75/75)

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

A. PO/ PSO ASSESSMENT PROCESS (5/5)

PO/PSO assessment is done by giving 80% weightage to direct assessment and 20% weightage to indirect assessment. Direct assessment is based on CO attainment obtained and the corresponding CO-PO/PSO mapping (Section 3.1.2). Indirect assessment is done through

Program exit survey, Alumni survey, Employer survey and Academician feedback. Process of PO/ PSO assessment is illustrated in the figure 3.

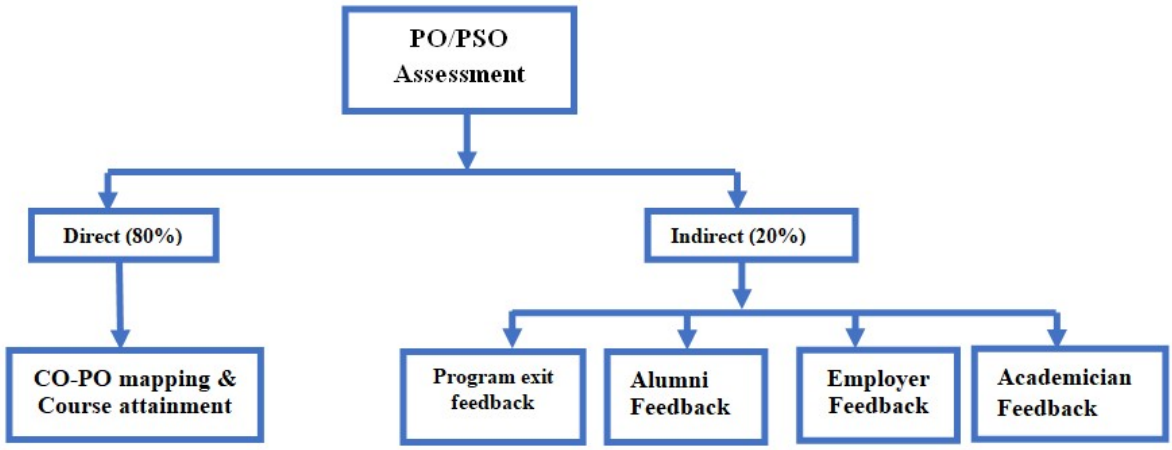

Figure.3: PO/PSO assessment Process

A 1. PO and PSO Assessment Tools

The various direct and indirect assessment tools used to evaluate POs & PSOs and the frequency with which the assessment processes are carried out are listed in Table 3.3.1 (a).

Table 3.3.1 (a) Assessment tools used for evaluation of PO and PSO attainment

Direct (80% weightage)	**CO attainments & CO-PO co-relation matrix**	**Course**		**Assessment Tools**	**Frequency**
		Theory		Mid-Term	Once/Course
				Continuous Assessment	Weekly
				Major	Once/course
		Lab		Continuous Assessment (Report, Experiments)	Daily
				Major Lab Exam (Viva Voce, perform a given experiment and quiz)	Once/lab course
		Seminar/Industrial training		Presentation	Twice/Course
				Report	Once/course
		Project	7^{th} Semester	Mid-Term Evaluation	Once/course
				End- Term Evaluation	Once/course
			8^{th} Semester	Mid-Term Evaluation	Once/course
				End- Term Evaluation	Once/course

				(Demonstration and evaluation by External Examiner)	
Indirect (20% weightage)	Surveys	Program Exit Survey			Once in a year
		Employer Survey			Once in a year
		Alumni Survey			Once in a year
		Academician feedback			As arrival

i. Direct Assessment Tools and Process

Direct assessment tools described in section 3.2.1 are used for the direct assessment of POs and PSOs. Initially, the attainment of each course outcome is determined as described in section 3.2.2. The attainment of each PO corresponding to a course is determined from the attainment values obtained for each course outcome related to that PO and the CO-PO mapping values. Similarly, the values of PSO attainment are also determined by factoring in the attainment of COs,

PO attainment = (PO mapping level/3) *CO attainment

PSO attainment = (PSO mapping level/3) *CO attainment

PO/PSO attainment of a course (sample)

Power Plant Engineering (MEC 804) **SESSION: SPRING-2019**

CO	CO Attainment	PO1	PO1 ATT.	PO2	PO2 ATT.	PO3	PO3 ATT.	PO4	PO4 ATT.	PO5	PO5 ATT.	PO6	PO6 ATT.	PO7	PO7 ATT.	PO8	PO8 ATT.	PO9	PO9ATT.	PO10	PO10ATT.	PO11	PO11 ATT.	PO12	PO12 ATT.	PSO1	PSO1 ATT.	PSO2	PSO2 ATT.	PSO3	PSO3 ATT.
CO1	2.9	3	2.9	2	2.0	2	2.0			2	2.0	1	1.0	2	2.0	2	2.0							2	2.0	3	2.9	2	2.0	3	2.9
CO2	2.4	3	2.4	2	1.6	2	1.6			2	1.6	2	1.6	2	1.6	2	1.6							2	1.6	3	2.4	2	1.6	3	2.4
CO3	2.2	3	2.2	2	1.5	2	1.5			2	1.5	2	1.5	2	1.5	2	1.5							2	1.5	3	2.2	2	1.5	3	2.2
CO4	2.1	3	2.1	3	2.1	3	2.1					3	2.1	1	0.7	2	1.4					3.0	2.1	2	1.4	3	2.1	1	0.7	3	2.1
Avg. Atta	2.4		2.4		1.8		1.8		0		1.7		1.6		1.4		1.6						2.1		1.6		2.4		1.4		2.4

PO & PSO ATTAINMENT CALCULATION (INDIRECT ASSESSMENT)

Employer's feedback, Alumni Feedback, Student exit survey and Academician feedback is considered for this purpose. For the conduct of Students exit survey, a questionnaire was designed. The average responses of the outgoing students for each PO& PSO are computed for **Academic year 2017-2018, 2018-2019 and 2019-2020.**

OVERALL PO/PSO ATTAINMENT CALCULATIONS

Indirect Attainment	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
2017-2018	2.35	2.09	2.09	1.65	2.33	2.13	2.10	2.33	2.30	2.09	1.68	2.33	2.25	1.94	1.84
2018-2019	2.36	1.95	2.09	1.69	2.08	2.16	2.10	2.29	2.19	2.10	1.67	2.32	2.25	1.96	1.84
2019-2020	2.48	2.29	2.20	2.14	2.28	2.25	2.43	2.45	2.37	2.45	2.45	2.30	2.37	2.27	2.29

Direct Assessment + In Direct Assessment

Finally, overall PO attainment values are computed by adding direct and indirect PO attainment values in the proportion of 80:20 respectively i.e. 80% weightage for direct assessment and 20% for indirect assessment

Overall PO/PSO attainment = (80% Direct + 20% Indirect)

PO's	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
Indirect Attainment	2.36	1.95	2.09	1.69	2.08	2.16	2.1	2.29	2.19	2.1	1.67	2.32	2.25	1.96	1.84
Direct Attainment	2.4	1.8	1.8		1.7	1.6	1.4	1.6			2.1	1.6	2.4	1.4	2.4
Overall PO Attainment	2.39	1.83	1.86	0.34	1.78	1.71	1.54	1.74	0.44	0.42	2.01	1.74	2.37	1.51	2.29

ii. Indirect Assessment Tools and Process:

Indirect assessment is done through program exit survey, alumni survey and employer survey

(1) Program Exit Survey:

An exit survey is conducted for students who have graduated out of the department for that year. The questionnaire format in the exit survey form to evaluate the attainment of POs and PSOs is **given in section (a) and relation of POs & PSOs with each question are given in section (b).**

(a) Questionnaire Format.

National Institute of Technology Srinagar Mechanical Engineering Department Exiting Students Survey			
Name:		Enrol. No:	
Phone No.		Email:	
Assessment of Abilities, Skills and Attributes acquired at NIT Srinagar. **Please rate each of the following items in terms how well your education at NIT Srinagar prepared you for them.**			
1	Basic knowledge in mathematics, science, engineering and humanities.		
	Extremely Satisfied	**Satisfied**	**Not Satisfied**
2	Ability to identify, design, analyse and solve mechanical engineering problems		
	Extremely Satisfied	**Satisfied**	**Not Satisfied**
3	Ability to identify mathematical/ analytical method to solve mechanical engineering problems		
	Extremely Satisfied	**Satisfied**	**Not Satisfied**
4	Design/ development of complex engineering problems and their solutions		
	Extremely Satisfied	**Satisfied**	**Not Satisfied**
5	Use of research-based knowledge and research methods		

	Extremely Satisfied	**Satisfied**	**Not Satisfied**
6	Demonstrate the ability to apply advanced technologies to solve contemporary and new problems		
	Extremely Satisfied	**Satisfied**	**Not Satisfied**
7	Awareness to apply engineering solutions in global, national and societal contexts		
	Extremely Satisfied	**Satisfied**	**Not Satisfied**
8	Understanding professional engineering solutions in societal and environmental contexts		
	Extremely Satisfied	**Satisfied**	**Not Satisfied**
9	Understanding the implications of the proposed engineering solution on environment		
	Extremely Satisfied	**Satisfied**	**Not Satisfied**
10	Understanding of professional and ethical responsibility		
	Extremely Satisfied	**Satisfied**	**Not Satisfied**
11	Ability to function as an effective member in multi-disciplinary teams		
	Extremely Satisfied	**Satisfied**	**Not Satisfied**
12	Proficient in English language in both communicative and technical forms		
	Extremely Satisfied	**Satisfied**	**Not Satisfied**
13	Demonstrate the ability to choose and apply appropriate resource management techniques		
	Extremely Satisfied	**Satisfied**	**Not Satisfied**
14	Capable of self-education and clearly understand the value of updating their professional knowledge to engage in life-long learning		

	Extremely Satisfied	**Satisfied**	**Not Satisfied**
15	Ability to integrate theory and practice to construct systems of varying complexity		
	Extremely Satisfied	**Satisfied**	**Not Satisfied**
16	Ability to apply mechanical engineering skills, tools and mathematical techniques to analyse, design and model complex systems		
	Extremely Satisfied	**Satisfied**	**Not Satisfied**
17	Ability to design and manage small-scale projects to develop a career in mechanical engineering		
	Extremely Satisfied	**Satisfied**	**Not Satisfied**

(b) Relation of POs and PSOs with questionnaire:

POs	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
Questions	Q1	Q5	Q4	Q2	Q7	Q8	Q6	Q3	Q11	Q9	Q12	Q10

PSOs	**PSO1**	**PSO2**	**PSO3**
Questions	Q13 & Q 14	Q15	Q16 & Q 17

(c) Evaluation Process

The questionnaire consists of 17 questions which are relevant for assessing each PO and PSO. The first 12 questions correspond to the 12 POs and the remaining 5 questions are for PSOs (Questions 13 & 14 are used to evaluate PSO 1 and Question 15 is used to evaluate PSO 2 and Question 16 and 17 are used to evaluate PSO3). Each question has 3 options, namely, extremely satisfied, satisfied and not satisfied, which are given marks 3, 2 and 1 respectively. The survey results are tabulated and the average values corresponding to each PO and PSO are calculated.

(2) Employer Survey:

- Provides general information on current industry trends.
- Desirable graduate attributes.
- Overall perceptions of program quality.

- Strengths and expectations of graduates.
- Typically collected every two years

Feedback is taken at a frequency of once in two years from the employers who had given jobs to our graduates. The questionnaire format in the employer survey form to evaluate attainment of POs and PSOs is given in section (a) and relation of POs & PSOs with each question is given in section (b).

(a) Questionnaire Format

National Institute of Technology Srinagar Mechanical Engineering Department EMPLOYER SURVEY FORM			
The purpose of this survey is to obtain Employer's input on the quality of education of undergraduate programs in NIT Srinagar. Your sincere cooperation would enable us to improve the quality of our graduates as per your requirements			
Name of Company/ Organization			
Mailing address			
Sector (Private/Public/Academia)			
What are the pertinent employability skills to stay updated in current industry trends and thereby improve the quality of the undergraduate program?	Logical Thinking	Good Aptitude	Excellent Communication

Rate the NIT Srinagar Graduates working in your organization using the following criterion.
Put a tick mark against Knowledge, Skills, Abilities, Attitude and other Attributes expected from NIT Srinagar graduates.

No.	**Overall, how satisfied are you?**	**Excellent (3)**	**Good (2)**	**Satisfied (1)**
1	Capacity for development and analysis of engineering problems and formulation of appropriate solutions, retaining professional and ethical responsibilities.			
2	Aptitude for self-education, ability to learn new skills and a clear appreciation for the value of life-long learning to update professional knowledge.			
3	Understanding professional engineering solutions for sustainable development and their application in global, national and societal contexts.			

4	Competence for acquiring new skills and applying them in research and development.			
5	Fundamental knowledge in mathematics and science and professional fluency in English both communicative and technical forms.			
6	Dexterity in differentiation of management techniques and possession of leadership skills that enable successful function of multi-disciplinary teams.			
	Signature	**Name and Designation**		

(b) Relation of POs and PSOs with questionnaire:

POs	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
Questions	Q5	Q1	Q1	Q4	Q2 &Q4	Q3	Q3	Q1	Q6	Q5	Q6	Q2

PSOs	**PSO1**	**PSO2**	**PSO3**
Questions	Q1, Q2, Q3, Q4, Q5 and Q6	Q2 and Q4	Q6

(c) Evaluation Process

The questionnaire consists of 6 questions. These questions are relevant for assessing each PO and PSO. If multiple questions satisfy a PO, then their average is taken. Similar procedure is followed for PSOs also. Each question is having 3 options namely, Excellent, good and satisfied which are given marks 3, 2 and 1 respectively. These marks are tabulated and the average values corresponding to each PO and PSO are determined.

(3) Alumni Survey: It is done once in a year.

- Measures the extent to which past students believes they achieved program-level learning outcomes.
- Overall satisfaction with the program.
- Overall satisfaction with the program delivery.
- Information on current professional or academic status.

2.

Feedback is taken from the alumni. The questionnaire format in the alumni survey form to evaluate attainment of POs and PSOs is given in section (a) and relation of POs & PSOs with each question are given in section (b).

(a) Questionnaire Format

National Institute of Technology Srinagar Alumni Survey Form		
Thank you for taking the time to fill out this questionnaire. All the information will be kept confidential and will be used only for statistical purposes. As an alumnus, your opinions are valued and are utilized to help us make periodic changes and updates for continuous improvement of our undergraduate program		
Alumni name		
Year of Graduation		
Mailing address		
Placement	**Before/after graduation**	**Core/Software**
Name of the Company		
Please rate each of the following skills, abilities or attributes in terms of their importance to state how well your education at Mechanical Engineering Department, National Institute of Technology, Srinagar **prepare you for these.**		
Skills, Abilities and Attributes	Scale (1 to 5) Excellent-5, Poor-1	
1. **Apply Knowledge of mathematics, Basic sciences and Engineering**		
2. **Problem Identification and Analysis**		
3. **Design a system and develop solution to the problem**		
4. **Investigate and Handle complex problems**		
5. **Ability to use techniques and tools in engineering practice**		
6. **Understand and appreciate the impact of engineering in the societal and global contexts**		
7. **Awareness of existing issues (e.g. Economics of engineering, Environmental issues)**		
8. **Understand professional and ethical responsibilities as an engineer (e.g., safety, professional ethics, code of conduct)**		
9. **Function effectively in teams**		
10. **Proficient in English language in both communicative and technical forms**		
11. **Awareness of the need for life-long learning (Seeking further education, self-learning, Membership in professional societies)**		
12. **Project Management and Finance**		
Signature	**Suggestion if any:**	

(a) Relation of POs and PSOs with questionnaire

Pos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
Questions	Q1	Q5	Q4	Q2	Q7	Q8	Q6	Q3	Q11	Q9	Q12	Q10

PSOs	PSO 1	PSO 2	PSO 3
Questions	Q6	Q11	Q8 & Q9

(b) Evaluation Process

(c) The questionnaire consists of 12 attributes which are relevant for assessing each POs and PSOs. Each attribute to be rated on scale of 1 to 5, with Excellent being 5 and Poor being 1. These marks are tabulated and the average values corresponding to each PO and PSO are determined.

3.3.2. PROVIDE RESULTS OF EVALUATION OF EACH PO & PSO (65/65)

A. Verification of documents, results and level of attainment of each PO/PSO (50/50)

Table 4. PO/PSO Attainment of all courses (2017-18)

S No.	Subject	Course Code	Pos												PSO		
			1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	Chemistry-1	CHM-101	**2.8**	2.3	1.5		2	1.3	1.8		1	1.8	2	2.3	2.3	2.5	1.8
2	Chemistry lab	CHM-101L	**2.5**	1.5			2.5	2	2.25			1.33	2	1.25	2.5	2.5	1.5
3	Computer Fundamentals	IT101	**2.2**	1.1	0.4		0.9							1.7			0.9
4	Engineering Drawing	CIV-102	**2.3**	2.3	2.3	2.3	1.6	1.6	1.6		2.3	2.3	1.6	1.6	2.3	2.3	2.3
5	Humanities: "Communication Skills & Oral Presentation."	HSS-101									1.6	1.8	1.6				
6	Mathematics I	MTH-101	**1.412**	1.65	1.47	1.73	1.53	0.91							1.41	1.69	0.83
7	Physics Theory	PHY101	**2.4**	2.4	2.2	1.1	2	0.8									
8	Physics Lab I	PHY 101P	**3**	3	2.75	2	2	1			1						
9	Central Workshop	WSP-I	**2.54**	0.85	0.85		1.7	1.7	1.7	1.7	2.54	1.7		2.54	1.7	0.85	0.85
10	Physics	PHY201	**2**	2	1.7	0.9	0.7				0.8						
11	Physics Lab	PHY201P															
12	Chemistry-II	CHM-201	**2.25**	1.75	2	1	1.5	1	2.33	1	1	2		1.75	2	2.25	1.25
13	Chemistry lab	CHM-201P	**2.5**	2	1.75			1.75	2			1.5	1.33	1.25	2.25	2.5	2
14	Mathematics	MTH201	**2.4**	2	2.1	1.8	2.2								1.5	1.7	0.8
15	Machine Drawing	MEC201	**2.02**	0.57	2.16	0.98				1.08	0.84			0.57	2.36	1.95	0.92
16	Introduction to Social Sciences	HU 201			0.35			1.08	1.01	0.99	0.9	0.25	0.43	0.35			

17	Computer programming	CSE201	**1.77**	1.37	1.82	1.2	1.18							1.5	2.02	0.85	0.62
18	Computer programming Lab	CSE 202P	**2.08**	2.07	2.43	1.32	1.56				0.41			2.55	0.84	2.14	0.84
19	Workshop II	WSPII	**2.706**	0.902	0.902		1.804	1.804	1.804	1.804	2.706	1.804		2.706	1.804	0.902	0.902
20	Fundamental Dynamics	MEC 301	**2.75**	1.85	2.75	0.5	0.75	0.5		0.75	0.75	0.5	0.75	0.75	1.75	2	
21	Mechanics of Materials-I	MEC 302	**1.75**	1.54	1.43			0.79						0.91	1.43	1.11	
22	Fluid Mechanics	MEC 303	**2.11**	1.72	2.29	1.7	0.2			0.18				1.28	1.66	0.83	
23	Engineering Thermodynamics	MEC 304	**2.13**	2.05	1.59							2.05		2.27	1.73	2.05	0.87
24	Manufacturing Technology	MEC 305	**2.6**	0.88	1.07	0.38	1.73	1.33	1.92	1.73	0.88	0.88	0.5	2.6	1.5	1.48	0.77
25	Engineering Graphics & Computer Modelling	MEC 306	**1.78**	0.66	1.33							1.98		1.78		1.62	
26	Mathematics	MTH 304	**1.69**	1.56	1.57									0.98	1.41	1.98	1.28
27	Mechanics of Materials-I Lab	MEC 302P	**1.7**	0.97	0.97						0.97				2.19	1.7	
28	Manufacturing Technology Lab-I	MEC 305P	**2.7**	0.9	0.9	0.5	1.6	0.8	1.5	1.8	1.7	1.4	0.5	2.5	2	0.9	0.6
29	Fluid Mechanics Lab	MEC 303P	**1.92**	1.92		2.88				1.4	0.96			0.96	1.92	0.96	
30	Material Science	MEC 401	**2.75**	2.75	2.75	0.5	0.75	0.5		0.75	0.75	0.5	0.75	0.75	1.75	2	
31	Mechanics of Materials-II	MEC 402	**2.44**	2.02	2.5			0.72						0.89	1.61	1.79	
32	Theory of Machines-I	MEC 403	**2.01**	2.24	1.79	1.57	0.9	0.45	0.67	1.4	0.22		0.67	1.34	1.57	1.57	1.79
33	Applied Thermodynamics-I	MEC 404	**2.67**	2.45	1.78	2.23	1.34	0.67	0.67	0.35		0.45	0.89	1.56	1.11	1.78	0.67
34	CAM & Industrial Automation	MEC 405	**2.53**	1.84	2.03	0.75	2.13	1.46	0.46	0.88	1.69	1.19	0.31	2.53	2.28	1.19	0.53

35	Electrical Engineering Technology	ELE 406	**2.43**	2.27	0.97									2.43	1.3	0.49
36	Theory of Machines-I Lab	MEC 403P	**2.23**	2.55		1.27		0.96	0.96	1.91	1.91			2.23	1.28	1.91	1.91
37	Applied Thermodynamics-I Lab	MEC 404P	**1.67**	1.59	1.88	1.59	1.89	1.88	1.88	1.17	1.91	1.88		1.88	1.88	1.42	0.94
38	CAM & Industrial Automation Lab	MEC 405P	**2.9**	1	1.5	1	2.4	1	0.9	1.9	1.7	1		2.9	2.9	1.2	1
39	Electrical Engineering Technology Lab	ELE 406P	**2.62**	2.85		2.54	2.9			1.4					2.62	2.38	1.43
40	Theory of Machines -II	MEC 501	**2.49**	2.49		0.83									2.56	2.56	0.85
41	Machine Design- I	MEC 502	**2.36**	2.16		1.49	1.96			1.55	1.57	1.57		1.97	2.36	2.36	
42	Hydraulic Machinery	MEC 503	**2.73**	2.55		2.07	1.15	1.92	0.96		2.73	0.98		0.91	1.82	2.25	
43	Heat Transfer	MEC 504	**2.55**	2.55	2.55	1.95	1.7	0.85	1.7	1.56				1.7	2.55	1.7	2.55
44	Industrial Engineering-I	MEC 505	**2.67**	2.43	2.43	2.21	1.78	2.21	2.45	1.76	2.21	1.32	1.78	1.78	2.45	2.67	2.02
45	Industrial Electronics	ECE 508 / 507	**2.02**	1.31	2.08	1.31	1.59	1.84	1.78		1.42			2.68	2.02	2.02	1.84
46	Theory of Machines II-Lab.	MEC 501P	**2.34**	1.89	0.97	1.94				1.66	1.82			1.88	1.87	0.97	1.88
47	Heat Transfer Lab.	MEC 504P	**2.92**	2.87	2.9	2.17	1.93	1.21	1.93	1.8	1.93	1.93	1.93	1.93	2.9	1.93	2.9
48	Industrial Engineering - I Lab.	MEC 505P	**2.91**	2.91	2.67	2.67	2.67	2.67	2.67	1.08	1.7	1.7	2.43	1.94	2.43	1.94	1.94
49	Industrial Electronics Lab.	ECE 508P	**2.25**	1.29		0.96		0.96	0.96	1.4	1.61				2.25		
50	Automatic Control	MEC 601	**1.51**	1.51	0.5	0.5				1.4					1.51	1.51	0.5
51	Machine Design-II	MEC 602	**2.66**	2.66	2.66	2.41	0.96	0.81	1.91	0.93	0.84	1.18	0.81	1.77	2.66	2.02	2.41
52	Fundamentals of Tribology	MEC 603	**2.2**	2.02	2.2	1.07	0.67	2.2	0.71	1.4				1.86	2.2	2.2	1.46

53	Linear Optimization in Engineering	MEC 604	**2.57**	2.57	2.57	2.57	2.11	1.71	1.71	1.08	1.71	1.71		1.71	2.11	1.95	1.71
54	Introduction to Mechatronics	MEC 605	**1.51**		1.51		1.73		1.49						1.97	1.49	1.73
55	Seminar	MEC 606	**1.18**	2.13	0.94	1.18	1.89	0.94	1.89	0.94	0	2.19	0	1.89	1.89	1.89	1.89
56	Fundamentals of Tribology Lab	MEC 603P	**2.86**	2.15	2.63	1.27	1.91	0.95	1.91	1.4				2.62	2.63	2.62	1.91
57	Mechatronics Lab	MEC 605P	**1.79**	1.79	1.87	1.63									2.11	1.79	1.87
58	Basic Fracture Mechanics	MEC 701	**1.94**	1.75		1.55	0.6	0.59	0.58	0.35	0.2			1.17	1.57	1.15	0.97
59	Measurement & Instrumentation	MEC 702	**2.63**	1.98		0.88		1.75	0.23	0.35	2.63			0.88	1.52	1.11	0.23
60	Industrial Engineering-II	MEC 703	**1.97**	2.15		2.15		2.2	2.2	0.78	1.59			1.59	1.95	1.59	1.59
61	Applied Thermodynamics-II	MEC 704	**2.61**	1.92		1.74		1.7	1.57	1.74				1.74	2.61	1.57	2.61
62	Computer Applications in Mech. Engg (CAME)	MEC 705	**2.69**	2.69		0.9		1.79	1.97	0.35	2.69			1.79	0.9	0.9	2.03
63	Industrial Engineering-II Lab	MEC 703P	**2.91**	2.67	2.67	2.18	1.94	2.43	2.67	1.08	2.43	1.46	1.94	1.94	2.67	2.91	2.18
64	CAME Lab	MEC 705P	**2.59**	2.59		0.86								1.73	0.86	0.86	
65	Final year project	MEC 706	**3**	2	2	3	2	2	2	1	2	2	1	2	2	2	2
66	Practical Training & Professional viva	MEC 707	**3**	3	3	-	2	2	2	2	2	3	3	2	-	3	3
67	Production & Operation Management	MEC 801	**2.48**	2.3	2.32	1.76	2.33	1.54	1.57	1.57	1.84	1.82	1.2	1.47	2.27	0.72	1.61
68	Internal Combustion Engines	MEC 802	**2.55**	2.55	2.55	2.55	2.55	2.55	2.55	2.35	2.55	2.55	2.55	2.55	2.55	2.55	2.55
69	Departmental Elective-I (Power plant engineering)	MEC 804	**2.38**	1.76	1.76		1.64	1.52	1.41	1.58			2.12	1.59	2.38	1.41	2.38

70	DE-2 (Theory of Elasticity)	MEC803	**2.38**	2.15	1.97	1.47	1.97			1.48	1.59	1.59		2	2.38	2.38	
71	Final year project	MEC 805	**3**	3	3	3	2	2	2	2	2	3	3	2	3	3	3
72	IC Engine Lab	MEC 802P	**1.68**	2.64		1.92		1.92	2.16	0.35	2.88			2.88	2.88	0.96	2.16
PO/PSO ATTAINMENT LEVEL			**2.34**	**2.00**	**1.88**	**1.58**	**1.68**	**1.42**	**1.63**	**1.27**	**1.57**	**1.60**	**1.40**	**1.76**	**2.03**	**1.77**	**1.54**

B. Overall levels of attainment **(15/15)**

Overall PO/PSO attainment = (80% Direct + 20% Indirect)

PO/PSO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
Direct Attainment	2.34	2.00	1.88	1.58	1.68	1.42	1.63	1.27	1.57	1.60	1.40	1.76	2.03	1.77	1.54
Indirect Attainment	2.49	2.30	2.21	2.15	2.29	2.25	2.43	2.45	2.38	2.45	2.45	2.31	2.38	2.27	2.30
Overall PO Attainment	2.37	2.06	1.95	1.70	1.80	1.59	1.79	1.51	1.73	1.77	1.61	1.87	2.10	1.87	1.69

Table 5. PO/PSO Attainment of all courses (2018-19)

S No.	**Subject**	**Course code**	**POs**												**PSO**		
			1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
1	Chemistry-1	CHM-101	**2.75**	2.25	1.5		2	1.33	1.75		1	1.75	2	2.25	2.25	2.5	1.75
2	Chemistry lab	CHM-101L	**2.5**	1.5			2.5	2	2.25			1.33	2	1.25	2.5	2.5	1.5
3	Computer Fundamentals	IT101	**2.23**	1.09	0.37		0.85							1.73			0.87
4	Engineering Drawing	Civ-102	**1.2**	1.2	1.2	1.2	0.8	0.8	0.8		1.2	1.2	0.8	0.8	1.2	1.2	1.2

5	Humanities: "Communication Skills & Oral Presentation."	HSS-101									1.84	2.13	1.91				
6	Mathematics I	MTH-101	**1.388**	1.608	1.42	1.7	1.5	0.89							1.39	1.68	0.8
7	Physics Theory	PHY101	**0.9**	0.9	0.75	0.4	0.72	0.3									
8	Physics Lab I	PHY 101P	**3**	3	2.75	2	2	1			1						
9	Central Workshop	WSP-I	**2.813**	0.937	0.94		1.88	1.88	1.88	1.88	2.81	1.88		2.81	1.88	0.94	0.94
10	Physics	PHY201	**2.1**	2.1	1.85	0.95	0.7				0.7						
11	Physics Lab	PHY201P															
12	Chemistry-II	CHM-201	**2.25**	1.75	2	1	1.5	1	2.33	1	1	2		1.75	2	2.25	1.25
13	Chemistry lab	CHM-201P	**2.5**	2	1.75			1.75	2			1.5	1.33	1.25	2.25	2.5	2
14	Mathematics	MTH201	**2.64**	2.12	2.3	1.92	2.26								1.56	1.7	0.88
15	Machine Drawing	MEC201	**1.3**	0.07	1.2	0.17				0.65	0.48			0.07	1.4	1	0.41
16	Introduction to Social Sciences	HU 201			0.36			1.08	0.88	0.95	1.03	0.35	0.38	0.36			
17	Computer programming	CSE201	**1.85**	1.37	1.8	1.22	1.15							1.62	2.07	0.92	0.65
18	Computer programming Lab	CSE 202P	**2.08**	2.07	2.43	1.32	1.56				0.41			2.55	0.84	2.14	0.84
19	Workshop II	WSPII	**2.816**	0.938	0.94		1.88	1.88	1.88	1.88	2.82	1.88		2.82	1.88	0.94	0.94

20	Fundamental Dynamics	MEC 301	**2.75**	1.85	2.75	0.5	0.75	0.5		0.75	0.75	0.5	0.75	0.75	1.75	2	
21	Mechanics of Materials-I	MEC 302	**1.87**	1.67	1.55			0.87						0.99	1.51	1.18	
22	Fluid Mechanics	MEC 303	**2.11**	1.72	2.29	1.7	0.2			0.18				1.28	1.66	0.83	
23	Engineering Thermodynamics	MEC 304	**2.13**	2.05	1.59							2.05		2.27	1.73	2.05	0.87
24	Manufacturing Technology	MEC 305	**2.72**	0.97	1.2	0.47	1.81	1.27	2.05	1.81	0.97	0.97	0.5	2.72	1.56	1.56	0.81
25	Engineering Graphics & Computer Modelling	MEC 306	**1.78**	0.66	1.33							1.98		1.78		1.62	
26	Mathematics	MTH 304	**1.69**	1.56	1.57									0.98	1.41	1.98	1.28
27	Mechanics of Materials-I Lab	MEC 302P	**1.69**	0.97	0.97						0.97				2.18	1.7	
28	Manufacturing Technology Lab-I	MEC 305P	**2.9**	1	1	0.5	1.7	0.8	1.7	1.9	1.7	1.4	0.5	2.7	2.2	1	0.7
29	Fluid Mechanics Lab	MEC 303P	**1.92**	1.92		2.88				1.4	0.96			0.96	1.92	0.96	
30	Material Science	MEC 401	**2.75**	2.75	2.75	0.5	0.75	0.5		0.75	0.75	0.5	0.75	0.75	1.75	2	

31	Mechanics of Materials-II	MEC 402	**1.57**	1.31	1.66			0.47						0.59	1.05	1.18	
32	Theory of Machines-I	MEC 403	**2.01**	2.24	1.79	1.57	0.9	0.45	0.67	1.4	0.22		0.67	1.34	1.57	1.57	1.79
33	Applied Thermodynamics-I	MEC 404	**2.67**	2.45	1.78	2.23	1.34	0.67	0.67	0.35		0.45	0.89	1.56	1.11	1.78	0.67
34	CAM & Industrial Automation	MEC 405	**2.3**	1.65	1.8	0.63	1.94	1.34	0.34	0.81	1.53	1.03	0.23	2.3	2.05	1.03	1.03
35	Electrical Engineering Technology	ELE 406	**2.43**	2.27	0.97										2.43	1.3	0.49
36	Theory of Machines-I Lab	MEC 403P	**2.23**	2.55		1.27		0.96	0.96	1.91	1.91			2.23	1.28	1.91	1.91
37	Applied Thermodynamics-I Lab	MEC 404P	**1.67**	1.59	1.88	1.59	1.89	1.88	1.88	1.17	1.91	1.88		1.88	1.88	1.42	0.94
38	CAM & Industrial Automation Lab	MEC 405P	**2.6**	0.9	1.3	0.8	2.2	0.9	0.8	1.7	1.6	0.9		2.6	2.6	1.1	0.8
39	Electrical Engineering Technology Lab	ELE 406P	**2.62**	2.85		2.54	2.9			1.4					2.62	2.38	1.43
40	Theory of Machines -II	MEC 501	**2.49**	2.49		0.83									2.56	2.56	0.85
41	Machine Design- I	MEC 502	**2.36**	2.16		1.49	1.96			1.55	1.57	1.57		1.97	2.36	2.36	

42	Hydraulic Machinery	MEC 503	**2.73**	2.55		2.07	1.15	1.92	0.96		2.73	0.98		0.91	1.82	2.25	
43	Heat Transfer	MEC 504	**2.55**	2.55	2.55	1.95	1.7	0.85	1.7	1.56				1.7	2.55	1.7	2.55
44	Industrial Engineering-I	MEC 505	**2.67**	2.43	2.43	2.21	1.78	2.21	2.45	1.76	2.21	1.32	1.78	1.78	2.45	2.67	2.02
45	Industrial Electronics	ECE 508 / 507	**2.02**	1.31	2.08	1.31	1.59	1.84	1.78		1.42			2.68	2.02	2.02	1.84
46	Theory of Machines II-Lab.	MEC 501P	**2.34**	1.89	0.97	1.94				1.66	1.82			1.88	1.87	0.97	1.88
47	Heat Transfer Lab.	MEC 504P	**2.92**	2.87	2.9	2.17	1.93	1.21	1.93	1.8	1.93	1.93	1.93	1.93	2.9	1.93	2.9
48	Industrial Engineering - I Lab.	MEC 505P	**2.91**	2.91	2.67	2.67	2.67	2.67	2.67	1.08	1.7	1.7	2.43	1.94	2.43	1.94	1.94
49	Industrial Electronics Lab.	ECE 508P	**2.25**	1.29		0.96		0.96	0.96	1.4	1.61				2.25		
50	Automatic Control	MEC 601	**1.51**	1.51	0.5	0.5				1.4					1.51	1.51	0.5
51	Machine Design-II	MEC 602	**2.66**	2.66	2.66	2.41	0.96	0.81	1.91	0.93	0.84	1.18	0.81	1.77	2.66	2.02	2.41
52	Fundamentals of Tribology	MEC 603	**2.2**	2.02	2.2	1.07	0.67	2.2	0.71	1.4				1.86	2.2	2.2	1.46
53	Linear Optimization in Engineering	MEC 604	**2.72**	2.72	2.72	2.72	2.22	1.75	1.81	0.87	1.81	1.81	2.72	1.81	2.22	2.06	1.81

54	Introduction to Mechatronics	MEC 605	**1.51**		1.51		1.73		1.49						1.97	1.49	1.73
55	Seminar	MEC 606	**1.05**	2.01	0.89	1.05	1.77	0.89	1.77	0.89		1.94	0	1.77	1.29	1.29	1.29
56	Fundamentals of Tribology Lab	MEC 603P	**2.86**	2.15	2.63	1.27	1.91	0.95	1.91	1.4				2.62	2.63	2.62	1.91
57	Mechatronics Lab	MEC 605P	**1.79**	1.79	1.87	1.63									2.11	1.79	1.87
58	Basic Fracture Mechanics	MEC 701	**1.94**	1.75		1.55	0.6	0.59	0.58	0.35	0.2			1.17	1.57	1.15	0.97
59	Measurement & Instrumentation	MEC 702	**2.63**	1.98		0.88		1.75	0.23	0.35	2.63			0.88	1.52	1.11	0.23
60	Industrial Engineering-II	MEC 703	**1.97**	2.15		2.15		2.2	2.2	0.78	1.59			1.59	1.95	1.59	1.59
61	Applied Thermodynamics-II	MEC 704	**2.61**	1.92		1.74		1.7	1.57	1.74				1.74	2.61	1.57	2.61
62	Computer Applications in Mech. Engg (CAME)	MEC 705	**2.69**	2.69		0.9		1.79	1.97	0.35	2.69			1.79	0.9	0.9	2.03
63	Industrial Engineering-II Lab	MEC 703P	**2.91**	2.67	2.67	2.18	1.94	2.43	2.67	1.08	2.43	1.46	1.94	1.94	2.67	2.91	2.18
64	CAME Lab	MEC 705P	**2.59**	2.59		0.86								1.73	0.86	0.86	

65	Final year project	MEC 706	**3**	2	2	3	2	2	2	1	2	2	1	2	2	2	2
66	Practical Training & Professional viva	MEC 707	**3**	3	3	-	2	2	2	2	2	3	3	2	-	3	3
67	Production & Operation Management	MEC 801	**2.48**	2.3	2.32	1.76	2.33	1.54	1.57	1.57	1.84	1.82	1.2	1.47	2.27	0.72	1.61
68	Internal Combustion Engines	MEC 802	**2.55**	2.55	2.55	2.55	2.55	2.55	2.55	2.35	2.55	2.55	2.55	2.55	2.55	2.55	2.55
69	Departmental Elective-I (Power plant engineering)	MEC 804	**2.38**	1.76	1.76		1.64	1.52	1.41	1.58			2.12	1.59	2.38	1.41	2.38
70	DE-2 (Theory of Elasticity)	MEC803	**2.38**	2.15	1.97	1.47	1.97			1.48	1.59	1.59		2	2.38	2.38	
71	Final year project	MEC 805	**3**	3	3	3	2	2	2	2	2	3	3	2	3	3	3
72	IC Engine Lab	MEC 802P	**1.68**	2.64		1.92		1.92	2.16	0.35	2.88			2.88	2.88	0.96	2.16
PO/PSO ATTAINMENT LEVEL			**2.29**	**1.95**	**1.81**	**1.53**	**1.63**	**1.39**	**1.61**	**1.26**	**1.58**	**1.57**	**1.43**	**1.73**	**1.98**	**1.72**	**1.51**

Overall PO/PSO attainment = (80% Direct + 20% Indirect)

PO's	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
Direct Attainment	**2.29**	**1.95**	**1.81**	**1.53**	**1.63**	**1.39**	**1.61**	**1.26**	**1.58**	**1.57**	**1.43**	**1.73**	**1.98**	**1.72**	**1.51**

Indirect Attainment	2.49	2.30	2.21	2.15	2.29	2.25	2.43	2.45	2.38	2.45	2.45	2.31	2.38	2.27	2.30
Overall PO Attainment	2.33	2.02	1.89	1.66	1.76	1.56	1.78	1.50	1.74	1.75	1.63	1.85	2.06	1.83	1.67

Table 3. PO/PSO Attainment of all courses (2019-20)

S No.	Subject	Course code	POs												PSO		
			1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	Elements of Mechanical Engineering	MEL100	**2.4**	1.6	1.6							1.6		2.4	2.4	1.6	2.4
2	Engineering Physics	PHL100	**2.7**	2.7	2.6	1.8	1.9	1.6			1.5						
3	Engineering Mechanics	CIL100	**2.54**	2.54	1.5	1.5		1.69	0.84						1.69	0.66	1.5
4	Basic English and Communication Skills	HUL100						0.92			1.6	2.7	0.92	1.14			
6	Environmental Studies	CYL101	**2.75**	2.5	3		1.75	2.75	3			2	1.5	2.25	2.25	1.5	2
7	Mathematics-I	MAL100	**1.33**	0.99	1.35								0.36		0.97	1.33	0.65
8	Language Laboratory	HUP100									0.72	1.93	1.93	0.72			
9	Physics Laboratory	PHP100	**3**	3	2.75	2	2	1			1						
10	Work shop Practice	WSP100	**3**	1	1		2	2	2	2	3	2		3	2	1	1
11	Advanced English Comm. Skills & Organizational Behavior	HUL101	**2.63**					1.18			1.43	2.63	1.26	0.95			

13	Basic Electrical Engineer	EEL100	**2.92**	2.55	1.911	1.95									2.92	2.53	0.96
14	Computer Programming	ITL100	**1.85**	1.37	1.8	1.22	1.15							1.62	2.7	0.92	0.65
15	Engineering Chemistry	CYL100	**2.2**	1.96	2.21	1		1.21	1.96	1	1	1.46	1.86	2.2	2.25	2.45	1.71
16	Engineering Drawing	CIV 102	**2.3**	2.3	2.3	2.3	1.54	1.54	1.54		2.3	2.3	1.54	1.54	2.3	2.3	2.3
17	Mathematics II	MAL101	**1.9**	2.08	1.83	1.33							0.86		0.97	1.32	0.65
18	Basic Electrical Engineering Laboratory	ELP100	**3**	2		2		3	2.5				2		2	2.75	1
19	Chemistry Laboratory	CYP100	**2.46**	1.95	2.2	0.93		1.48	1.95	0.93	0.93	1.95	2	2.46	1.96	2.46	1.73
20	Computer Programming Laboratory	ITP100	**2.08**	2.07	2.43	1.32	1.56				0.83			2.55	0.84	2.14	0.84
21	Fundamental Dynamics	MEC 301	**2.75**	1.85	2.75	0.5	0.75	0.5		0.75	0.75	0.5	0.75	0.75	1.75	2	
22	Mechanics of Materials-I	MEC 302	**1.14**	1.08	0.97			0.55						0.66	0.96	0.72	
23	Fluid Mechanics	MEC 303	**2.11**	1.72	2.29	1.7	0.2			0.18				1.28	1.66	0.83	
24	Engineering Thermodynamics	MEC 304	**2.13**	2.05	1.59							2.05		2.27	1.73	2.05	0.87
25	Manufacturing Technology	MEC 305	**1.69**	1.22	1.37	0.56	1.51	0.92	0.27	0.48	1.13	0.66	0.18	1.69	1.45	0.66	0.66
26	Engineering Graphics & Computer Modelling	MEC 306	**1.78**	0.66	1.33							1.98		1.78		1.62	
27	Mathematics	MTH 304	**1.69**	1.56	1.57									0.98	1.41	1.98	1.28

28	Mechanics of Materials-I Lab	MEC 302P	**1.7**	0.97	0.97						0.97				2.19	1.71	
29	Manufacturing Technology Lab-I	MEC 305P	**2.8**	0.9	1	0.5	1.7	0.8	1.6	1.9	1.6	1.5	0.5	2.6	2.1	1	0.7
30	Fluid Mechanics Lab	MEC 303P	**1.92**	1.92		2.88				1.4	0.96			0.96	1.92	0.96	
31	Material Science	MEC 401	**2.75**	2.75	2.75	0.5	0.75	0.5		0.75	0.75	0.5	0.75	0.75	1.75	2	
32	Mechanics of Materials-II	MEC 402	**2.71**	2.22	2.71			0.74						0.99	1.72	1.97	
33	Theory of Machines-I	MEC 403	**2.01**	2.24	1.79	1.57	0.9	0.45	0.67	1.4	0.22		0.67	1.34	1.57	1.57	1.79
34	Applied Thermodynamics-I	MEC 404	**2.67**	2.45	1.78	2.23	1.34	0.67	0.67	0.35		0.45	0.89	1.56	1.11	1.78	0.67
35	CAM & Industrial Automation	MEC 405	**2.83**	2.08	2.33	0.89	2.39	1.58	0.58	1	1.89	1.39	0.39	2.83	2.58	1.39	1.39
36	Electrical Engineering Technology	ELE 406	**2.43**	2.27	0.97										2.43	1.3	0.49
37	Theory of Machines-I Lab	MEC 403P	**2.23**	2.55		1.27		0.96	0.96	1.91	1.91			2.23	1.28	1.91	1.91
38	Applied Thermodynamics-I Lab	MEC 404P	**1.67**	1.59	1.88	1.59	1.89	1.88	1.88	1.17	1.91	1.88		1.88	1.88	1.42	0.94
39	CAM & Industrial Automation Lab	MEC 405P	**2.8**	0.9	1.3	0.8	2.3	1	0.9	1.8	1.5	0.9	0	2.8	2.8	1.2	0.8
40	Electrical Engineering Technology Lab	ELE 406P	**2.62**	2.85		2.54	2.9			1.4					2.62	2.38	1.43
41	Theory of Machines -II	MEC 501	**1.79**	1.91	1.28	1.29	1	1	1	1	1	1	1	1.33	1.25	1.47	1.4
42	Machine Design- I	MEC 502	**2.36**	2.16		1.49	1.96			1.55	1.57	1.57		1.97	2.36	2.36	
43	Hydraulic Machinery	MEC 503	**2.73**	2.55		2.07	1.15	1.92	0.96		2.73	0.98		0.91	1.82	2.25	

44	Heat Transfer	MEC 504	**2.55**	2.55	2.55	1.95	1.7	0.85	1.7	1.56				1.7	2.55	1.7	2.55
45	Industrial Engineering-I	MEC 505	2.72	2.47	2.47	2.06	1.81	2.24	2.49	1.81	2.24	1.33	1.81	1.81	2.49	2.72	2.06
46	Industrial Electronics	ECE 508 / 507	**2.02**	1.31	2.08	1.31	1.59	1.84	1.78		1.42			2.68	2.02	2.02	1.84
47	Theory of Machines II-Lab.	MEC 501P	**2**	2.15	1.81	1.43	1.11	1	1	1	1	1.96	1	1.48	1.43	1.39	1.81
48	Heat Transfer Lab.	MEC 504P	**2.92**	2.87	2.9	2.17	1.93	1.21	1.93	1.8	1.93	1.93	1.93	1.93	2.9	1.93	2.9
49	Industrial Engineering -I Lab.	MEC 505P	**2.91**	2.91	2.67	2.67	2.67	2.67	2.67	1.08	1.7	1.7	2.43	1.94	2.43	1.94	1.94
50	Industrial Electronics Lab.	ECE 508P	**2.25**	1.29		0.96		0.96	0.96	1.4	1.61				2.25		
51	Automatic Control	MEC 601	**1.51**	1.51	0.5	0.5				1.4					1.51	1.51	0.5
52	Machine Design-II	MEC 602	**2.36**	2.36	2.36	2.36		1.57	2.36		1.57		1.57	2.36	2.36	1.57	2.36
53	Fundamentals of Tribology	MEC 603	**2.2**	2.02	2.2	1.07	0.67	2.2	0.71	1.4				1.86	2.2	2.2	1.46
54	Linear Optimization in Engineering	MEC 604	**2.57**	2.57	2.57	2.57	2.11	1.71	1.71	1.08	1.71	1.71		1.71	2.11	1.95	1.71
55	Introduction to Mechatronics	MEC 605	**1.35**	1.23	1.6	1.29									1.92	1.23	1.72
56	Seminar	MEC 606	**1.2**	2.16	0.96	1.2	1.92	0.96	1.92	0.96		2.23		1.92	1.44	1.44	1.44
57	Fundamentals of Tribology Lab	MEC 603P	**2.86**	2.15	2.63	1.27	1.91	0.95	1.91	1.4				2.62	2.63	2.62	1.91
58	Mechatronics Lab	MEC 605P	**1.38**	0.48	0.48	0.65	2.12	0.73	0.57	2.2	1.29	1.15	0.56	1.44	1.95	1.92	1.19
59	Basic Fracture Mechanics	MEC 701	**1.94**	1.75		1.55	0.6	0.59	0.58	0.35	0.2			1.17	1.57	1.15	0.97
60	Measurement & Instrumentation	MEC 702	**2.63**	1.98		0.88		1.75	0.23	0.35	2.63			0.88	1.52	1.11	0.23
61	Industrial Engineering-II	MEC 703	**1.97**	2.15		2.15		2.2	2.2	0.78	1.59			1.59	1.95	1.59	1.59

62	Applied Thermodynamics-II	MEC 704	**2.61**	1.92		1.74		1.7	1.57	1.74				1.74	2.61	1.57	2.61
63	Computer Applications in Mech. Engg (CAME)	MEC 705	**2.69**	2.69		0.9		1.79	1.97	0.35	2.69			1.79	0.9	0.9	2.03
64	Industrial Engineering-II Lab	MEC 703P	**2.91**	2.67	2.67	2.18	1.94	2.43	2.67	1.08	2.43	1.46	1.94	1.94	2.67	2.91	2.18
65	CAME Lab	MEC 705P	**2.59**	2.59		0.86								1.73	0.86	0.86	
66	Final year project	MEC 706	**1.67**	2.14	1.39	0.84	1.67	0.84	1.67	0.84	2.5	1.2	2.5	2.5	1.48	1.67	1.67
67	Practical Training & Professional viva	MEC 707	**1.28**	0.9	1.43	1.22	1.45	1.38	1.38	1.47	1.65	1.47	1.42	1.47	1.28	0.9	1.47
68	Production & Operation Management	MEC 801	**2.48**	2.3	2.32	1.76	2.33	1.54	1.57	1.57	1.84	1.82	1.2	1.47	2.27	0.72	1.61
69	Internal Combustion Engines	MEC 802	**2.55**	2.55	2.55	2.55	2.55	2.55	2.55	2.35	2.55	2.55	2.55	2.55	2.55	2.55	2.55
70	Departmental Elective-I (Power plant engineering)	MEC 804	**2.38**	1.76	1.76		1.64	1.52	1.41	1.58			2.12	1.59	2.38	1.41	2.38
71	DE-2 (Theory of Elasticity)	MEC803	**2.38**	2.15	1.97	1.47	1.97			1.48	1.59	1.59		2	2.38	2.38	
72	Final year project	MEC 805	**1.67**	1.89	2.02	1.87	1.38	1.54	1.78	1.54	2.28	2	2.3	2.28	1.67	1.89	1.36
73	IC Engine Lab	MEC 802P	**1.68**	2.64		1.92		1.92	2.16	0.35	2.88			2.88	2.88	0.96	2.16
PO/PSO ATTAINMENT LEVEL			**2.27**	1.99	1.91	1.52	1.65	1.42	1.55	1.22	1.61	1.61	1.33	1.78	1.95	1.66	1.51

Indirect Attainment

The Indirect attainment is calculated based on the Alumni survey and Program Exit Survey giving 50% weightage to both to arrive the final Indirect Attainment

Indirect Attainment = (50% Program Exit Survey + 50 % Alumni Survey)

PO's	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
Program Exit Survey	2.66	2.35	2.28	2.09	2.29	2.38	2.57	2.64	2.36	2.58	2.64	2.66	2.30	2.21	2.40
Alumni Survey	2.33	2.25	2.14	2.21	2.29	2.12	2.29	2.26	2.40	2.33	2.26	2.33	2.46	2.36	2.20
Overall Indirect Attainment	2.49	2.30	2.21	2.15	2.29	2.25	2.43	2.45	2.38	2.45	2.45	2.31	2.38	2.27	2.30

Overall PO/PSO attainment = (80% Direct + 20% Indirect)

PO's	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
Direct Attainment	2.27	1.99	1.91	1.52	1.65	1.42	1.55	1.22	1.61	1.61	1.33	1.78	1.95	1.66	1.51
Indirect Attainment	2.49	2.30	2.21	2.15	2.29	2.25	2.43	2.45	2.38	2.45	2.45	2.31	2.38	2.27	2.30
Overall PO Attainment	2.31	2.05	1.97	1.65	1.78	1.59	1.73	1.47	1.76	1.78	1.56	1.89	2.03	1.79	1.66