CRITERION 3	Course Outcomes and Program Outcomes	120

3. Course Outcomes and Program Outcomes (120)

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

In addition to the 12 Program Outcomes (POs), the department has formulated three Program Specific Outcomes (PSOs) as listed below:

Program Specific Outcomes (2—4) (Defined by the Department)

1. Mechanical Engineers would be able to identify, analyze and solve Mechanical Engineering problems as well as problems of allied engineering streams for meaningful implementation.
2. Mechanical engineers would be able to apply the basic principles of engineering in various engineering problems by engaging themselves in research work.
3. Mechanical engineers would be able to cater to the fast changing needs of industry, society and the country.

3.1.1. Course Outcomes (COs)

SAR should include course outcomes of One course/Semester (3rd to 8th) of study, however, should be prepared for all courses and made available as evidence, if asked) (05)

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

Table B.3.1.1a: Course Name—[ME 204] Engineering Mechanics I; Year of study: 2013-2014

ME 204.1	*Apply* the basic principles of rigid body mechanics for formulating and solving engineering problems.
ME 204.2	*Analyze* problems of CG and MI for stability of rigid bodies
ME 204.3	*Identify* problems of static equilibrium for using principle of virtual work
ME 204.4	*Analyze* the problems of kinematics and kinetics for engineering application.
ME 204.5	*Develop* the analytical models for simple mechanical vibration problems

Table B.3.1.1b: Course Name: [**ME-324]:** WORKSHOP THEORY – I**,** Year of study 2014-2015

ME 425.1	To analyze motion transmission in machine-fixture-tool-work (MFTW) system for variation in cutting parameters.
ME 425.2	To identify and apply machines and tools for metal removal to produce various metal parts.
ME 425.3	To analyze and evaluate speed, feed, depth of cut for MFTW system and their effect on machining time.
ME 425.4	To apply, analyze and evaluate production economy by semi automatic system.
ME 425.5	To apply techniques of sand molding and casting for production of metal parts.

Table B.3.1.1c: Course Name: **[ME425]** MECHANICS OF MATERIALS; Year of study: 2014-2015

ME324.1	Explain stress-strain relationship for homogeneous and isotropic material under axial, torsional, flexural and combined loads.
ME324.2	Compute principal stresses and strains and maximum shear stress using analytical and graphical methods.
ME324.3	Analyze radial, hoop and longitudinal stresses for thick cylinders under external and internal loading.
ME324.4	Derive stresses in curved beam and rotating discs.
ME324.5	Estimate the deflection of helical spring under axial load and use energy method to estimate the deflection and rotation of beams under flexural loading.

Table B.3.1.1d: Course Name: [ME523] APPLIED THERMODYNAMICS—I; Year of study 2015-2016

ME 523.1	Apply the thermodynamic properties of steam for suitable applications in a steam power plant.
ME 523.2	Analyse the thermodynamic processes involved in the components of a power plant, namely, boiler, nozzle, turbine blade and condenser for efficient conversion of heat to useful work.
ME 523.3	Evaluate the effects of irreversibility occurring during the processes that tend to reduce the performance of a power plant and select suitable methods to reduce the effects by applying concepts of the second law of thermodynamics.
ME 523.4	Compare the components of a power plant in terms of their advantages and disadvantages for selection in industrial applications.
ME 523.5	Explain the constraints on thermodynamics properties due to the metallurgical considerations of the materials used in building the components.

Table B.3.1.1e: Course Name: [ME 621] MACHINE DESIGN II; Year of Study: 2015-2016

ME 621.1	Identify the modes of fatigue failure in materials in cases of axial, torsional, flexural and combined loading conditions with stress concentration criteria.
ME 621.2	Distinguish between cases of static and dynamic loading conditions to test the theories of failure in design of simple mechanical elements like plates, bars, beams and shafts.
ME 621.3	Design gears, springs, cams and gaskets by selecting and analyzing engineering materials and considering design criterions of failure under static and dynamic loading conditions using design data hand book(s).
ME 621.4	Utilize the principles of tribology to design sliding contact bearing and select antifriction-bearings under static and dynamic loading conditions using design data hand book(s).
ME 621.5	Design and analyze brakes and clutches under the consideration of power transmission using design data hand book(s).

Table B.3.1.1f: Course Name: [ME 721] Vibration of Mechanical Systems; Year of Study: 2016-2017

ME 721.1	Construct free body diagram and formulate the equation of motion for free vibration of mechanical system under damped and undamped conditions.
ME 721.2	Develop mathematical models of physical systems under forced vibration using Newton's laws of motion and principles of conservation of energy and solve.
ME 721.3	Analyze results of seismic instruments to estimate vibration parameters.
ME 721.4	Evaluate vibration parameters and noise for multi degrees of freedom system and estimate the critical speed of a shaft for whirling motion.
ME 721.5	Develop mathematical model using MATLAB for mechanical vibrating system.

Table B.3.1.1g: Course Name: [ME 821] Manufacturing Methods; Year of study: 2016-2017

ME 821.1	The students will able to *analyze* and apply various mechanical working processes suitable to various engineering products.
ME 821.2	Students will be able to *apply* various special casting methods for manufacturing of engineering products.
ME 821.3	Students will be able to *analyse* various casting defects and recommend necessary remedial measures.
ME 821.4	Students will be able to *apply* powder metallurgy techniques for manufacturing engineering components including metal powders.
ME 821.5	Students will be able to *apply* and *design* various press working operations to produce components from sheet metal.

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

Table B.3.1.2a: Course Name— [ME 204] Engineering Mechanics I

COs	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO1	PSO2	PSO3
204.1	3	2	2	2	3	-	-	-	-	-	-	1	2	2	1
204.2	3	2	2	1	3	-	-	-	-	-	-	1	2	2	2
204.3	3	2	2	3	1	-	-	-	-	-	-	1	2	2	2
204.4	3	2	2	3	1	-	-	-	-	-	-	1	2	2	2
204.5	3	2	2	2	1	-	-	-	-	-	-	1	2	2	2
Sum	15	10	10	11	9	-	-	-	-	-	-	5	10	10	9
Average	3	2	2	2.5	1.8	-	-	-	-	-	-	1	2	2	1.8

Table B.3.1.2b: Course Name: [ME324]: WORKSHOP THEORY – I

CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
ME 425. 1	3	3	1	-	-	-	-	-	-	-	-	1	3	3	3
ME: 425 .2	3	3	1	-	-	-	-	-	-	-	-	1	3	1	3
ME: 425 .3	3	3	2	-	-	-	-	-	-	-	-	1	3	2	3
ME: 425 .4	3	3	1	-	-	-	-	-	-	-	-	2	2	-	3
ME: 425 .5	3	2	-	-	-	-	-	-	-	-	-	1	2	-	2
SU M	15	14	5	-	-	-	-	-	-	-	-	6	13	6	14
Av	3	2.8	1.2 5	-	-	-	-	-	-	-	-	1. 2	2.6	2	2.8

Table B.3.1.2c: Course Name: [**ME-425]** MECHANICS OF MATERIALS

Course	PO1	PO 2	PO 3	PO 4	PO5	PO 6	PO7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2	PS O3
ME324.1	3	2							1	1		1	2	2	2
ME324.2	3	2	2						1	1		1	2	2	2
ME324.3	3	2	2						1	1		1	2	2	2
ME324.4	3	2	2						1	1		1	2	2	2
ME324.5	3	2	2						1	1		1	2	2	2
Average	3	2	2						1	1		1	2	2	2

Table B.3.1.2d: Course Name: [ME523] APPLIED THERMODYNAMICS—I

	P O1	P O2	P O3	P O4	P O5	P O6	P O7	PO 8	P O9	PO 10	PO 11	PO 12	PS O1	PS O2	PS O3
523.1	3	3	-	1	-	-	-	-	-	-	-	3	1	3	3
523.2	3	3	-	1	-	-	-	-	1	-	-	2	1	3	3
523.3	2	3	-	3	-	-	1	-	-	-	-	-	1	3	3
523.4	3	2	-	3	-	-	-	-	-	-	-	1	1	1	2
523.5	3	1	-	-	-	-	-	-	-	-	-	1	1	2	3
Total	14	12	-	8	-	-	1	-	1	-	-	7	5	12	14

Average	2.8	2.4	-	2	-	-	1	-	1	-	-	1.75	1	2.4	2.8

Table B.3.1.2e: Course Name: [ME 621] MACHINE DESIGN II

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
526.1	3	3	1	2	-	-	-	-	-	-	-	1	3	2	2
526.2	3	2	1	2	-	-	-	-	-	-	-	-	2	2	2
526.3	2	3	3	2	1	-	-	-	-	1	-	-	2	3	2
526.4	3	3	3	2	2	-	-	-	1	1	-	1	2	2	2
526.5	3	3	3	3	2	-	-	-	1	1	--	1	2	3	3
Total	14	14	11	11	5	-	-	-	2	3	-	2	11	12	11
Ave.	2.8	2.8	2.2	2.2	1.67	-	-	-	1	1	-	1.5	2.2	2.4	2.2

Table B.3.1.2f: Course Name: [ME 721] Vibration of Mechanical Systems

Course	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
ME721.1	3	2	2	-	-	-	-	-	1	1	-	1	2	2	2
ME721.2	3	2	2	-	-	-	-	-	1	1	-	1	2	2	2
ME721.3	3	2	1	-	-	-	-	-	1	1	-	1	2	2	2
ME721.4	3	2	2	-	-	-	-	-	1	1	-	1	2	2	2
ME721.5	3	2	2	-	3	-	-	-	1	1	-	1	2	2	2
Average	3	2	1.8	-	3	-	-	-	1	1	-	1	2	2	2

Table B.3.1.2g: Course Name: [ME 821] Manufacturing Methods

Course	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	P1 0	PO1 1	PO1 2	PSO1	PSO2	PSO3
ME 821.1	3	3	—	—	—	—	—	—	—	—	—	1	2	—	2
ME 821.2	3	—	—	—	—	—	—	—	—	—	—	1	—	—	2
ME 821.3	3	3	—	—	—	—	—	—	—	—	—	1	2	—	2
ME 821.4	3	—	—	—	—	—	—	—	—	—	—	1	—	—	2
ME 821.5	3	3	3	—	—	—	—	—	—	—	—	1	2	—	2
Sum	15	9	3	—	—	—	—	—	—	—	—	1	6	—	10
Average	3	3	3	—	—	—	—	—	—	—	—	1	2	—	2

3.1.3 Program level Course-PO matrix of all courses INCLUDING first year courses (10)

Table B.3.1.3a: CO-PO mapping of all courses

Course Name	Course Code	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
Physics-I	PH101	2.5	2	1.5	—	—	—	—	—	—	—	—	—
Chemistry-I	CY102	2.6	2.2	1	1	1.2	1	1	-	1	1	-	1
Mathematics-I	MA103	3	3	1.2	1	_	_	_	_	1	_	_	2
Elements of Civil Engineering	CE104	2.6	2.2	1	2	1.5	—	—	—	—	—	—	—
Eng Communication and Tech	HU105	_	1	_	1	_	1	1	1.4	3	2.25	_	3

report Writing													
Engineering Graphics-I	CE106	3	3	2.42	2.57	2.14	2.57	1	—	—	—	—	—
Introduction to Computing	CS107	3	2.6	2.8	3.2	2.4	2.4	1.6	1	2	3.2	1.6	2
Workshop-I	ME108	1.8	1.4	_	_	_	_	_	1.2	1.8	_	_	_
Physics-I Lab	PH101L	2	-	-	-	-	-	-	-	1	-	-	-
Chemistry-I Lab	CY102L	2.2	1.7	-			1						
Physics-II	PH201	1.75	1.33	1.25	-	1	-	-	-	-			
Chemistry-II	CY202	2.66	1.83	1.33	1.5	1.5	2.2	1.83	-	2	2.66	-	2.16
Mathematics-II	MA203	3	3	2	-	-	-	-	-	-	-	-	2
Engineering Mechanics-I	ME204	3	2	2	2.5	1.8	-	-	-	-	-	-	1
Strength of Materials	CE205	3	2	2	2.5	1.8	-	-	-	-	-	-	1
Basic Electrical Engineering - I	EE206	3	3	3	2	1.6	1	3	2	1	-	-	3
Engineering Graphics-II	ME207	3	3	1	-	2	3	-	-	-	-	-	1
Workshop-II	ME208	1.6	2	-	-	-	-	-	1	1.6	-	-	-
Physics-II Lab	PH201L	2	-	-	-	-	-	-	-	1	-	-	-
Chemistry-II Lab	CY202L	2.2	2	1.5	1.6	1.5	1	1.7	-	1	1.25	1	1

Engineering Mechanics-I Lab	ME204L	3	1.5	1.3	1.8	1.3	-	-	-	-	-	-	1
Strength of Materials Lab	CE205L	3	1.5	1.3	1.8	1.3	-	-	-	-	-	-	1
Basic Electrical Engg-I Lab	EE206L	3	3	-	1	-	-	-	-	3	2	-	3
Mathematics – III	MA 301	3	3	-	-	-	-	-	-	-	-		2
Electro Technology – I	EE 303	3	3	-	-	-	-	-	-	-	-	-	1.8
Basic Thermodynamics	ME 305	3	2.8	1	1	1		1					
Theory of Machine	ME 322	3	2	2.6	1.4	1.4	-	-	-	-	-	-	1
Engineering Graphics – III	ME 323	3	.8	2-	1	-	-	-	-	1	-	-	1
Workshop Theory – I	ME 324	3	2.8	1.25	-	-	-	-	-	-	-	-	1.2
General Proficiency	ME 325	-	-	-	-	-	-	-	-	-	2.75	-	2.4
Electro Technology – I	EE 303L	3	1.66	-	1.33	-	-	-	-	-	2	-	1.66
Theory of Machines	ME 322L	2	1.8	2.3	1.8	1.3	-	-	-	-	-	-	1
Engineering Graphics – III	ME 323L	3	2.5	2		3							1

Workshop Theory – I	ME 324L	3	2	1	-	-	-	-	-	-	-	-	1
Mathematics – IV	MA 401	2.8	2.8	-	-	-	-	-	-	-	-	-	2
Sociology and Accountancy	HU 402	-	1	-	-	-	1.33	1	1.6	1.16	1	1	3
Communication Skill	HU 403	-	1.8	-	1.5	-	2.2	1.2	1.8	2	3	-	3
Electro Technology – II	EE 404	3	2.5	-	1	-	-	-	-	-	2	-	1.75
Mechanics of Material	ME 425	3	2	2	-	-	-	-	-	1	1	-	1
Fluid Mechanics - I	ME 426	3	3	1.2	1	1	-	-	-	1	-	-	1
Material Science	ME 427	3	3	3	-	-	-	-	-	-	-	-	1
General Proficiency	ME 428	-	-	-	-	-	-	-	-	-	3	-	2.4
Electro Technology – II	EE 404L	3	1.75	-	1.5	-	-	-	-	-	2	-	1.5
Mechanics of Materials LAB	ME 425L	3	2	-	-	-	-	-	-	2	2	-	1
Fluid Mechanics	ME 426L	3	3	1.4	1.2	-	1	-	-	2	2	1	1
Economics & Principle of Management	HU 501	-	1	-	-	-	1.5	1	1.5	2	1	1	2.67
Mechanism & Dynamics of Machines	ME 522	3	3	2.6	1.6	1.8	-	-	-	2	-	-	1
Applied Thermodynamics – I	ME 523	2.8	2.4	-	2	-	-	1	-	1	-	-	1.75
Heat Transfer – I	ME 524	3	2	2	2	1	1.4	1.2	-	1.4	1.4	1	1.4

Instrumentation	ME 525	3	3	2.2	2	2.33	1.5	1.5	2	1	1	2	1.2
Machine Design - I	ME 526	2.6	2.8	3	2.2	2	-	1.75	1.5	-	1	1.5	1
General Proficiency	ME 527	-	-	-	-	-	-	-	-	-	2.67	1	2.2
Mechanism & Dynamics of Machines	ME 522L	1	1	1	1	1	1	1	1	1	1	1	1
Applied Thermodynamics – I	ME 523L	3	2.5	1	1.25	-	-	1	-	2	1	-	1
Instrumentation LAB	ME 525L	3	3	2.6	2.2	2.2	1.8	1	1	2.5	1	2	1
Heat Transfer – I LAB	ME 524L	3	3	2.33	3	1	2	1	1	3	3	2	1
Machine Design - II	ME 621	3	3	2.8	3	2	3	2.2	3	-	3	-	3
Operation Research	ME 622	3	3	2.2	2	-	-	-	-	-	-	-	2
Fluid Mechanics – II	ME 623	3	3	2.8	2.4	-	1.4	-	-	1	1	-	1.6
Engineering Inspection and Metrology	ME 624	3	3	2	1.75	2	-	-	-	-	-	-	1.2
Workshop Theory – II	ME 625	3	2.4	2.6	2.4	2.6	-	1	-	1	-	-	1.8
Numerical Methods and Computation	ME 626	3	3	2.6	1.6	1.8	-	-	-	2	-	-	-
General Proficiency	ME 627	-	-	-	-	-	-	-	-	-	2.75	-	2.4
Machine Design – II LAB	ME 621L	2	3	3	2	3	-	1			1	1	2

Fluid Mechanics – II	ME 623L	3	3	2.5	2.5	-	2	-	-	2	2	-	1.5
Engineering Inspection and Metrology	ME 624L	3	2.4	1.6	-	-	-	-	-	-	-	-	2
Workshop Theory – II	ME 625L	3	2	2.5	2.8	2.2	1.5	1	-	2.8	-	-	2
Mechanical Vibration	ME 721	3	2	1.8		3				1	1		1
Applied Thermodynamics – II	ME 722	2.6	2.4	1.7	1.6	-	-	2	-	-	1	-	1.6
Hydraulic Machines	ME 723	3	3	2.2	1.8	-	1.2	1	-	1.4	1.33	1	1.2
Heat Transfer – II	ME 724	3	3	1.6	1	2	2		2	3	2		3
Elective – I Refrigeration	ME 725	3	2.6	2.2	1.6	-	1	-	-	-	-	-	1
Machine Tools		3	3	2.6	1	-	-	-	-	-	-	-	-
Elective – II (Open) Computational Fluid Dynamics and Heat Transfer	ME 726	3	2.8	2.8	2.4	1.8	-	-	-	1	-	-	1
Non Conventional Energy Systems													
Practical Training	ME 727L	2	2.3	2	-	-	1	-	2	3	3	-	1.2

Project – I	ME 728L	1.5	2.5	2	1	2	2	2.5	-	3	-	2.5	2
Manufacturing Method	ME 821	3	3	3	—	—	—	—	—	—	—	—	1
Industrial Engg& Management	ME 822	1	2	2	2	3	2	1.5	2	2	1	2.5	1
Internal Combustion Engine	ME 823	2.2	2	2	2.4	2	1	1.75	-	2.25	2.5	-	1.25
Elective – III Air Conditioning	ME 824	3	3	2	2	-	1.67	1	1.33	-	-	1	1
Compressor & Gas Turbine		3	2.6	2.6	2.2	-	1.8	1	-	1	1	-	1.4
Elective – IV (Open) Power Plant Technology	ME 825	3	2.6	2.6	2.4	-	1.4	1.4	-	1	1.2	-	2
Robotics & Applications		3	2	1.6	-	2	-	-	-	1	1	-	1
Project – II	ME 826	-	3	-	-	-	2	2	2	3	-	2	2
Viva-Voce	ME 827	-	2	-	-	-	-	-	-	-	1	-	2
Grand Average		2.75	2.41	1.97	1.80	1.83	1.57	1.37	1.60	1.69	1.74	1.45	1.59

Table B.3.1.3b: CO-PSO mapping of all courses

Course Name	Courses Code	PSO1	PSO2	PSO3
Physics-I	PH101	-	-	-
Chemistry-I	CY102	-	-	-
Mathematics-I	MA103	-	-	-
Elements of Civil Engineering	CE104	—	—	—

Eng Communication and Tech report Writing	HU105	-	—	—
Engineering Graphics-I	CE106	—	—	—
Introduction to Computing	CS107	2.8	2.8	2.8
Workshop-I	ME108	1.8	1.2	3
Physics-I Lab	PH101L	-	-	—
Chemistry-I Lab	CY102L	-	-	-
Physics-II	PH201	-	-	-
Chemistry-II	CY202	-	-	-
Mathematics-II	MA203	-	-	-
Engineering Mechanics-I	ME204	1.2	1	-
Strength of Materials	CE205	1.2	1	-
Basic Electrical Engineering -I	EE206	-	-	-
Engineering Graphics-II	ME207	-	1	-
Workshop-II	ME208	2	1.6	2.6
Physics-II Lab	PH201L	-	-	-
Chemistry-II Lab	CY202L	-	-	-
Engineering Mechanics-I Lab	ME204L	2	2	1.5
Strength of Materials Lab	CE205L	1	1	-
Basic Electrical Engg-I Lab	EE206L	-	-	-
Mathematics – III	MA 301	-	-	-
Electro Technology – I	EE 303	2	1	1.66
Basic Thermodynamics	ME 305	1.8	1.4	1.33
Theory of Machine	ME 322	2.8	3	1
Engineering Graphics – III	ME 323	2	2	2
Workshop Theory – I	ME 324	2.6	2	2.8
General Proficiency	ME 325	1	1	1
Electro Technology – I LAB	EE 303L	1	1	1
Theory of Machines	ME 322L	2	2	1
Engineering Graphics – III LAB	ME 323L	2	1	1
Workshop Theory – I LAB	ME 324L	2.8	2.33	2.8
Mathematics – IV	MA 401	-	-	-
Sociology and Accountancy	HU 402	-	-	-

Communication Skill	HU 403	-	-	-
Electro Technology – II	EE 404	1.4	1	1.25
Mechanics of Material	ME 425	2	2	2
Fluid Mechanics - I	ME 426	2	2	2
Material Science	ME 427	1	-	2.3
General Proficiency	ME 428	1	1	1
Electro Technology – II LAB	EE 404L	1.33	-	1.5
Mechanics of Materials LAB	ME 425L	2	2	2
Fluid Mechanics	ME 426L	2	2	2
Economics & Principle of Management	HU 501	-	-	0.5
Mechanism & Dynamics of Machines	ME 522	2	2	2
Applied Thermodynamics – I	ME 523	1	2.4	2.8
Heat Transfer – I	ME 524	1.8	1.6	1.6
Instrumentation	ME 525	1.8	1.8	2
Machine Design - I	ME 526	2.2	2.4	2.2
General Proficiency	ME 527	2.93	2.93	2.93
Mechanism & Dynamics of Machines	ME 522L	2.4	2	2
Applied Thermodynamics – I	ME 523L	2.0	1.25	2.0
Instrumentation LAB	ME 525L	2.8	2.6	2
Heat Transfer – I LAB	ME 524L	3	2.3	1
Machine Design – II	ME 621	2.2	2.4	2.2
Operation Research	ME 622	2.6	1	2.2
Fluid Mechanics – II	ME 623	2.8	2.6	1
Engineering Inspection and Metrology	ME 624	2.75	2	2
Workshop Theory – II	ME 625	2.0	2.6	3
Numerical Methods and Computation	ME 626	2	2	2
General Proficiency	ME 627	1	1	1
Machine Design – II LAB	ME 621L	—	—	—
Fluid Mechanics – II LAB	ME 623L	2	2	2
Engineering Inspection and Metrology LAB	ME 624L	2.33	1.67	3
Workshop Theory – II LAB	ME 625L	1.8	1.8	3
Mechanical Vibration LAB	ME 721	2	2	2
Applied Thermodynamics – II	ME 722	1.4	2.4	2.2

Hydraulic Machines	ME 723	1.6	1.6	1.2
Heat Transfer – II	ME 724	2	1.4	1.4
Elective – I Refrigeration	ME 725	3	2.6	1
Machine Tools		3	2	3
Elective – II (Open) Computational Fluid Dynamics and Heat Transfer	ME 726	2	2	2
Non Conventional Energy Systems				
Practical Training	ME 727L	2	2.5	1
Project – I	ME 728L	2.5	3	1.25
Manufacturing Methods	ME 821	2	—	2
Industrial Engg& Management	ME 822	1	1	2.67
Internal Combustion Engine	ME 823	1	1.75	1.6
Elective – III Air Conditioning	ME 824	1.4	1.2	1
Compressor & Gas Turbine		2.6	2.4	1.4
Elective – IV (Open) Power Plant Technology	ME 825	3	2.8	1.6
Robotics & Applications		2	2	2
Project – II	ME 826	2.5	3	1
Viva-Voce	ME 827	1	-	1
Grand Average		1.97	1.87	1.82

3.2. Attainment of Course Outcomes (50)

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

List of Assessment Processes:

Direct Assessment Tools:

- Internal Assessment- Class Test, Home assignment, etc.
- Laboratory
- Grand viva

- Final Year Projects
- End Semester University Examinations

Indirect Assessment Methods:

- Industrial Training
- Alumni/Parents/Students Exit surveys

Quality and relevance of processes and tools

Average attainment for course outcomes (CO) for a particular course is calculated by considering the ESE theory mark and sessional mark (internal assessment) of a student. As per regulation of Gauhati University (GU), the sessional mark is divided into four components *viz.,* attendance (30%), class test (40%) impression (20%) and home assignment (10%). Class test component *i.e.,* 40% marks is considered for calculation of COs. It is to be noted that, as per GU regulation, best class test mark is to be used out of 2/3 class tests conducted for awarding sessional mark. Equal weightage (50%) is considered to derive the CO attainment.

Since, the evaluated class tests answer scripts and assignments copies were returned to the students during the period of 2011-17, the department is not a position to compute the attainment on CO basis as question-wise (CO-wise) marks of the students are presently not available. Hence, it is decided in the departmental meeting to calculate average Course Outcomes as per the procedure outlined above.

At present, from the year 2017-18, the department has been following the method as explained in SAR for calculation of COs.

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

Program shall have set Course Outcome attainment levels for all courses

(The attainment levels shall be set considering average performance levels in the University Examination or any higher value set as target for the assessment years. Attainment level is to measured in terms of student performance in internal assessments with respect the Course Outcomes in addition to the performance in the University Examination)

Target and Attainment Level

The department has fixed the attainment level for both University examination marks [ESE theory and sessional (internal assessment)] marks as given below:

i. **65% ≥ Level 3,**
ii. **40% ≥ level 2 < 65%,**
iii. **35% ≥ Level 1 < 40%**

Target level for PO = 2.6
Target level for PSO = 2.7

If the target is achieved (i.e., attainment level 3 is achieved) for a course, then the course outcomes are attained for that year and hence the level percentage is raised reasonably (approximately 5%). If the target is not achieved then an action plan is to be specified to take further action to attain the target in the following year.

The final attainment is computed as given below

$$\textbf{\textit{Course outcome Attainment}} = 0.5 * \textbf{\textit{AL in unviersityexam}} + 0.5 * \textbf{\textit{AL in Sessional}}$$

where, AL= Attainment Level

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

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

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

The assessment tools for measuring the attainment of each PO and PSO include direct and indirect assessment methods.

Direct Assessment:

Average course outcomes (CO) attainment for a particular course is calculated by considering the University end semester examination (ESE) theory mark and sessional mark (internal assessment) of a student. As per regulation of Gauhati University (GU), the sessional mark is divided into four components *viz.,* attendance (30%), class test (40%) impression (20%) and home assignment (10%). Class test component *i.e.,* 40% marks is considered for calculation of COs. It is to be noted that, as per GU regulation, best class test mark is to be used out of 2/3 class tests conducted for awarding sessional mark.

Since, the evaluated class tests answer scripts and assignments copies were returned to the students during the period of 2011-17, the department is not a position to compute the attainment on CO basis as question-wise (CO-wise) marks of the students are presently not available. Hence, it is decided in the departmental meeting to calculate average Course Outcomes as per the procedure outlined above.

At present, from the year 2017-18, the department has been following the method as explained in SAR for calculation of COs.

The direct assessment of each course includes semester end examination, and internal assessments. Equal weightage (50%) is considered to derive the CO attainment.

For each PO and PSO, the attainment value of a course that contributes to that PO or PSO is computed as explained below: (Figure 4)

(MENTION)		Subject name Assessment method	Subject code		Semester, Branch & Year			Faculty= XYZ		
TABLE No.1	Mark>=65%, Level=3; 40%<= Mark<65%, Level =2; 35%<=Mark<40%, Level =1									
Roll Number	CO_1 MARK	CO_1 LEVEL	CO_2 MARK	CO_2 LEVEL	CO_3 MARK	CO_3 LEVEL	CO_4 MARK	CO_4 LEVEL	CO_5 MARK	CO_5 LEVEL
1										
2										
3										
4										
#										
#										
59										
Last roll #										
	Avg CO_1 attainment = (Average of CO_1 levels) = X_1 (SAY)		Avg CO_2 attainment = (Average of CO_2 levels) = X_2 (SAY)		Avg CO_3 attainment = (Average of CO_3 levels) = X_3 (SAY)		Avg CO_4 attainment = (Average CO_4 levels) = X_4 (SAY)		Avg CO_5 attainment = (Average of CO_5 levels) = X_5 (SAY)	

TABLE No.2	Example CO-PO mapping (SIMILAR CALCULATIONS ARE TO BE DONE FOR ALL COLUMNS)									
	PO_1	PO_2	PO_3		PO_{12}		PSO_1	PSO_2	PSO_3	
CO_1	3				2		1	3		
CO_2	2	1			1		2		2	
CO_3		3			3					
CO_4	2				3		3	2	1	
CO_5	1	2								
TOTAL	8	6			9		6	5	3	
AVERAGE	2	2			2.25		2	2.5	1.5	
PO ATTAIN MENT =	$\frac{(3.X_1+2.X_2+2.X_4+1.X_5)}{8}$	$\frac{(1.X_2+3.X_3+2.X_4)}{6}$			$\frac{(2.X_1+1.X_2+3.X_3+3.X_4)}{9}$	PSO ATTAIN MENT =	$\frac{(1.X_1+2.X_2+3.X_4)}{6}$	$\frac{(3.X_1+2.X_4)}{5}$	$\frac{(2.X_2+1.X_4)}{3}$	

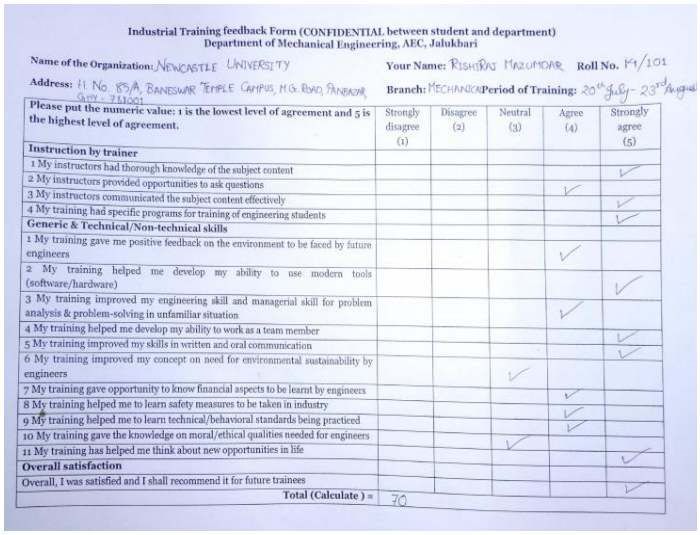
Fig 5: Method for calculating PO and PSO, the attainment

a. Indirect Assessment:

The following assessment tools are used to compute the indirect attainment based on requirement & relevance.

b. Indirect Assessment Methods:

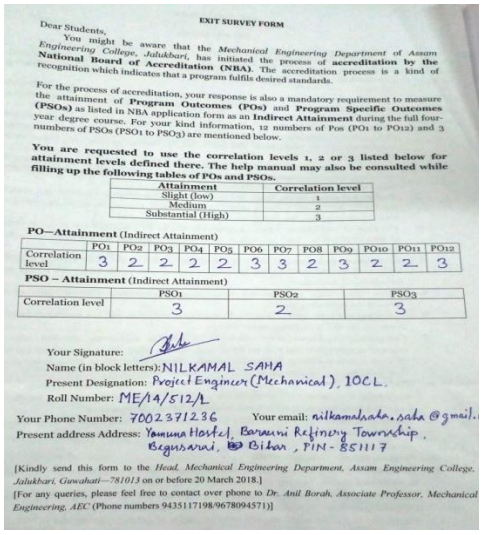
- Industrial Training (sample form attached)
- Alumni/Parents/Students Exit surveys **sample attached**



Industrial Training feedback Form (CONFIDENTIAL between student and department)
Department of Mechanical Engineering, AEC, Jalukbari

Name of the Organization: NEWCASTLE UNIVERSITY Your Name: RISHIRAJ MAZUMDAR Roll No. 14/101
Address: H. No. 85/A, BANESWAR TEMPLE CAMPUS, M.G. ROAD, PANBAZAR, GHY - 781001 Branch: MECHANICAL Period of Training: 20th July - 23rd August

Please put the numeric value: 1 is the lowest level of agreement and 5 is the highest level of agreement.	Strongly disagree (1)	Disagree (2)	Neutral (3)	Agree (4)	Strongly agree (5)
Instruction by trainer					
1 My instructors had thorough knowledge of the subject content					✓
2 My instructors provided opportunities to ask questions				✓	
3 My instructors communicated the subject content effectively					✓
4 My training had specific programs for training of engineering students					✓
Generic & Technical/Non-technical skills					
1 My training gave me positive feedback on the environment to be faced by future engineers				✓	
2 My training helped me develop my ability to use modern tools (software/hardware)					✓
3 My training improved my engineering skill and managerial skill for problem analysis & problem-solving in unfamiliar situation				✓	
4 My training helped me develop my ability to work as a team member					✓
5 My training improved my skills in written and oral communication					✓
6 My training improved my concept on need for environmental sustainability by engineers			✓		
7 My training gave opportunity to know financial aspects to be learnt by engineers				✓	
8 My training helped me to learn safety measures to be taken in industry				✓	
9 My training helped me to learn technical/behavioral standards being practiced				✓	
10 My training gave the knowledge on moral/ethical qualities needed for engineers			✓		
11 My training has helped me think about new opportunities in life					✓
Overall satisfaction					
Overall, I was satisfied and I shall recommend it for future trainees					✓
Total (Calculate) = 70					



EXIT SURVEY FORM

Dear Students,

You might be aware that the *Mechanical Engineering Department of Assam Engineering College, Jalukbari*, has initiated the process of **accreditation by the National Board of Accreditation (NBA)**. The accreditation process is a kind of recognition which indicates that a program fulfils desired standards.

For the process of accreditation, your response is also a mandatory requirement to measure the attainment of **Program Outcomes (POs)** and **Program Specific Outcomes (PSOs)** as listed in NBA application form as an **Indirect Attainment** during the full four-year degree course. For your kind information, 12 numbers of Pos (PO1 to PO12) and 3 numbers of PSOs (PSO1 to PSO3) are mentioned below.

You are requested to use the correlation levels 1, 2 or 3 listed below for attainment levels defined there. The help manual may also be consulted while filling up the following tables of POs and PSOs.

Attainment	Correlation level
Slight (low)	1
Medium	2
Substantial (High)	3

PO—Attainment (Indirect Attainment)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
Correlation level	3	2	2	2	2	3	3	2	3	2	2	3

PSO – Attainment (Indirect Attainment)

	PSO1	PSO2	PSO3
Correlation level	3	2	3

Your Signature:
Name (in block letters): NILKAMAL SAHA
Present Designation: Project Engineer (Mechanical), IOCL.
Roll Number: ME/14/512/L
Your Phone Number: 7002371236 Your email: nilkamalsaha.saha@gmail.
Present address Address: Yamuna Hostel, Barauni Refinery Township, Begusarai, Bihar, PIN - 851117

[Kindly send this form to the *Head, Mechanical Engineering Department, Assam Engineering College, Jalukbari, Guwahati—781013* on or before 20 March 2018.]
[For any queries, please feel free to contact over phone to *Dr. Anil Borah, Associate Professor, Mechanical Engineering, AEC* (Phone numbers 9435117198/9678094571)]

Fig 6: Sample industrial training and exit survey forms

The data from the above surveys are classified into three performance levels as 1 for low, 2 for medium and 3 for high.

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

Program shall set Program Outcome attainment levels for all POs and PSOs

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

Table B3.3.2a: PO Attainment of all courses Batch: 2013—17

Course Name	Course Code	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
Physics-I	PH101	2.45	2.45	2.45	-	-	-	-	-	-	-	-	-
Chemistry-I	CY102	2.72	2.72	2.72	2.72	2.72	2.72	2.72		2.72	2.72		2.72
Mathematics-I	MA103	2.675	2.675	2.675	-	-	-	-	-	2.675	-	-	-
Elements of Civil Engineering	CE104	2.555	2.555	2.555	2.555	2.555	-	-	-	-	-	-	-
Eng Communication and Tech report Writing	HU105	-	1.295	-	1.295	-	1.295	-	1.295	1.295	1.295	-	1.295
Engineering Graphics-I	CE106	2.625	2.625	2.625	2.625	2.625	2.625	2.625	-	-	-	-	-
Introduction to Computing	CS107	1.705	1.705	1.705	1.705	1.705	1.705	1.705	1.705	1.705	1.705	1.705	1.705
Workshop-I	ME108	2.77	2.77	-	-	-	-	-	2.77	2.77	-	-	-

Physics-I Lab	PH101L	1.6	-	-	-	-	-	-	-	0.8	-	-	-
Chemistry-I Lab	CY102L	3	3	-	3	-	-	3	-	3	3	-	-
Physics-II	PH201	2.46	2.46	2.46	-	2.46	-	-	-	-	-	-	-
Chemistry-II	CY202	2.48	2.48	2.48	2.48	2.48	2.48	2.48	-	-	2.48	2.48	2.48
Mathematics-II	MA203	2.445	2.445	2.445	-	-	-	-	-	-	-	-	2.445
Engineering Mechanics-I	ME204	2.655	2.655	2.655	2.655	2.655	-	-	-	-	-	-	2.655
Strength of Materials	CE205	2.655	2.655	2.655	2.655	2.655	-	-	-	-	-	-	2.655
Basic Electrical Engineering –I	EE206	2.425	2.425	2.425	2.425	2.425	2.425	2.425	2.425	2.425	-	-	2.425
Engineering Graphics-II	ME207	2.625	2.625	2.625	-	-	2.625	-	-	-	-	-	2.625
Workshop-II	ME208	2.79	2.79	-	-	-	-	-	2.79	2.79	-	-	-
Physics-II Lab	PH201L	2.65	-	-	-	-	-	-	-	2.65	-	-	-
Chemistry-II Lab	CY202L	2.98	2.98	2.98	2.98	2.98	2.98	2.98	-	2.98	2.98	2.98	2.98
Engineering Mechanics-I Lab	ME204L	2.98	2.98	-	2.98	2.98	-	-	-	-	-	-	-
Strength of Materials Lab	CE205L	2.98	2.98	-	2.98	2.98	-	-	-	-	-	-	-
Basic Electrical Engg-I Lab	EE206L	2.45	2.45	-	2.45	-	-	-	-	2.45	-	-	2.45

Mathematics – III	MA 301	2.29	2.29	-	-	-	-	-	-	-	-	-	-
Electro Technology – I	EE 303	2.67	2.67	-	-	-	-	-	-	-	-	-	2.67
Basic Thermodynamics	ME 305	2.74	2.74	2.74	2.74	2.74	-	2.74	-	-	-	-	-
Theory of Machine	ME 322	2.725	2.725	2.725	2.725	2.725		-	-	-	-	-	2.725
Engineering Graphics – III	ME 323	2.4	2.4	2.4	2.4	-	-	-	-	2.4	-	-	2.4
Workshop Theory – I	ME 324	2.71	2.71	2.71	-	-	-	-	-	-	-	-	2.71
General Proficiency	ME 325	-	-	-	-	-	-	-	-	-	2.7	-	2.7
Electro Technology – I	EE 303L	2.84	2.84	-	2.84	-	-	-	-	-	2.84	-	2.84
Theory of Machines	ME 322L	3	3	3	3	3	-	-	-	-	-	-	3
Engineering Graphics – III	ME 323L	3	3	-	3	-	-	-	-	-	3	-	3
Workshop Theory – I	ME 324L	2.73	2.73	2.73	-	-	-	-	-	-	-	-	2.73
Mathematics – IV	MA 401	2.26	2.26	-	-	-	-	-	-	-	-	-	-
Sociology and Accountancy	HU 402	-	2.57	-	-	-	2.57	2.57	2.57	2.57	2.57	2.57	2.57
Communication Skill	HU 403	-	2.09	-	2.09	-	2.09	2.09	2.09	2.09	2.09	-	2.09
Electro Technology – II	EE 404	2.51	2.51	-	2.51	-	-	-	-	-	2.51	-	2.51

Mechanics of Material	ME 425	2.85	2.85	2.85	-	-	-	-	-	2.85	2.85	-	2.85
Fluid Mechanics – I	ME 426	2.51	2.51	2.51	2.51	2.51	-	-	-	2.51	-	-	2.51
Material Science	ME 427	2.03	2.03	2.03	-	-	-	-	-	-	-	-	2.03
General Proficiency	ME 428	-	-	-	-	-	-	-	-	2.78	-	-	2.78
Electro Technology – II	EE 404L	2.72	2.72	-	2.72	-	-	-	-	-	-	-	2.72
Mechanics of Materials	ME 425L	3	3	-	-	-	-	-	-	3	3	-	3
Fluid Mechanics	ME 426L	3	3	3	3	-	3	-	-	3	3	3	3
Economics & Principle of Management	HU 501	-	2.423	-	-	-	2.423	2.423	2.423	2.423	2.423	2.423	2.423
Mechanism & Dynamics of Machines	ME 522	2.667	2.667	2.667	2.667	2.667	-	-	-	2.667	-	-	2.667
Applied Thermodynamics – I	ME 523	2.51	2.51	-	2.51	-	-	2.51	-	2.51	-	-	2.51
Heat Transfer – I	ME 524	2.827	2.827	2.827	2.827	2.827	2.827	2.827	-	2.827	2.827	2.827	2.827
Instrumentation	ME 525	2.533	2.533	2.533	2.533	2.533	2.533	2.533	2.533	2.533	2.533	2.533	2.533
Machine Design – I	ME 526	2.633	2.633	2.633	2.633	2.633	-	2.633	2.633	-	2.633	2.633	2.633
General Proficiency	ME 527	-	-	-	-	-	-	-	-	-	2.93	-	2.93
Mechanism & Dynamics of Machines	ME 522L	3	3	3	3	3	3	3	3	3	3	3	3
Applied Thermodynamics – I	ME 523L	2.96	2.96	2.96	2.96	-	-	2.96	-	2.96	2.96	-	2.96
Instrumentation	ME 525L	2.59	2.59	2.59	2.59	2.59	2.59	2.59	2.59	2.59	2.59	2.59	2.59
Heat Transfer – I	ME 524L	3	3	3	3	3	3	3	3	3	3	3	3

Machine Design – II	ME 621	2.79	2.79	2.79	2.79	2.79	-	-	-	-	2.79	-	2.79
Operation Research	ME 622	2.57	2.57	2.57	2.57	-	-	-	-	-	-	-	2.57
Fluid Mechanics – II	ME 623	2.5	2.5	2.5	2.5	-	-	-	-	-	-	-	2.5
Engineering Inspection and Metrology	ME 624	2.9	2.9	2.9	2.9	-	-	-	-	-	-	-	2.9
Workshop Theory – II	ME 625	2.71	2.71	2.71	2.71	-	-	-	-	-	-	-	2.71
Numerical Methods and Computation	ME 626	2.945	2.945	2.945	2.945	-	-	-	-	2.945	-	-	2.945
General Proficiency	ME 627	-	-	-	-	-	-	-	-	-	2.95	-	2.95
Machine Design – II	ME 621L	3	3	3	3	3	-	3	-	-	3	3	3
Fluid Mechanics – II	ME 623L	2.98	2.98	2.98	2.98	-	2.98	-	-	2.98	2.98	-	2.98
Engineering Inspection and Metrology	ME 624L	3	3	3	-	-	-	-	-	-	-	-	3
Workshop Theory – II	ME 625L	2.77	2.77	2.77	2.77	2.77	2.77	2.77	-	2.77	-	-	2.77
Mechanical Vibration	ME 721	2.94	2.94	2.94	-	2.94	-	-	-	2.94	2.94	-	2.94
Applied Thermodynamics – II	ME 722	2.49	2.49	2.49	2.49	-	-	2.49	-	-	2.49	-	2.49

Hydraulic Machines	ME 723	2.64	2.64	2.64	2.64	-	2.64	2.64	-	2.64	2.64	2.64	2.64
Heat Transfer – II	ME 724	2.79	2.79	2.79	2.79	2.79	2.79	-	2.79	2.79	2.79	-	2.79
Elective – I Refrigeration	ME 725	2.76	2.76	2.76	2.76	-	2.76	-	-	-	-	-	2.76
Machine Tools													
Elective – II (Open) Computational Fluid Dynamics and Heat Transfer	ME 726	2.9	2.9	2.9	2.9	2.9	-	-	-	2.9	-	-	2.9
Non Conventional Energy Systems													
Practical Training	ME 727L	2.68	2.68	2.68	-	-	2.68	-	2.68	2.68	2.68	-	2.68
Project – I	ME 728L	3	3	3	3	3	3	3	-	3	-	3	3
Manufacturing Method	ME 821	2.32	2.32	2.32	-	-	-	-	-	-	-	-	2.32
Industrial Engg& Management	ME 822	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8
Internal Combustion Engine	ME 823	2.78	2.78	2.78	2.78	2.78	2.78	2.78	-	2.78	2.78	-	2.78
Elective – III Air Conditioning	ME 824	2.745	2.745	2.745	2.745	-	2.745	2.745	2.745	-	-	2.745	2.745
Elective – IV (Open)	ME 825	3	3	3	3	-	3	3	-	3	3	-	3

Power Plant Technology													
Robotics & Applications		2.8	2.8	2.8	-	2.8	-	-	-	2.8	2.8	-	2.8
Project – II	ME 826	2.97	2.97	2.97	2.97	2.97	2.97	2.97	-	2.97	-	2.97	2.97
Viva-Voce	ME 827	2.73	2.73	2.73	-	-	-	2.73	2.73	-	2.73	-	2.73
Indirect attainment (present final year students)		2.09	2.07	1.83	1.83	1.94	2.37	2.22	2.48	2.24	2.33	2.33	2.43
Indirect attainment (last passed out batch)		2.56	2.33	2	2.22	2.44	2.67	2.78	2.56	2.78	2.22	2.44	2.44
Indirect attainment (Parents & alumni)		2.85	2.69	2.38	2.31	2	2.69	2.69	2.77	2.92	2.62	2.54	2.69
Direct Avg Attn.		2.69	2.68	2.70	2.70	2.73	2.65	2.69	2.53	2.65	2.71	2.72	2.69
Indirect Avg Attn.		2.50	2.36	2.07	2.12	2.13	2.58	2.56	2.60	2.65	2.39	2.44	2.52
Overall PO attainment		2.65	2.62	2.57	2.58	2.61	2.64	2.66	2.54	2.65	2.65	2.66	2.66

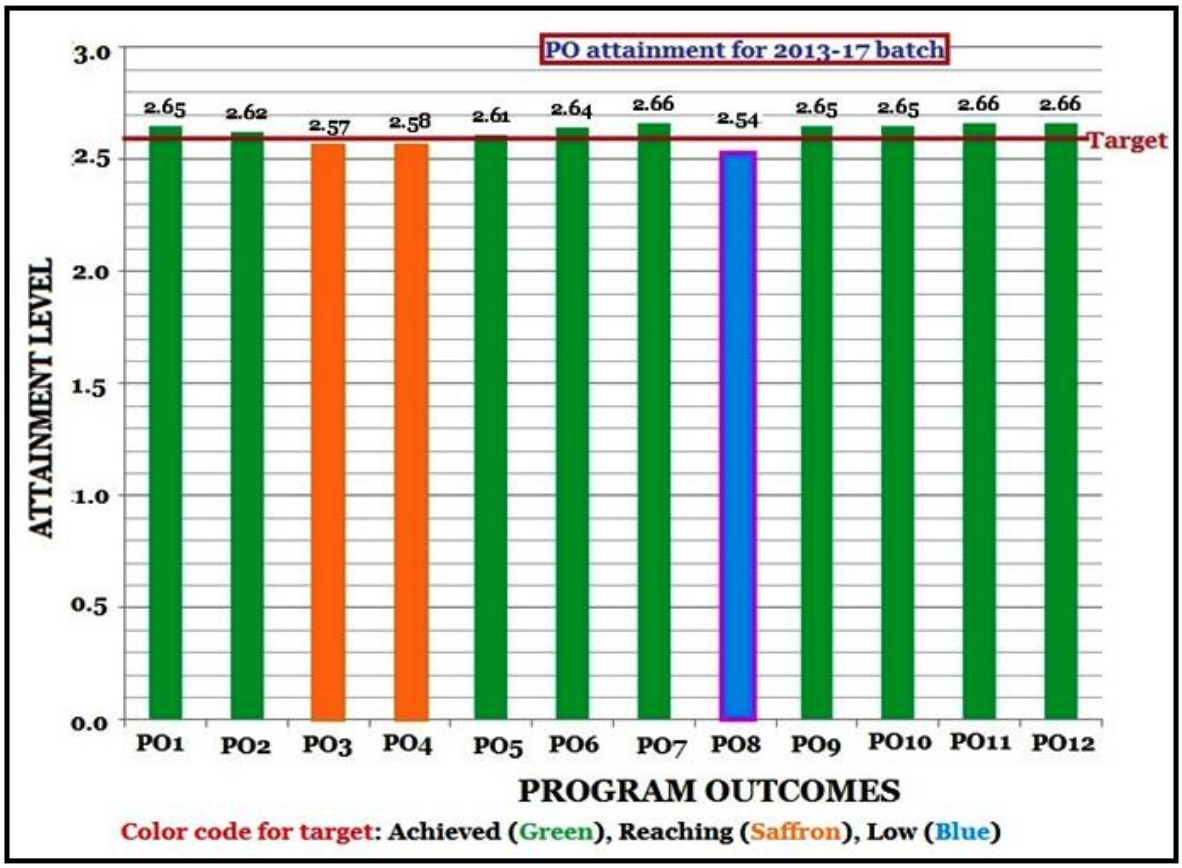


Fig 7: Histogram showing PO attainment for 2013-17 batch

Table B3.3.2b: PSO Attainment of all courses Batch: 2013—17

Course Name	Courses Code	PSO1	PSO2	PSO3
Physics-I	PH101	-	-	-
Chemistry-I	CY102	-	-	-
Mathematics-I	MA103	-	-	-
Elements of Civil Engineering	CE104	-	-	-
Eng Communication and Tech report Writing	HU105	-	-	-
Engineering Graphics-I	CE106	-	-	-
Introduction to Computing	CS107	1.705	1.705	1.705
Workshop-I	ME108	2.77	2.77	2.77
Physics-I Lab	PH101L	-	-	-
Chemistry-I Lab	CY102L	-	-	-
Physics-II	PH201	-	-	-
Chemistry-II	CY202	-	-	-
Mathematics-II	MA203	-	-	-
Engineering Mechanics-I	ME204	2.655	2.655	2.655
Strength of Materials	CE205	2.655	2.655	2.655
Basic Electrical Engineering –I	EE206	-	-	-

Engineering Graphics-II	ME207	2.625	2.625	2.625
Workshop-II	ME208	2.79	2.79	2.79
Physics-II Lab	PH201L	-	-	-
Chemistry-II Lab	CY202L	-	-	-
Engineering Mechanics-I Lab	ME204L	2.98	2.98	2.98
Strength of Materials Lab	CE205L	2.98	2.98	2.98
Basic Electrical Engg-I Lab	EE206L	-	-	-
Mathematics – III	MA 301	-	-	-
Electro Technology – I	EE 303	2.67	2.67	2.67
Basic Thermodynamics	ME 305	2.74	2.74	2.74
Theory of Machine	ME 322	2.725	2.725	2.725
Engineering Graphics – III	ME 323	2.4	2.4	2.4
Workshop Theory – I	ME 324	2.71	2.71	2.71
General Proficiency	ME 325	2.7	2.7	2.7
Electro Technology – I LAB	EE 303L	2.84	2.84	2.84
Theory of Machines	ME 322L	3	3	3
Engineering Graphics – III	ME 323L	3	3	3
Workshop Theory – I LAB	ME 324L	2.73	2.73	2.73
Mathematics – IV	MA 401	-	-	-
Sociology and Accountancy	HU 402	-	-	-
Communication Skill	HU 403	-	-	-
Electro Technology – II	EE 404	2.51	2.51	2.51
Mechanics of Material	ME 425	2,85	2.85	2.85
Fluid Mechanics – I	ME 426	2.51	2.51	2.51
Material Science	ME 427	2.03	-	2.03
General Proficiency	ME 428	2.78	2.78	2.78
Electro Technology – II LAB	EE 404L	2.72	2.72	2.72
Mechanics of Materials LAB	ME 425L	3	3	3
Fluid Mechanics	ME 426L	3	3	3
Economics & Principle of Management	HU 501	-	-	-
Mechanism & Dynamics of Machines	ME 522	2.667	2.667	2.667
Applied Thermodynamics – I	ME 523	2.51	2.51	2.51
Heat Transfer – I	ME 524	2.827	2.827	2.827
Instrumentation	ME 525	2.533	2.533	2.533
Machine Design – I	ME 526	2.633	2.633	2.633

General Proficiency	ME 527	2.93	2.03	2.93
Mechanism & Dynamics of Machines	ME 522L	3	3	3
Applied Thermodynamics – I	ME 523L	2.96	2.96	2.96
Instrumentation LAB	ME 525L	2.59	2.59	2.59
Heat Transfer – I LAB	ME 524L	3	3	3
Machine Design – II	ME 621	2.79	2.79	2.79
Operation Research	ME 622	2.57	2.57	2.57
Fluid Mechanics – II	ME 623	2.5	2.5	2.5
Engineering Inspection and Metrology	ME 624	2.9	2.9	2.9
Workshop Theory – II	ME 625	2.71	2.71	2.71
Numerical Methods and Computation	ME 626	2.945	2.945	2.945
General Proficiency	ME 627	2.7	2.7	2.7
Machine Design – II LAB	ME 621L	-	-	-
Fluid Mechanics – II LAB	ME 623L	2.98	2.98	2.98
Engineering Inspection and Metrology LAB	ME 624L	3	3	3
Workshop Theory – II LAB	ME 625L	2.77	2.77	2.77
Mechanical Vibration LAB	ME 721	2.94	2.94	2.94
Applied Thermodynamics – II	ME 722	2.49	2.49	2.49
Hydraulic Machines	ME 723	2.64	2.64	2.64
Heat Transfer – II	ME 724	-	-	-
Elective – I Refrigeration	ME 725	2.76	2.76	2.76
Machine Tools				
Elective – II (Open) Computational Fluid Dynamics and Heat Transfer	ME 726	2.9	2.9	2.9
Non Conventional Energy Systems				
Practical Training	ME 727L	2.68	2.68	2.68
Project – I	ME 728L	3	3	3
Manufacturing Methods	ME 821	2.32	-	2.32
Industrial Engg& Management	ME 822	2.8	2.8	2.8
Internal Combustion Engine	ME 823	2.78	2.78	2.78

Elective – III Air Conditioning	ME 824	2.745	2.745	2.745
Elective – IV (Open) Power Plant Technology	ME 825	3	3	3
Robotics & Applications		2.8	2.8	2.8
Project – II	ME 826	2.97	2.97	2.97
Viva-Voce	ME 827	2.73	2.73	2.73
Indirect attainment (present final year students)		2.35	2.31	2.37
Indirect attainment (last passed out batch)		2.89	2.44	2.44
Indirect attainment (Parents & alumni)		2.85	2.85	2.92
Direct Avg Attn.		2.74	2.74	2.74
Indirect Avg Attn.		2.69	2.53	2.58
Overall PSO attainment		2.73	2.698	2.708

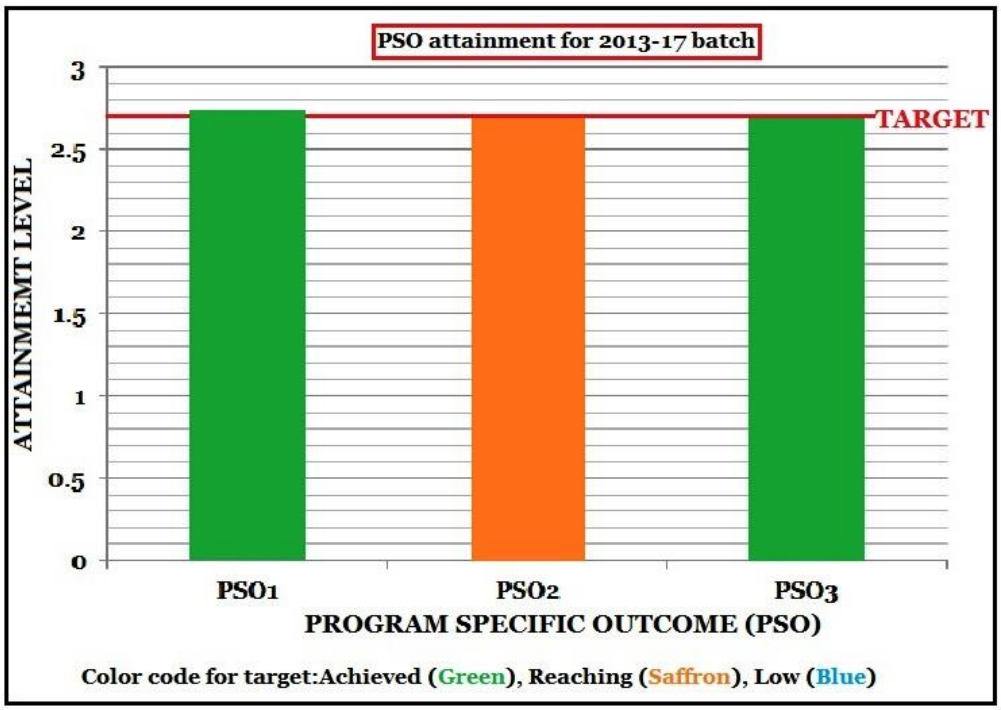


Fig 8: Histograms showing PSO attainment for 2013-17 batch