

## **PROGRAM OUTCOMES (PO)**

Engineering Graduates will be able to:

- 1. Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
- 2. Problem analysis:** Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
- 3. Design/development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
- 4. Conduct investigations of complex problems:** Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
- 5. Modern tool usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
- 6. The engineer and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
- 7. Environment and sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
- 8. Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
- 9. Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
- 10. Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

**11. Project management and finance:** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

**12. Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

### PROGRAM SPECIFIC OUTCOMES (PSO)

**PSO 1:** An ability to design, developed and apply knowledge in the field of applied Science for the benefit of society.

**PSO 2:** Having a strong educational background in applied Science which is essential for pursuing successful careers in Industry, research, and higher education.

**PSO 3:** Finding a creative and innovative solutions to Engineering problems in a multidisciplinary work environment and utilize their broad-based knowledge, skills and resources to design, invent and develop novel technology.

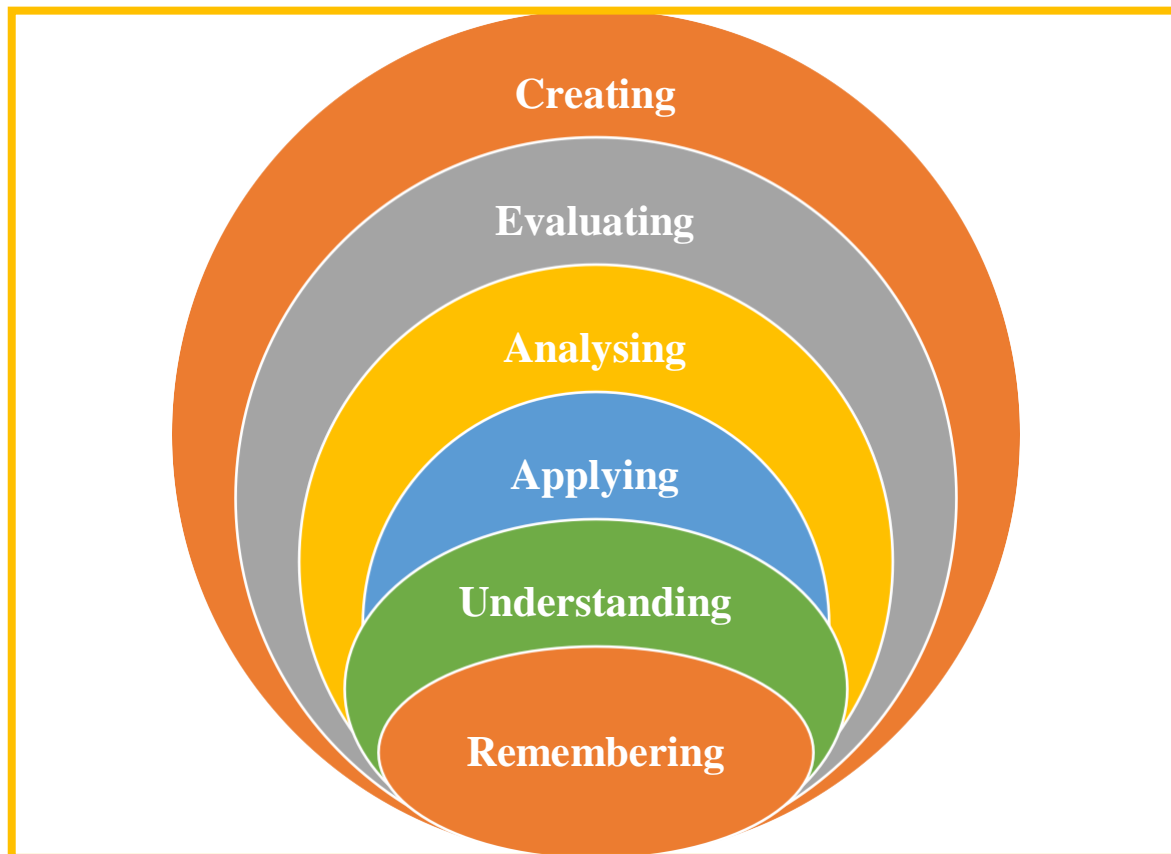
### COURSE OUTCOMES (CO)

Course Outcomes are the guidelines for Engineering graduates to know the purpose for pursuing the course and what he will be able to do at the end of the course. A Course outcome should encompass different learning levels as understanding the course and demonstrating & applying the concept of the course. A well-defined COs helps the faculty members in designing suitable teaching plan and assessment methods to achieve the designed CO. **Along with the syllabi, for many courses COs are defined by the University which is followed by the faculty members.** However, faculty members may redefine / modify COs considering the guidelines of NBA for each programme and Bloom's taxonomy levels.

### OUTCOMES MAPPING

The mapping of COs with POs and PSOs is done for every course, as COs are the path way to attain POs and PSOs and thereby the Mission and Vision of the Institute.

Outcome mapping facilitates the alignment of the course-level outcomes with program level outcomes. Outcomes mapping focuses on student learning levels and thereby knowing how students are meeting program-level outcomes at the course level. Mapping levels can reveal gap in the curriculum so the faculty members can plan additional content to increase student achievement in meeting program outcomes



## **BLOOM's TAXONOMY LEVELS**

Sr. No.	Bloom's Levels	Learning Outcome Verbs
01	Remembering	cite, define, describe, identify, label, list, match, name, outline, quote, recall, report, reproduce, retrieve, show, state, tabulate, and tell
02	Understanding	abstract, arrange, articulate, associate, categorize, clarify, classify, compare, compute, conclude, contrast, defend, diagram, differentiate, discuss, distinguish, estimate, exemplify, explain, extend, extrapolate, generalize, give examples of, illustrate, infer, interpolate, interpret, match, outline, paraphrase, predict, rearrange, reorder, rephrase, represent, restate, summarize, transform, and translate
03	Applying	apply, calculate, carry out, classify, complete, compute, demonstrate, dramatize, employ, examine, execute, experiment, generalize, illustrate, implement, infer, interpret, manipulate, modify, operate, organize, outline, predict, solve, transfer, translate, and use.
03	Analyzing	Analyze, arrange, break down, categorize, classify, compare, connect, contrast, deconstruct, detect, diagram, differentiate, discriminate, distinguish, divide, explain, identify, integrate, inventory, order, organize, relate, separate, and structure.
05	Evaluating	appraise, apprise, argue, assess, compare, conclude, consider, contrast, convince, criticize, critique, decide, determine, discriminate, evaluate, grade, judge, justify, measure, rank, rate, recommend, review, score, select, standardize, support, test, and validate.
06	Creating	arrange, assemble, build, collect, combine, compile, compose, constitute, construct, create, design, develop, devise, formulate, generate, hypothesize, integrate, invent, make, manage, modify, organize, perform, plan, prepare, produce, propose, rearrange, reconstruct, reorganize, revise, rewrite, specify, synthesize, and write.

Sinhgad Technical Education Society  
**RMD SINHGAD SCHOOL OF ENGINEERING, WARJE, PUNE.**  
**DEPARTMENT OF FIRST YEAR ENGINEERING**

**Course Outcomes (CO) and Program Outcomes (PO) Program Specific Outcomes (PSO) Mapping**

First Year Engineering																		
CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3			
107001	2.0	1.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.0	0.0	0.4			
107002	2.8	1.67	0.3	0.0	1.0	0.0	0.0	0.0	0.3	0.0	0.0	2.0	2.0	0.7	1.2			
107009	3.0	3.0	3.0	1.5	0.0	1.8	2.0	0.0	0.0	0.0	0.0	1.0	3.0	1.7	0.8			
103004	3.0	2.0	1.0	2.0	0.0	1.0	0.2	0.0	1.0	0.0	0.0	1.0	3.0	2.0	1.0			
107008	2.0	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.4	0.2	0.6			

# **CO PO Mapping**

## DEPARTMENT OF FIRST YEAR ENGINEERING

### Course Outcomes (CO), Program Outcomes (PO), Program Specific Outcomes Mapping

#### First Year of Engineering

Program Outcomes (PO)	
PO1: Engineering knowledge	PO7: Environment and sustainability
PO2: Problem analysis	PO8: Ethics
PO3: Conduct investigations of complex problems	PO9: Individual and team work
PO4: Conduct investigations of complex problems	PO10: Communication
PO5: Modern tool usage	PO11: Project management and finance
PO6: The engineer and society	PO12: Life-long learning

#### Program Specific Outcomes (PSOs)

PSO 1: An ability to design, developed and apply knowledge in the field of applied Science courses for the benefit of society.

PSO 2: Having a strong educational background in applied Science which is essential for pursuing successful careers in industry, research, and higher education.

PSO 3: Finding a creative and innovative solutions to Engineering problems in a multidisciplinary work environment and utilize their broad-based knowledge, skills and resources to design, invent and develop novel technology.

Name of the Subject :107001: Engineering Mathematics-I

Name of Subject Teacher: Dr. Shikha Saxena

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1: Mean value theorems and its generalizations leading to Taylors and Maclaurin's series useful in the analysis of engineering problems.	2	2	0	0	0	0	0	0	0	0	0	0	3	2	2
CO2: The Fourier series representation and harmonic analysis for design and analysis of periodic continuous and discrete systems.	2	2	0	0	0	0	0	0	0	0	0	0	3	2	0
CO3: To deal with derivative of functions of several variables that are essential in various branches of Engineering.	2	2	0	0	0	0	0	0	0	0	0	0	3	2	0
CO4: To apply the concept of Jacobian to find partial derivative of implicit function and functional dependence. Use of partial derivatives in estimating error and approximation and finding extreme values of the function.	2	1	0	0	0	0	0	0	0	0	0	0	3	2	0
CO5: Summarize basics of magnetism and superconductivity. Explore few of their technological applications.	2	2	0	0	0	0	0	0	0	0	0	0	3	2	0
<b>Addition</b>	10	9	0	0	0	0	0	0	0	0	0	0	15	10	2
<b>Average</b>	2.00	1.80	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.00	2.00	0.40

*Shikha*  
Subject Teacher  
First Year Engg.

*W.S.D.*  
I/c CO PO Mapping  
First Year Engg.

*Pratik*  
I/c Academic Coordinator  
First Year Engg.


*Elmy*  
HOD  
First Year Engg.

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Name of the Subject : 107002: Engineering Physics

Name of Subject Teacher: Dr. Sunil Jagtap

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1: Develop understanding of interference, diffraction and polarization; connect it to few Engineering applications.	2	2	0	0	1	0	0	0	1	0	0	2	2	1	1
CO2: Learn basics of lasers and optical fibers and their use in some applications.	3	2	0	0	2	0	0	0	1	0	0	2	2	1	2
CO3: Understand concepts and principles in quantum mechanics. Relate them to some applications.	3	2	2	0	0	0	0	0	0	0	0	2	2	0	0
CO4: Understand theory of semiconductors and their applications in some semiconductor devices.	3	2	0	0	1	0	0	0	0	0	0	2	2	2	2
CO5: Summarize basics of magnetism and superconductivity. Explore few of their technological applications.	3	1	0	0	1	0	0	0	0	0	0	2	2	0	1
CO6: Comprehend use of concepts of physics for Non-Destructive Testing. Learn some properties of nanomaterials and their application.	3	1	0	0	1	0	0	0	0	0	0	2	2	0	1
<b>Addition</b>	17	10	2	0	6	0	0	0	2	0	0	12	12	4	7
<b>Average</b>	2.83	1.67	0.33	0	1	0	0	0	0.3	0	0	2	2	0.67	1.17

  
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Name of the Subject :107009 Engineering Chemistry


Name of Subject Teacher: Mrs. Anjali Gaikwad

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1: Apply the different methodologies for analysis of water and techniques involved in softening of water as commodity.	3	3	3	1	0	3	3	0	0	0	0	1	3	2	1
CO2: Select appropriate electro-technique and method of material analysis.	3	3	3	2	0	1	1	0	0	0	0	1	3	2	0
CO3: Demonstrate the knowledge of advanced engineering materials for various engineering applications	3	3	3	2	0	2	2	0	0	0	0	1	3	2	1
CO4: Analyze fuel and suggest use of alternative fuels.	3	3	3	1	0	1	2	0	0	0	0	1	3	1	1
CO5: Identify chemical compounds based on their structure.	3	3	3	2	0	1	1	0	0	0	0	1	3	1	1
CO6: Explain causes of corrosion and methods for minimizing corrosion	3	3	3	1	0	3	3	0	0	0	0	1	3	2	1
<b>Addition</b>	18	18	18	9	0	11	12	0	0	0	0	6	18	10	5
<b>Average</b>	3	3	3	1.5	0	1.8	2	0	0	0	0	1	3	1.7	0.8

  
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Name of the Subject :103004 Basic Electrical Engineering


Name of Subject Teacher: Mrs. Madhura Patel

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1: Evaluate work, power, energy relations and suggest various batteries for different applications, concept of charging and discharging and depth of charge	3	2	1	2	0	1	0	0	1	0	0	1	3	2	1
CO2: Differentiate between electrical and magnetic circuits and derive mathematical relation for self and mutual inductance along with coupling effect.	3	2	1	2	0	1	0	0	1	0	0	1	3	2	1
CO3: Calculate series, parallel and composite capacitor. the operation of single-phase transformer and calculate efficiency and regulation at different loads.	3	2	1	2	0	1	0	0	1	0	0	1	3	2	1
CO4: Rectangular and polar representation of phasors. Sinusoidal voltages and currents their mathematical and graphical representation	3	2	1	2	0	1	0	0	1	0	0	1	3	2	1
CO5: Relate phase and line electrical quantities in polyphase networks, demonstrate Derive expression for impedance, current, power in series and parallel RLC circuit with AC supply along with phasor diagram.	3	2	1	2	0	1	0	0	1	0	0	1	3	2	1
CO6: Apply and analyse the resistive circuits using star-delta conversion KVL, KCL and different network theorems.	3	2	1	2	0	1	1	0	1	0	0	1	3	2	1
<b>Addition</b>	18	12	6	12	0	6	1	0	6	0	0	6	18	12	6
<b>Average</b>	3	2	1	2.0	0	1	0.17	0	1	0	0	1	3	2	1

  
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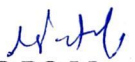
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Name of the Subject : :107008 Engineering Mathematics-II


Name of Subject Teacher: Dr. Shikha Saxena

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1: The effective mathematical tools for solutions of first order differential equations that model physical processes such as Newton's law of cooling, electrical circuit, rectilinear motion, mass spring systems, heat transfer etc.	2	2	0	0	0	0	0	0	0	0	0	0	2	2	1
CO2: Advanced integration techniques such as Reduction formulae, Beta functions, Gamma functions, Differentiation under integral sign and Error functions needed in evaluating multiple integrals and their applications.	2	2	0	0	0	0	0	0	0	0	0	0	1	2	0
CO3: To trace the curve for a given equation and measure arc length of various curves.	2	2	0	0	0	0	0	0	0	0	0	0	1	2	0
CO4: The concepts of solid geometry using equations of sphere, cone and cylinder in a comprehensive manner.	2	2	0	0	0	0	0	0	0	0	0	0	1	2	1
CO5: Evaluation of multiple integrals and its application to find area bounded by curves, volume bounded by surfaces, Centre of gravity and Moment of inertia.	2	2	0	0	0	0	0	0	0	0	0	0	2	2	1
<b>Addition</b>	10	10	0	0	0	0	0	0	0	0	0	0	7	10	3
<b>Average</b>	2.0	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.4	2.0	0.6

  
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