

Preamble

Philosophy of Course Outcomes (COs):

Course outcomes are statements that describe what the students are expected to know, attributes that they are expected to hold and what they are able to do as a result of taking a course.

- The course outcomes must state the major skills, knowledge, attitude or ability that students will acquire.
- Course outcomes should be expressed in terms of **measurable** and/or **observable** behaviours.
- Course outcomes should begin with an **action verb** (e.g., write, install, solve, and apply).

Note: COs should be measurable through CIE and SEE.

The three domains of learning:

K – Knowledge domain; **A** – Affective domain; **S** – Psychomotor domain

Knowledge levels	Action Verbs
Create (K6)	Appraise, ascertain, argue, assess, attach, choose, compare, conclude, contrast, convince, criticise, decide, defend, discriminate, explain, evaluate, interpret, judge, justify, measure, predict, rate, recommend, relate, resolve, revise, score, summarise, support, validate, value.
Evaluate (K5)	Argue, arrange, assemble, categorise, collect, combine, compile, compose, construct, create, design, develop, devise, establish, explain, formulate, generalise, generate, integrate, invent, make, manage, modify, organise, originate, plan, prepare, propose, rearrange, reconstruct, relate, reorganise, revise, rewrite, set up, summarise.
Analyze (K4)	Analyse, appraise, arrange, break down, calculate, categorise, classify, compare, connect, contrast, criticise, debate, deduce, determine, differentiate, discriminate, distinguish, divide, examine, experiment, identify, illustrate, infer, inspect, investigate, order, outline, point out, question, relate, separate, sub-divide, test.
Apply (K3)	Apply, assess, calculate, change, choose, complete, compute, construct, demonstrate, develop, discover, dramatise, employ, examine, experiment, find, illustrate, interpret, manipulate, modify, operate, organise, practice, predict, prepare, produce, relate, schedule, select, show, sketch, solve, transfer, use.
Understand (K2)	Associate, change, clarify, classify, construct, contrast, convert, decode, defend, describe, differentiate, discriminate, discuss, distinguish, estimate, explain, express, extend, generalise, identify, illustrate, indicate, infer, interpret, locate, predict, recognise, report, restate, review, select, solve, translate.
Remember (K1)	Arrange, collect, define, describe, duplicate, enumerate, examine, find, identify, label, list, memorise, name, order, outline, present, quote, recall, recognise, recollect, record, recount, relate, repeat, reproduce, show, state, tabulate, tell

Affective Domain levels	Action Verbs
Characterization(A5)	authenticate, characterize, defend, display, embody, habituate, internalize, produce, represent, validate, verify
Organization (A4)	adapt, adjust, alter, change, customize, develop, improve, manipulate, modify, practice, revise
Valuing (A3)	accept, adapt, balance, choose, differentiate, defend, influence, prefer, recognize, seek, value
Responding (A2)	behave, comply, cooperate, discuss, examine, follow, model, present, respond, show, studies
Receiving (A1)	accept, attend, describe, explain, locate, observe, realize, receive, recognize
Psychomotor Domain levels	Action Verbs
Naturalisation (S5)	construct, compose, create, design, specify, manage, invent, project-manage, originate
Articulation (S4)	solve, adapt, combine, coordinate, revise, integrate, adapt, develop, formulate, modify, master
Precision (S3)	demonstrate, complete, show, perfect, calibrate, control, achieve, accomplish, master, refine
Manipulation (S2)	re-create, build, perform, execute, implement, acquire, conduct, operate
Imitation (S1)	copy, follow, replicate, repeat, adhere, attempt, reproduce, organize, sketch, duplicate

Content Delivery Methods and their relation with the different domains of learning:

Content Delivery Method	Domains of Learning
Class room lecture (chalk and board) (D1)	K1, K2, A1, A2
Visual presentation (D2)	K2
Tutorial (D3)	K3, K4, A3
Active learning (D4)	K3-K6, A3-A5
Blended/hybrid learning (D5)	K3-K6, A3-A5
Simulations (D6)	K2
Discussion/brainstorming (D7)	K3, K4, A3-A5
Demonstration (D8)	K2, K3, S1-S3, A3-A5
Case studies (D9)	K2, K3, S1-S3, A3-A5
Field visits (D10)	K3, K4, A3
Projects (D11)	K5, K6, A4, A5, S3

Programme Outcomes (POs) (Graduate Attributes of Washington Accord)

Engineering Graduates will be able to:

1. **Engineering knowledge:** Apply knowledge of mathematics, science, engineering fundamentals and an engineering specialization to the solution of complex engineering problems.
2. **Problem analysis:** Identify, formulate, 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 specified needs with appropriate consideration for public health and safety, cultural, societal and environmental considerations.
4. **Investigation of Complex Problem:** using research-based knowledge and research methods including design of experiments, analysis and interpretation of data and synthesis of 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 modelling to complex engineering activities with an understanding of the limitations.
6. **The Engineer and Society:** Apply reasoning informed by contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to professional engineering practice.
7. **Environment and Sustainability:** Understand the impact of professional engineering solutions in societal and environmental contexts and demonstrate knowledge of and need for sustainable development.
8. **Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of engineering practice.
9. **Individual and Team Work:** Function effectively as an individual, and as a member or leader in diverse teams and in multi-disciplinary 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 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.

Programme Specific Outcome (PSO) for Power Engg. Dept.

PSO1: **Interdisciplinary Domain Exposure:** Interpret problems and apply enabling technologies to develop comprehensive solutions for the energy and power sectors

PSO2: **Economic and sustainable energy resources:** Assess and analyze energy resources and formulate optimized solutions for sustainable development

PSO3: **Safe and secured energy:** Recognize safety, control and management aspects of new generation energy technology