

Welcome to Spring 2024

Department of Software Engineering

Washington Accord

- **Washington Accord (WA):** Agreement that establishes equivalence of accredited professional engineering programs of member countries.
- Accredited Engineering Graduates are recognized by other signatory countries - **Possible employment as engineers in those countries without further examinations.**

Washington Accord

Members

Established in 1989, as of 2023, the full signatories are Australia, Canada, China, Costa Rica, Hong Kong, India, Indonesia, Ireland, Japan, Korea, Malaysia, Mexico, New Zealand, Pakistan, Peru, Russia, Singapore, South Africa, Sri Lanka, Taiwan, Turkey, the United Kingdom and the United States.

Why Outcome Based Education (OBE) ?

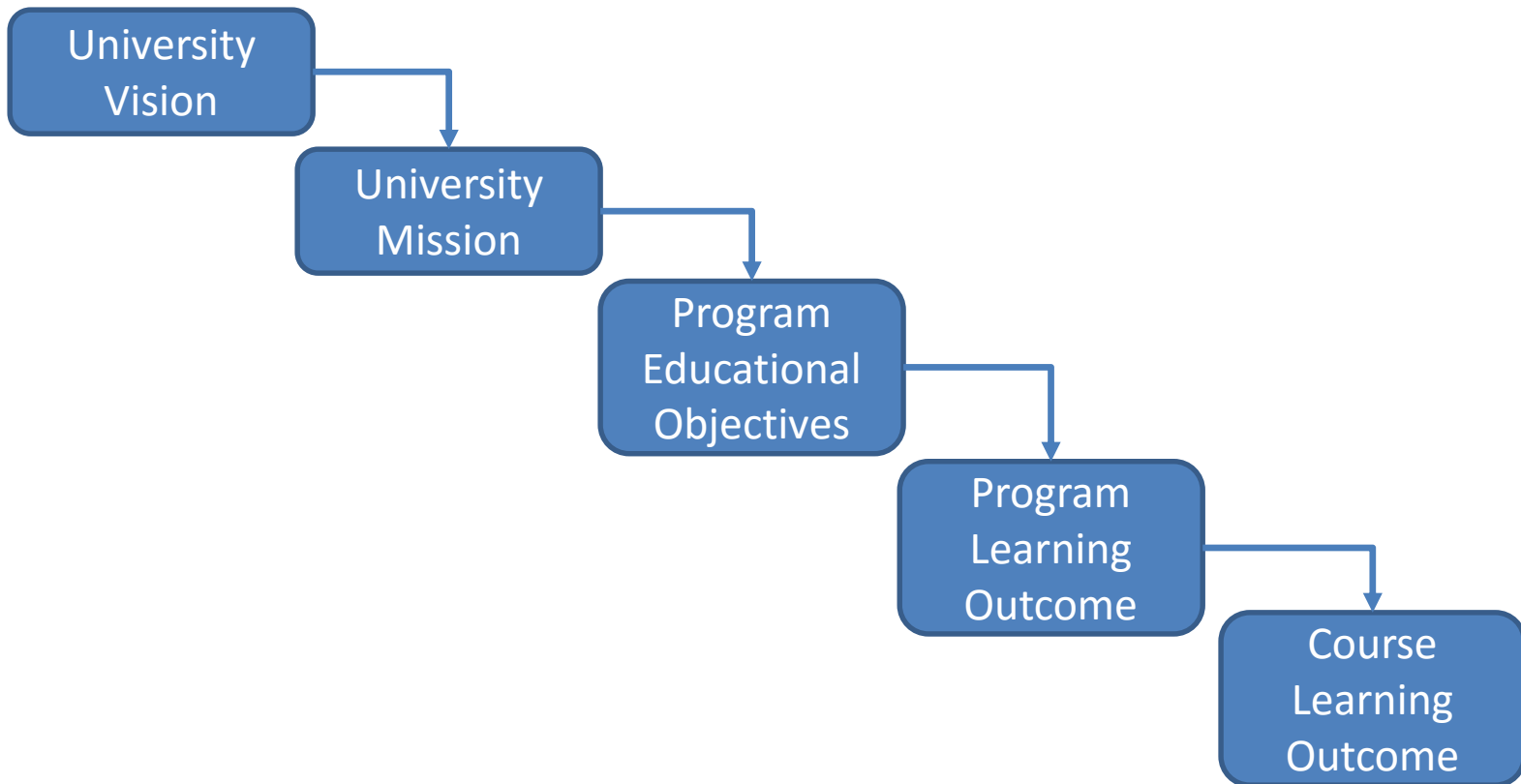
- To address mismatches between **employers** and graduates.
- Students main concerns are GRADES, Employers are looking for KNOWLEDGE, ATTITUDE and SKILLS.
- OBE is a process that involves assessment and evaluation practices in education to reflect the attainment of expected learning outcomes and showing mastery in the program area.

OBE Framework

BSE Programme

Background

- ❖ For OBE system implementation of BSE Program, the University Vision, Program Mission, Program Educational Objectives (PEOs), Program Learning Outcomes (PLOs), Course Learning Outcomes (CLOs) should be mapped.



University Vision and Mission

University Vision

To become a knowledge and creativity driven international university that contributes towards development of society.

University Mission

To ensure academic excellence through deliverance of quality education and applied research in a collegiate environment having strong linkages with industry and international community to meet the societal challenges.

BSE Program Educational Objectives

Graduates from Bachelor of Software Engineering program are expected to achieve the following Program Educational Objectives and would possess the ability to:

PEO 1:

Graduates should demonstrate competence in applying Software Engineering principles & practices in various phases of software/system development life cycle in their respective professional career.

PEO 2:

Graduates should demonstrate effective team member or leadership skills with strong managerial skills and a sound sense of social responsibility for the sustainable development of society.

PEO 3:

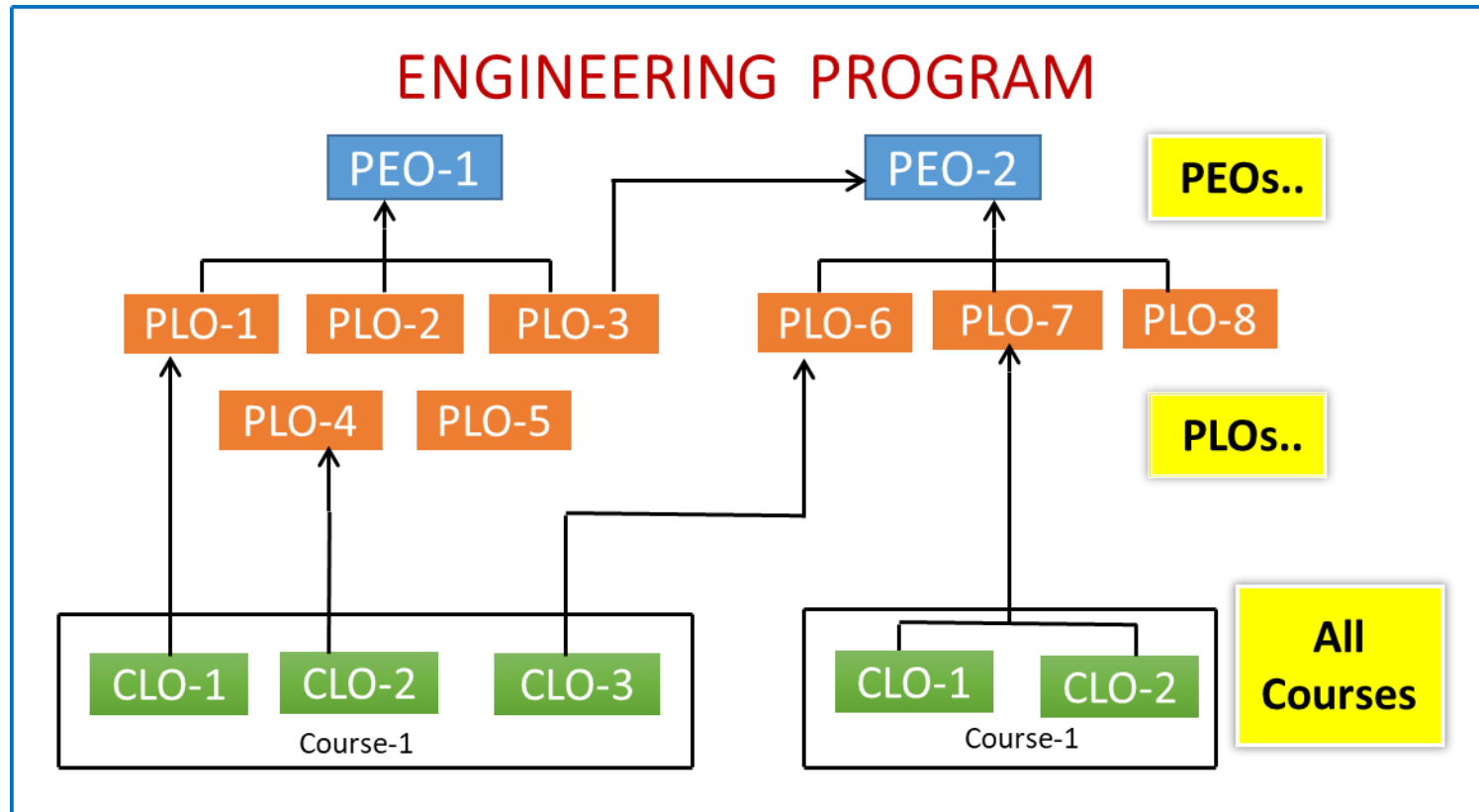
Graduates should demonstrate sustained career development and progression through ethical engineering practices, effective communication skills and continuous learning.

PLOs (Attributes)

- GA1 Engineering Knowledge:** An ability to apply knowledge of mathematics, science, engineering fundamentals and an engineering specialization to the solution of complex engineering problems.
- GA2 Problem Analysis:** An ability to identify, formulate, research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences and engineering sciences.
- GA3 Design/Development of Solutions:** An ability to design solutions for complex engineering problems and design systems, components or processes that meet specified needs with appropriate consideration for public health and safety, cultural, societal, and environmental considerations.
- GA4 Investigation:** An ability to investigate complex engineering problems in a methodical way including literature survey, design and conduct of experiments, analysis and interpretation of experimental data, and synthesis of information to derive valid conclusions.
- GA5 Modern Tool Usage:** An ability to 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.

- GA6 The Engineer and Society:** An ability to apply reasoning informed by contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to professional engineering practice and solution to complex engineering problems.
- GA7 Environment and Sustainability:** An ability to understand the impact of professional engineering solutions in societal and environmental contexts and demonstrate knowledge of and need for sustainable development.
- GA8 Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of engineering practice.
- GA9 Individual and Team Work:** An ability to work effectively, as an individual or in a team, on multifaceted and /or multidisciplinary settings.
- GA10 Communication:** An ability to communicate effectively, orally as well as in writing, 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.
- GA11 Project Management:** An ability to demonstrate management skills and apply engineering principles to one's own work, as a member and/or leader in a team, to manage projects in a multidisciplinary environment.
- GA12 Lifelong Learning:** An ability to recognize importance of, and pursue lifelong learning in the broader context of innovation and technological developments.

Design Structure of OBE



- Inclusion of Complex Engineering Problems
- Open Ended Labs

OBE Learning Domains – Bloom's Taxonomy

Cognitive Level

Knowledge – C1

Comprehension –C2

Application –C3

Analysis –C4

Synthesis–C5

Evaluation– C6

Psychomotor Level

Perception – P1

Set –P2

Guided Response –P3

Mechanism –P4

Complex Overt Response –P5

Adaptation – P6

Origination – P7

Affective Level

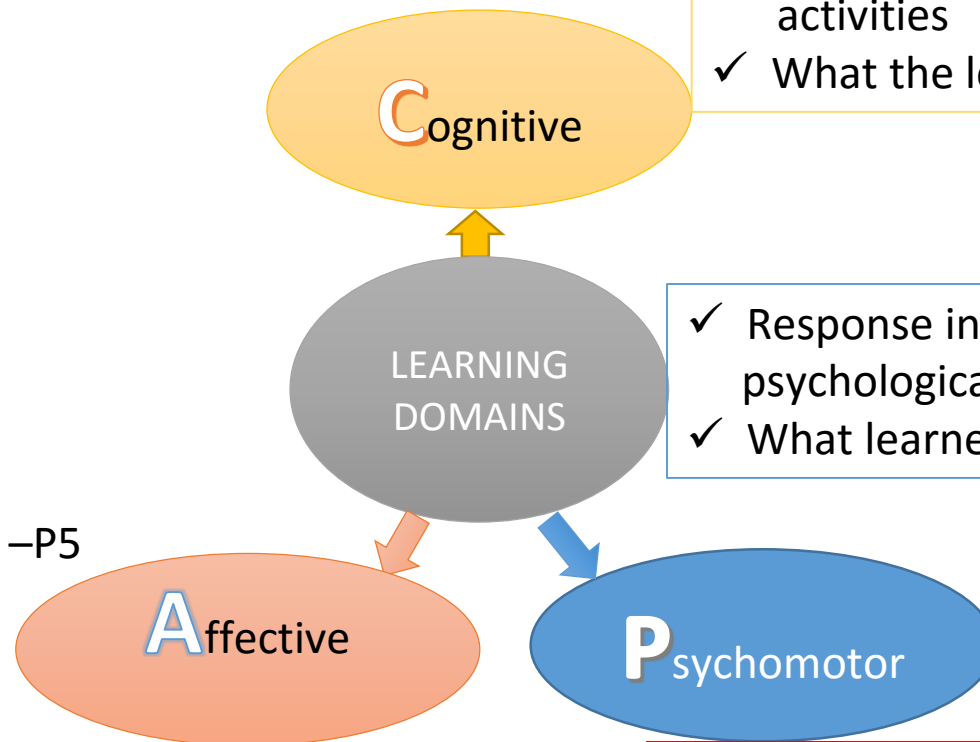
Receiving – A1

Responding –A2

Valuing –A3

Organization–A4

Characterization –A5



- ✓ Involving intellectual activities
- ✓ What the learner knows

- ✓ Response involving motor and psychological components
- ✓ What learner able to perform

- ✓ the manner in which we deal with things emotionally, such as feelings, values, appreciation, enthusiasms, motivations, and attitudes

Cognitive Domain

	Level	Descriptions	Key words
C1	Knowledge	Recall or recognize information	Arrange, define, describe, label, list, memorize, recognize, relate, reproduce, select, state
C2	Comprehension	Comprehension meaning, re-state data in one's own words, interpret, extrapolate, translate	Explain, reiterate, reword, critique, classify, summarize, illustrate, translate, review, report, discuss, re-write, estimate, interpret, theorize, paraphrase, reference, example
C3	Application	Use or apply knowledge, put theory into practice, use knowledge in response to real circumstances	Use, apply, discover, manage, execute, solve, produce, implement, construct, change, prepare, conduct, perform, react, respond, role-play
C4	Analysis	Interpret elements, organizational principles, structure, construction, internal relationships; quality, reliability of individual components	Analyze, break down, catalogue, compare, quantify, measure, test, examine, experiment, relate, graph, diagram, plot, extrapolate, value, divide

Cognitive Domain

	Level	Descriptions	Key words
C5	Synthesis	Student originates, integrates, and combines ideas into a product, plan or proposal that is new to him or her.	Create, design, hypothesize, invent, develop, arrange, assemble, categorize, collect, combine, comply, compose, construct, create, design, develop, devise, explain, formulate, generate, plan, prepare, rearrange, reconstruct, relate, reorganize, revise, rewrite, set up, summarize, synthesize, tell, write
C6	Evaluation	Assess effectiveness of whole concepts, in relation to values, outputs, efficacy, viability; critical thinking, strategic comparison and review; judgment relating to external criteria	Review, justify, assess, present a case for, defend, report on, investigate, direct, appraise, argue, project-manage

Psychomotor Domain

	Level	Descriptions	Key words
P1	Perception	The ability to use sensory cues to guide motor activity: This ranges from sensory stimulation, through cue selection, to translation.	chooses, describes, detects, differentiates, distinguishes, identifies, isolates, relates, selects.
P2	Set	Readiness to act: It includes mental, physical, and emotional sets. These three sets are dispositions that predetermine a person's response to different situations (sometimes called mindsets). This subdivision of psychomotor is closely related with the "responding to phenomena" subdivision of the affective domain.	begins, displays, explains, moves, proceeds, reacts, shows, states, volunteers.
P3	Guided response	The early stages of learning a complex skill that includes imitation and trial and error: Adequacy of performance is achieved by practicing.	copies, traces, follows, react, reproduce, responds.
P4	Mechanism	The intermediate stage in learning a complex skill: Learned responses have become habitual and the movements can be performed with some confidence and proficiency.	assembles, calibrates, constructs, dismantles, displays, fastens, fixes, grinds, heats, manipulates, measures, mends, mixes, organizes, sketches.

Psychomotor Domain

	Level	Descriptions	Key words
P5	Complex overt response	The skillful performance of motor acts that involve complex movement patterns: Proficiency is indicated by a quick, accurate, and highly coordinated performance, requiring a minimum of energy.	assembles, builds, calibrates, constructs, dismantles, displays, fastens, fixes, grinds, heats, manipulates, measures, mends, mixes, organizes, sketches.
P6	Adaptation	Skills are well developed and the individual can modify movement patterns to fit special requirements.	adapts, alters, changes, rearranges, reorganizes, revises, varies.
P7	Origination	Creating new movement patterns to fit a particular situation or specific problem: Learning outcomes emphasize creativity based upon highly developed skills.	arranges, builds, combines, composes, constructs, creates, designs, initiate, makes, originates.

Affective Domain

	Level	Descriptions	Key words
A1	Receiving	Open to experience, willing to hear	Ask, listen, focus, attend, take part, discuss, acknowledge, hear, be open to, retain, follow, concentrate, read, do, feel
A2	Responding	React and participate actively	React, respond, seek clarification, interpret, clarify, provide other references and examples, contribute, question, present, cite, become animated or excited, help team, write, perform
A3	Valuing	Attach values and express personal opinions	Argue, challenge, debate, refute, confront, justify, persuade, criticize,
A4	Organization	Reconcile internal conflicts; develop value system	Build, develop, formulate, defend, modify, relate, prioritize, reconcile, contrast, arrange, compare
A5	Characterization	Adopt belief system and philosophy	Act, display, influence, solve, practice,

Course Objectives & Description

The main objective of this course is to provide students with the background to design, implement, and use database management systems. This course shows students how the theory of relational algebra serves as a framework and a foundation for the efficient organization and retrieval of data. It introduces students to some standard notations (for example, SQL) that implement important parts of relational algebra. This course gives students practical experience of the use and limitations of some database notations (such as SQL) that are widely used in industry and business. Transaction processing, concurrency control and recovery techniques, query optimization concepts are also covered.

Database Management Systems

CLO	Statement	Bloom's Taxonomy	Associated PLO
1	Define the fundamental concepts of cloud computing.	C1	PLO-1
2	Analyze problem requirements to recognize what type of data and processes are involved in a cloud computing solution.	C2	PLO-2
3	Apply and develop business centric models on cloud based IT resources.	C3	PLO-3
4	Present the updated technologies evolving in the field of Cloud Computing.	A2	PLO-9

Marks Distribution

EVALUATION INSTRUMENTS (EI)	MARKS
Quizzes	10
Assignments	20
Mid Term Examination	20
Final Examination	50
Total:	100

Computer Programming

EI	CLO's			
	CLO 1	CLO 2	CLO 3	CLO 4
Assignments			X	X
Quizzes	X	X	X	
Midterm Exam	X	X	X	
Final Exam	X	X	X	

Course Resources

TEXT BOOK:

- Rajkumar Buyya, Christian Vecchiola “Mastering Cloud Computing”, McGraw Hill
- THOMAS ERL, “CLOUD COMPUTING CONCEPTS, TECHNOLOGY AND ARCHITECTURE”, 1ST ED., 2014, PEARSON.

REFERENCE BOOKS:

- RONALD L. KRUTZ AND RUSSELL DEAN VINES, “CLOUD SECURITY-A COMPREHENSIVE GUIDE TO SECURE CLOUD COMPUTING”, 2013, WILEY.
- BARRIE SOSINKY, “CLOUD COMPUTING”, 1ST ED., 2014, WILEY.
- **“CLOUD COMPUTING: PRINCIPLES AND PARADIGMS”**, JOHN WILEY & SONS