

Learning Outcomes based Curriculum Framework (LOCF)/ Outcome based Education (OBE) Manual

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Introduction

Learning Outcomes basedCurriculum Framework (LOCF)

The University Grants Commission (UGC) has initiated the mission of improving the quality of higher education in India through its Quality Mandate (QM) brought in to force during 2018. The quality mandate of the UGC has given thrust on curriculum reforms with an aim to equip the students with knowledge, skill, values and attitude. Therefore, Quality Mandate recommends the drive for developing **Learning Outcomes based Curriculum Framework (LOCF)**. The idea behind the implementation of LOCF in the universities is to pre-determine what outcomes need to be achieved by planning, mapping & measuring the student outcomes with Choice Based Credit System (CBCS) for the undergraduate (UG) & postgraduate (PG) programs. The faculty needs to design a curriculum that would help students learn subjects of their interests while mapping their progress at every step.

Periodic curriculum revision process is critically important to ensure that the programs offered in the universities are at par with the global standards, according to the UGC guidelines and as demanded by the fast-changing environment in which the learner has to operate.

Benefits of LOCF

The ultimate benefits of LOCF lies in enhancing the quality of higher education in India and encouraging the students to gain the best skills & knowledge during their student journey. Learning outcomes are determined in sync with what students are expected to understand at the end of their study program. The final expected student learning outcomes are considered as a reference to design the teaching-learning curriculum and graduate attributes. Once the final expected outcomes are defined clearly, teachers need to formulate a curriculum that would help them attain their goals. The curriculum intents to:

- Improve flexibility of learning
- Teaching-learning innovation
- Continuous teaching-learning improvements
- Assessment of students at various levels
- Periodic review of student performance
- Evaluating program specific outcomes (PSOs)
- Evaluating program outcomes (POs)
- Evaluating course outcomes (COs)
- Maintain highest standards of education
- Create an environment of global competitiveness

Benefits of adopting LOCF

- a. help formulate graduate attributes, qualification descriptors, program learning outcomes and course learning outcomes that are expected to be demonstrated by the holder of a qualification;
- b. enable prospective students, parents, employers and others to understand the nature and level of learning outcomes (knowledge, skills, attitudes and values) or attributes a graduate of a program should be capable of demonstrating on successful completion of the program of study;
- c. maintain national standards and international comparability of learning outcomes and academic standards to ensure global competitiveness, and to facilitate student/graduate



mobility; and

d. provide higher education institutions an important point of reference for designing teachinglearning strategies, assessing student learning levels, and periodic review of programs and academic standards.

Outcome-based education (OBE)

OBE is an educational model that places each component of an educational process around outcomes (goals). In OBE model, all educational activities aim to help students achieve the outcomes. There is no single specified style of teaching or assessment in OBE; instead, classes, opportunities, and assessments should all help students achieve the specified outcomes. The role of the faculty adapts into instructor, trainer, facilitator, and mentor based on the outcomes targeted.

Outcome-based methods have been adopted in education systems around the world, at multiple levels since 1990's. In an international effort to accept OBE, The Washington Accord was created in 1989, which is an agreement to accept undergraduate engineering degrees that were obtained using OBE methods.

India has become the permanent signatory member of the Washington Accord since 13 June 2014. The National Assessment and Accreditation Council (NAAC) established by UGC and National Board of Accreditation (NBA), established by AICTE are the autonomous bodies for promoting global quality standards for technical education in India. NBA does program level accreditation for professional programs governed by AICTE, while NAAC does institutional level accreditation.

Both NAAC and NBA mandates establishing a culture of outcome-based education and use the reports of outcome analysis to find gaps and carryout continuous improvements in the education system of the University.

Benefits of OBE

- **Clarity:** The focus on outcome leads to clear expectation of accomplishment at the end of the program/ course.
- Flexibility: With clear sense of outcomes, instructors will be able to structure their lessons student centric and adopt pedagogies to achieve the outcomes.
- Comparison: OBE can be compared across individual, class, batch, program & University levels.
- **Involvement:** With clear sense of outcomes and increased involvement allows students to feel responsible for their own learning, and leads to self-learning.

The University Grants Commission (UGC) has given its Quality Mandate (QM) brought in 2018. The quality mandate has given thrust on curriculum reforms with an aim to equip the students with knowledge, skill, values and attitude. Therefore, Quality Mandate recommends the drive for developing **Learning Outcomes basedCurriculum Framework** (LOCF). LOCF which has adopted adopts Outcome Based Education (OBE) and emphasize on curricular reforms

Vision, Mission and Quality Policy of University

Vision

- To lead the teeming millions of the world through the wilderness of ignorance and illiteracy, as "Kindly Light" (Exodus 13:21) with the resounding divine proclamation. "Read: Thy Lord is the most bounteous (Quran 30:96:3)." and to educate them in the most constructive and innovative ways.
- To integrate the ebullience, intellect and dynamism of youth with decency, decorum, discipline and dedication through value-based quality education.

Mission

• To make every student a role model of intellectuals and torch bearer for others all over the world through his / her inspiring existence.



- To inculcate a spirit of confidence, self-respect and firm commitment in students along with farsighted wisdom and understanding.
- To make India a self reliant and dominant G-1 country recognized for quality education, higher economic growth and valuable moral practices.

Quality Policy

To pursue standards of excellence in all facets of the institution encompassing teaching, research, outreach and services that meet and exceed the expectations of all stakeholders. To comply with the standards and applicable statutory and regulatory requirements and to improve the Quality Management Systems effectiveness continually through periodical reviews and feedbacks at appropriate levels.

LOCF/OBE Framework of the University

Integral University's outcome-based framework is a cornerstone of its educational ethos, designed to ensure students are primed for success. It's a blend of academic rigor and practical application, tailored to meet industry demands. With a focus on experiential learning, students engage in projects, internships, real-world scenarios, personality development programs, co-curricular and extracurricular activities honing their skills. Continuous assessment fosters accountability and growth, while personalized learning paths cater to individual strengths. This holistic approach equips graduates not just with knowledge, but with the adaptability and resilience needed to thrive in diverse professional environments.

Stakeholders	olders students Parents		Industry/1	Institutions	Alumni	Society
(Input) students	Infrastructi Technolog Student • Infra stru • Faculty • Learning	Administrati ire support S ical support support Programs icture Processes A	on port/ extra & Co curricular support	(finished pro student Desired Out •On and Off	oduct) s comes campus place	ments
students	Learning re Library / Ii Course	esources nternet/ ware feedback	acement / PDP aining support	•Higher educ •Competitivo •Entrepreneu	cation e exams (IES/ urship /startup	IAS/Gate etc.) s

Academic process

OBE process starts with clear statement of what knowledge, skills and attribute Graduates will be able to demonstrate at the completion of program. This statement should be measurable and aligned with Program Educational Objectives (PEO) and Vision/ Mission statements of the institution. These are called program outcome (PO) or Graduate attributes (GA).

- 1. Then outcome-based curriculum is designed/ modified for the program to achieve PO Curriculum through a set of courses. With each course having a set of course objective (CO) which contribute to PO attainment as well as Program specific outcome (PSO) attainment
- 2. A suitable planned teaching learning process (with appropriate assessment tools) and activities is put in place to achieve CO-PO.
- 3. PEO's/ PSO's are aligned with departmental Vision/ Mission while PO's are provided by NBA/ NAAC. Departmental Vision/ Mission and PEOs/PSOs are regularly reviewed.



PEO, PSO, PO and CO definitions:

Objective

Program Educational Objectives (PEO): describes the <u>expected</u> achievement of graduates in the moderate span of their career, guided by local /global factors, stakeholders and defined by institution

Outcomes

Program Specific Outcomes (PSO): describe what the graduates should be able to <u>do after completion</u> <u>of program</u>. PSOs are defined by the departments.

Program Outcome (PO): describes the expected knowledge, skills and attributes of the graduates of the program, *guided by accreditation agencies (NBA/NAAC)*

Course Outcome (CO): describe what students are expected to know, and be able to do at the end of each course/subject, *defined by teacher*



Vision & Mission, Objectives (PEO), Outcomes (PSO, PO, CO)

Blooms' Taxonomy

Bloom's Taxonomy, formulated by Benjamin Bloom in 1956 and revised in 2001 by Anderson and Krathwohl. Bloom's taxonomy categorizes cognitive learning into six levels, ranging from simple remember to complex create. In outcome-based education, Bloom's Taxonomy serves as a roadmap for designing curriculum and assessments that promote higher-order thinking skills. By flexible learning experiences to progressively challenge students, educators can ensure mastery of learning outcomes. From remembering and understanding foundational concepts to analyzing, evaluating, and creating innovative solutions, Bloom's Taxonomy provides a structured approach to foster deep understanding and application of knowledge. This facilitates the development of well-rounded graduates capable of navigating diverse challenges and contributing effectively to their professions and society.





Bloom's Taxonomy levels

Benjamin S. Bloom identified three 3 hierarchical models under which learning process takes place, to classify educational learning objectives in to Cognitive, Affective and Psychomotor (sensory) domains.

Domains of Learning Outcomes:

COGNITIVE - Thinking, intellectual abilities. Comprehending information, organizing ideas, evaluating information and actions.

AFFECTIVE - A learner's emotions toward learning. Interests, feelings, attitudes, opinions, appreciations, values, emotional sets

PSYCHOMOTOR - Basic motor skills, coordination, and physical movement. Speech development, reading readiness, handwriting, physical education, manipulative skills (keyboarding), industrial technology, performance areas in science, art, music.

American education and Indian education have been leaning more toward the cognitive domain at the exclusion of the affective and psychomotor domains. Well-rounded and fully functioning people need development inall three domains.

The Taxonomy of cognitive objectives developed by Benjamin Bloom continues to be one of the most universally applied models, which provide a way to organize thinking skills into six levels, from the most basic to thehigher order levels of thinking. Lorin Anderson (former student of Bloom) revisited the taxonomy during 1990. The flowchart of the taxonomy is given in the figure below.



Flow chart of the Bloom taxonomy



Categories of Knowledge:

Revised Bloom taxonomy (Anderson et al., 2001) suggests the following bur categories of knowledge applicable to all disciplines:

- Factual Knowledge
- Conceptual Knowledge
- Procedural Knowledge
- Metacognitive Knowledge

The table below describes the types of knowledge and its elements

Types	Elements
	"Inert" knowledge; that is, students often seem to acquire a great deal of factual knowledge, but
Factual	theymay not understand it at a deeper level.
Knowledge	Knowledge of terminology (e.g., words, numerals, signs, pictures)
	Knowledge of specific details and elements (Celsius, Fahrenheit, Kelvin etc.)
	Relationships amongst pieces of a larger structure that makethem part of the whole.
Conceptual	Knowledge of classification and categories, theories, modelsstructure etc. eg.
Knowledge	Ideas about Earth, Rotation, Seasons etc. Concepts of the Evolution Theory, Origin of Life etc.
	Relationship between scarcity and choice, opportunity cost
Procedural	How to do something, e.g. Knowledge of subject specific skills and algorithms Knowledge of
Knowladge	the skills" to do painting with water colors
Kilowieuge	Knowledge and skills on psychometric testing
Matacognitiva	Knowledge on one's own cognition in general
Knowlodgo	Knowledge of thinking in general and individual thinking inparticular, eg.
Kilowieuge	Strategic Knowledge, Knowledge about cognitive tasksSelf Knowledge

• Lower order skills (LOS) require less cognitive processing but makes important base for learning



- Higher order skills (HOS) require more cognitive processing and can be achieved only after LOS being achieved
- Industry 4.0 demand HOS.
- LOS may lead to entry level jobs but career progression is very slow.
- HOS leads to rapid career progression
- Top level skill of Bloom's Taxonomy leads to entrepreneurship

The Cognitive Process dimensions- Categories					
Lower Order Skills (LOS)		Higher order Skills (HOS)			
Remember	Understand	Apply	Analyze	Evaluate	Create
 Recognizing 	 Illustrating 	 Executing 	 Differentiating 	 Checking 	 Planning
(identifying)	 Classifying 	 Implementing 	 Organizing 	 Detecting 	 Generating
 Recalling 	 Summarizing 	 Applying 	 Attributing 	 Testing 	 Producing
(retrieving)	 Inferring 			 Critiquing 	 constructing
	 Explaining 			 Judging 	

The Knowledge Dimension					
Conce	rete Knowledge	Abstract	Knowledge		
Factual	Conceptual	Procedural	Metacognitive		
 Knowledge of 	• Knowledge of	• Knowledge of specific skills &	 Strategic Knowledge 		
terminologies	classifications &	algorithms	• Knowledge about		
 Knowledge of 	categories	• Knowledge of subject specific	cognitive task,		
specific details &	• Knowledge of principles	techniques & methods	including appropriate		
elements	& generalizations	• Knowledge of criteria for	contextual &		
	• Knowledge of theories,	determining when to use	conditional Knowledge		
	models & structures	appropriate procedures	 Self-Knowledge 		

Action Verbs for Course Outcome:

Lower Order Skills (LOS)			Higher Order Skills (HOS)		
Remember	Understand	Apply	Analyze	Evaluate	Create
Define	Explain	Solve	Analyze	Reframe	Design
Describe	Describe	Apply	Compare	Criticize	Create
List	Interpret	Illustrate	Classify	Judge	Plan
State	Summarize	Calculate	Distinguish	Recommend	Formulate
Match	Compare	Sketch	Explain	Grade	Invent
Tabulate	Discuss	Prepare	Differentiate	Measure	Develop
Record	Estimate	Chart	Appraise	Test	Organize
Label	Express	Choose	Conclude	Evaluate	Produce

Illustration:

Use of Action Verbs	Factual	Conceptual	Procedural	Metacognitive
Remember	List the properties of metal	Match materials with characteristics	Describe working of diode	Identify strategies for data collection
Understand	Summarize features of a Bluetooth.	Classify materials by strength.	Explain assembly line.	Predict the behavior of system
Apply	Respond to the queries	Provide advice to group	Carry out pH tests of water samples.	Use modern tools & find solution
Analyze	Explain the selection of tool/ activity for the task.	Differentiate between LOS and HOS	Integrate compliance with regulations.	Assess the The project work
Evaluate	Select the appropriate tool for analysis	Determine relevance of results.	Judge efficiency of sampling techniques.	Reflect on progress of the project.
Create	Generate log of daily activities.	Assemble a team of experts.	Design efficient project workflow.	Create a learning portfolio.



Dale's Cone of Learning:

Dale's Cone of Learning, proposed by Edgar Dale, illustrates the hierarchy of retention rates for various learning methods. It suggests that learners retain more information when they are actively engaged in the learning process. In outcome-based education, Dale's Cone serves as a guiding principle, emphasizing experiential learning over passive methods. By prioritizing hands-on activities, simulations, and real-world applications, educators can enhance students' retention and understanding of course material. This approach fosters critical thinking, problem-solving skills, and practical knowledge acquisition, aligning perfectly with the goal of producing competent graduates capable of making meaningful contributions in their chosen field

	Deeple Consuelly Domember	People are able to:
	People Generally Remember	(Learning Outcomes)
Traditional	10% of what they read	*Define *Describe
Lectures	20% of what they hear Hear	*List *Explain
E content/	30% of what they see ViewImages Watch Videos	•Demonstrate •Apply
Labs/ animations	50% of what they hear and see Watch a Demonstration	•Practice
writings/ simulations/Group assign / design/ Presentations	70% of whatDesign Collaborative Lthey say and writeParticipate in Hands-on A90% of whatSimulate, Model or ExperThey say asDesign/perform a Presentation, Do	esson Activity rience "the real thing" •Analyze •Design •Create •Evaluate

Dale's cone of Learning

PEO, PSO Example: PEO For B.Tech ECE:

- PEO1. To provide the necessary background in science and mathematics and to provide solid foundation in engineering fundamentals so that students are ready to face challenges in the field of Electronics & Communication Engineering Technology.
- PEO2. To train students with engineering breadth by providing experimental exposure so that they can analyze, design & comprehend scientific data which may have direct application to society.
- PEO3. To inculcate in students professional and ethical attitude, effective communication skills and team work needed for a successful professional carrier and entrepreneurship orientation.
- PEO4. To make students aware of various social and environmental problems and relate engineering issues to broader social context.

PSO For B.Tech ECE:

- PSO1. Understand the concepts of Mathematics, Science, and Electronics & Communication
- PSO2. Apply, and analyze engineering problems and simulate or design systems and solutions in the field of electronics and communication.
- PSO3. Creative thinking, Effective communication, Group working ability and lifelong learning.
- PSO4. Understanding of professional, social, ethical environmental concerns and responsibilities.

Sample PSOs of BSc Zoology:

- PSO1. Understand the nature and basic concepts of cell biology, Biochemistry, Taxonomy & ecology.
- PSO2. Analyze the relationships among animals, plants and microbes
- PSO3. Perform procedures as per laboratory standards in the areas of Biochemistry, Bioinformatics, Taxonomy, Economic Zoology and Ecology
- PSO4. Understand the applications of biological sciences in Apiculture, Aquaculture, Agriculture and Medicine



Sample PSOs of BA Economics:

- PSO1. Understand the behaviour of Indian and World economy,
- PSO2. Analyze macroeconomic policies including fiscal and monetary policies of India
- PSO3. Determine economic variables including inflation, unemployment, poverty, GDP, Balance of Payments using statistical methods
- PSO4. Understand the behavior of financial and money markets and perform cost-benefit analysis for making investment decisions

Reference <u>http://www.naac.gov.in/images/docs/Manuals/University%20Manual%20Amended-%2020th%20June%202018n.docx</u>

	PO for Engineering			
	Undergraduate		Diploma	
PO1.	Engineering knowledge	PO1.	Basic and Discipline specific knowledge	
PO2.	Problem analysis:	PO2.	Problem analysis	
PO3.	Design/development of solutions:	PO3.	Design/ development of solutions	
PO4.	Conduct investigations of complex	PO4.	Engineering Tools, Experimentation and Testing	
	problems	PO5.	Engineering practices for society, sustainability and	
PO5.	Modern tool usage		environment	
PO6.	The engineer and society	PO6.	Project Management	
PO7.	Environment and sustainability	PO7.	Life-long learning	
PO8.	Ethics			
PO9.	Individual and team work			
PO10.	Communication			
PO11.	Project management and finance			
PO12.	Life-long learning			
http://v	www.nbaind.org/Files/ug-sar-tier-i-final-	http://v	www.nbaind.org/files/diploma-sar-final-v1.pdf	
ver-1.0	.pdf			
	-	Pharr	nacy	
	Undergraduate		Diploma	
PO1.	Pharmacy Knowledge	PO1.	Pharmacy Knowledge	
PO2.	Planning Abilities	PO2.	Modern tool usage	
PO3.	Problem analysis	PO3.	Leadership skills	
PO4.	Modern tool usage	PO4.	Professional Identity	
PO5.	Leadership skills	PO5.	Pharmaceutical Ethics	
PO6.	Professional Identity	PO6.	Communication	
PO7.	Pharmaceutical Ethics	PO7.	The Pharmacist and society	
PO8.	Communication	PO8.	Environment and sustainability	
PO9.	The Pharmacist and society	PO9.	Life-long learning	
PO10.	Environment and sustainability			
PO11.	Life-long learning			
http://v	vww.nbaind.org/Files/ug-pharmacy-sar-	http://v	www.nbaind.org/files/Diploma Pharmacy SAR April2	
v0.pdf		019.pc	<u>lf</u>	
PO for	MCA	PO Fo	or MBA	
PO1.	Computational Knowledge	PO1.	Apply knowledge of management theories and	
PO2.	Problem Analysis		practices to solve business problems.	
PO3.	Design /Development of Solutions	PO2.	Foster Analytical and critical thinking abilities for	
PO4.	Conduct investigations of complex		data-based decision making.	
	Computing problems	PO3.	Ability to develop Value based Leadership ability.	
PO5.	Modern Tool Usage	PO4.	Ability to understand, analyze and communicate	
PO6.	Professional Ethics		global, economic, legal, and ethical aspects of	
PO7.	Life-long Learning		business.	
PO8.	Project management and finance	PO5.	Ability to lead themselves and others in the	
PO9.	Communication Efficacy		achievement of organizational goals, contributing	
PO10.	Societal and Environmental Concern		effectively to a team environment.	
PO11.	Individual and Team Work	Note:]	Program may add up to three additional Pos.	
PO12.	Innovation and Entrepreneurship			
http://v	www.nbaind.org/Files/MCA Tier II%20m	http://v	www.nbaind.org/Files/pg-mgmt-sar.pdf	
anual.p	<u>odf</u>			



PO for other Higher Educational programs

PO1.	Critical	Thinking

PO2. Effective Communication

PO3. Social Interaction

PO4. Effective Citizenship

PO5. Ethics

PO6. Environment and Sustainability

PO7. Self-directed and Life-long Learning

http://www.naac.gov.in/images/docs/Manuals/University%20Manual%20Amended-

%2020th%20June%202018n.docx

Guidelines for Writing Course Outcome Statements:

- The number of COs of courses carrying a different number of credits can be suitably adjusted.
- For a (3-0-0 or 3-1-0) theory course consisting of five units should have preferably five CO's each CO covering one unit.
- For a (0-0-1 or 0-0-2) course consisting of field/ practical/ laboratory activities, 2-4 CO's can be defined by grouping activities/experiments using some theme that can serve as a Course Outcome.
- For a (3-1-1 or 3-0-1) course integrating field/ practical/ laboratory activities, preferably 2-4 CO's should be defined for these activities beside CO's of each unit of theory content.
- CO should focus on higher order skills (HOS), i.e. Analyze, Evaluate and Create
- Each CO may take few lectures (7-10) on an average.
- CO's are written using action verbs, which are specific, measurable and can be demonstrated by students after successful completion of the course
- Attainment of each CO leads to one or more PO attainment.
- For professional courses PO are normally guided by accreditation agency/ governing bodies.

A well written course outcome use a action verb representing the blooms taxonomy level and the following features

- Condition component
- Performance component
- Criterion Component

Example CO

Given the integrable real time input signals, would be able to perform Fourier analysis and analyze the spectral characteristics.

	CO statement	Missing Features
Poor CO statement	Understand Fourier Analysis	No Condition
		No Performance
Weak CO	Understand Fourier Analysis and apply it on signal analysis	No Condition
statement		
Good Co statement	Given the integrable real time input signals, would be able to	
	perform Fourier analysis and analyze the spectral characteristics	

CO-PO Mapping Guidelines:

Course Articulation matrix represent relationship between CO's of the course and PO/PSO of the program. It mentions the strengths to which the COs of a course address Pos and PSOs.

- Every CO may address a subset of Pos and PSOs.
- In the matrix COs are tagged with Pos and PSOs that are addressed by it with a representation of strength of relationship
- In determining the strength to which a CO relates a PO/PSO, it is convenient to tag each CO with the number of Class Hours /Laboratory Hours used for delivery/instruction, which also indicate the depth to which the instructor intends to deal the topic/ CO.
- The strength of mapping is defined using three levels:



- 1 -Low contribution
- 2 Average contribution
- 3 Strong contribution

• A approximate quantitative method to measure the strength to which a PO/PSO is addressed is to relate the strength with the number of hours devoted to the COs, which address that PO/PSO.

•	For >40 % contribution	of class sessions/lab hours address a PO/PSO	\rightarrow 3 - Strong
•	For 10-40%	of class sessions/lab hours address a PO/PSO	\rightarrow 2 - Average
•	For 1-10% contribution	of class sessions/lab hours address a PO/PSO	$\rightarrow 1$ - Low

• For 0% of class sessions /lab hours address a PO/PSO \rightarrow 0 - No contribution

CO for a course "Signals and Systems" (B.Tech EC II year):

S No.	CO description	Unit Covered by CO
CO1	Given the integreable real continuous time input signals, would be able to perform Fourier transformation and analyze the spectral characteristics.	Ι
CO2	Given a system description, would be able to explore alternate description and implement using basic building blocks of the system	Π
CO3	Given the real discrete time system description, would be able to perform discrete time Fourier transformation/ Z transformation and analyze the characteristics of the system.	III
CO4	For a system with input output relationship described in standard form, would be able to characterize the time/ frequency characteristics and demonstrate in graphical form,	IV

Example Course Articulation Matrix (CO-PO-PSO mapping)

	Co	ourse Articulation Matrix (C	C O-I	PO-I	PSO	map	ping	g) foi	r a co	ours	e "Si	ignal	s an	d Sy	stem	ıs"		
		B.Tech. EC	'E: F	rogi	ram	Spec	cific	Out	come	es (P	SO's	5)						
	PSO1. PSO2.	Understand the concepts of I Apply, and analyze engineer of electronics and communic Creative thinking. Effective	Math ring catio	nema prob n.	itics, lems	Scie and	nce, simu	and ilate	Elec or de	troni esigr	cs & 1 syst	Con cems	nmu and	nicat solut	ion tions	in th	e fie	ld
	PSO4	Understanding of profession	com al s	ocial	eth	ical e	nouj nvir	onm	ental	con	cern	nu n s and	rest	ng ie	ariii hiliti	ig. es		
	1501.	B.Tech	n. EC	CE: I	Prog	ram	Obi	ectiv	ves (]	PO's)	5 und	100	01151	omu	05.		
PO1. PO2. PO3. PO4. PO5. PO6.	O1. Engineering knowledge PO7. Environment and sustainability O2. Problem analysis: PO8. Ethics O3. Design/development of solutions: PO9. Individual and team work O4. Conduct investigations of complex problems PO10.Communication O5. Modern tool usage PO11.Project management and finance O6. The engineer and society PO2s																	
		PO's PSO's																
S No.	CO des	cription	P01	P02	P03	P04	PO5	P06	P07	P08	P09	PO10	P011	P012	PSO1	PSO2	PSO3	PSO4
CO1	Given the continute be able transforms spectral	he integreable real ous time input signals, would to perform Fourier mation and analyze the characteristics.	3	2	2	3	1								3	2		
CO2	Given a be able descript basic bu	system description, would to explore alternate ion and implement using hilding blocks of the system	3	3	3	3	2							1	3	3		
CO3	Given t	he real discrete time system	3	2	2	3	1								3	3		



	description, would be able to perform discrete time Fourier transformation/ Z -transformation and analyze the characteristics of the system.														
CO4	For a system with input output relationship described in standard form, would be able to characterize the time/ frequency characteristics and demonstrate in graphical form	3	3	2	3	1					1		3	3	
Signa	als and Systems PO Mapping	3	2.5	2.2 5	3	1.2 5					0.2 5	0.2 5	3	2.7 5	
3 Strong contribution, 2 average contributions, 1 Low contribution															

	Curricular Structure B.Tech. ECE III-year, V Semester																						
			PO'	s											PSO	's							
S. No.	Code	Subject	PO1	PO2	PO2	P04	PO5	PO6	PO7	PO8	60d	PO10	P011	PO12	PSO1	PSO2	PSO3	PSO4					
1	IEC501	Computer Organization and Architecture	2	2	3	2								1	3	3							
2	IEE501	Control System	3	2	2	2	2	1						1	3	3							
3	IEC502	Integrated Circuits	2	2	2		2								3	3							
4	IEC503	Communication Systems	3	3	2	2	2							1	3	3							
5	IHU501	Industrial Management					2	1	2		1	1	2		2	2							
6	IEC506	Antenna & Wave propagation	2	2	2										3	3							
7	IEC551	Seminar						1		2	2	3		2	1		3						
8	IEE551	Control System Lab			2	1	1								3	2	2	1					
9	IEC552	Integrated Circuits Lab			2	1	1								3	2	2	1					
10	IEC553	Communication Lab-I			2	2					3 2 2 1												
A	verage c	ontribution of all courses	2.4	2.2	2.13	1.67	1.67	1	2	2	1.5	2	2	1.25	2.7	2.56	2.25	1					
3 5	Strong con	ntribution, 2 average contribution	ition	, 1 L	ow c	ontril	outio	n															

CO Attainment Computations:

Targets / Attainment Levels:

CO Attainment are measured in terms of 'reference attainment levels' against a 'benchmark' defined by institution.

- Reference level and Benchmark are decided by the institution judiciously
- Target attainment level chosen is set higher than previous year attainment as part of continuous improvement

CO attainment is weighted combination of two components

- Direct Attainment 80% weightage
- Indirect Attainment 20% weightage

Example Reference attainment level (example)

Level 1 Satisfactory:	60% students scoring more than benchmark (X)
Level 2 Moderate:	70% students scoring more than benchmark (X)
Level 3 Substantial:	80% students scoring more than benchmark (X)

• Benchmark may be university average of subject, or average of last three years of subject or any other value decided judiciously by institution



• Target attainment level chosen is set higher than previous year attainment as part of continuous improvement

If target is that 65 % students score more than X then attainment level target is set as 1.5 with reference to the defined levels

Course	e evaluation scheme example		
•	End sem Examination:	100	(66.7%)
•	Internal assessment	50	(33.3%)
Total		150	(100%)
Break	up of Internal assessment		
•	Mid sem test	30	
•	Presentation/ Group Project	10	
•	Assignment	10	

Attainment is measured separately for internal assessment and End sem exam (using benchmark/ levels, if not defined by institution assume it and mention in bracket as assumed)

Average Course attainment measurement example

- Let attainment target for End Sem assessment and internal assessment is decided as
 - End Sem Examination: 60% students will score more than benchmark (X)
 - Internal assessment: 70% students will score more than benchmark (X)

Then CO attainment target for	
End sem Examination:	1
Mid sem Examination:	2

• Set the final attainment target using the weightage of marks (internal/ external)

Final attainment target	= 66.7% of external targe	et + 33.3% of internal target
	= 0.667 x 1	+ 0.333 x 2
	= 1.33	

(if weight of internal assessment in curricular structure is 33.3% or other weigtage decided judiciously)

Let result summary obtained in m	id sem assessment and internal assessment is
End sem assessment:	68% student score more than $X = 1.8$ attainment level
Mid sem assessment:	70 % student score more than $X = 2$ attainment level
Achieved attainment level	= 75% of End sem exam $+ 25%$ of Internal assessment
	= 75% of 1.8+ 25% of 2
	= 1.35 + 0.25 = 1.6

Average Course Outcome Contribution PO/PSO Attainment

PO/PSO attainment is computed at the end of the program using CO attainment of various courses. A simple method to compute PO/PSO attainment is to compute weighted average of Courses attainment with Courses contribution to PO/PSO. If Course attainment is combination of direct attainment or and indirect attainment then PO/PSO attainment can be computed using Course attainments only. Alternatively direct component of PO/PSO attainment can be computed using weighted average of direct component of Course attainments and adding indirect component based on surveys/ feedback.

	^	PO							PSO	PSO	PSO	PSO
S No	СО	1	PO2	PO3	PO4	PO5	PO6	PO7	1	2	3	4
1	CO1	3	2	1	1	1	2	0	3	2	1	2
2	CO2	2	1	1	3	1	0	0	1	1	2	1
3	CO3	1	2	1	1	2	3	0	1	2	2	3
4	CO4	3	2	1	2	1	1	0	1	2	1	2

Sample Articulation Matrix of BM 101 Financial Accounting



5		CO5	3	1	2	1	2	2	1	0	2	1	2	1
BM101	Average Course Outcome													
Contrib	oution	BM101	2.4	1.6	1.2	2 1.	6 1.	4 1	.4 (0.0	1.6	1.6	1.6	1.8
	Semanla Com			N	T a 4 mile									
Course	Sample Cou	irse arti	Iculat	ION IV	letric		BBA	prog	ram	DO	DGO	DEO	DCO	DCO
Course	Course Name		Som	r0 1	rU 2	PU 3		FU 5	FU 6	PU 7	1	2	2	PSU 4
Coue. BM101	Financial Accounting		I	24	16	$\frac{3}{12}$	4	3 14	14	/	1.6	1.6	1.6	18
MT105	Quantitative Techniques		I T	2.4	1.0	$\frac{1.2}{2.0}$	$\frac{1.0}{2.0}$	1.4	1.4	0.0	2.0	$\frac{1.0}{2.0}$	1.0	1.0
RM102	Office Management		I I	2.0	$\frac{1.0}{2.0}$	1.6	2.0	1.0	$\frac{2.0}{2.0}$	0.0	2.0	2.0	1.0	1.0
BM102 BM103	Principles of Economics		ı T	2.4	$\frac{2.0}{2.0}$	1.0	0.0	3.0	0.0	0.0	3.0	3.0	$\frac{1.0}{2.0}$	1.0
BM103 BM104	Principles & Concepts of Manag	ement	I	1.8	2.0	2.4	1.8	2.0	2.4	24	2.0	2.6	1.8	1.0
LN104	Essential Professional Communi	cation	I	2.0	1.0	2.0	2.0	1.0	2.0	0.0	2.0	2.0	1.0	1.0
BM105	Business Organization	cution	II	3.0	1.0	2.4	1.0	1.0	2.0	0.0	3.0	$\frac{2.0}{2.0}$	1.0	2.0
BM106	Public Finance		II	1.8	1.0	1.8	1.8	1.0	2.4	1.8	2.0	1.6	1.0	$\frac{2.0}{2.2}$
MT116	Business Statistics		II	2.0	1.0	2.0	2.0	1.0	2.0	0.0	2.0	2.0	1.0	1.0
BM107	Advance Accounting		II	1.0	1.0	1.0	1.0	0.0	0.0	0.0	3.0	3.0	3.0	1.0
BM108	Introduction to Business Enviror	ment	II	2.8	2.4	2.4	2.2	2.2	2.0	0.0	1.8	1.8	2.2	2.2
BM109	Computerized Accounting		II	2.4	2.2	2.2	2.2	2.2	2.0	0.0	2.4	2.0	1.8	2.2
BM201	Cost Accounting		III	2.4	2.0	0.0	0.6	0.0	1.0	0.0	3.0	2.0	0.0	1.0
BM202	Corporate Law		III	2.4	2.0	0.6	0.6	1.0	1.0	0.0	3.0	2.0	0.0	1.0
BM203	Principles of Marketing Manage	ment	III	3.0	1.4	2.0	1.0	1.0	2.4	0.0	3.0	2.0	1.0	2.6
BM204	Human Resource Management		III	2.4	2.0	0.0	0.6	0.0	1.0	0.0	3.0	2.0	0.0	1.0
BM205	Introduction to Indian Economy		III	3.0	2.0	1.0	2.0	2.0	0.0	0.0	3.0	3.0	0.0	1.0
BM206	Income Tax		III	1.0	1.0	0.0	0.0	0.0	0.0	0.0	1.0	1.0	1.0	1.0
BM207	Corporate Accounting		IV	0.0	2.4	0.0	0.0	0.0	2.4	0.0	3.0	2.4	2.0	2.4
BM208	Financial Auditing		IV	0.4	1.0	0.0	0.2	0.2	0.8	0.0	2.2	1.8	1.6	1.6
BM209	Business Psychology & OB		IV	2.4	2.0	2.2	2.4	2.2	2.0	0.0	2.0	2.0	1.8	2.2
BM210	Introduction to Micro Economics	s	IV	1.0	1.0	1.0	1.0	1.0	0.0	0.0	1.0	1.0	1.0	1.0
BM211	Indian Financial System		IV	2.4	1.8	2.6	1.8	1.4	1.2	0.0	2.0	2.0	1.6	1.8
BM212	Introduction to E-Business		IV	2.2	2.0	2.2	1.6	1.6	1.2	0.0	2.0	2.0	1.8	2.2
BM301	Financial Management		V	0.6	0.6	0.4	0.0	0.0	2.2	0.0	2.2	1.8	1.6	1.8
BM302	Entrepreneurship Development		V	1.8	1.4	0.8	1.2	1.2	0.6	0.0	1.6	0.8	0.8	1.0
BM303	Money & Banking		V	2.2	1.8	1.6	1.6	1.2	2.2	0.0	1.6	1.8	1.4	1.8
BM304	Production & Operations Manag	ement	V	2.2	1.2	1.4	1.2	0.6	0.6	0.0	2.0	2.0	1.8	2.0
BM305	Project Financing		V	2.2	1.8	1.6	1.6	1.2	2.2	0.0	1.6	1.8	1.4	1.8
BM306	Introduction to Consumer Behav	iour	V	1.6	2.0	2.0	1.8	2.2	1.8	2.0	2.0	2.0	2.2	1.8
BM307	Basics of Insurance Managemen	t	VI	2.2	1.4	1.4	1.2	0.6	0.6	0.0	2.0	2.0	1.8	2.0
BM308	Security Analysis		VI	2.2	1.8	1.6	1.6	1.2	2.2	0.0	1.6	1.8	1.4	1.8
BM309	Introduction to International Bus	iness	VI	2.6	1.4	1.0	1.8	1.0	2.4	0.0	2.6	2.2	1.2	3.0
BM310	Management Information System	n	VI	2.6	1.4	1.0	1.8	1.0	2.4	0.0	2.6	2.2	1.2	3.0
BM311	Introduction To Financial Marke	ts		2.0	1.0	2.0	2.0	1.0	2.0	0.0	2.0	2.0	1.0	1.0
BM312	Investment and Portfolio Manage	ement		2.2	1.6	1.2	0.4	0.8	0.6	0.0	2.0	1.2	0.8	2.0
BM313	Marketing Communication			3.0	1.4	2.4	1.4	1.0	2.4	0.0	2.0	2.0	1.2	2.6
BM314	International Marketing Manage	ment		1.0	1.8	1.4	2.2	2.6	2.2	0.0	2.2	1.2	2.2	2.0
BM312	Introduction to Industrial Relation	n		1.0	2.0	2.0	1.5	2.0	2.0	0.0	2.3	2.0	2.5	2.0
DM217	Vivo Voco			1.4	1.8	1.8	2.4	2.0	2.2	0.0	2.2	2.0	2.2	2.0
BM317	viva voce	1	٧I	2.0	0.0	0.0	0.0	0.0	3.0	2.0	0.0	0.0		0.0
	Average Course Outcome Contri	oution		2.0	1.0	1.4	1.4	1.4	1.0	0.2	2.1	1.9	1.4	1./

Individual CO Attainment Computation

Average CO attainment target of the course may be split down to each CO target or activity target if required.

CO attainment for each CO may be computed by measuring score obtained in each assessment component contribution to each CO using attainment levels and benchmark.

Activities and assessment planned for an example course for internal assessment given in table below



N	Mid Sem 1				Mid Sem 2				Improvement				Quiz1					ıiz2		Assignment			
Questio	u	MM (30)	Mapped CO	Questio	u	MM (30)	Mapped CO	Questio	u		Mapped CO	Questio	u	MM (1)	Mapped CO	Questio	u	MM (1)	Mapped CO	Questio	u	MM (1)	Mapped CO
Q1	1	1	CO1	Q1	1	1	CO3	Q1	1	1	CO3	Q1	1	1	CO1	Q1	1	1	CO1	Q1	1	1	CO5
Q1	2	1	CO1	Q1	2	1	CO3	Q1	2	1	CO3	Q1	2	1	CO2	Q1	2	1	CO2	Q1	2	1	CO5
Q1	3	1	CO1	Q1	3	1	CO3	Q1	3	1	CO3	Q1	3	1	CO3	Q1	3	1	CO3	Q1	3	1	CO5
Q1	4	1	CO1	Q1	4	1	CO3	Q1	4	1	CO3	Q1	4	1	CO1	Q1	4	1	CO1	Q1	4	1	CO5
Q1	5	1	CO1	Q1	5	1	CO3	Q1	5	1	CO3	Q1	5	1	CO1	Q1	5	1	CO1				
Q1	6	1	CO2	Q1	6	1	CO4	Q1	6	1	CO4	Q1	6	1	CO1	Q1	6	1	CO1				
Q1	7	1	CO2	Q1	7	1	CO4	Q1	7	1	CO4	Q1	7	1	CO4	Q1	7	1	CO4				
Q1	8	1	CO2	Q1	8	1	CO4	Q1	8	1	CO4	Q1	8	1	CO5	Q1	8	1	CO5				
Q1	9	1	CO3	Q1	9	1	CO4	Q1	9	1	CO4	Q1	9	1	CO1	Q1	9	1	CO1				
Q1	10	1	CO3	Q1	10	1	CO3	Q1	10	1	CO3	Q1	10	1	CO2	Q1	10	1	CO2				
Q2	1	5	CO1	Q2	1	5	CO1	Q2	1	5	CO2												
Q2	2	5	CO2	Q2	2	5	CO4	Q2	2	5	CO4												
Q2	3	5	CO3	Q2	3	5	CO3	Q2	3	5	CO3												
Q3	1	10	CO1	Q3	1	10	CO1	Q3	1	10	CO1												
Q3	2	10	CO2	Q3	2	10	CO4	Q3	2	10	CO4												

For mid sem 1 in above table performance of students

	Mid Sem 1										CO	wise	marl	ks Ol	otain	ed in											
Q No								Midsem1 (MM:30) Maximum marks as per exam conducted				Scaled CO wise marks Obtained in Midsem1 (MM: 7.5) Contribution in final marks															
MM	1	1	1	1 1	1	1	1	1	1	5	5	5	1 0	1 0	al	20	18	7	0	0	45	5	4.5	1.75	0	0	
Mapped CO	COI	CUL		COL	C02	C02	C02	C03	C03	C01	C02	C03	C01	C02		C01	C02	CO3	C04	CO5	Total	C01	C02	CO3	C04	CO5	Total
Student1	1	1	1 1	1	1	0	1	1	1	5	5		9		28	19	7	2	0	0	28	4.75	1.75	0.5	0	0	7
Student2	0	0	0 1	0	0	1	1	0	1	5		4	9		22	15	2	5	0	0	22	3.75	0.5	1.25	0	0	5.5
Student3	1	1	1 1	1	1	1	1	1	1	4		1		6	21	9	9	3	0	0	21	2.25	2.25	0.75	0	0	5.25
Student4	1	1	1 1	1	1	0	0	0	0	5	4		9		24	19	5	0	0	0	24	4.75	1.25	0	0	0	6
Student5	1	1	1 1	1	1	0	1	1	1	4	1		6		20	15	3	2	0	0	20	3.75	0.75	0.5	0	0	5

In similar way CO wise marks of students can be obtained in covering all mid semester and end semester assessments can be obtained. Addition of CO wise score of all students for all assessment activities can be used to compute individual CO attainment as explained in example.

PO/SO Attainment Computation

PO/PSO attainment can be computed by weighted sum of Average CO attainment of contributing courses weighted to course articulation metric of the program. Also, indirect attainment component of PO/PSO attainment obtained by end of program surveys/ statics etc. converted matching to three level score may be added to earlier computed value in a ratio of 80:20 to obtain final score.

Reference Level & Benchmark

Reference levels and benchmark is reviewed and notified by CEO for computation purposes. Benchmark for each course may be separately defined by providing proper justification in consonance of competent authorities. Since adoption of OBE from session 2020-21 the reference levels and benchmark adopted is

Level 1 Satisfactory:	60% students scoring more than benchmark (X)
Level 2 Moderate:	70% students scoring more than benchmark (X)
Level 3 Substantial:	80% students scoring more than benchmark (X)

Benchmark: 65 % score



Since implementation of OBE, average course attainment is computed by examination cell. From even semester 2023-24, department are advised to compute attainment of individual CO's.

Student Competency:

- 1. Academic Competence: critical thinking, research abilities, analytical skills, and the ability to comprehend and synthesize complex information.
- 2. Communication Skills: Written and oral communication skills, including the ability to express ideas clearly, engage in productive discourse, and effectively communicate with diverse audiences.
- 3. Problem-Solving Skills: Problem-solving abilities, including identifying problems, analyzing situations, evaluating options, and implementing solutions.
- 4. Collaboration and Teamwork: Collaborative projects, team work, navigate group dynamics.
- 5. Ethical and Social Responsibility: ethical principles relevant to their field, integrity and consider social impact of decisions.
- 6. Adaptability and Flexibility: adaptable and flexible, able to learn new skills and adjust to evolving circumstances.
- 7. Information Literacy: ability to locate, evaluate, and effectively use information from various sources, including libraries, databases, and the internet.
- 8. Technological Competence: basic digital literacy and more advanced technical skills relevant to the student's field of study.
- 9. Global Awareness and Cultural Competence: understanding of global issues, cultural diversity, and intercultural communication skills.
- 10. Leadership and Initiative: leadership qualities, take initiative, and demonstrate the ability to motivate and inspire others.
- 11. Self-Management and Time Management: manage their time effectively, prioritize tasks, and balance academic responsibilities with personal and extracurricular activities.
- 12. Resilience and Emotional Intelligence: resilience in the face of challenges, emotional intelligence skills such as self-awareness, empathy, and self-regulation.
- 13. Creativity and Innovation: encouraging students to think creatively, generate new ideas, and explore unconventional solutions to problems.
- 14. Career Development and Professionalism: networking, resume writing, interview techniques, and professionalism in the workplace.
- 15. Financial Literacy: basic financial principles, budgeting, managing debt, and making informed financial decisions

Rubrics for Assessment:

What is Rubric?

A scoring guide with criteria for evaluating students' work in direct relation to one or more of the PO's and a rating scale indicating differing levels of performance.

Rubrics are:

- Used to examine how well students have met CO or PO rather than how well they perform compared to their peers.
- Typically include measurable descriptors that define expectations at each level of performance for each criterion.



Sample Rubrics

RUBRICS FOR PROJECT EVALUATION

Rubrics Review

Review #	Agenda	Assessment	Review Assessment Weightage	Over all Weightage
Review 1	Project Synopsis/ Proposal Evaluation	Rubric R1	(15)	(75)
Review 2	Mid-Term Project Evaluation	Rubric R2	(28)	
Review 3	End Term Project Evaluation	Rubric R3	(32)	
External E	valuation		(75)	(75)
Total			(100)	(100)

Rubric #R1: Project Synopsis/ Proposal Evaluation

Maximum Marks*: 15

				Level of Achiev	vement	
		Weight	Good (3)	Average (2)	Poor (1)	Score
a	Identification of	3	Detailed explanation	Average explanation	Minimal explanation of the	
	Problem Domain and		of the purpose and	of the purpose and	purpose and need of the	
	Analysis		need of the project	need of the project	project	
b	Study of the Existing	3	Detailed explanation	Collects some basic	incomplete information	
	Systems and limitations			information		
c	Objectives of the Proposed Work	3	All objectives of the proposed work are well defined;	Incomplete justification to the objectives proposed;	Objectives of the proposed work are either not identified or not well defined:	
d	Methodology of the Proposed Work	3	Steps to solve the defined problem are clearly specified	Steps are mentioned but unclear;	Incomplete and improper methodology	
e	Team work	3	Appropriate distribution of project work	Distribution of project work un-even	Inappropriate distribution of project work	

Rubric #R2: Mid-term Project Evaluation

Maximum Marks*: 28

	Level of Achievement											
		Weight	Excellent (4)	Good (3)	Average (2)	Poor (1)	Score					
a	Modular	4	Division of problem	Division of problem	Division of problem	Modular approach						
	approach of		into modules and	into modules and	into modules but	not adopted						
	problem solving		good selection of	good selection of	inappropriate							
			computing	computing	selection of							
			framework	framework	computing							
					framework							
b	Design	4	Appropriate design	Design methodology	Design methodology	Design methodology						
	Methodology		methodology with	not properly justified	not defined properly	not defined						
			justification									
с	Planning of	4	Time frame properly	Time frame properly	Time frame properly	Time frame not						
	Project Work		specified and being	specified and being	specified, but not	properly specified						
			followed	followed	being followed							
d	Team work	4	Appropriate	Distribution of	Distribution of	Inappropriate						
			distribution of	project work	project work un-even	distribution of						
			project work	somehow acceptable		project work						
e	Demonstration	4	Objectives achieved	Most of the	Few Objectives	No objectives						
			as per time frame	Objectives achieved	achieved as per time	achieved						
				as per time frame	frame							
f	Presentation	4	Contents of	Contents of	Contents of	Contents of						
	Content		presentations are	presentations are	presentations are	presentations are not						



			appropriate and well arranged	appropriate but not well arranged	appropriate but not well arranged	appropriate and not well delivered	
g	Presentation	4	Excellent	Good presentation:	Average Presentation	Poor delivery of	
	style		presentation: Proper	clear voice, good,		presentation	
			eye contact, clear	language, eye			
			voice, good language	contact not proper			

Rubric #R3: End Term Internal Project Evaluation

Maximum Marks*: 32

				Level of Achievemen	nt		
		Weight	Excellent (4)	Good (3)	Average (2)	Poor (1)	Score
a	Modular approach of problem solving	4	Division of problem into modules and good	Division of problem into modules and good selection of	Division of problem into modules but inappropriate	Modular approach not adopted	
			selection of computing framework	computing framework	selection of computing framework		
b	Design Methodology	4	Appropriate design methodology with justification	Design methodology not properly justified	Design methodology not defined properly	Design methodology not defined	
с	Planning of Project Work	4	Time frame properly specified and being followed	Time frame properly specified and being followed	Time frame properly specified, but not being followed	Time frame not properly specified	
d	Team work	4	Appropriate distribution of project work	Distribution of project work somehow acceptable	Distribution of project work un-even	Inappropriate distribution of project work	
e	Demonstration	4	Objectives achieved as per time frame	Most of the Objectives achieved as per time frame	Few Objectives achieved as per time frame	No objectives achieved	
f	Incorporation of Suggestions	4	Changes are made as per modifications suggested during midterm evaluation and new innovations added	Changes are made as per modifications suggested during mid-term evaluation and good justification	Few changes are made as per modifications suggested during mid-term evaluation	Suggestions during mid-term evaluation are not incorporated	
g	Presentation Content	4	Contents of presentations are appropriate and well arranged	Contents of presentations are appropriate but not well arranged	Contents of presentations are appropriate but not well arranged	Contents of presentations are not appropriate and not well delivered	
h	Presentation style	4	Excellent presentation: Proper eye contact, clear voice, good language	Good presentation: clear voice, good, language, eye contact not proper	Average Presentation	Poor delivery of presentation	

Activity Based Learning:

- CO should target HOS
- Teaching learning process should foster HOS
- Assessment tools should also measure HOS with LOS
- Course activities should be designed to foster HOS with consideration of Dale's cone of learning experience.

Pedagogies:

- Flipped Classroom,
- Think Pair Share,



- Peer Learning
- Problem-Based Learning
- Experiment-Based Learning
- Collaborative Learning
- Gamification
- Personalized Learning,
- Group Discussion,
- Debate,
- Case Studies

List of Assessment Tools

- I. Mid semester Test
- II. End semester Examination
- III. Quiz
- IV. Assignment
- V. Practical/ Lab work
- VI. Industrial Visit, Workshop
- VII. Seminar Presentation/Colloquium presentation
- VIII. Project/ Dissertation
- IX. Other Task/Activity

Continuous Improvement:

Continuous improvement in OBE involves systematically reviewing, analyzing, and enhancing educational processes and outcomes to ensure they meet the evolving needs and expectations of stakeholders, including students, faculty, employers, and society at large. Stakeholder engagement, data-informed decision-making, and ongoing professional development are key strategies. Challenges include resource constraints and resistance to change. Balancing innovation with stability is crucial. By fostering a culture of collaboration and innovation, institutions can ensure that educational programs remain relevant and effective in preparing students for success in a rapidly changing world.

Annexure: Suggested Processes

a) Process for defining /Review of Vision, Mission, Program Objectives and Outcomes:



b) Process for Curriculum Design:





c) Process for identifying extent of compliance of the curriculum for PO/PSO attainment



d) Process to improve quality of Teaching-Learning:







e) Process for Continuous Assessment Question Paper setting with outcomes/ learning levels perspective, evaluation and effective process implementation



f) Process of Project Allocation, Monitoring, Evaluation and Assessment of performance:





g) Assessment processes used to gather the data upon for evaluation of CO :



h) Assessment tools & processes for assessing the attainment of POs & PSOs.

