GANPAT UNIVERSITY

FACULTY OF ENGINEERING & TECHNOLOGY

Programme	Master of Technology	Branch/Spec.	Chemical Engineering
Semester	II	Version	1.0.0.0
Effective from Academic Year	2026-27	Effective for the batch Admitted in	July 2026
Subject code	**3CH2103**	Subject Name	**Engineering Economics and Project Evaluation**

Teaching scheme						Examination scheme (Marks)			
(Per week)	Lecture (DT)		Practical (Lab.)		Total		CE	SEE	Total
	L	TU	P	TW					
Credit	3	0	0	0	3	Theory	40	60	100
Hours	3	0	0	0	3	Practical	0	0	0

Pre-requisites:

Basic knowledge of Engineering Mathematics, Chemical Process Calculations, and Fundamentals of Chemical Engineering Design.

Course Outcomes

On successful completion of the course, the students will be able to:

CO1	Apply engineering economics principles and time-value-of-money methods in chemical projects.
CO2	Estimate capital investment, operating costs, and analyze project cash flows.
CO3	Evaluate plant location, layout design, and economic feasibility of process plants.
CO4	Develop and manage project schedules using GANTT charts and PERT/CPM techniques.

Theory syllabus

Unit	Content	Hrs
1	**Fundamentals of Engineering Economics:** Nature and scope of engineering economics, Role of economics in chemical process design and decision making, Time value of money, Simple and compound interest, Nominal and effective interest rate, Continuous compounding, Cash flow diagrams, Economic equivalence, Present worth, Future worth, Annual worth methods	8
2	**Capital Cost Estimation and Cost Accounting:** Fixed capital investment and working capital, Direct and indirect costs, Total capital investment, Methods of cost estimation (factorial method, percentage of delivered equipment cost), Cost indices and capacity exponent method, Cost escalation and inflation adjustment, Manufacturing costs (variable, fixed, semi-variable), Cost of production, Cost sheet preparation for chemical plants	10
3	**Depreciation, Taxes and Cash Flow Analysis:** Concept of depreciation, Methods of depreciation (Straight-line, Declining balance, MACRS), Book value and salvage value, Income taxes and their impact on project cash flow, After-tax cash flow calculation, Working capital recovery, Replacement analysis, Economic life of equipment	8
4	**Plant Layout and Design with Economic Considerations:** Plant location factors, Site selection criteria for chemical plants, Types of plant layout (product, process, fixed-position), Equipment layout and space requirements, Material handling and safety considerations, Utility integration and piping layout, Economic factors influencing plant layout, Optimization of layout for cost minimization, Preliminary plant design and feasibility analysis	9
5	**Project Planning and Management for Chemical Plants:** Project identification and feasibility study, Technical and economic feasibility analysis, Project report preparation, GANTT charts, Critical Path Method (CPM), PERT analysis, Project scheduling and resource allocation, Cost	10

	control and monitoring, Project closure and performance evaluation	
Text Books		
1	*Engineering Economics* (2nd Edition) 2013 Pentice Hall India Pvt Ltd by **R Paneerselvam**	
2	*Engineering Economics* (1st Edition) 2016 CRC Press by **J.K Yates**	
3	*Plant Design and Economics for Chemical Engineers* (5th Edition) by **M. S. Peters & K. D. Timmerhaus**, *McGraw-Hill*	
4	*Process Engineering Economics* by **H. E. Schweyer**	
5	*Project Management:* A Systems Approach to Planning, Scheduling, and Controlling (13th Edition) by **Harold Kerzner**	
Reference Books		
1	*Advanced Engineering Economics* 2021 Wiley by **Chan S Park and Gunter P Sharp**	
ICT/MOOCs references		

1) **Coursera via NPTEL (Swayam):** "Engineering Economic Analysis" by Prof. Pradeep Kumar Jha (IIT Roorkee). https://onlinecourses.nptel.ac.in/noc25_me98/preview

Mapping of CO with PO and PSO:

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	2	1	1	1	1	1	1	1	2	2	2	1	1
CO2	3	3	2	2	2	1	1	1	1	2	2	3	2	1
CO3	2	3	3	2	2	2	3	1	2	2	2	3	3	1
CO4	2	2	3	2	3	1	1	1	2	2	3	2	2	2