

| Course code | Course Name | L-T-P-Credits | Year of Introduction |
|--|---|---------------|----------------------|
| CH402 | PROJECT ENGINEERING AND PROCESS PLANT ECONOMICS | 3-0-0-3 | 2016 |
| Prerequisite : Nil | | | |
| Course Objectives | | | |
| <ul style="list-style-type: none"> To impart the basic concepts of project engineering and economics | | | |
| Syllabus | | | |
| <p>Scope of project engineering - the role of project engineer, process engineering - flow diagrams - plot plans - engineering design and drafting, Planning and scheduling of projects, safety in plant design - plant constructions, start up and commissioning,</p> <p>Time value of money and equivalence - equations used in economic analysis, methods of calculating depreciation, cost estimation techniques, profitability analysis, break-even analysis, inflation, principles of accounting, profit and loss account, balance sheet account, ethics for engineers</p> | | | |
| Expected Outcome | | | |
| <p>At the end of the course the students will be able to</p> <ol style="list-style-type: none"> use efficient tools for planning, scheduling and commissioning of projects. use different tools of economic analysis for comparing different projects and in decision making. | | | |
| References | | | |
| <ol style="list-style-type: none"> Ernest E. Ludwig, Applied project engineering and management, Gulf Pub. Co., (1988) Jelen F.C., Cost and Optimisation Engineering, McGraw Hill Peters & Timmerhaus, Plant Design & Economics for Chemical Engineering, McGraw Hill Rase & Barrow, Project Engineering of Process Plants, John Wiley Schweyer, Process Engineering Economics, McGraw Hill | | | |
| Course Plan | | | |
| Module | Contents | Hours | Sem. Exam Marks |
| I | Classification of Projects, Scope of project engineering - the role of project engineer - R & D - TEF - plant location and site selection - preliminary data for construction projects - process engineering - flow diagrams - plot plans - engineering design and drafting | 7 | 15% |
| II | Planning and scheduling of projects - bar chart and network techniques - procurement operations - office procedures - contracts and contractors - project financing - statutory sanctions, | 7 | 15% |
| FIRST INTERNAL EXAMINATION | | | |
| III | Scope of piping engineering, pipe sizing technique, Codes and standards, Piping design, thermal insulation and buildings, safety in plant design - plant constructions, start up and commissioning | 6 | 15% |

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|------------------------------------|--|---|-----|
| IV | Time value of money and equivalence - equations used in economic analysis - compound interest and continuous interest, unacost - capitalized cost, depreciation and taxes - nature of depreciation - methods of determining depreciation - straight line - sinking fund - declining balances - double declining balance - sum of years digits and units of production methods | 6 | 15% |
| SECOND INTERNAL EXAMINATION | | | |
| V | Cost indices - material cost indices - labour cost indices - William's sixteenth factor - location index - Cost estimation - equipments for process plants - types of cost estimates - order of magnitude estimate - study estimate - preliminary estimate - definitive estimate - detailed estimate - techniques of cost estimates - conference techniques - comparison techniques graphic relationship - tabular relationship - unit rate techniques - lang factor method - hand factor method - Chilton method - miller method - Peter's and Timmerhaus ratio factor method principles of accounting - accounting definition - trial balance - balance sheet - profit and loss accounts - financial ratios related to balance sheet and profit and loss account, canons of ethics of engineers | 7 | 20% |
| VI | Profitability analysis - mathematical methods for profitability evaluation - payout time - payout time with interest - return on average investment - DCF rate of return - net present value - net present value index - break even analysis - variable cost and fixed cost - economic production chart for 100% capacity and dumping - non-linear economic production chart Inflation, una-burden, displacement vs replacement , | 9 | 20% |
| END SEMESTER EXAMINATION | | | |

Question Paper Pattern:

Maximum Marks: 100

Exam Duration: 3 Hours

Part A : There shall be **Three questions** uniformly covering Modules 1 and 2, each carrying 15 marks, of which the student has to answer any **Two questions**. At the most 4 subdivisions can be there in one main question with a total of 15 marks for all the subdivisions put together. (2 x15= 30 Marks)

Part B: There shall be **Three questions** uniformly covering Modules 3 and 4, each carrying 15 marks, of which the student has to answer any **Two questions**. At the most 4 subdivisions can be there in one main question with a total of 15 marks for all the subdivisions put together. (2 x15= 30 Marks)

Part C: There shall be **Three questions** uniformly covering Modules 5 and 6, each carrying 20 marks, of which the student has to answer any **Two questions**. At the most 4 subdivisions can be there in one main question with a total of 20 marks for all the subdivisions put together. (2 x20= 40 Marks)