

PROGRAM: THREE YEARS DIPLOMA PROGRAMME IN CIVIL ENGINEERING	
Course Code: PC601	Course Title: Design of Steel Structures & Drawing
Semester: VI	Credits: 4
Periods Per Week: (L: 4, T: 0, P: 0)	

COURSE OBJECTIVES:

This subject is an applied engineering subject Diploma holders in Civil Engineering will be required to supervise steel construction and fabrication. He may also be required to design simple structural elements, make changes in design depending upon availability of materials. This subject thus deals with elementary design, principles as per BIS code of practice IS: 800.

1. Structural Steel and Properties (3 hrs)

Advantages and disadvantages of Steel structures, structural steel sections, loads and load combinations, Limit state design- Design considerations, Failure criteria for steel, codal specifications and section classifications as per **IS 800-2007**.

2. Bolted Connections (05hrs)

Introduction, advantages and disadvantages of bolted connections, Difference between unfinished bolts and High strength friction grip bolts (HSFG). Behaviors of bolted joints, failure of bolted joints, Simple problems on finding shear strength, bearing strength, tensile strength of bolts (bearing type only). Tensile strength of plate, Efficiency of the joint. Simple Lap Joint Design problems.

Note: Excluding problems on HSFG Bolts and Long joints conditions.

3. Welded Connections (05hrs)

Introduction, advantages of welding, types of joints, weld symbols, specifications, effective area of weld, design strength of fillet weld, Simple problems on welded joints (fillet weld only).

4. Tension and Compression Members (10hrs)

Analysis and design of single angle section tension members and their bolted and welded connections with gusset plate as per IS:800 -2007

Analysis and design of single angle sections compression members (struts) and their Bolted and welded connections with gusset plate as per BIS:800

5. Columns: (8hrs)

Concept of buckling of columns, effective length and slenderness ratio, permissible stresses in compression as per IS:800 for different end conditions.

Analysis and Design of axially loaded single section steel column Types of column bases (Descriptive only) Beam and column, frame and seated connections (descriptive only, no design)

6. Roof Trusses (4 hrs)

Form of trusses, pitch of roof truss, spacing of trusses, spacing of purlins, connection between purlin and roof covering. Connection between purlin and principal rafter (no design, only concept)

7. Beams (03hrs)

Only concept of Beams. Introduction to plate girder and functions of various elements of a plate girder.

8. Drawing Exercises

E. Drawing No. 1: Roof Truss – Drawing of Fink Roof Truss with details of joints, fixing details of purlins and roof sheets.

F. Drawing No.2: Column and Column Bases - Drawing of splicing of steel columns. Drawings of slab base, gusseted base and grillage base for single section steel columns.

G. Drawing No.3 : Column Beam Connections

- a. Sealed and Framed Beam to Beam Connections
- b. Sealed and Framed beam o Column Connections

H. Drawing No. 4: Plate Girder

Plan and Elevation of Plate Girder with details at supports and connection of stiffness, flange angles and cover plate with web highlighting curtailment of plates.

I. Drawing No. 5: Draw at least one sheet using CAD software

Important Note: Use of IS: 800 and Steel Tables are permitted in examination.

COURSE OUTCOME

- After undergoing the subject, students will be able to:
- Explain structural properties of steel and its designation as per Indian Standards
- Select different types of bolted and welded joints
- Analyze and design single and double angle section struts and I section compression members
- Explain different types of trusses, their different components and usability
- Analyze and design of simply supported steel beams

- Select various types of plate girders
- Supervise fabrication and erection of steel structure like trusses, columns and girders

RECOMMENDED BOOKS

1. Duggal SK, "Design of Steel Structures" by Standard Publishers, Delhi
2. Birinder Singh, "Steel Structures Design and Drawing", Kaption Publishing House, Ludhiana
3. Ram Chandra, "Design of Steel Structures", Standard Publishers, Delhi
4. S Ramamurthan, "Design of Steel Structures",
5. Harbhajan Singh, "Design of Steel Structures", Abhishek Publishing, Chandigarh
6. IS Code : 800-2007
7. Loyal JS "Civil Engineering Drawing", Satya Parkashan, New Delhi
8. Chandel RP " Civil Engineering Drawings"
9. Kumar; NS " Civil Engineering Drawing " IPH, New Delhi
10. Malik RS and Meo GA, "Civil Engineering Drawing" Asian Publishing House, New Delhi
11. Singh, Birinder "RCC Design and Drawing" Kaption Publishing House, New Delhi.
12. Singh, Harbhajan, "Structural Drawings", Abhishek Publishers, Chandigarh
13. B.V. Sikka, Civil Engineering Drawing

SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Time Allotted (Hrs)	Marks Allotted (%)
1	3	05
2	05	10
3	05	10
4	10	20
5	08	15
6	04	05
7	03	10
8	10	25
Total	48	100

PROGRAM: THREE YEARS DIPLOMA PROGRAMME IN CIVIL ENGINEERING	
Course Code: HS602	Course Title: Entrepreneurship and Start-ups
Semester: VI	Credits: 3
Periods Per Week: 3(L: 3, T: 0, P: 0)	

COURSE OBJECTIVES:

1. Acquiring Entrepreneurial spirit and resourcefulness.
2. Familiarization with various uses of human resource for earning dignified means of living.
3. Understanding the concept and process of entrepreneurship-its contribution and role in the growth and development of individual and the nation.
4. Acquiring entrepreneurial quality, competency, and motivation.
5. Learning the process and skills of creation and management of entrepreneurial venture

COURSE CONTENT:

1. INTRODUCTION TO ENTREPRENEURSHIP AND START-UPS (8 hours)

- 1.1. Definitions, Traits of an entrepreneur, Entrepreneurship, Motivation
- 1.2. Types of Business Structures,
- 1.3. Similarities / differences between entrepreneurs and managers.

2. BUSINESS IDEAS AND THEIR IMPLEMENTATION (8 hours)

- 2.1. Discovering ideas and visualizing the business
- 2.2. Activity map
- 2.3. Business Plan

3. IDEA TO START-UP (8 hours)

- 3.1. Market Analysis– Identifying the target market,
- 3.2. Competition evaluation and Strategy Development,
- 3.3. Marketing and accounting,

4. MANAGEMENT (8 hours)

- 4.1. Company's Organization Structure,
- 4.2. Recruitment and management of talent.
- 4.3. Financial organization and management

5. FINANCING AND PROTECTION OF IDEAS (8 hours)

- 5.1. Financing methods available for start-ups in India
- 5.2. Communication of Ideas to potential investors– Investor Pitch
- 5.3. Patenting and Licenses

COURSE OUTCOMES

Upon completion of the course, this student will be able to demonstrate knowledge of the following topics:

1. Understanding the dynamic role of entrepreneurship and small businesses
2. Organizing and Managing a Small Business
3. Financial Planning and Control
4. Forms of Ownership for Small Business
5. Strategic Marketing Planning
6. New Product or Service Development
7. Business Plan Creation

SUGGESTED LEARNING RESOURCES

S.NO	Title of Book	Author	Publication
1	The Startup Owner's Manual: The Step by Step Guide for Building a Great Company	Steve Blank and Bob Dorf	K & S Ranch ISBN-978-0984999392
2	The Lean Startup: How Today's Entrepreneurs Use Continuous Innovation to Create Radically Successful Businesses	Eric Ries	Penguin UK ISBN-978-0670921607
3	Demand: Creating What People Love Before They Know They Want It	Adrian J. Slywotzky with Karl Weber	Headline Book Publishing ISBN-978-0755388974
4	The Innovator's Dilemma: The Revolutionary Book That Will Change the Way You Do Business	Clayton M. Chris Tensen	Harvard business ISBN

SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Time Allotted (Hrs)	Marks Allotted (%)
1	08	20
2	08	20
3	08	20
4	08	20
5	08	20

Total	40	100
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PROGRAM: THREE YEARS DIPLOMA PROGRAMME IN CIVIL ENGINEERING	
Course Code:OE603	Course Title: Energy conservation and Audit (Open Elective-III)
Semester: VI	Credits: 3
Periods per week: 3 (L:3, T:0, P:0)	

COURSE OBJECTIVE:

The subject aims at giving the basic knowledge of energy conservation and audit to the students in order to analyze and optimize the energy usage in various systems such as buildings and transportation for reduction in energy consumption and improving overall efficiency.

DETAILED CONTENT:

UNIT1: (16 hours)

1.1 Introduction to Energy Conservation:

- 1.1.1 Basic concepts of energy conservation
- 1.1.2 Importance of energy conservation and its impact on the environment and economy
- 1.1.3 Energy conservation policies and regulations

1.2 Energy Auditing:

- 1.2.1 Introduction to energy auditing
- 1.2.2 Energy audit process and methodologies
- 1.2.3 Energy audit tools and techniques
- 1.2.4 Types of energy audits (preliminary, walkthrough, comprehensive)
- 1.2.5 Data collection and analysis for energy auditing

UNIT 2: (8 hours)

Energy Systems and Efficiency:

- 2.1.1 Overview of energy systems (electrical, mechanical, thermal)
- 2.1.2 Energy efficiency principles and calculations
- 2.1.3 Energy performance assessment of various systems and equipment

2.1.4 Identifying energy loss and waste in systems

2.1.5 Energy-efficient technologies and practices

UNIT 3: (10 hours)

3 Building Energy Conservation:

3.1.1 Energy conservation in residential, commercial, and industrial buildings

3.1.2 Building envelope and insulation systems

3.1.3 HVAC (Heating, Ventilation, and Air Conditioning) systems and energy efficiency

3.1.4 Lighting systems and energy-efficient lighting design

3.1.5 Renewable energy integration in building

UNIT 4: (6 hours)

4 Renewable Energy Sources:

4.1.1 Overview of renewable energy sources (solar, wind, hydro, geothermal, biomass)

4.1.2 Integration of renewable energy systems

4.1.3 Feasibility analysis of renewable energy projects

4.1.4 Policies and incentives for renewable energy adoption

UNIT 5 (4 hours)

5 Energy Management and Planning:

5.1.1 Energy management strategies for organizations

5.1.2 Energy conservation planning and implementation

5.1.3 Monitoring and verification of energy savings

5.1.4 Energy performance contracting

COURSE OUTCOMES

Upon completion of the course, this student will be able to demonstrate knowledge of the following:

1. Identification of energy conservation opportunities in various industrial processes.
2. Gain knowledge on tools and techniques employed in energy auditing.
3. Comprehend an Energy Audit report, including economic parameters

REFERENCES:

1. "Energy Audit Handbook: A Guide for Energy Auditors" by A.K. Gupta and S.P. Kaushik
2. Energy Audit and Management: Principles and Practices" by Manish Goyal
3. Energy Management and Conservation Handbook" by Frank Kreith and D. Yogi Goswami

4. "Energy Audit of Building Systems: An Engineering Approach" by MoncefKarti

UNIT NO	TIME ALLOTED (HRS)	MARK ALLOTED (%)
01	16	33
02	08	17
03	10	20
04	06	17
05	04	13
TOTAL	44	100

5. "Energy Audit and Conservation" by S. Rao Parulekar

SUGGESTED DISTRIBUTION OF MARKS

PROGRAM: THREE YEARS DIPLOMA PROGRAMME IN CIVIL ENGINEERING	
Course code	Course Title: Engineering Economics and Accountancy (Open Elective -III)
Semester VI	Credits:-3
Period Per Week 3(L:3,T:0,P:0)	

Course Objectives:

EEA is a think beyond program which will make the student to examine the application of microeconomics theory as applied to the manager's responsibilities in an organization. To explain the basic principles of managerial economics, accounting and current business environment underlying business decision making. This course should emphasize the quantitative and qualitative applications of economic principle to business analysis

Course Content

UNIT I:

(7 hours)

Business Environment and Managerial Economics Business Environment -Characteristic features of Business, Features and evaluation of Sole Proprietorship, Partnership, Joint Stock Company, Public Enterprises and their types, Latest trends in Business Environment (Entrepreneurship). Managerial Economics - Definition, Nature and Scope of Managerial Economics— Demand Analysis: Demand Determinants, Law of Demand and its exceptions. Elasticity of Demand, Types, Significance of Elasticity of Demand, Demand Forecasting, Factors governing demand forecasting, methods of demand forecasting.

UNIT II:

(6 hours)

Theory of Production and Cost Analysis. Theory of Production - Production Function — ISO quants and ISO costs, MRTS, Least Cost Combination of Inputs, Cobb-Douglas Production function, Laws of Returns, Internal and External Economies of Scale. Cost Analysis - Cost concepts, Opportunity cost, fixed vs. Variable costs, explicit costs Vs. Implicit costs, Out of pocket costs vs. Imputed costs. Break-even Analysis (BEA)- Determination of Break-Even Point (simple problems) - Managerial Significance and limitations of BEA.

UNIT III:

(6 hours)

Market structures and Pricing Policies. Introduction to Markets & Market structures - Types of competition, Features of Perfect competition, Monopoly and Monopolistic Competition. Price-Output Determination in case of Perfect Competition and Monopoly. B: Pricing Policies & Methods - Cost plus Pricing, Marginal Cost Pricing, Sealed Bid Pricing, Going Rate Pricing, PLC based pricing methods. 103

UNIT IV:

(6 hours)

Capital and Capital Budgeting. Capital and its significance, Types of Capital, Estimation of Fixed and Working capital requirements, Methods and sources of raising finance. Capital Budgeting - Nature and scope of capital budgeting, features of capital budgeting proposals, Methods of Capital Budgeting: Payback Method, Accounting Rate of Return (ARR) and Net Present Value Method (simple problems)

UNIT V:

(7 hours)

Financial Accounting and Ratios Financial Accounting -Introduction, Accounting principles, Accounting Cycle, Journal, Ledger, Trial Balance- Final Accounts(Trading Account, Profit and Loss Account and Balance Sheet with simple adjustments). Financial Analysis Through Ratios - Computation, Analysis and Interpretation of Liquidity Ratios(Current Ratio and quick ratio), Activity Ratios(Inventory turnover ratio and Debtor Turnover ratio), Capital structure Ratios (Debt- Equity ratio, Interest Coverage ratio), and Profitability ratios (Gross Profit Ratio, Net Profit ratio, Operating Ratio, P/E Ratio and EPS).

Course Outcome:

- 1.Evaluate the economics theories, cost concepts & pricing policies.
- 2.Understand accountancy systems and analyze financial statements.
- 3.Understand the basic principle of managerial economics ,accountancy and current business environment.
- 4.Understand the quantative and qualitative application of economic principle to business analysis.

TEXT BOOKS

1. Aryasri, "Managerial Economics and Financial Analysis", TMH, 2'd edition, 2005.
2. Varshney & Maheswari, "Managerial Economics", 5th Edition Sultan Chand, 2003

REFERENCES

1. H. Craig Peterson & W. Cris Lewis, "Managerial Economics", PHI, 4th Edition

2. Domnick Salvatore, "Managerial Economics In a Global Economy", Thomson, 4^o Edition.
3. Raghunatha Reddy & Narasimhachary, "Managerial Economics & Financial Analysis", 4th Edition Scitech.
4. S.N. Maheswari & S.K. Maheswari, "Financial Accounting", 6th Edition Vikas. S. Dwivedi, "Managerial Economics", Vikas, 6th Edition.

SUGGESTED MARKS DISTRIBUTION

Unit	Time(hrs)	Marks
Unit I	7	20
Unit 1I	6	20
Unit 1II	6	20
Unit IV	6	20
Unit V	7	20
Total	32	100

PROGRAM: THREE YEARS DIPLOMA IN CIVIL ENGINEERING	
Course Code: OE 603	Course Title: Economic Policies in India (Open Elective -III)
Semester: VI	Credits:3
Periods Per Week: 3 (L:3, T:0, P:0)	

COURSE OBJECTIVE:

The objective of this course is to familiarize the students of different streams with the basic concepts, structure, problems and issues concerning Indian economy.

COURSE CONTENT:

UNIT-I

(7 Hours)

Basic features and problems of Indian Economy, Economic history of India, Nature of Indian Economy, Features and Indicators of Development, Poverty: Concept, Causes and Government policies, Unemployment in India: Concept, Causes and Government policies, Inflation: Nature and extent

UNIT-II

(7 Hours)

Sectoral composition of Indian Economy: Issues in Agriculture sector in India, land reforms, Productivity Trends and Crop Patterns, Green Revolution, Recent Issues in Indian Agriculture Growth, Trends and patterns in Agriculture: Rural Credit & Marketing, WTO & Agriculture

UNIT-III

(7 Hours)

Industrial development ,Industrial Sector in Pre-reform Period, Industrial Sector in Post-reform Period, Issues and Problems of Public Sector, small scale and cottage industries, industrial policy, Public sector in India, service sector in India

UNIT-IV

(8 Hours)

Economic policies: Economic planning in India, Implementation of Economic Policies, Parallel Economy, Role of Bureaucracy and Delivery Mechanism in

Implementation of Economic Policies, Planning commission v/s NITI Aayog, Five Year Plans, monetary policy in India, Fiscal Policy in India, Centre State Finance Relations, Finance commission in India. LPG policy in India

UNIT-V

(7 Hours)

External sector in India- India's foreign trade value composition and direction, India Balance of payment since 1991, Role of Foreign Capital-FDI and Multinational Corporations, Impact of Globalization on Indian Economy, WTO and India

COURSE OUTCOME:

After the completion of the course the student will be able to:

1. Understand Indian economic policies, planning strategies
2. Analyze economic issues and find solutions to complex economic problems and take correct economic judgment.
3. Describe the economic Planning in India.
4. Explain the Objective, Strategies and Evaluation of economic Planning in India
5. Able to identify the problems and capable to decide the application for future development.

RECOMMENDED BOOKS:

1. The Indian Economy; S.K. Ray; Prentic, Hall of India Private Limited New Delhi.
2. Indian Economy ; Gaurav Datt and Aswani Mahajan; S. Chand and Company LTD. Ram Nagar, New Delhi
3. Dutt Rudder and KPM Sunnderam(2017) Indian Economy S Chand & Co, Ltd. New Delhi .
4. Mishra S.K & VK Puri (2017) Indian Economy and its development experience, Himalaya Publishing House.
5. Singh, Ramesh (2016): Indian Econoy, Tata –McGraw Hill Publications, New Delhi
6. Karam Singh Gill (1978), Evolution of the Indian Economy, NCERT, New Delhi

UNIT WISE TIME AND MARKS DISTRIBUTION

Unit	Time Allotted(Hrs)	Marks Allotted (%)
1	7	15
2	7	20
3	7	20
4	8	30
5	7	15
Total	36	100

PROGRAM: THREE YEARS DIPLOMA PROGRAMME IN CIVIL ENGINEERING	
Course Code: SI/PR604	Course Title: Major Project
Semester: VI	Credits: 7
Periods Per Week: 14 (L: 0, T: 0, P: 14)	

As far as possible students should be given live project problems with a view to:

- i) Develop understanding regarding the size and scale of operations and nature of field work in which students are going to play their role after completing the courses of study.
- ii) Develop understanding of subject based knowledge given in the classroom in the context of its application at work places.
- iii) Provide firsthand experience to develop confidence amongst the students to enable them to use and apply classroom based knowledge and skills to solve practical problems of the world of work.
- iv) Develop special skills and abilities like interpersonal skills, communication skills, attitudes and values.

For the fulfillment of above objectives, polytechnics may establish close linkage with 8-10 relevant organization for providing such an experience. It is necessary that each organization is visited well in advance by respective teachers and activities to be performed by students are well defined. The chosen activities should be such which are of curricular interest to students and of professional value to industrial/field organizations. Each teacher is expected to supervise and guide 5 - 6 students.

Effort should be made to identify actual field problems to be given as project work to the students. Project selected should not be too complex which is beyond the comprehension level of the students. The placement of the students for such a practical cum project work should match with the competency profile and interest of students. Students may be assessed both by industry and polytechnic faculty. The suggested performance criteria is given below:

- | | |
|---|----|
| a) Punctuality and regularity | 10 |
| b) Initiative in learning/working at site | 10 |
| c) Level/proficiency of practical skills acquired | 10 |
| d) Sense of responsibility | 10 |
| e) Self expression/Communication skills | 10 |
| f) Interpersonal skills | 10 |

- g) Report writing skills 20
h) Viva voce 20

Some of suggested projects are given below: These are only guidelines, teacher may take any project related to Civil Engineering depending upon the availability of projects. Preference should be given to practical oriented projects.

According to the need of the polytechnic, the following major projects are suggested:

1. Construction of a small concrete road consisting of following activities
 - Survey and preparation of site plan
 - Preparation of drawings i.e. L-Section and X-Section
 - Estimating earth work
 - Preparation of sub grade with stone ballast
 - Laying of concrete
 - Testing of slump, casting of cubes and testing
 - Material estimating and costing with specifications
 - Technical report writing
2. Water Supply system for a one or two villages
 - Surveying
 - Design of water requirements and water distribution system
 - Preparation of drawing of overhead tank
 - Material estimating and costing
 - Specifications
 - Technical report writing
3. Construction of seating benches in polytechnic campus
4. Welding of angle iron and Expanded metal jali to prepare fencing in polytechnic campus
5. Construction of toilets and baths for a shopping complex in a township
6. Construction of bridal path 4 kms long
7. Construction of shopping complex by detailing of RCC drawings, estimating and costing of material
8. Rainwater harvesting
 - Assessment of catchment's area
 - Intensity of rainfall
 - Collection of water
 - Soak pit design

- Supply of water
 - Monitoring during rainy season
9. Design and construction of septic tank with soak pit for 100 users
 10. Preparing plumbing detailed drawings of a two storey building and material estimate and costing
 11. Planning and design of sports stadium in a township or cluster of villages
 12. Design of small residential building including structural members, specifications, estimating and costing of materials, report writing and municipal drawings for water supply and sewerage system
 13. Concrete Mix Design
 14. Construction of concrete cubes by mixing appropriate quantity of fly ash with fibres
 - (i) the fibres like polypropylene, carbon, steel etc. can be used
 - (ii) students will show the comparison between concrete mixed with fibres verses the quality controlled concrete.
 15. Estimation and designing of a State Highway Road
 - (i) Reconnaissance survey of proposed road
 - (ii) To take L - section and cross sections
 - (iii) Fixing of grades
 - (iv) Estimation of cutting and filling of earth mass
 - (v) Plane tabling survey of proposed road
 - (vi) Estimation of proposed road
 16. Designing a small height gravity dam
 - (i) Constructing of catchment area
 - (ii) Calculating the reservoir capacity
 - (iii) Designing of gravity dam by taking into account various forces
 17. Designing of ferro-cement water tank and toilet. Testing of the ferro-cement products in civil engineering labs.

PROGRAM: THREE YEARS DIPLOMA PROGRAMME IN CIVIL ENGINEERING	
Course Code: SI/PR605	Course Title: Seminar
Semester: VI	Credits: 2
Periods Per Week: 4 (L: 0, T: 0, P: 4)	

Aim: -

- Development of professional awareness in before and after sales and services construction sector.

Course Objectives: - Student will be able to:

1. Acquire information from different sources.
2. Prepare notes for given topic.
3. Interact with peers to share thoughts.
4. Present given topic in a seminar.
5. Prepare a report on industrial visit, expert lecture

Pre-Requisite: -

1. Students should have complete knowledge of design of construction
2. Students should know all the govt norms related to construction industry.

Contents: -

Unit-1

Structured industrial visits shall be arranged and report of the same should be submitted by the individual students, to form a part of the term work. (Minimum 2 Visits)

Following are the suggested type of industries / Fields-

- a) Visit to RCC framed structure building for details of reinforcement.
- b) Visit to water / sewage treatment plant.
- c) Visit to works carried out under watershed development / micro-irrigation scheme.
- d) Visit to any structure undergoing rehabilitation/ retrofitting.

Unit-2

The Guest lecture/s from field / industry experts, professionals to be arranged (2Hrs duration), minimum 2 nos. from the following or alike topics. The brief report to be submitted on the guest lecture by each student as a part of Term work.

- a) HRD and civil engineering projects.
- b) Project planning and execution of Civil engineering projects.
- c) PWD system of accounts.
- d) Contract Management.
- e) RCC design and detailing

Unit-3

Information Search, data collection and writing a report on the topics

- a) Collection of data for valuation of old building.
- b) Collection of data and case study of failure of RCC structure.
- c) Collection of information on any topic from journal available in library

Unit-4

The Students should discuss in group of 6 to 8 students and write a brief report on the same as a part of term work. The topic of group discussions may be selected by the faculty members. Some of the suggested topics are:-

- a) Role of Civil engineer in disaster management.
- b) Scope of outsourcing of civil engineering services.
- c) Pollution control.

Unit-5

Seminar Presentation

The students should select a topic for Seminar based on recent development in civil engineering field, emerging technology etc.

PROGRAM: THREE YEARS DIPLOMA PROGRAMME IN CIVIL ENGINEERING	
Course Code: PE606	Course Title: Construction Contracts & Specifications (Elective-IV)
Semester: VI	Credits: 3
Periods Per Week: 3 (L: 3, T: 0, P: 0)	

Course Objectives: -

This course will enable students to analyze, evaluate and design construction contract documents.

Course Contents

Unit1 (12 hrs)

1.1 Agreement, Contract, essential conditions, Indian Contract Act 1872, types of contract, terminology of contract. Construction Specifications: standard specifications, general specification, development, interpretation.

Unit2 (12 hrs)

2.1 Tender and tender documents: types of bidding, tender notice, tendering procedure. Construction claims: extra item, excess quantity, deficit quantity, price escalation.

Unit3 (12 hrs)

3.1 Dispute resolution mechanism: litigation, arbitration, conciliation, mediation, dispute resolution board. Contractual Problems: possible contractual problems, creation of claims, development of disputes. Contractdocument: drafting of clauses, development, and interpretation, CPWD conditions of contract, FIDICconditions of contract.

Unit4 (12 hrs)

4.1 BOT contract: types of contract, PPP framework, types of risk, concession agreement, drafting of clauses, development, and interpretation.

Unit5 (12 hrs)

1.1 Laws affecting Engineers: Labour Law, Sales Tax, VAT,Service Tax, Excise Duty. Relational Contract: partnering,alliancing, key elements, processes.

Course Outcomes

At the end of the course the students should be able to:

1. Develop the tender documents for the project
2. Attain the knowledge on arbitration
3. Present the contract documents as per CPWD

References: -

1. "Managing Engineering and Construction Contracts: Some Perspectives" by Lakshman Prasad
2. "Basics of Construction Contracts" by Sharjeel Faiz
3. Civil Engineering Contract Administration and Control by Ivor H. Seeley

SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Time Allotted (Hrs)	Marks Allotted (%)
1	12	20
2	12	20
3	12	20
4	12	20
5	12	20
Total	48	100

PROGRAM: THREE YEARS DIPLOMA IN CIVIL ENGINEERING	
Course Code: PE606	Course Title: Construction Planning and Scheduling (Elective-IV)
Semester: VI	Credits:3
Periods Per Week: 3 (L:03T:0 P:0)	

COURSE OBJECTIVE:

1. To Understand the key issues of planning and scheduling in a clear, concise and practical way.
2. To provide details of the basis of these techniques and then look at how they are used in practice and how they are adopted, adapted and utilised in practical situations.
3. To describes the methods used to investigate equipment productivity and it provides equipment application understanding.

COURSE CONTENT:

1: An Introduction to Planning and Scheduling (6 hours)

A brief history of planning and scheduling Critical path methods Planning programming and scheduling The cost and benefits of planning Types of plans

2: Planning and Scheduling Techniques (12 hours)

Bar charts Flow diagrams Flow charts Work study Network analysis Activity-on-arrow networks Drawing the network Precedence diagrams Drawing the network-precedence diagrams Linked bar charts Space diagrams Time chainage charts Multiple activity charts Line of balance Line of balance – resource scheduling Work Breakdown Structure Pre-tender planning, pre-contract planning, contract planning Pre-tender planning Pre-contract planning Contract planning Activities: selection, sequencing and duration Activity selection Sequencing Assessing the duration of each activity Links, dependencies and constraints Float and contingency Total float Free float Interfering float Independent float Intermittent float Negative float Terminal float Internal float Contingency Manipulation of float

3: Introduction to Critical Chain Project Management & Earned Value Analysis (6 hours)

How does CCPM differ from accepted best practice in project management? Cost Performance Index (CPI) Cost variance Earned value analysis (EVA) Earned value management (EVM)

4: Equipment Economics and Equipment Used In Construction industry (12 hours)

Important Questions Equipment Records The Rent Paid for the Use of Money Cost of Capital Evaluating Investment Alternatives Elements of Ownership Cost Elements of Operating Cost for Bidding Replacement Decisions Rent and Lease Considerations

5: Planning for Earthwork Construction and Planning for Building Construction (8 hours)

Planning Graphical Presentation of Earthwork Quantities Mass Diagram Using the Mass Diagram. Introduction Site Layout Delivery of Structural Components Steel Erection Tilt-Up Construction LIFTING AND SUPPORT EQUIPMENT Cranes Aerial Lift Platforms Integrated Tool Carriers Telescopic Handlers/Forklifts Generators Portable Light Towers Portable Welding Equipment Construction Noise Mitigation Lighting Dust Vibration

COURSE OUTCOME:

After the completion of the course the student will be able to:

1. Better understand the planning and scheduling methods.
2. Understand the application of CPM
3. Get acquainted with various civil engg equipments and understand equipment economics.

RECOMMENDED BOOKS:

- 1) A Handbook for Construction Planning and Scheduling - Andrew Baldwin
- 2) Construction planning equipment and methods -R. L. Peurifoy
- 3) Construction Process Planning and Management-Sidney Levy

UNIT WISE TIME AND MARKS DISTRIBUTION

Topic No.	Time Allotted(Hrs)	Marks Allotted(%)
1	6	10
2	12	30
3	6	20
4	12	20
5	8	20
Total	44	100

PROGRAM: THREE YEARS DIPLOMA PROGRAMME IN CIVIL ENGINEERING	
Course Code: AU607	Course Title: Essence of Indian Knowledge & Tradition
Semester: VI	Credits: 0
Periods Per Week: 2 (L: 2, T: 0, P: 0)	

COURSE OBJECTIVES:

- 1:** To facilitate the students with the concepts of Indian traditional knowledge and to make them understand the Importance of roots of knowledge system.
- 2:** To make the students understand the traditional knowledge and analyse it and apply it to their day to day life.

COURSE CONTENT

UNIT 1: INTRODUCTION TO TRADITIONAL KNOWLEDGE (08 hrs)

Define traditional knowledge, nature and characteristics, scope and importance, kinds of traditional knowledge, Indigenous Knowledge (IK), characteristics, traditional knowledge vis-a-vis indigenous knowledge, traditional knowledge Vs western knowledge traditional knowledge

UNIT 2: PROTECTION OF TRADITIONAL KNOWLEDGE: (10 hrs)

The need for protecting traditional knowledge Significance of TK Protection, value of TK in global economy, Role of Government to harness Traditional Knowledge.

UNIT 3: LEGAL FRAMEWORK AND TRADITIONAL KNOWLEDGE (10 hrs)

A: The Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006, Plant Varieties Protection and Farmer's Rights Act, 2001(PPVFR Act);

B: The Biological Diversity Act 2002 and Rules 2004, the protection of traditional knowledge bill, 2016. Geographical indicators act 2003.

UNIT 4: TRADITIONAL KNOWLEDGE AND INTELLECTUAL PROPERTY (10 hrs)

Systems of traditional knowledge protection, Legal concepts for the protection of traditional knowledge, Certain non IPR mechanisms of traditional knowledge protection, Patents and traditional knowledge, Strategies to increase protection of traditional knowledge, global legal FORA for increasing protection of Indian Traditional Knowledge.

UNIT-V: TRADITIONAL KNOWLEDGE IN DIFFERENT SECTORS (10 hrs)

Traditional knowledge and engineering, Traditional medicine system, Traditional knowledge and biotechnology, Traditional Knowledge in agriculture, Traditional societies depend on it for their food and healthcare needs, Importance of conservation and sustainable development of environment, Management of biodiversity, Food security of the country and protection of Traditional Knowledge.

COURSE OUTCOME

At the end of the Course, Student will be able to:

- 1: Identify the concept of Traditional knowledge and its importance.
- 2: Explain the need and importance of protecting traditional knowledge.
- 3: Illustrate the various enactments related to the protection of traditional knowledge.
- 4: Interpret the concepts of Intellectual property to protect the traditional knowledge.
- 5: Explain the importance of Traditional knowledge in Agriculture and Medicine.

RECOMMENDED REFERENCE BOOKS AND TEXT BOOK

1. Traditional Knowledge System in India, by Amit Jha, 2009.
2. Traditional Knowledge System and Technology in India by Basanta Kumar Mohanta and Vipin Kumar Singh, Pratibha Prakashan 2012.
3. Traditional Knowledge System in India by Amit Jha Atlantic publishers, 2002.
4. "Knowledge Traditions and Practices of India "Kapil Kapoor, Michel Danino.

SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Time Allotted (Hrs)	Marks Allotted (%)
1	08	20
2	10	20
3	10	20
4	10	20
5	10	20
Total	48	100