Department of

ENGINEERING CIVIL

Syllabus for

Bachelor of Technology (Civil Engineering)

Academic Year (2016)

1 Semester - 2016 - Batch

Paper Code	Paper	Hours Per Week	Credits	Marks
CE134	BASICS OF CIVIL ENGINEERING AND ENGINEERING MECHANICS #	6	5	100
CH132	APPLIED CHEMISTRY #	6	05	150
CS134	BASICS OF COMPUTER SCIENCE AND ENGINEERING #	6	4	100
EC133	BASIC ELECTRONICS #	5	5	100

EE133 BASICS OF ELECTRICAL ENGINEERING # 4 4 100

EG135 ENGINEERING GRAPHICS 4 04 100

MA131 MATHEMATICS - I 5 4 100

ME135 BASICS OF MECHANICAL ENGINEERING 4 4 100

ME151 WORKSHOP PRACTICE 2 2 50

PD136 PROFESSIONAL DEVELOPMENT-I 4 3 100

PH132 APPLIED PHYSICS # 6 5 150

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2 Semester - 2016 - Batch

Paper Code

Paper

Hours Per Week

Credits

Marks

CE234 BASICS OF CIVIL ENGINEERING AND ENGINEERING MECHANICS# 6 5 100

CH232 APPLIED CHEMISTRY# 6 05 100

CS234 BASICS OF COMPUTER SCIENCE AND ENGINEERING# 6 4 100

EC233 BASIC ELECTRONICS# 5 5 100

EE233 BASICS OF ELECTRICAL ENGINEERING# 6 5 100

EG235 ENGINEERING GRAPHICS 4 04 100

ME235 BASICS OF MECHANICAL ENGINEERING 4 3 100

ME251 WORKSHOP PRACTICE 2 2 50

PD236 PROFESSIONAL DEVELOPMENT - I 4 3 100

PH232 APPLIED PHYSICS# 6 5 100

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3 Semester - 2015 - Batch

Paper Code	Paper	Hours Per Week	Credits	Marks
CE332	STRENGTH OF MATERIALS	5	04	100
CE333	SURVEYING	3	3	100
CE334	FLUID MECHANICS	4	4	100
CE335	BUILDING MATERIALS AND CONSTRUCTION	3	3	100
CE336	PROFESSIONAL DEVELOPMENT-II	4	4	100
CE351	MATERIALS TESTING LABORATORY	2	02	50
CE352	SURVEYING PRACTICE	2	2	50
HOL	HOLISTIC EDUCATION	1	1	50
MA331	MATHEMATICS - III	4	3	100

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4 Semester - 2015 - Batch

Paper Code	Paper	Hours Per Week	Credits	Marks
CE432	CONCRETE TECHNOLOGY	3	3	100
CE433	STRUCTURAL ANALYSIS - I	4	4	100
CE434	ADVANCED SURVEYING	4	03	100

CE435 HYDRAULICS AND HYDRAULIC MACHINES 4 4 100

CE436 BUILDING PLANNING AND DRAWING 4 04 100

CE451 HYDRAULICS AND HYDRAULIC MACHINERY LABORATORY 2 2 50

CE452 CONCRETE TECHNOLOGY LABORATORY 2 2 50

MA431 MATHEMATICS - IV 4 4 100

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5 Semester - 2014 - Batch

Paper Code

Paper

Hours Per Week

Credits

Marks

CE531 STRUCTURAL ANALYSIS - II 4 4 100

CE532 DESIGN OF RCC ELEMENTS 4 4 100

CE533 GEOTECHNICAL ENGINEERING - I 4 4 100

CE534 HYDROLOGY AND WATER RESOURCES ENGINEERING 4 4 100

CE535 TRANSPORTATION ENGINEERING - I 4 4 100

CE536 APPLIED ENGINEERING GEOLOGY 4 04 100

CE551 APPLIED ENGINEERING GEOLOGY LABORATORY 2 02 50

CE552 COMPUTER AIDED DESIGN LABORATORY 2 2 50

ME531 DESIGN OF MACHINE ELEMENTS - I 4 04 100

ME533 DYNAMICS OF MACHINES 4 4 100

ME534 TURBO MACHINES 4 4 100

ME535 MANUFACTURING PROCESS - III 4 4 100

ME536 COMPUTER AIDED MACHINE DRAWING 4 4 100

ME551 FLUID MECHANICS AND MACHINES LAB 2 2 50

ME552 ENERGY CONVERSION ENGINEERING LABORATORY 2 2 50

MTME135 ADVANCED DESIGN OF MECHANICAL SYSTEM 4 4 100

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6 Semester - 2014 - Batch

Paper Code

Paper

Hours Per Week

Credits

Marks

CE631 ENVIRONMENTAL ENGINEERING-I 4 4 100

CE632 DESIGN AND DRAWING OF RCC STRUCTURES 4 04 100

CE633 TRANSPORTATION ENGINEERING-II 4 4 100

CE634 GEOTECHNICAL ENGINEERING-II4 4 100

CE635 IRRIGATION ENGINEERING AND HYDRAULIC STRUCTURES 4 4 100

CE636A MATRIX METHOD OF STRUCTURAL ANALYSIS 4 4 100

CE636B TRAFFIC ENGINEERING 4 04 100

CE651 GEOTECHNICAL ENGINEERING LABORATORY 2 2 50

CE652 EXTENSIVE SURVEY PROJECT 2 02 50

ME631 DESIGN OF MACHINE ELEMENTS - II 4 04 100

ME632 HEAT AND MASS TRANSFER 4 4 100

ME633 FINITE ELEMENT METHODS 4 4 100

ME634 MECHATRONICS AND MICROPROCESSORS 4 4 100

ME636 HYDRAULICS AND PNEUMATICS 4 4 100

ME651 HEAT AND MASS TRANSFER LABORATORY 2 2 50

ME652 COMPUTER AIDED MODELING AND ANALYSIS LABORATORY 2 2 50

MTME234 FRACTURE MECHANICS 4 4 100

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7 Semester - 2013 - Batch

Paper Code

Paper

Hours Per Week

Credits

Marks

CE731 ENVIRONMENTAL ENGINEERING - II 4 4 100

CE732 DESIGN OF STEEL STRUCTURES 4 4 100

CE733 PRE-STRESSED CONCRETE 4 4 100

CE734 QUANTITY SURVEYING AND ESTIMATION 4 4 100

CE735 DESIGN AND DRAWING OF BRIDGES 4 04 100

CE736 ADVANCED CONCRETE TECHNOLOGY 4 04 100

CE751 ENVIRONMENTAL ENGINEERING LABORATORY 2 2 50

CE752 CONCRETE AND HIGHWAY MATERIALS LABORATORY 4 02 50

CE771 INTERNSHIP 1 2 0

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8 Semester - 2013 - Batch

Paper Code

Paper

Hours Per Week

Credits

Marks

BTCY01	CYBER SECURITY	2	2	50
CE831	PAVEMENT DESIGN	4	04	100
CE832	DESIGN OF MASONRY STRUCTURES	4	4	100
CE833	ENVIRONMENTAL IMPACT ASSESSMENT	4	4	100
CE871	PROJECT WORK	4	6	200
CE872	COMPREHENSION	2	2	50

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Assesment Pattern

ASSESSMENT - ONLY FOR THEORY COURSE (without practical component) Continuous Internal Assessment (CIA) : 50% (50 marks out of 100 marks) End Semester Examination(ESE) : 50% (50 marks out of 100 marks) Components of the CIA CIA I : Subject Assignments / Online Tests : 10 marks CIA II : Mid Semester Examination (Theory) : 25 marks CIA III: Quiz/Seminar/Case Studies/Project/ Innovative Assignments/presentations/publications : 10 marks Attendance : 05 marks Total : 50 marks Mid Semester Examination (MSE): Theory Papers: The MSE is conducted for 50 marks of 2 hours duration. Question paper pattern; Five out of Six questions have to be answered. Each question carries 10 marks End Semester Examination (ESE): The ESE is conducted for 100 marks of 3 hours duration. The syllabus for the theory papers are divided into FIVE units and each unit carries equal weightage in terms of marks distribution. Question paper pattern is as follows. Two full questions with either or choice will be drawn from each unit. Each question carries 20 marks. There could be a maximum of three sub divisions in a question. The emphasis on the questions is to test the objectiveness, analytical skill and application skill of the concept, from a question bank which reviewed and updated every year The criteria for drawing the questions from the Question Bank are as follows 50 % - Medium Level questions 25 % - Simple level questions 25 % - Complex level questions II. ASSESSMENT OF THEORY COURSE WITH PRACTICAL COMPONENT Theory : 70 marks Laboratory. : 30 marks TOTAL : 100 marks LABORATORY EVALUATION (30 marks) CIA: 15 Marks and End Semester Exam (ESE): 15 Marks Components of the CIA Conduct of experiments : 10 marks Observations/Lab Record : 05 marks TOTAL : 15 marks Eligibility for ESE: minimum of 40 % in CIA End Semester Exam (ESE) The ESE is conducted for 3 hours duration. Write up & Viva ? voce : 05 marks Execution : 10 marks TOTAL : 15 marks THEORY EXAMINATION (for 70 marks) Eligibility: Cleared practical exam with the minimum of 40 % marks 35 Marks CIA and 35 Marks End Semester Exam (ESE)

Components of the CIA CIA I : Assignments/tests/quiz :05marks CIA II: Mid Semester Examination (Theory) :20 marks CIA III: Quizzes/Seminar/Case Studies/Project Work/ Online Course (optional) /projects/publications/innovativeness :05 marks Attendance :05 marks Total : 35 marks End Semester Examination (ESE): The ESE is conducted for 100 marks of 3 hours duration, scaled to 70 % and pattern remain same as for the course without practical III. ASSESSMENT OF COURSE WITH ONLY PRACTICALS End Semester Examination (ESE) : 25 marks Mid Semester Examination (MSE) : 10 marks Conduct of experiments/record : 10 marks Attendance : 05 marks Total: 50 marks IV. ASSESSMENT OF COMPREHENSION, INTERNSHIP and SERVICE LEARNING Comprehension Passing marks 40% min Do not have ESE and completely evaluated through continuous assessment only, The evaluation (minimum 2 presentations) shall be based on the Topic / report :40% Presentation: 40% Response to the questions asked during presentation :20%. Service Learning Passing marks 40% min Do not have ESE and completely evaluated through continuous assessment only, Comprising Internal Assessment with components like tests/quiz/written assignments: 25 marks Field Work or equivalent assignment as approved by the department panel: 25 marks Internship Passing marks 40% min Do not have ESE and completely evaluated through continuous assessment only Continuous Internal Assessment is based upon No of Internship Days: 20 marks Type of Industry and Work Carried out : 10 marks Report on Internship : 10 marks Presentation on Internship : 10 marks V. ASSESSMENT OF PROJECT WORK Project work may be assigned to a single student (with due approval from department) or to a group of students not exceeding 4 per group. Maximum Marks = 200 Continuous Assessment 100 and the End Semester Examination (project report evaluation and viva-voce) : 100 marks. The continuous assessment and End Semester Examinations marks for Project Work and the Viva-Voce Examination will be distributed as indicated below. There shall be 3 review and the student shall make presentation on the progress made before the committee constituted by the Department The total marks obtained in the 3 reviews shall be 100 marks.

Examination And Assesments

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: 70 marks ? Laboratory. : 30 marks TOTAL : 100 marks LABORATORY EVALUATION (30 marks) CIA: 15 Marks and End Semester Exam (ESE): 15 Marks Components of the CIA Conduct of experiments : 10 marks Observations/Lab Record : 05 marks TOTAL : 15 marks Eligibility for ESE: minimum of 40 % in CIA End Semester Exam (ESE) The ESE is conducted for 3 hours duration. Write up & Viva voce : 05 marks Execution : 10 marks TOTAL : 15 marks THEORY EXAMINATION (for 70 marks) Eligibility: Cleared practical exam with the minimum of 40 % marks 35 Marks CIA and 35 Marks End Semester Exam (ESE) Components of the CIA CIA I : Assignments/tests/quiz :05marks CIA II: Mid Semester Examination (Theory) :20 marks CIA III: Quizzes/Seminar/Case Studies/Project Work/ Online Course (optional) /projects/publications/innovativeness :05 marks Attendance :05 marks Total : 35 marks End Semester Examination (ESE): The ESE is conducted for 100 marks of 3 hours duration, scaled to 70 % and pattern remain same as for the course without practical III. ASSESSMENT OF COURSE WITH ONLY PRACTICALS End Semester Examination (ESE) : 25 marks Mid Semester Examination (MSE) : 10 marks Conduct of experiments/record : 10 marks Attendance : 05 marks Total : 50 marks IV. ASSESSMENT OF COMPREHENSION, INTERNSHIP and SERVICE LEARNING Comprehension Passing marks 40% min Do not have ESE and completely evaluated through continuous assessment only, The evaluation (minimum 2 presentations) shall be based on the Topic / report :40% Presentation: 40% Response to the questions asked during presentation :20%. Service Learning Passing marks 40% min Do not have ESE and completely evaluated through continuous assessment only, Comprising Internal Assessment with components like tests/quiz/written assignments: 25 marks Field Work or equivalent assignment as approved by the department panel: 25 marks Internship Passing marks 40% min Do not have ESE and completely evaluated through continuous assessment only Continuous Internal Assessment is based upon No of Internship Days : 20 marks Type of Industry and Work Carried out : 10 marks Report on Internship : 10 marks Presentation on Internship : 10 marks

Department Overview:

Civil engineering course are designed to meet the needs of modern Civil Engineering fields like Construction Technology, Geo-Technical Engineering, Irrigation Engineering, Transportation Engineering, Structural Engineering, Environmental Engineering, etc. By the time students complete this course, they will be fully trained to analyze and design the complicatedstructures, Program Outcomes of Civil Engineering Department An ability to apply knowledge of mathematics, science, and engineering. An ability to design and conduct experiments, as well as to analyze and interpret data An ability to design a system, component, or process to meet desired needs. ? An ability to function on multi-disciplinary teams. ? An ability to identify, formulate and solve engineering problems. ? An understanding of professional and ethical responsibility ? An ability to communicate effectively ? The broad education necessary to understand the impact of engineering solutions in a global and societal context ? Recognition of the need for and an ability to engage in life-long learning Knowledge of contemporary issues. ? An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

Mission Statement:

Create and sustain a community of learning in which students acquire knowledge and learn to apply it professionally with due consideration for ethical, ecological and economic issues. Also, aim to provide knowledge-based technological services to satisfy the needs of society and industry and to help in building national capabilities in science, technology and research.

Introduction to Program:

Engineering Science is a key area in the study of an Engineering Course. A sound knowledge of this area develops principles of physics, laws of Chemistry and mathematical analytical skills, thus enabling graduates to solve numerical problems encountered in daily life, particularly in the area of engineering. An educational institution that does not respond to the present requirement and changes and does not lead to research will remain on the way side of the higher education missing the opportunities for going beyond. Keeping our vision ?Excellence and Service?, Engineering Science introduces student to those areas of Science which, from a modern point of view, are most important in connection with practical problems.

Program Objective:

The B. Tech. course aims at to fulfill the following broad objectives: 1. To make aware students about the importance and symbiosis between Science and Engineering. 2. Developing a respectable intellectual level seeking to expose the various concepts in Science. 3. To enhance the students reasoning, analytical and problem solving skills. 4. To cultivate a scientific habit of thought and reasoning. 5. To develop a research culture in young minds. 6. Development of students? competence by evolving a learner centered curriculum. 7. To encourage the students to uphold scientific integrity and objectivity in professional endeavors. 8. To translate a given physical or other information and data into mathematical form. 9. Obtaining the solution by selecting and applying suitable mathematical models. During the course students will learn to balance between the development of understanding and mastering of solution techniques with emphasis being on the development of student?s ability to use Science and Mathematics with understanding to solve Engineering problems by retaining the philosophy of ?learning by doing?.

CE134 - BASICS OF CIVIL ENGINEERING AND ENGINEERING MECHANICS # (2016 Batch)

Total Teaching Hours for Semester:75

No of Lecture Hours/Week:6

Max Marks:100

Credits:5

Course Objective

The students will understand the basics of civil engineering and Engineering Mechanics.

The students will understand the basic principles, laws, measurements, calculations and SI units.

The students will understand mechanics that studies the effects of forces and moments acting on rigid bodies that are either at rest or moving with constant velocity along a straight path for static condition only.

The students will understand the basic concepts of forces in the member, centriod, moment of inertia & friction.

Learning Outcome

Identify and differentiate the different branches of civil engineering.

Identify the basic properties of materials of construction.

Find the resultant of problems under co planar concurrent and non-concurrent force systems.

Find the reactions of systems under equilibrium by equations of equilibrium.

Find the support reactions of statically determinate beams.

Locate the centroid and moment of inertia of plane figures.

Find the normal reaction and frictional forces of systems under equilibrium.

Unit-1

Teaching Hours:5

Basics of Civil Engineering and Materials of Construction

Introduction to Civil Engineering, Surveying, Structural Engineering, Geotechnical Engineering, Transportation Engineering, Water resources Engineering, Environmental Engineering and Construction Project Management. Stones, Bricks, Tiles, Timber and Concrete.

Unit-2

Teaching Hours:17

Introduction to Engineering Mechanics

Introduction to Engineering Mechanics, Newton's laws of motion, Force systems and classification, Moment, Couple, Composition of Co planar Concurrent and Non concurrent force systems.

Unit-3

Teaching Hours:13

Equilibrium of Force Systems and Support Reactions

Equilibrium equations, Lami's Theorem, Reactions and Types of reactions, Supports and Types of Supports, Types of loading.

Unit-4

Teaching Hours:15

Centroid and Moment of Inertia

Centroid of plane figures, Moment of Inertia of Plane Figures, Parallel axis theorem, Perpendicular axis theorem and Radius of gyration.

Unit-5

Teaching Hours:10

Friction

Friction, Types of Friction, Angle of Friction, Angle of Repose, Block Friction, Ladder Friction and Wedge Friction.

Essential Text Books:

Bhavikatti S.S. “Elements of Civil Engineering (IV Edition) and Engineering Mechanics”, 2/E, Vikas Publishing House Pvt. Ltd., New Delhi, 2008

Jagadeesh T.R. and Jay Ram, “Elements of Civil Engineering and Engineering Mechanics”, 2/E, Sapana Book House, Bangalore, 2008.

Shesh Prakash and Mogaveer, “Elements of Civil Engineering and Engineering Mechanics”, 1/E, PHI learning Private Limited, New Delhi, 2009.

Meriam J. L, and Kraige., L. G , “Engineering Mechanics”, 5/E, Volume I, Wiley India Edition, India, 2009.

Recommended Reading:

CH132 - APPLIED CHEMISTRY # (2016 Batch)

Total Teaching Hours for Semester:90

No of Lecture Hours/Week:6

Max Marks:150

Credits:05

Course Objective

To familiarise the students on application oriented themes like the chemistry of materials used in engineering discipline

To focus the students on the chemistry of compounds resulting from pollution, waste generation and environmental degradation and to apply the knowledge in solving these current environmental problems effectively.

Learning Outcome

At the completion of this course, the successful student will be able to apply the knowledge of chemistry of materials in the traditional and emerging fields of engineering.

Unit-1

Teaching Hours:10

Chemical Energy Sources

Introduction to energy; Fuels - definition, classification, importance of hydrocarbons as fuels; Calorific value-definition, Gross and Net calorific values (SI units). Determination of calorific value of a solid / liquid fuel using Bomb calorimeter. Petroleum cracking-fluidised catalytic cracking. Reformation of petrol. Knocking - mechanism, octane number, cetane number, prevention of knocking, anti-knocking agents, unleaded petrol; synthetic petrol – Bergius process and Fischer Tropsch process; power alcohol.Solar Energy : Photovoltaic cells- Introduction, definition, importance, working of a PV cell; solar grade silicon, physical and chemical properties of silicon relevant to photovoltaics, production of solar grade (crystalline) silicon and doping of silicon.

Unit-2

Teaching Hours:15

Conversion and Storage of Electrochemical Energy

Battery Technology - Batteries-Basic concepts, battery characteristics. Classificationof batteries – primary, secondary and reserve batteries. Classical Batteries–Construction working and applications of Zn–air, Nickel-Metal hydride and Lithium-MnO_2 batteries, Fuel Cells - Introduction, types of fuel cells-Alkaline, Phosphoric acid and Molten carbonate fuel cells. Solid polymer electrolyte and solid oxide fuel cells. Construction and working of $H_2O_2$and Methanol-Oxygen fuel cell

Unit-2

Teaching Hours:15

Electrochemical Energy Systems (Electrode potential and cells)

Single electrode potential- origin, sign conventions. Derivation of Nernst equation. Standard electrode potential Construction of Galvanic cell–classification - primary, secondary and concentration cells, EMF of a cell, notation and conventions. Reference electrodes –calomel electrode, Ag/AgCl electrode.

Measurement of single electrode potential. Numerical problems on electrode potential and EMF. Ion-selective electrode- glass electrode, Determination of pH using glass electrode.

Unit-3

Teaching Hours:10

Corrosion Science

Corrosion - definition, Chemical corrosion and Electro-chemical theory of corrosion, Types of corrosion, Differential metal corrosion, Differential aeration corrosion (pitting and water line corrosion), Stress corrosion. Factors affecting the rate of corrosion, Corrosion control: Inorganic coatings – Anodizing and Phosphating, Metal coatings –Galvanization and Tinning, Corrosion Inhibitors, Cathodic and Anodic protection

Unit-4

Teaching Hours:8

Catalysis

Introduction, Types of catalysis, Absorption, absorption isotherms, rates of absorption, Physisorption and chemisorptions, Solid catalysis, types of catalysts, catalyst formulations and Preparation methods.

Unit-5

Teaching Hours:12

Water Technology

Impurities in water, Water analysis - Determination of different constituents in water – Hardness & Alkalinity, Numerical problems on hardness and alkalinity. Biochemical Oxygen Demand and Chemical Oxygen Demand. Numerical problems on BOD and COD. Sewage treatment. Potable water, purification of water - Flash evaporation, Electro dialysis and Reverse Osmosis. Hazardous chemicals with ill effects.

Unit-5

Teaching Hours:12

Instrumental Methods of Analysis

Theory, Instrumentation and Applications of Colorimetry, Potentiometry and Conductometry

Unit-6

Teaching Hours:30

CHEMISTRY LABORATORY

List of Experiments

Determination of viscosity coefficient of a given liquid using Ostwald's viscometer.

Determination of copper by spectrophotometric method.

Conductometric estimation of an acid using standard NaOH solution

Determination of pKa value of a weak acid using pH meter.

Potentiometric estimation of FAS using standard $K_2Cr_2O_7$ solution.

Determination of Total Hardness of a sample of water using disodium salt of EDTA.

Determination of Calcium Oxide (CaO) in the given sample of cement by Rapid EDTA method.

Determination of Carbonate, Bicarbonate and Chloride contents in water.

Determination of Iron in the given sample of Haematite ore solution using potassium dichromate crystals by external indication method.

Determination of Chemical Oxygen Demand (COD) of the given industrial waste Water sample.

Essential Text Books:

Dr. B.S. Jai Prakash, "Chemistry for Engineering Students", Subhas Stores, Bangalore, Revised Edition 2009

M. M. Uppal, "Engineering Chemistry", Khanna Publishers, Sixth Edition, 2001

Jain and Jain, "A text Book of Engineering Chemistry", S. Chand & Company Ltd. New Delhi, 2009

J. Bassett, R.C. Denny, G.H. Jeffery, "Vogels text book of quantitative inorganic analysis",4th Edition

Sunita and Ratan "Practical Engineering Chemistry"

Reference Books

Alkins P.W. “physical chemistry” ELBS IV edition 1998, London

G. W. Gray and P. A. Winsor, “Liquid crystals and plastic crystals”, Vol - I, Ellis Horwood series in Physical Chemistry, New York. (P. No. 106-142)

M. G. Fontana, “Corrosion Engineering”, Tata Mc Graw Hill Publications 1994.

Stanley E. Manahan, “Environmental Chemistry”, Lewis Publishers, 2000

B. R. Puri, L. R. Sharma & M. S. Pathania, ”Principles of Physical Chemistry”, S. Nagin Chand & Co., 33rd Ed.,1992

Kuriakose J.C. and Rajaram J. “ Chemistry in Engineering and Technology” Vol I & II, Tata Mc Graw – Hill Publications Co Ltd, NewDelhi, 1996.

G. Ertl, H. Knozinger and J. Weitkamp, "Handbook of Heterogeneous Catalysis" Vol 1-5, Wiley - VCH.

B. Viswanathan, S. Sivasanker , A.V. Ramaswamy, "Catalysis : Principles & Applications" CRC Press.

Recommended Reading:

Enginering Chemistry J.C. Kuriacase & J. Rajaram, Tata McGraw Hills co., New Delhi (2004).

Engineering Chemistry with Laboratory Experiments, Kaurav M. S.,PHI Learning Pvt. Ltd.

Vogel’s Text Book of Quantitative Chemical Analysis by G.H.Jeffery, J. Bassett, J. Mendham and R.C Denney.

Applied Chemistry – A text for Engineering & Technology – Springer (2005).

CS134 - BASICS OF COMPUTER SCIENCE AND ENGINEERING # (2016 Batch)

Total Teaching Hours for Semester:90

No of Lecture Hours/Week:6

Max Marks:100

Credits:4

Course Objective

To develop skill in problem solving concepts through learning C/C++ programming.

Learning Outcome

- Students will be able to read, understand and trace the execution of programs written in C/C++ language.
- For a given algorithm students will be able to write the C/C++ code using a modular approach.
- Students will be able to design programs involving decision structures, loops, functions, and pointers.

Unit-1

Teaching Hours:12

ALGORITHMS AND FLOWCHARTS

Algorithms, Flowcharts, Divide and conquer strategy. Examples on algorithms and flowcharts.

Constants, Variables, and Data types: Characters set, tokens, Keywords and Identifiers, Constants, Variables, Data types, Declaration of variables.

Unit-1

Teaching Hours:12

INTRODUCTION TO COMPUTERS

Introduction to Computers -Computer Systems, Basic organization of a computer, Computing Environments, Internet and World Wide Web, Information technology today, System software, Software engineering, Database management system, Computer network, Multimedia, IT in business, personal, social and ethical issues.

Problem formulation and problem solving, Computer Languages, Creating and running programs, Program Development. Introduction to the C/C++ Language –Background, example C/C++ programs, Preprocessor commands.

Unit-2

Teaching Hours:12

DECISION MAKING AND BRANCHING

Decision making with if statement, Simple if statement, The if…else statement, Nesting of if…else statements, The else … if ladder, The switch statement, The ?: operator, Goto

Unit-2

Teaching Hours:12

OPERATORS AND EXPRESSIONS

Arithmetic operators, Relational operators, Logical operators, Assignment operators, Increment and Decrement operators, Conditional operator, Bitwise operators, Special operators, Arithmetic expressions, Evaluation of expressions, Precedence of Arithmetic operators, Type conversions in expressions, Operator precedence and associatively.

Unit-2

Teaching Hours:12

LOOPING

The while statement, The do statement, The for statement, Jumps in Loops

Unit-2

Teaching Hours:12

MANAGING INPUT AND OUTPUT OPERATIONS

Reading a character, writing a character, Formatted Input, Formatted Output

Unit-3

Teaching Hours:12

ARRAYS

One-dimensional Arrays, Declaration of one-dimensional Arrays, Initialization of one-dimensional Arrays, Two-dimensional Arrays, Initializing two-dimensional Arrays.

Unit-3

Teaching Hours:12

USER-DEFINED FUNCTIONS

Need for User-defined Functions, A multi-function Program, Elements of user - defined Functions, Definition of Functions, Return Values and their types, Function Calls, Function Declaration, Category of Functions, No Arguments and no Return Values, Arguments but no Return Values, Arguments with Return Values, No Argument but Returns a Value, Functions that Return Multiple Value, Scope, Storage classes -auto, register, static, extern, scope rules, type qualifiers, recursion –recursive functions, Limitations of recursion

Unit-4

Teaching Hours:12

POINTERS

Understanding the pointers, Accessing the Address of a Variable, Declaring Pointer Variables, Initialization of Pointer Variables, Accessing a Variable through its Pointer, Pointer Expressions, Pointer Increments and Scale Factor, Pointers and Arrays, Pointers and Character Strings, Pointers as Function Arguments, Functions Returning Pointers.

Unit-5

Teaching Hours:12

STRINGS, STRUCTURE, UNION, FILES

Strings: String concepts, C/C++ strings, String I/O functions, Array of strings, String manipulation function, Memory formatting, Derived types-Enumerated, Structure, and Union: The type definition, Enumerated types, Structure, Accessing structures, Complex structures, Array of structures, Structures and functions, Union , Files: Classification of Files, Standard Library Functions for Files.

Essential Text Books:

1. Deitel and Deitel, "C How to Program", Prentice Hall 2010 (Reprint).

2. Herbert Schildt, "C++ : The Complete Reference", Mcgraw - Hill Osborne Media; 3rd edition 2012 (Reprint).

3. Yashvant Kanetkar, “Let Us C 13E”, BPB Publications – 13th Edition, 2013.

Recommended Reading:

1. Shelly and Junt, “Computers and Commemsense”, 4th edition, Prentice Hall of India, 2010 (Reprint).

2. Deniis P. Curtin, KIMfolly, Kunal Sen, Cathleen Morin, “Information Technology”, Tata MC GrawHill Companies, 2010 (Reprint).

3. Peter Norton, “Introduction to Computers”, 2011 (Reprint).

EC133 - BASIC ELECTRONICS # (2016 Batch)

Total Teaching Hours for Semester:60

No of Lecture Hours/Week:5

Max Marks:100

Credits:5

Course Objective

To impart basic knowledge about electronic and digital systems

To give basic ideas about various communication systems

Learning Outcome

- Identify the applications and functions of electronics in Engineering.

- Recognise basic electronic components and devices used for different electronic functions.

- Be able to use basic techniques for analyzing analogue and digital electronic circuits.

- Be able to design analogue and digital electronic circuits at block level.

Unit-1

Teaching Hours:12

BASIC SEMICONDUCTOR AND PN JUNCTION THEORY

Atomic Theory – Atom, Electron Orbits and Energy Levels - Conduction in solids – Electron Motion and Hole Transfer, Conventional Current and Electron Flow –Conductors, Insulators and Semiconductors – Energy Band Diagrams – Variation of band gap with temperature. Intrinsic and Extrinsic Semiconductors – Doping, n type and p type material, Majority and minority carriers, Charge Carrier Density, Mass Action Law. Semiconductor Conductivity – Drift Current, Diffusion Current, Charge Carrier Velocity, Condyctivity.The pn Junction – Biased Junctions – Junction Currents and Voltages.VI Characteristics – Static and Dynamic Resistance.Zener diode characteristics, Zener and Avalanche breakdown.

Unit-2

Teaching Hours:12

DIODE APPLICATIONS

Diode Approximations – DC Load Line Analysis - DC voltage applied to diodes (Si and zener diodes only). (Simple analysis using KCL and KVL). Rectifiers – Half Wave rectifier – Full Wave Rectifier – Bridge Rectifier : dc load current and voltage, rms load current and voltage, ripple factor, efficiency, PIV. Simple Capacitor Filter(Analysis not expected) – Simple Shunt Zener Voltage Regulator

Unit-3

Teaching Hours:12

BIPOLAR JUNCTION TRANSISTOR

Bipolar Junction Transistors: Transistor Construction – Operation – Common Base Configuration – Transistor Amplifying action – Common Collector – Common Emitter. Transistor currents.Common emitter current gain – Common Base Current gain – Relationship.

Transistor Biasing : Operating Point – Significance – Fixed Bias and Voltage Divider Bias – Simple analysis.

Unit-4

Teaching Hours:12

INTRODUCTION TO OPERATIONAL AMPLIFIERS

Block diagram, Op-amp transfer characteristics, Basic Op-amp parameters and its value for IC 741- offset voltage and current, input and output impedance, Gain, slew rate, bandwidth, CMRR, Concept of negative feedback, Inverting and Non-inverting amplifiers, Summing Amplifier, Subtractor, Differential Amplifier, integrator, differentiator, Voltage follower, Introduction to Oscillators, the Barkhausen Criterion for Oscillations, Applications of Oscillator

Unit-5

Teaching Hours:12

DIGITAL ELECTRONICS

Sampling theorem, Introduction, decimal system, Binary, Octal and Hexadecimal number systems, addition and subtraction, fractional number, Binary Coded Decimal numbers. Boolean algebra, Logic gates, Two Variable and three variable K – maps - Half-adder, Full-adder, Logic Design based on two and three input variables only.

Essential Text Books:

1. David A. Bell, “Electronic Devices and Circuits” – Vth Edition, OUP

2. N. P. Deshpande, “Electronic Devices and Circuits – Principles and Applications”, TMH.

3. Robert L Boylestad& Louis Nashelsky, "Electronic Devices and Circuit Theory", 3rd Edition.

4. Morris Mano, “Digital Logic and Computer Design”, PHI, EEE

Recommended Reading:

1. Donald A. Neamen, “Electronic Circuits”, 3rd Edition, TMH

2. Thomas L. Floyd, “Electronic Devices”, Seventh Edition, Pearson Education.

3. Albert Malvino, David. J. Bates, —Electronic Principles , 7th Edition, Tata McGraw Hill, 2007

EE133 - BASICS OF ELECTRICAL ENGINEERING # (2016 Batch)

Total Teaching Hours for Semester:60

No of Lecture Hours/Week:4

Max Marks:100

Credits:4

Course Objective

- To identify and understand the electrical components.

- To solve the AC and DC electrical network

- To know the basic concepts of electrical power systems

- To explain the working principle, construction, applications of power system components.

- To understand the importance of renewable energy

- To apply electrical knowledge in day-to-day life.

Learning Outcome

At the end of the course students will be able to

Identify and analyze the different types of dc and ac circuits and determine the various electrical quantities related to it.

Gain the thorough knowledge of power system components, generation, transmission and distribution system.

Explain the different types of loads and tariff schemes.

Describe the importance of Electrical Energy conservation and Effective usage of Electrical energy.

Explain the principle of various generating plant both renewable and non-renewable.

Unit-1

Teaching Hours:12

Basic Electrical Concepts

Introduction to basic electrical quantities: Charge, Voltage, Current, Power and Energy. Active and passive elements – Basic Laws: Ohm’s law - Kirchhoff’s laws – Analysis of DC circuits– Direct method (only Branch current method) and Network Reduction method : Resistances in series, parallel, star and delta topology – Electromagnetism and its Applications - Faraday's Laws of electromagnetic induction - Lenz's law - Fleming's Right and Left Hand Rule.

Unit-2

Teaching Hours:12

Single Phase AC Circuits

Introduction to AC signal – Derivation of RMS, average, peak value of sinusoidal signal -Representation of AC signal - Relationship between voltage and current in circuits containing individual and combination of R, L and C- Impedance, Active, Reactive, Apparent power and Power Factor

Unit-3

Teaching Hours:12

Basics of Electrical Power System

General structure of electrical power system - power transmission & distribution voltage levels - Power system components: Alternator, Transformer, Transmission line, Fuse, Miniature Circuit breaker (Construction and Working principle) – Introduction to three phase network, Comparison of Overhead and underground distribution System.

Unit-4

Teaching Hours:12

Electrical Energy Utilization

Types of Loads and Tariff structure - Domestic wiring and its components: Incandescent lamp, fluorescent lamp, heater, protective devices and switches, Single phase Induction motors –Safety measures - Electrical engineering materials–conductor, insulator and semiconductor materials in electrical system - Electrical Energy conservation: Necessity and Measures.

Unit-5

Teaching Hours:12

Renewable and Non-renewable Energy Sources

Sources of energy - Power generation: thermal, hydel, nuclear - Advantages of renewable energy sources - Power generation: solar, wind, tidal, biomass, OTEC, geothermal – Electrical characteristics of PV cell

Essential Text Books:

1. Arthur Eugene Fitzgerald, David E. Higginbotham, Arvin Grabel, “Basic electrical

engineering: circuits, electronics, machines, controls”, McGraw-Hill, Fifth Edition.

2. E. Hughes; “Electrical Technology",9th Edition”, Pearson, 2005.

Recommended Reading:

a. Dr. K Uma Rao and Dr. A Jayalakshmi, “Basic Electrical Engineering”, Revised Edition, Sanguine Technical publishers, 2014.

b. Kothari D. P. & Nagarath I. J, “Basic Electrical Technology”, TMH, 2004

c. Rajendra Prasad, “Fundamentals of Electrical Engineering”, Prentice Hall of India Pvt. Ltd., 2005

d. K.A. Krishnamurthy and M.R Raghuveer, “Electrical, Electronics and Computer Engineering”, 2nd Edition, T.M.H., 2001

e. D C Kulshreshtha, “Basic Electrical Engineering”,TMH.

f. Abhijit Chakrabarti, Sudipta Nath & Chandan Kumar Chanda, “Basic Electrical Engineering”, TMH, 2009.

EG135 - ENGINEERING GRAPHICS (2016 Batch)

Total Teaching Hours for Semester:60

No of Lecture Hours/Week:4

Max Marks:100

Credits:04

Course Objective

Provides basic knowledge about Orthographic projections, Projections of points, Projection of lines, Projection of Planes and Projection of Solids, development of Surfaces & isometric projections & also helps students learn Solid Edge.

To draw and interpret various projections of 1D, 2D and 3D objects..

To prepare and interpret the drawings.

Hands on training in Solid Edge.

Learning Outcome

Will be in a position to convert vision /imagination into reality.

Acquires knowledge of scaling.

Can develop plan and elevation of geometrical objects.

Can produce development of surfaces.

Draw isomertic projection ofobjects.

Unit-1

Teaching Hours:10

Introduction to Computer Aided Sketching:

Introduction, Drawing Instruments and their uses, BIS conventions, Lettering, Dimensioning and free hand practicing. Computer screen, layout of the software, standard tool bar/menus and description of most commonly used tool bars, navigational tools. Co-ordinate system and reference planes. Definitions of HP, VP, RPP & LPP. Creation of 2D/3D environment. Selection of drawing size and scale. Commands and creation of Lines, Co-ordinate points, axes, poly-lines, square, rectangle, polygons, splines, circles, ellipse, text, move, copy, off-set, mirror, rotate, trim, extend, break, chamfer, fillet, curves, constraints viz. tangency, parallelism, inclination and perpendicularity. Dimensioning, line conventions, material conventions and lettering

Unit-2

Teaching Hours:10

Orthogonal Projections:

Introduction, Definitions - Planes of projection, reference line and conventions employed, Projections of points in all the four quadrants, Projections of straight lines (located in First quadrant/first angle only), True and apparent lengths, True and apparent inclinations to reference planes (No application problems).

Unit-3

Teaching Hours:10

Orthographic Projections of Plane Surfaces (First Angle Projection Only)

Introduction, Definitions – projections of plane surfaces – triangle, square, rectangle, rhombus, pentagon, hexagon and circle, planes in different positions by change of position method only (No problems on punched plates and composite plates)

Unit-4

Teaching Hours:10

PROJECTIONS OF SOLIDS:

Introduction, Definitions – Projections of right regular tetrahedron, hexahedron (cube), prisms, pyramids, cylinders and cones in different positions. (No problems on octahedrons and combination solid)

Unit-5

Teaching Hours:10

SECTIONS AND DEVELOPMENT OF LATERAL SURFACES OF SOLIDS:

Introduction, Section planes, Sections, Section views, Sectional views, Apparent shapes and True shapes of Sections of right regular prisms, pyramids, cylinders and cones resting with base on HP. (No problems on sections of solids) Development of lateral surfaces of above solids, their frustums and truncations. (No problems on lateral surfaces of trays, tetrahedrons, spheres and transition pieces).

Unit-6

Teaching Hours:10

ISOMETRIC PROJECTION (USING ISOMETRIC SCALE ONLY):

Introduction, Isometric scale, Isometric projection of simple plane figures, Isometric projection of tetrahedron, hexahedron(cube), right regular prisms, pyramids, cylinders, cones, spheres, cut spheres and combination of solids (Maximum of three solids).

Essential Text Books:

1. K.R. Gopalakrishna, “Engineering Graphics”, 15th Edition, Subash Publishers Bangalore.

2. Basant Agrawal, C. M. Agrawal, “Engineering Drawing”, TMH.

3. N.D. Bhatt, “Engineering Graphics, Elementary Engineering Drawing”, 48th Edition, Charotar

Publishing House, 2005.

4. S. Trymbaka Murthy, “Computer Aided Engineering Drawing”, I.K. International Publishing

House Pvt. Ltd., New Delhi.

Recommended Reading:

P. J. Shah, “A Text Book og Engineering Graphics”, S. Chand & Company Ltd., New Delhi

Arunoday Kumar, “Engineering Graphics – I and II”, Tech – Max Publication, Pune.

T. Jeyapoovan, "Engineering Drawing & Graphics using Auro CAD 2000", Vikas Publishing

Hoise Pvt. Ltd. , New Delhi.

R. K. Dhawan, "A Text Book of Engineering Drawing", by S. Chand & Company Ltd., New Delhi.

P. S. Gill, "A Text Book of Engineering Drawing", S K Kataria & sons, Delhi.

D. A. Jolhe, "Engineering Drawing with an Introduction to Auto CAD", D. A. Jolhe Tata

McGraw – Hill Publishing Co. Ltd., New Delhi.

S. Trymbaka Murthy, "Computer Aided Engineering Drawing", I.K. International

Publishing House Pvt. Ltd., New Delhi.

HOL - HOLISTIC EDUCATION (2016 Batch)

Total Teaching Hours for Semester:12

No of Lecture Hours/Week:1

Max Marks:50

Credits:1

Course Objective

Christ University understands the limitations of compartmentalized knowledge which is not adequate enough to face the challenges of the globalized world. With a mission to prepare the students for life and not just for the acquisition of a degree, it encourages every initiative that would help students make perfect connections with the world outside. Inspired by the educational philosophy of Rousseau, Emerson, Ivan Illich, Paulo Freire, Gandhi, Tagore and Blessed Chavara, the University formulated this concept of Holistic Education more than fifteen years ago and included it in the curriculum and makes necessary changes every year. A group of teachers drawn from across the streams go through the whole process of designing the curriculum through a series of intense discussions under the broad classification of three skills: personal, interpersonal and societal.

Learning Outcome

Striving for Academic Excellence

Improved Personal Skills

Improved Interpersonal Skills

Improved Societal Skills

Citizens who can make effective contribution to Society

Professionals who can adapt to changing times

Awareness / Appreciation of Diversity

Strive to be better Human Beings

Life Long Learners

Ability to pursue excellence

Unit-1

Teaching Hours:6

I Semester UG

Personal Skill : Goal Setting and Cyber Etiquettes

Inter-Personal Skill : Dealing with Competition and Leading and Following

Societal Skill : Gender Sensitization and Community Living

III Semester UG

Personal Skill : Spirituality and Transition to Adulthood

Inter-Personal Skill : Alienation and Blocks in Relationship

Societal Skill : Gender Stereotypes and Good Governance

I Semester PG

Personal Skill : Accountability and Mindful Living

Inter-Personal Skill : Alienationand Blocks in Relationship

Societal Skill : Gender Sensitization and Sustainable Development

Essential Text Books:

Recommended Reading:

HOL - HOLISTIC EDUCATION (2016 Batch)

Total Teaching Hours for Semester:12

No of Lecture Hours/Week:1

Max Marks:50

Credits:1

Course Objective

Christ University understands the limitations of compartmentalized knowledge which is not adequate enough to face the challenges of the globalized world. With a mission to prepare the students for life and not just for the acquisition of a degree, it encourages every initiative that would help students make perfect connections with the world outside. Inspired by the educational philosophy of Rousseau, Emerson, Ivan Illich, Paulo Freire, Gandhi, Tagore and Blessed Chavara, the University formulated this concept of Holistic Education more than fifteen years ago and included it in the curriculum and makes necessary changes every year. A group of teachers drawn from across the streams go through the whole process of designing the curriculum through a series of intense discussions under the broad classification of three skills: personal, interpersonal and societal.

Learning Outcome

Striving for Academic Excellence

Improved Personal Skills

Improved Interpersonal Skills

Improved Societal Skills

Citizens who can make effective contribution to Society

Professionals who can adapt to changing times

Awareness / Appreciation of Diversity

Strive to be better Human Beings

Life Long Learners

Ability to pursue excellence

Unit-1

Teaching Hours:6

I Semester UG

Personal Skill : Goal Setting and Cyber Etiquettes

Inter-Personal Skill : Dealing with Competition and Leading and Following

Societal Skill : Gender Sensitization and Community Living

III Semester UG

Personal Skill : Spirituality and Transition to Adulthood

Inter-Personal Skill : Alienation and Blocks in Relationship

Societal Skill : Gender Stereotypes and Good Governance

I Semester PG

Personal Skill : Accountability and Mindful Living

Inter-Personal Skill : Alienationand Blocks in Relationship

Societal Skill : Gender Sensitization and Sustainable Development

Essential Text Books:

Recommended Reading:

MA131 - MATHEMATICS - I (2016 Batch)

Total Teaching Hours for Semester:60

No of Lecture Hours/Week:5

Max Marks:100

Credits:4

Course Objective

This course is outlined to those who intend to apply the subject at the proper place and time, while keeping him/her aware to the needs of the society where he/she can lend his/her expert service, and also to those who can be useful to the community without even going through the formal process of drilling through rigorous treatment of Mathematics.

Learning Outcome

At the end of this course, students will

have a solid base of understanding elementary linear algebra as required for further undergraduate work in engineering.

be able to differentiate a function partially with respect to each of its variables in turn

be able to utilize methods of integration to compute length of arcs, surface area and volume of solids

be skilled in using integration to compute problems important in physics and engineering

learn the meaning and computation of the curl and divergence of a vector field.

be able to solve first order differential equations that are separable, linear or exact

Unit-1

Teaching Hours:10

Linear Algebra

Fundamental concepts of Matrix, Rank of a Matrix, Consistency of the system of equations, Solution of linear simultaneous equations: - Gauss elimination and Gauss Jordan methods. Gauss – Seidel iterative method.

Eigen values and Eigen Vectors, Diagonalization,Computation of largest eigen value and the corresponding eigenvector by Rayleigh's power method.

Unit-2

Teaching Hours:12

Differential Calculus - I

Partial Differentiation: Partial derivatives, Euler's theorem. Total differential coefficient,

differentiation of composite and implicit functions, Jacobians and properties. Leibnitz's Rule of differentiation under integral sign.

Unit-3

Teaching Hours:14

Integral Calculus - I

Reduction formulae for the integration of

sin nx, cos nx, sin mx cos nxand evaluation of these integrals with standard limits - Problems. Tracing of standard curves in Cartesian, Parametric and Polar form.

Derivative of arc length, Applications of integration to find surfaces of revolution and volumes of solids of revolution.

Unit-4

Teaching Hours:12

Differential Equation - I

Solution of first order and first degree differential equations: Reducible to Homogeneous, Linear and Exact differential equation, Applications of differential equations. orthogonal trajectories.

Unit-5

Teaching Hours:12

Vector Calculus - I

Vector differentiation. Velocity, Acceleration of a particle moving on a space curve. Vector point function. directional derivative, Gradient, Divergence, Curl, Laplacian. Solenoidal and Irrotational vectors - Problems. Standard vector identities.

Essential Text Books:

TEXT BOOKS

1. Dr. B. S. Grewal, “Higher Engineering Mathematics”, 39th Edition, Khanna Publishers, July 2005.

2. H. K. Das & Rajnish Verma, “Higher Engineering Mathematics”, S. Chand &

Company Ltd., 2011.

Recommended Reading:

REFERENCE BOOKS

1. Erwin Kreyszig, “Advanced Engineering Mathematics”, 8th Edition, John Wiley & Sons, Inc, 2005

2. Thomas and Finney, “Calculus”, 9th Edition, Pearson Education, 2004

3. Peter V. O’Neil, “Advanced Engineering Mathematics”, Thomson Publication, Canada, 2007

4. B. V. Ramana, “Higher Engineering Mathematics”, Tata McGraw – Hill, 2009.

5. Michael Artin, “Algebra”, 2nd Edition, Prentice Hall of India Private Limited, New Delhi, 2002

6. Kenneth Hoffman and Ray Kunze, “Linear Algebra”, 2nd Edition, Prentice Hall of India Private Limited, New Delhi, 2002

7. George F. Simmons and Steven G. Krantz, “Differential Equation, Theory, Technique and Practice”, Tata McGraw – Hill, 2006.

8. M. D. Raisinghania, “Ordinary and Partial Differential Equation”, Chand (S.) & Co. Ltd., India, March 17, 2005.

K. A. Stroud, “Engineering Mathematics”, 5th Edition, Industrial Press, 2001.

MA131 - MATHEMATICS - I (2016 Batch)

Total Teaching Hours for Semester:60

No of Lecture Hours/Week:5

Max Marks:100

Credits:4

Course Objective

This course is outlined to those who intend to apply the subject at the proper place and time, while keeping him/her aware to the needs of the society where he/she can lend his/her expert service, and also to those who can be useful to the community without even going through the formal process of drilling through rigorous treatment of Mathematics.

Learning Outcome

At the end of this course, students will have a solid base of understanding elementary linear algebra as required for further undergraduate work in engineering.

be able to differentiate a function partially with respect to each of its variables in turn

be able to utilize methods of integration to compute length of arcs, surface area and volume of solids

be skilled in using integration to compute problems important in physics and engineering

learn the meaning and computation of the curl and divergence of a vector field.

be able to solve first order differential equations that are separable, linear or exact

Unit-1

Teaching Hours:10

Linear Algebra

Fundamental concepts of Matrix, Rank of a Matrix, Consistency of the system of equations, Solution of linear simultaneous equations: - Gauss elimination and Gauss Jordan methods. Gauss – Seidel iterative method.

Eigen values and Eigen Vectors, Diagonalization,Computation of largest eigen value and the corresponding eigenvector by Rayleigh’s power method.

Unit-2

Teaching Hours:12

Differential Calculus - I

Partial Differentiation: Partial derivatives, Euler’s theorem. Total differential coefficient,

differentiation of composite and implicit functions, Jacobians and properties. Leibnitz’s Rule of differentiation under integral sign.

Unit-3

Teaching Hours:14

Integral Calculus - I

Reduction formulae for the integration of

sin nx, cos nx, sin mx cos nxand evaluation of these integrals with standard limits - Problems. Tracing of standard curves in Cartesian, Parametric and Polar form.

Derivative of arc length, Applications of integration to find surfaces of revolution and volumes of solids of revolution.

Unit-4

Teaching Hours:12

Differential Equation - I

Solution of first order and first degree differential equations: Reducible to Homogeneous, Linear and Exact differential equation, Applications of differential equations. orthogonal trajectories.

Unit-5

Teaching Hours:12

Vector Calculus - I

Vector differentiation. Velocity, Acceleration of a particle moving on a space curve. Vector point function. directional derivative, Gradient, Divergence, Curl, Laplacian. Solenoidal and Irrotational vectors - Problems. Standard vector identities.

Essential Text Books:

TEXT BOOKS

1. Dr. B. S. Grewal, “Higher Engineering Mathematics”, 39th Edition, Khanna Publishers, July 2005.

2. H. K. Das & Rajnish Verma, “Higher Engineering Mathematics”, S. Chand &

Company Ltd., 2011.

Recommended Reading:

REFERENCE BOOKS

1. Erwin Kreyszig, “Advanced Engineering Mathematics”, 8th Edition, John Wiley & Sons, Inc, 2005

2. Thomas and Finney, “Calculus”, 9th Edition, Pearson Education, 2004

3. Peter V. O’Neil, “Advanced Engineering Mathematics”, Thomson Publication, Canada, 2007

4. B. V. Ramana, “Higher Engineering Mathematics”, Tata McGraw – Hill, 2009.

5. Michael Artin, “Algebra”, 2nd Edition, Prentice Hall of India Private Limited, New Delhi, 2002

6. Kenneth Hoffman and Ray Kunze, “Linear Algebra”, 2nd Edition, Prentice Hall of India Private Limited, New Delhi, 2002

7. George F. Simmons and Steven G. Krantz, “Differential Equation, Theory, Technique and Practice”, Tata McGraw – Hill, 2006.

8. M. D. Raisinghania, “Ordinary and Partial Differential Equation”, Chand (S.) & Co. Ltd., India, March 17, 2005.

K. A. Stroud, “Engineering Mathematics”, 5th Edition, Industrial Press, 2001.

ME135 - BASICS OF MECHANICAL ENGINEERING (2016 Batch)

Total Teaching Hours for Semester:60

No of Lecture Hours/Week:4

Max Marks:100

Credits:4

Course Objective

To familiarize with

The Source of conventional and renewable energy recourses

Fundamental concepts of thermodynamics and heat transfer

Elementary concepts on prime movers like IC Engines and turbines

Basic principles of refrigeration and air-conditioning.

Concepts of power transmission system

The various metal joining process.

The Basic theory of machine tools.

Learning Outcome

a) To be able to distinguish between different energy recourses

b) To demonstrate basic thermodynamic and heat transfer concepts

c) To distinguish between SI and CI engines and their working principles

d) To explain the working of turbines and their applications

e) To describe the functioning of refrigeration and air-conditioning

f) To be able to demonstrate work with machine tools and metal joining operations

Unit-1

Teaching Hours:10

ENERGY and its UTILISATION

Energy Resources

Conventional Resources- Petroleum based solid, liquid and gaseous fuels. Combustion and atmospheric pollution due to combustion of fuels. Brief on Emission norms.

Non Conventional Resources:

Solar Power, Solar Thermal energy harvesting, solar collectors, solar pond (principle of operation only), Solar photovoltaic principle. Wind Energy, Ocean Thermal, Geo- thermal, Tidal energy and bio mass energy- working principle. Brief on bio-fuels.

Merits and demerits of different energy resources.

Unit-2

Teaching Hours:12

THERMODYNAMICS and HEAT TRANSFER

Thermodynamics

Basic concepts: State, path, process (reversible and irreversible), and cycle, System, surroundings and boundary. Closed system, Open system and Isolated Systems. I Law of Thermodynamics (conservation of energy). Concept of Internal energy and Enthalpy. Limitations of I Law and Introduction to II law (statements and brief description). Heat engine and Heat pump – Carnot cycle. Concept of entropy. (Simple problems on Carnot efficiency and COP)

Heat Transfer

Applications of heat transfer. Modes of Heat transfer. Description of conduction, convection and radiation heat transfer-basic governing equations. Fins – types and applications. Heat exchangers-types. (only descriptions)

Unit-3

Teaching Hours:16

PRIME MOVERS

IC Engines

Classification, I.C. Engines parts, 2 Stroke and 4 stroke operations. SI and CI engines, Problems on indicated power, brake power, indicated thermal efficiency, brake thermal efficiency, mechanical efficiency, and specific fuel consumption.

A brief description of CRDI, MPFI, GDI and Hybrid Vehicles

Turbines 8 Hours

Steam Turbine:

Properties steam, boilers, fire and water tube boilers (Lancashire and Babcock and Will Cox boiler-working)

Classifications of steam turbines, Principle of operation of Impulse and reaction turbines, Delaval’ s turbine, Parson’ s turbine – working principles

Gas Turbine:

Working principles and operations of Open cycle and closed cycle gas turbines

Water turbines: Classification, Principles and operations of Pelton wheel, Francis turbine and Kaplan turbine

Unit-4

Teaching Hours:9

Refrigeration and Air-Conditioning

Refrigeration-History and applications. Refrigerants and its properties. Refrigerating effect and unit of Refrigeration. Principle and working of vapor Compression refrigeration and vapour absorption refrigeration:

Air-conditioning

Psychometry - different temperatures and humidity. Components of an air conditioner. Principles and applications of air conditioners, Room air conditioner. Introduction on cryogenics

Unit-5

Teaching Hours:13

Machine Tools and Metal Joining

Lathe Machine, Types, Parts, and different operations like-turning, facing, knurling, tapering and thread cutting.

Drilling Machine- Drilling,, Boring, Counter Boring , and Reaming operation. Radial and vertical drilling machines (simple sketches)

Milling Machine – up milling, down milling, Plane milling, End milling, Slot milling and gear cutting (sketches only for operations)

Material Joining

Soldering, Brazing and Welding : Definitions, classification and method of soldering, Brazing and welding. Differences between soldering, Brazing and Welding. Description of Electric, Arc Welding and Oxy-Acetylene Welding.

Essential Text Books:

1. K.R. Gopalkrishna, “A text Book of Elements of Mechanical Engineering”, Subhash Publishers, Bangalore.

2. S. Trymbaka Murthy, “A Text Book of Elements of Mechanical Engineering”, 3rd revised edition,I .K. International Publishing House Pvt. Ltd., New Delhi. 2010.

3. Dr. R. P. Reddy, N. Kapilan, “Elements of Mechanical Engineering”, 1st Edition, Himalaya Publishing House, New Delhi.

Recommended Reading:

1. SKH Chowdhary, AKH Chowdhary, Nirjhar Roy, “The Elements of Workshop Technology”, Vol. I & II, Media Promotors and Publishers, Mumbai.

2. Ghosh Mallik, “Manufacturing Technology”, TMH. HMT, Production Technology, TMH

ME151 - WORKSHOP PRACTICE (2016 Batch)

Total Teaching Hours for Semester:30

No of Lecture Hours/Week:2

Max Marks:50

Credits:2

Course Objective

To provide the students with the hands on experience on different trades of engineering like fitting, welding, carpentry & sheet metal.

Learning Outcome

On successful completion of this module the learner will be able to:

1.Demonstrate an understanding of and comply with workshop safety regulations.

2.Select and perform a range of machining operations to produce a given project.

3.Identify and use marking out tools, handtools, measuring equipment and to work to prescribed tolerances.

4.Demonstrate a knowledge of welding process selection and capabilities.

5.Demonstrate a knowledge of welding, joint design and the application of welding.

Unit-1

Teaching Hours:10

Fitting

a) Study of fitting tools

b) Study of fitting operations & joints

c) Minimum 5 models involving rectangular, triangular, semi circular and dovetail joints.

Unit-1

Teaching Hours:2

Introduction

Description of tools

Unit-2

Teaching Hours:10

Welding

d) Study of electric arc welding tools & equipments

e) Minimum 4 Models - electric arc welding - Butt joint, Lap joint, T joint & L joint.

Unit-3

Teaching Hours:8

Sheet metal

f) Study of development of surfaces

g) Minimum 03 models (Tray,Funnel,Cone)

Unit-4

Teaching Hours:2

Carpentry

Study and demonstration of Carpentry tools, joints and operations.

Essential Text Books:

S. K. H. Choudhury, A. K. H. Choudhury, Nirjhar Roy, “The Elements of Workshop Technology”, Vol 1 & 2, Media Publishers, Mumbai

Recommended Reading:

Kannaiah P. & Narayana K.L., “Manual on Workshop Practice”, Scitech Publications, (1999).

Engineering Practices Lab - Basic Workshop Practice Manual, by Jeyapoovan T., ISBN: 8125918000 (81-259-1800-0)

Bawa H.S., “Workshop Practice”, Tata McGraw Hill Publishing Company Limited, (2007).

PD136 - PROFESSIONAL DEVELOPMENT-I (2016 Batch)

Total Teaching Hours for Semester:55

No of Lecture Hours/Week:4

Max Marks:100

Credits:3

Course Objective

upon Successful completion of this course, the student will have reliably demonstrated the ability to respond effectively, efficiently, and appropriately to writing in ways that demonstrate comprehension and evaluation of its purpose and meaning. pon Successful completion of this course, the student will have reliably demonstrated the ability to respond effectively, efficiently, and appropriately to writing in ways that demonstrate comprehension and evaluation of its purpose and meaning.

Learning Outcome

Able to make an organized, and well prepared oral presentation to meet the needs of individuals and small groups.

- Able to write good academic essays.

- Able to take part in group discussions with a better speaking skill.

- Able to have a better understanding of the Mechanics of English language.

Unit-1

Teaching Hours:12

Business Communication

Defining communication . Classifying communication. Purpose of communication.Process of communication. Principles of communication. Communication structure in Organisations.Importance of communication in management. Oral communication.Barriers of communication.Conversation control, Reflection and Empathy, Two sides of effective oral communication, Effective listening. Verbal & Non Verbal.

Unit-2

Teaching Hours:12

Soft Skills

Personality development, Emotional intelligence, Lateral thinking, Leadership skills, Assertiveness, Teams man ship , Time management, Presentation skills, Group discussions and personal interviews.

Business etiquette, Body Language, Understanding Personal Space, Cross Cultural Communication, Conflict Resolution, Stress Management, Appropriate humour at workplace.

HR interaction on presentation skills

Unit-3

Teaching Hours:12

Functional English Grammar

Parts of Speech, Phrases & Clauses, Tenses, Concord, Passive and Active Voice, Run on, Fragments, Parallel Structure, Vocabulary, Commonly confused and misused words, Idioms, Misplaced & Dangling Modifiers.

Unit-4

Teaching Hours:12

Reading & Writing Skills

- Regular & Extended paragraphs, Types of paragraphs, Topic sentence, Supporting evidence. Analysis of regular & extended Paragraphs. Writing different types of paragraphs.

- Case method of learning:

- HR interaction on case writing

Understanding the case method of learning – different types of cases – Analyzing a case . (Previewing, skimming, reading, scanning). – Do's and don'ts for case preparation. Purpose of writing – Clarity in writing –Principles of effective writing. Pre writing – Writing – Revising – Editing. Specific writing features – Unity & coherence in writing.

- Business letters: Introduction to business letters – writing routine and persuasive letters – positive and negative messages- writing memos.

Unit-5

Teaching Hours:12

Academic Writing

Patterns of Essay development - Analysis of academic essays - Pre writing techniques - Thesis statement and supporting details - Purpose of writing – clarity in writing – Principles of effective writing - unity, coherence, support &sentence skill in writing - Essay outline - Different types of Academic Essays - Narratives, Descriptive, Classification, Comparison and Contrast - Argumentative & Process essays.

Essential Text Books:

Business communication: Concepts , cases and applications – P D Chaturvedi, Mukesh Chaturvedi Pearson.

Recommended Reading:

1. College Writing Skills with Readings: John Langan.

2. Business Communication, process and Product – Mary Ellen Guffey – Thomson Learning.

3. Basic Business Communication – Lesikar , Flatley.

4. Business Communication, M K Sehgal & V Khetrapal, Excel Books.

5. Effective Technical Communication By M Ashraf Rizvi.

6. Business Communication Today by Bovee Thill Scatzman – Pearson & Education , 7th Ed,2003

7. Contemporary Business Communication – Scot Ober-Bitztanntra.

8. Business Communication – Krizan , Merrier, Jones- Thomson Learning.

9. Business Communication – Meenakshi Raman. Prakash Singh.

PH132 - APPLIED PHYSICS # (2016 Batch)

Total Teaching Hours for Semester:90

No of Lecture Hours/Week:6

Max Marks:150

Credits:5

Course Objective

To extend student’s knowledge on the basic concepts and ideas in physics.

To develop scientific attitudes and enable the students to apply the concepts of Physics with the core programmes.

Learning Outcome

At the end of the course, the students would be able to

· Identify the fundamental aspects of modern physics and quantum mechanics.

· Compare classical and quantum free electron theory.

· Outline the salient properties of elastic and dielectric materials.

- Apply the concepts learnt in Laser, Fiber optics and Ultrasonics in the field of Engineering.

- Apply optical phenomenon in technology.

Unit-1

Teaching Hours:14

Modern Physics

Introduction, Planck's theory - Deduction of Wien's displacement law and Rayleigh Jean's law from Planck's law, Compton effect, de Broglie hypothesis – extension to electron particle. Phase velocity, group velocity, expression for group velocity based on superposition of waves, relation between group velocity and particle velocity. Scanning electron microscope. Problems.

Unit-2

Teaching Hours:12

Quantum Mechanics

Heisenberg's uncertainty principle and its physical significance. Application of uncertainty principle (Non-existence of electron in the nucleus). Second order differential equation for a travelling wave. Wave function. Properties and Physical significance of a wave function Schrodinger - Time independent wave equation – Application: Setting up of a one dimensional Schrödinger wave equation of a particle in a potential well of infinite depth : Probability density and Normalization of wave function – Energy Eigen values and Eigen function. Problems.

Unit-3

Teaching Hours:12

Electrical and Thermal Conductivities of metals

Classical free-electron theory. Introduction, assumptions and limitation of classical free-electron theory. Thermal Conductivity. Wiedemann - Franz law, calculation of Lorentz number.

Quantum free-electron theory – Postulates of quantum fee electron theory, Fermi - Dirac Statistics. Fermi-energy – Fermi factor. Density of states. Carrier concentration in metals. Expression for electrical resistivity/conductivity Temperature dependence of resistivity of metals. Band theory of solids - Merits of Quantum free electron theory. Problems.

Unit-4

Teaching Hours:12

Materials Science and Ultrasonics

Elasticity : Introduction, types of moduli of elasticity - Bending of beams – Single Cantilever - Young's modulus-Non uniform bending. Problems.

Dielectrics : Dielectric constant and polarisation of dielectric materials. Types of polarisation. Equation for internal fields in liquids and solids (one dimensional). Clausius – Mossotti equation. Ferro and Piezo – electricity(qualitative). Frequency dependence of dielectric constant. Important applications of dielectric materials.

Ultrasonics : Ultrasonics production – Magnetostriction and Piezoelectric methods – Application (NDT) non-destructive testing of materials- Flaw detection- Measurement of velocity in liquids. Determination of elastic constants in liquids using Ultrasonic Interferometer.Problems.

Unit-5

Teaching Hours:10

Applied Optics

Optics : Interference – thin films - Air wedge theory and experiment-Testing of flat surfaces. Anti reflection coating single and multi layer. Problems.

Lasers : Principle and production. Einstein's coefficients (expression for energy density). Requisites of a Laser system. Condition for Laser action. Principle, Construction and working of Nd YAG and semiconductor diode Laser. Applications of Laser – Laser welding, cutting and drilling. Measurement of atmospheric pollutants. Problems.

Optical Fibers : Introduction, Principle andPropagation of light in optical fibers. Angle of acceptance. Numerical aperture. Types of optical fibers and modes of propagation. Applications –optical fiber communication system. Problems.

Unit-6

Teaching Hours:30

PHYSICS LABORATORY

LIST OF EXPERIMENTS (Any Eight to be performed)

Basic Measuring Instruments –Vernier Calipers, Screw Gauge, Travelling Microscope

1. Thermal Conductivity of a bad conductor – Lee's disc apparatus

2. Interference at a wedge

3. Young's modulus – Non-uniform bending

4. Laser Diffraction (Determination of grating constant and number of rulings per inch using diffraction grating)

5. Ultrasonic Interferometer

6. Frequency determination – Melde's apparatus

7. Planck's Constant (Determination of Planck's constant using LED or using the principle of photoelectric effect)

8. Verification of Stefan's law

9. Measurement of Dielectric Constant (Charging & discharging of capacitor)

10. Determination of Fermi Energy

11. Photomultiplier Tube - Demonstration only

Essential Text Books:

1. M.N.Avadhanulu and P.G. Kshirsagar, “A Text Book of Engineering Physics”, S.Chand & Company Ltd, 9th Edition 2012.

2. John Wiley “Engineering Physics”,Wiley India Pvt. Ltd, 1st Edition 2014.

3. S.O. Pillai, “Solid State Physics”, New Age International, 6th Edition 2009.

4. S.P. Basavaraju, “ Engineering Physics”, Revised Edition 2009.

5. Charles Kittel, “Introduction to Solid State Physics” , 8th Edition.

6. Arthur Beiser, “Concepts of Modern Physics” , Special Indian Edition 2009.

7. Ajoy Ghatak, “Optics”,4th Edition 2009.

Laboratory

Physics Laboratory Manual for the First / Second Semester B.Tech, CUFE, 2016.

Recommended Reading:

1. R.K. Gaur and S.L. Gupta, "Engineering Physics", Dhanpatrai and Sons, New Delhi, 2001.

2. Sehgal Chopra Sehgal, “ Modern Physics ", Tata McGraw-Hill, 6th Edition, 2005.

3. Halliday, Resnick and Krane, "Fundamentals of Physics Extended",

John Wiley and Sons Inc., New York, 5th Edition, 1997.

4. P.Mani, “Engineering Physics”, Dhanam publishers, Revised Edition 2011.

5. H.J. Sawant, "Engineering Physics", Technical Publications, 1st Edition, 2010.

6. V. Rajendran, “Engineering Physics”, Tata Mcgraw Hill Publishing Company Limited, 1st Edition, 2009.

7. K.Eric Drexler, “Nanosystems - Molecular Machinery, Manufacturing and Computation”, John Wiely & Sons, 2005.

8. J David, N Cheeke , “Fundamentals and Applications of Ultrasonic Waves”, CRC Press 1st Edition, 2002.

9. Frederick J Bueche and Eugene Hecht “Schaum Outline of Theory and Problems of College Physics”, Tata McGraw-Hill, 11th Edition, 2012.

10. M. Ali Omar, “ Elementary Solid State Physics”, Addison-Wesley 1st Edition, 1993.

Laboratory

Sathyaseelan H, “Laboratory Manual in Applied Physics”, New Age International,

3rdEdition, 2012.

CE234 - BASICS OF CIVIL ENGINEERING AND ENGINEERING MECHANICS# (2016 Batch)

Total Teaching Hours for Semester:75

No of Lecture Hours/Week:6

Max Marks:100

Credits:5

Course Objective

The students will understand the basics of civil engineering and Engineering Mechanics.

The students will understand the basic principles, laws, measurements, calculations and SI units.

The students will understand mechanics that studies the effects of forces and moments acting on rigid bodies that are either at rest or moving with constant velocity along a straight path for static condition only.

The students will understand the basic concepts of forces in the member, centriod, moment of inertia & friction.

Learning Outcome

Identify and differentiate the different branches of civil engineering.

Identify the basic properties of materials of construction.

Find the resultant of problems under co planar concurrent and non-concurrent force systems.

Find the reactions of systems under equilibrium by equations of equilibrium.

Find the support reactions of statically determinate beams.

Locate the centroid and moment of inertia of plane figures.

Find the normal reaction and frictional forces of systems under equilibrium.

Unit-1

Teaching Hours:5

Basics of Civil Engineering and Materials of Construction

Introduction to Civil Engineering, Surveying, Structural Engineering, Geotechnical Engineering, Transportation Engineering, Water resources Engineering, Environmental Engineering and Construction Project Management. Stones, Bricks, Tiles, Timber and Concrete.

Unit-2

Teaching Hours:17

Introduction to Engineering Mechanics

Introduction to Engineering Mechanics, Newton's laws of motion, Force systems and classification, Moment, Couple, Composition of Co planar Concurrent and Non concurrent force systems.

Unit-3

Teaching Hours:13

Equilibrium of Force Systems and Support Reactions

Equilibrium equations, Lami's Theorem, Reactions and Types of reactions, Supports and Types of Supports, Types of loading.

Unit-4

Teaching Hours:15

Centroid and Moment of Inertia

Centroid of plane figures, Moment of Inertia of Plane Figures, Parallel axis theorem, Perpendicular axis theorem and Radius of gyration.

Unit-5

Teaching Hours:10

Friction

Friction, Types of Friction, Angle of Friction, Angle of Repose, Block Friction, Ladder Friction and Wedge Friction.

Essential Text Books:

Bhavikatti S.S. “Elements of Civil Engineering (IV Edition) and Engineering Mechanics”, 2/E, Vikas Publishing House Pvt. Ltd., New Delhi, 2008

Jagadeesh T.R. and Jay Ram, “Elements of Civil Engineering and Engineering Mechanics”, 2/E, Sapana Book House, Bangalore, 2008.

Shesh Prakash and Mogaveer, “Elements of Civil Engineering and Engineering Mechanics”, 1/E, PHI learning Private Limited, New Delhi, 2009.

Meriam J. L, and Kraige., L. G , “Engineering Mechanics”, 5/E, Volume I, Wiley India Edition, India, 2009.

Recommended Reading:

CH232 - APPLIED CHEMISTRY# (2016 Batch)

Total Teaching Hours for Semester:90

No of Lecture Hours/Week:6

Max Marks:100

Credits:05

Course Objective

To familiarise the students on application oriented themes like the chemistry of materials used in engineering discipline

To focus the students on the chemistry of compounds resulting from pollution, waste generation and environmental degradation and to apply the knowledge in solving these current environmental problems effectively.

Learning Outcome

At the completion of this course, the successful student will be able to apply the knowledge of chemistry of materials in the traditional and emerging fields of engineering.

Unit-1

Teaching Hours:10

Chemical Energy Sources

Introduction to energy; Fuels - definition, classification, importance of hydrocarbons as fuels; Calorific value-definition, Gross and Net calorific values (SI units). Determination of calorific value of a solid / liquid fuel using Bomb calorimeter. Petroleum cracking-fluidised catalytic cracking. Reformation of petrol. Knocking - mechanism, octane number, cetane number, prevention of knocking, anti-knocking agents, unleaded petrol; synthetic petrol – Bergius process and Fischer Tropsch process; power alcohol.Solar Energy : Photovoltaic cells- Introduction, definition, importance, working of a PV cell; solar grade silicon, physical and chemical properties of silicon relevant to photovoltaics, production of solar grade (crystalline) silicon and doping of silicon.

Unit-2

Teaching Hours:15

Conversion and Storage of Electrochemical Energy

Battery Technology - Batteries-Basic concepts, battery characteristics. Classificationof batteries – primary, secondary and reserve batteries. Classical Batteries–Construction working and applications of Zn–air, Nickel-Metal hydride and Lithium-MnO2 batteries, Fuel Cells - Introduction, types of fuel cells-Alkaline, Phosphoric acid and Molten carbonate fuel cells. Solid polymer electrolyte and solid oxide fuel cells. Construction and working of H2O2and Methanol-Oxygen fuel cell

Unit-2

Teaching Hours:15

Electrochemical Energy Systems (Electrode potential and cells)

Single electrode potential- origin, sign conventions. Derivation of Nernst equation. Standard electrode potential Construction of Galvanic cell–classification - primary, secondary and concentration cells, EMF of a cell, notation and conventions. Reference electrodes –calomel electrode, Ag/AgCl electrode. Measurement of single electrode potential. Numerical problems on electrode potential and EMF. Ion-selective electrode- glass electrode, Determination of pH using glass electrode.

Unit-3

Teaching Hours:10

Corrosion Science

Corrosion - definition, Chemical corrosion and Electro-chemical theory of corrosion, Types of corrosion, Differential metal corrosion, Differential aeration corrosion (pitting and water line corrosion), Stress corrosion. Factors affecting the rate of corrosion, Corrosion control: Inorganic coatings – Anodizing and Phosphating, Metal coatings –Galvanization and Tinning, Corrosion Inhibitors, Cathodic and Anodic protection

Unit-4

Teaching Hours:8

Catalysis

Introduction, Types of catalysis, Absorption, absorption isotherms, rates of absorption, Physisorption and chemisorptions, Solid catalysis, types of catalysts, catalyst formulations and Preparation methods.

Unit-5

Teaching Hours:42

Water Technology

Impurities in water, Water analysis - Determination of different constituents in water – Hardness & Alkalinity, Numerical problems on hardness and alkalinity. Biochemical Oxygen Demand and Chemical Oxygen Demand. Numerical problems on BOD and COD. Sewage treatment. Potable water, purification of water - Flash evaporation, Electro dialysis and Reverse Osmosis. Hazardous chemicals with ill effects.

Unit-5

Teaching Hours:42

Instrumental Methods of Analysis

Theory, Instrumentation and Applications of Colorimetry, Potentiometry and Conductometry

Unit-5

Teaching Hours:42

Chemistry Laboratory

List of Experiments

Determination of viscosity coefficient of a given liquid using Ostwald’s viscometer.

Determination of copper by spectrophotometric method.

Conductometric estimation of an acid using standard NaOH solution

Determination of pKa value of a weak acid using pH meter.

Potentiometric estimation of FAS using standard $K_2Cr_2O_7$ solution.

Determination of Total Hardness of a sample of water using disodium salt of EDTA.

Determination of Calcium Oxide (CaO) in the given sample of cement by Rapid EDTA method.

Determination of Carbonate, Bicarbonate and Chloride contents in water.

Determination of Iron in the given sample of Haematite ore solution using potassium dichromate crystals by external indication method.

Determination of Chemical Oxygen Demand (COD) of the given industrial waste Water sample.

Essential Text Books:

Dr. B.S. Jai Prakash, “Chemistry for Engineering Students”, Subhas Stores, Bangalore, Revised Edition 2009

M. M. Uppal, “Engineering Chemistry”, Khanna Publishers, Sixth Edition, 2001

Jain and Jain, “A text Book of Engineering Chemistry”, S. Chand & Company Ltd. New Delhi, 2009

J. Bassett, R.C. Denny, G.H. Jeffery, “Vogels text book of quantitative inorganic analysis”,4th Edition

Sunita and Ratan “Practical Engineering Chemistry”

Reference Books

Alkins P.W. “physical chemistry” ELBS IV edition 1998, London

G. W. Gray and P. A. Winsor, “Liquid crystals and plastic crystals”, Vol - I, Ellis Horwood series in Physical Chemistry, New York. (P. No. 106-142)

M. G. Fontana, “Corrosion Engineering”, Tata Mc Graw Hill Publications 1994.

Stanley E. Manahan, “Environmental Chemistry”, Lewis Publishers, 2000

B. R. Puri, L. R. Sharma & M. S. Pathania, ”Principles of Physical Chemistry”, S. Nagin Chand & Co., 33rd Ed.,1992

Kuriakose J.C. and Rajaram J. “ Chemistry in Engineering and Technology” Vol I & II, Tata Mc Graw – Hill Publications Co Ltd, NewDelhi, 1996.

G. Ertl, H. Knozinger and J. Weitkamp, "Handbook of Heterogeneous Catalysis" Vol 1-5, Wiley - VCH.

B. Viswanathan, S. Sivasanker , A.V. Ramaswamy, "Catalysis : Principles & Applications" CRC Press.

Recommended Reading:

Enginering Chemistry J.C. Kuriacase & J. Rajaram, Tata McGraw Hills co., New Delhi (2004).

Engineering Chemistry with Laboratory Experiments, Kaurav M. S.,PHI Learning Pvt. Ltd.

Vogel's Text Book of Quantitative Chemical Analysis by G.H.Jeffery, J. Bassett, J. Mendham and R.C Denney.

Applied Chemistry – A text for Engineering & Technology – Springer (2005).

CS234 - BASICS OF COMPUTER SCIENCE AND ENGINEERING# (2016 Batch)

Total Teaching Hours for Semester:90

No of Lecture Hours/Week:6

Max Marks:100

Credits:4

Course Objective

To develop skill in problem solving concepts through learning C/C++ programming.

Learning Outcome

· Students will be able to read, understand and trace the execution of programs written in C/C++ language.

· For a given algorithm students will be able to write the C/C++ code using a modular approach.

· Students will be able to design programs involving decision structures, loops, functions, and pointers.

Unit-1

Teaching Hours:12

ALGORITHMS AND FLOWCHARTS

Algorithms, Flowcharts, Divide and conquer strategy. Examples on algorithms and flowcharts.

Constants, Variables, and Data types: Characters set, tokens, Keywords and Identifiers, Constants, Variables, Data types, Declaration of variables.

Unit-1

Teaching Hours:12

INTRODUCTION TO COMPUTERS

Introduction to Computers -Computer Systems, Basic organization of a computer, Computing Environments, Internet and World Wide Web, Information technology today, System software, Software engineering, Database management system, Computer network, Multimedia, IT in business, personal, social and ethical issues.

Problem formulation and problem solving, Computer Languages, Creating and running programs, Program Development. Introduction to the C/C++ Language –Background, example C/C++ programs, Preprocessor commands.

Unit-2

Teaching Hours:12

DECISION MAKING AND BRANCHING

Decision making with if statement, Simple if statement, The if…else statement, Nesting of if…else statements, The else … if ladder, The switch statement, The ?: operator, Goto

Unit-2

Teaching Hours:12

MANAGING INPUT AND OUTPUT OPERATIONS

Reading a character, writing a character, Formatted Input, Formatted Output

Unit-2

Teaching Hours:12

OPERATORS AND EXPRESSIONS

Arithmetic operators, Relational operators, Logical operators, Assignment operators, Increment and Decrement operators, Conditional operator, Bitwise operators, Special operators, Arithmetic expressions, Evaluation of expressions, Precedence of Arithmetic operators, Type conversions in expressions, Operator precedence and associatively.

Unit-2

Teaching Hours:12

LOOPING

The while statement, The do statement, The for statement, Jumps in Loops

Unit-3

Teaching Hours:12

ARRAYS

One-dimensional Arrays, Declaration of one-dimensional Arrays, Initialization of one-dimensional Arrays, Two-dimensional Arrays, Initializing two-dimensional Arrays.

Unit-3

Teaching Hours:12

USER-DEFINED FUNCTIONS

Need for User-defined Functions, A multi-function Program, Elements of user - defined Functions, Definition of Functions, Return Values and their types, Function Calls, Function Declaration, Category of Functions, No Arguments and no Return Values, Arguments but no Return Values, Arguments with Return Values, No Argument but Returns a Value, Functions that Return Multiple Value, Scope, Storage classes -auto, register, static, extern, scope rules, type qualifiers, recursion –recursive functions, Limitations of recursion

Unit-4

Teaching Hours:12

POINTERS

Understanding the pointers, Accessing the Address of a Variable, Declaring Pointer Variables, Initialization of Pointer Variables, Accessing a Variable through its Pointer, Pointer Expressions, Pointer Increments and Scale Factor, Pointers and Arrays, Pointers and Character Strings, Pointers as Function Arguments, Functions Returning Pointers.

Unit-5

Teaching Hours:12

STRINGS, STRUCTURE, UNION, FILES

Strings: String concepts, C/C++ strings, String I/O functions, Array of strings, String manipulation function, Memory formatting, Derived types-Enumerated, Structure, and Union: The type definition, Enumerated types, Structure, Accessing structures, Complex structures, Array of structures, Structures and functions, Union , Files: Classification of Files, Standard Library Functions for Files.

Essential Text Books:

1. Deitel and Deitel, "C How to Program", Prentice Hall 2010 (Reprint).

2. Herbert Schildt, "C++ : The Complete Reference", Mcgraw - Hill Osborne Media; 3rd edition 2012 (Reprint).

3. Yashvant Kanetkar, “Let Us C 13E”, BPB Publications – 13th Edition, 2013.

Recommended Reading:

1. Shelly and Junt, “Computers and Commemsense”, 4th edition, Prentice Hall of India, 2010 (Reprint).

2. Deniis P. Curtin, KIMfolly, Kunal Sen, Cathleen Morin, “Information Technology”, Tata MC GrawHill Companies, 2010 (Reprint).

3. Peter Norton, “Introduction to Computers”, 2011 (Reprint).

EC233 - BASIC ELECTRONICS# (2016 Batch)

Total Teaching Hours for Semester:60

No of Lecture Hours/Week:5

Max Marks:100

Credits:5

Course Objective

- To impart basic knowledge about electronic and digital systems

- To give basic ideas about various communication systems

Learning Outcome

- Identify the applications and functions of electronics in Engineering.

- Recognise basic electronic components and devices used for different electronic functions.

- Be able to use basic techniques for analyzing analogue and digital electronic circuits

Be able to design analogue and digital electronic circuits at block level.

Unit-1

Teaching Hours:12

BASIC SEMICONDUCTOR AND PN JUNCTION THEORY

Atomic Theory – Atom, Electron Orbits and Energy Levels - Conduction in solids – Electron Motion and Hole Transfer, Conventional Current and Electron Flow –Conductors, Insulators and Semiconductors – Energy Band Diagrams – Variation of band gap with temperature. Intrinsic and Extrinsic Semiconductors – Doping, n type and p type material, Majority and minority carriers, Charge Carrier Density, Mass Action Law. Semiconductor Conductivity – Drift Current, Diffusion Current, Charge Carrier Velocity, Condyctivity.The pn Junction – Biased Junctions – Junction Currents and Voltages.VI Characteristics – Static and Dynamic Resistance.Zener diode characteristics, Zener and Avalanche breakdown

Unit-2

Teaching Hours:12

DIODE APPLICATIONS

Diode Approximations – DC Load Line Analysis - DC voltage applied to diodes (Si and zener diodes only). (Simple analysis using KCL and KVL). Rectifiers – Half Wave rectifier – Full Wave Rectifier – Bridge

Rectifier : dc load current and voltage, rms load current and voltage, ripple factor, efficiency, PIV. Simple Capacitor Filter(Analysis not expected) – Simple Shunt Zener Voltage Regulator

Unit-3

Teaching Hours:12

BIPOLAR JUNCTION TRANSISTOR

Bipolar Junction Transistors: Transistor Construction – Operation – Common Base Configuration – Transistor Amplifying action – Common Collector – Common Emitter. Transistor currents.Common emitter current gain – Common Base Current gain – Relationship.

Transistor Biasing : Operating Point – Significance – Fixed Bias and Voltage Divider Bias – Simple analysis

Unit-4

Teaching Hours:12

INTRODUCTION TO OPERATIONAL AMPLIFIERS

Block diagram, Op-amp transfer characteristics, Basic Op-amp parameters and its value for IC 741- offset voltage and current, input and output impedance, Gain, slew rate, bandwidth, CMRR, Concept of negative feedback, Inverting and Non-inverting amplifiers, Summing Amplifier, Subtractor, Differential Amplifier, integrator, differentiator, Voltage follower, Introduction to Oscillators, the Barkhausen Criterion for Oscillations, Applications of Oscillator

Unit-5

Teaching Hours:12

DIGITAL ELECTRONICS

Sampling theorem, Introduction, decimal system, Binary, Octal and Hexadecimal number systems, addition and subtraction, fractional number, Binary Coded Decimal numbers. Boolean algebra, Logic gates, Two Variable and three variable K – maps - Half-adder, Full-adder, Logic Design based on two and three input variables only.

Essential Text Books:

TEXT BOOKS

1. David A. Bell, “Electronic Devices and Circuits” – Vth Edition, OUP

2. N. P. Deshpande, “Electronic Devices and Circuits – Principles and Applications”, TMH.

3. Robert L Boylestad& Louis Nashelsky, "Electronic Devices and Circuit Theory", 3rd Edition.

4. Morris Mano, “Digital Logic and Computer Design”, PHI, EEE

REFERENCE BOOKS

1. Donald A. Neamen, “Electronic Circuits”, 3rd Edition, TMH

2. Thomas L. Floyd, “Electronic Devices”, Seventh Edition, Pearson Education.

3. Albert Malvino, David. J. Bates, —Electronic Principles , 7th Edition, Tata McGraw Hill, 2007

Recommended Reading:

EE233 - BASICS OF ELECTRICAL ENGINEERING# (2016 Batch)

Total Teaching Hours for Semester:90

No of Lecture Hours/Week:6

Max Marks:100

Credits:5

Course Objective

- To identify and understand the electrical components.

- To solve the AC and DC electrical network

- To know the basic concepts of electrical power systems

- To explain the working principle, construction, applications of power system components.

· To understand the importance of renewable energy

· To apply electrical knowledge in day-to-day life.

Learning Outcome

At the end of the course students will be able to

Identify and analyze the different types of dc and ac circuits and determine the various electrical quantities related to it.

Gain the thorough knowledge of power system components, generation, transmission and distribution system.

Explain the different types of loads and tariff schemes.

Describe the importance of Electrical Energy conservation and Effective usage of Electrical energy.

Explain the principle of various generating plant both renewable and non-renewable.

Unit-1

Teaching Hours:12

Basic Electrical Concepts

Introduction to basic electrical quantities: Charge, Voltage, Current, Power and Energy. Active and passive elements – Basic Laws: Ohm’s law - Kirchhoff’s laws – Analysis of DC circuits– Direct method (only Branch current method) and Network Reduction method : Resistances in series, parallel, star and delta topology – Electromagnetism and its Applications - Faraday's Laws of electromagnetic induction - Lenz's law - Fleming's Right and Left Hand Rule.

Unit-2

Teaching Hours:12

Single Phase AC Circuits

Introduction to AC signal – Derivation of RMS, average, peak value of sinusoidal signal -Representation of AC signal - Relationship between voltage and current in circuits containing individual and combination of R, L and C- Impedance, Active, Reactive, Apparent power and Power Factor

Unit-3

Teaching Hours:12

Basics of Electrical Power System

General structure of electrical power system - power transmission & distribution voltage levels - Power system components: Alternator, Transformer, Transmission line, Fuse, Miniature Circuit breaker (Construction and Working principle) – Introduction to three phase network, Comparison of Overhead and underground distribution System.

Unit-4

Teaching Hours:12

Electrical Energy Utilization

Types of Loads and Tariff structure - Domestic wiring and its components: Incandescent lamp, fluorescent lamp, heater, protective devices and switches, Single phase Induction motors –Safety measures - Electrical engineering materials–conductor, insulator and semiconductor materials in electrical system - Electrical Energy conservation: Necessity and Measures.

Unit-5

Teaching Hours:12

Renewable and Non-renewable Energy Sources

Sources of energy - Power generation: thermal, hydel, nuclear - Advantages of renewable energy sources - Power generation: solar, wind, tidal, biomass, OTEC, geothermal – Electrical characteristics of PV cell

Unit-5

Teaching Hours:12

Electrical Laboratory

1. Circuit Laws:

a. Verification of Kirchhoff’s Voltage Law.

b. Verification of Kirchhoff’s Current Law.

2. Wiring Practice and its cost estimation:

1. Multiple switching operation

2. Two way switching operation

3. AND/OR logic implementation

3. Measurement of Electrical Energy:

1. Single Phase AC circuit with R Load

2. Single Phase AC circuit with R L Load

4. Measurement of phase angle difference (Power Factor) between supply voltage and supply current:

1. Single Phase R-L circuit

2. Single Phase R-C circuit

5. Fault Detection and Rectification of home appliances such as Ceiling Fan, Table Fan, Electric Iron, and Electric Stove.

6. Determination of Electrical Characteristics of Photovoltaic Cells.

7. Demonstration of Assembling of Electrical Machines.

Essential Text Books:

1. Arthur Eugene Fitzgerald, David E. Higginbotham, Arvin Grabel, “Basic electrical engineering: circuits, electronics, machines, controls”, McGraw-Hill, Fifth Edition.

2. E. Hughes; “Electrical Technology",9th Edition”, Pearson, 2005.

Recommended Reading:

a. Dr. K Uma Rao and Dr. A Jayalakshmi, “Basic Electrical Engineering”, Revised Edition, Sanguine Technical publishers, 2014.

b. Kothari D. P. & Nagarath I. J, “Basic Electrical Technology”, TMH, 2004

c. Rajendra Prasad, “Fundamentals of Electrical Engineering”, Prentice Hall of India Pvt. Ltd., 2005

d. K.A. Krishnamurthy and M.R Raghuveer, “Electrical, Electronics and Computer Engineering”, 2nd Edition, T.M.H., 2001

e. D C Kulshreshtha, “Basic Electrical Engineering”,TMH.

f. Abhijit Chakrabarti, Sudipta Nath & Chandan Kumar Chanda, “Basic Electrical Engineering”, TMH, 2009.

EG235 - ENGINEERING GRAPHICS (2016 Batch)

Total Teaching Hours for Semester:60

No of Lecture Hours/Week:4

Max Marks:100

Credits:04

Course Objective

Provides basic knowledge about Orthographic projections, Projections of points, Projection of lines, Projection of Planes and Projection of Solids, development of Surfaces & isometric projections & also helps students learn Solid Edge.

To draw and interpret various projections of 1D, 2D and 3D objects..

To prepare and interpret the drawings.

Hands on training in Solid Edge.

Learning Outcome

Will be in a position to convert vision /imagination into reality.

Acquires knowledge of scaling.

Can develop plan and elevation of geometrical objects.

Can produce development of surfaces.

Draw isomertic projection ofobjects.

Unit-1

Teaching Hours:10

Introduction to Computer Aided Sketching:

Introduction, Drawing Instruments and their uses, BIS conventions, Lettering, Dimensioning and free hand practicing. Computer screen, layout of the software, standard tool bar/menus and description of most commonly used tool bars, navigational tools. Co-ordinate system and reference planes. Definitions of HP, VP, RPP & LPP. Creation of 2D/3D environment. Selection of drawing size and scale. Commands and creation of Lines, Co-ordinate points, axes, poly-lines, square, rectangle, polygons, splines, circles, ellipse, text, move, copy, off-set, mirror, rotate, trim, extend, break, chamfer, fillet, curves, constraints viz. tangency, parallelism, inclination and perpendicularity. Dimensioning, line conventions, material conventions and lettering

Unit-2

Teaching Hours:10

Orthogonal Projections:

Introduction, Definitions - Planes of projection, reference line and conventions employed, Projections of points in all the four quadrants, Projections of straight lines (located in First quadrant/first angle only), True and apparent lengths, True and apparent inclinations to reference planes (No application problems).

Unit-3

Teaching Hours:10

Orthographic Projections of Plane Surfaces (First Angle Projection Only)

Introduction, Definitions – projections of plane surfaces – triangle, square, rectangle, rhombus, pentagon, hexagon and circle, planes in different positions by change of position method only (No problems on punched plates and composite plates)

Unit-4

Teaching Hours:10

PROJECTIONS OF SOLIDS:

Introduction, Definitions – Projections of right regular tetrahedron, hexahedron (cube), prisms, pyramids, cylinders and cones in different positions. (No problems on octahedrons and combination solid)

Unit-5

Teaching Hours:10

SECTIONS AND DEVELOPMENT OF LATERAL SURFACES OF SOLIDS:

Introduction, Section planes, Sections, Section views, Sectional views, Apparent shapes and True shapes of Sections of right regular prisms, pyramids, cylinders and cones resting with base on HP. (No problems on sections of solids) Development of lateral surfaces of above solids, their frustums and truncations. (No problems on lateral surfaces of trays, tetrahedrons, spheres and transition pieces).

Unit-6

Teaching Hours:10

ISOMETRIC PROJECTION (USING ISOMETRIC SCALE ONLY):

Introduction, Isometric scale, Isometric projection of simple plane figures, Isometric projection of tetrahedron, hexahedron(cube), right regular prisms, pyramids, cylinders, cones, spheres, cut spheres and combination of solids (Maximum of three solids).

Essential Text Books:

1. K.R. Gopalakrishna, “Engineering Graphics”, 15th Edition, Subash Publishers Bangalore.

2. Basant Agrawal, C. M. Agrawal, “Engineering Drawing”, TMH.

3. N.D. Bhatt, “Engineering Graphics, Elementary Engineering Drawing”, 48th Edition, Charotar Publishing House, 2005.

4. S. Trymbaka Murthy, “Computer Aided Engineering Drawing”, I.K. International Publishing House Pvt. Ltd., New Delhi.

Recommended Reading:

P. J. Shah, “A Text Book og Engineering Graphics”, S. Chand & Company Ltd., New Delhi

Arunoday Kumar, “Engineering Graphics – I and II”, Tech – Max Publication, Pune.

T. Jeyapoovan, “Engineering Drawing & Graphics using Auro CAD 2000”, Vikas Publishing Hoise Pvt. Ltd. , New Delhi.

R. K. Dhawan, “A Text Book of Engineering Drawing”, by S. Chand & Company Ltd., New Delhi.

P. S. Gill, “A Text Book of Engineering Drawing”, S K Kataria & sons, Delhi.

D. A. Jolhe, “Engineering Drawing with an Introduction to Auto CAD”, D. A. Jolhe Tata

McGraw – Hill Publishing Co. Ltd., New Delhi.

S. Trymbaka Murthy, “Computer Aided Engineering Drawing”, I.K. International

Publishing House Pvt. Ltd., New Delhi.

HOL - HOLISTIC EDUCATION (2016 Batch)

Total Teaching Hours for Semester:12

No of Lecture Hours/Week:1

Max Marks:50

Credits:1

Course Objective

Christ University understands the limitations of compartmentalized knowledge which is not adequate enough to face the challenges of the globalized world. With a mission to prepare the students for life and not just for the acquisition of a degree, it encourages every initiative that would help students make perfect connections with the world outside. Inspired by the educational philosophy of Rousseau, Emerson, Ivan Illich, Paulo Freire, Gandhi, Tagore and Blessed Chavara, the University formulated this concept of Holistic Education more than fifteen years ago and included it in the curriculum and makes necessary changes every year. A group of teachers drawn from across the streams go through the whole process of designing the curriculum through a series of intense discussions under the broad classification of three skills: personal, interpersonal and societal.

Learning Outcome

Striving for Academic Excellence

Improved Personal Skills

Improved Interpersonal Skills

Improved Societal Skills

Citizens who can make effective contribution to Society

Professionals who can adapt to changing times

Awareness / Appreciation of Diversity

Strive to be better Human Beings

Life Long Learners

Ability to pursue excellence

Unit-1

Teaching Hours:6

I Semester UG

Personal Skill : Goal Setting and Cyber Etiquettes

Inter-Personal Skill : Dealing with Competition and Leading and Following

Societal Skill : Gender Sensitization and Community Living

III Semester UG

Personal Skill : Spirituality and Transition to Adulthood

Inter-Personal Skill : Alienation and Blocks in Relationship

Societal Skill : Gender Stereotypes and Good Governance

I Semester PG

Personal Skill : Accountability and Mindful Living

Inter-Personal Skill : Alienationand Blocks in Relationship

Societal Skill : Gender Sensitization and Sustainable Development

Essential Text Books:

Recommended Reading:

HOL - HOLISTIC EDUCATION (2016 Batch)

Total Teaching Hours for Semester:12

No of Lecture Hours/Week:1

Max Marks:50

Credits:1

Course Objective

Christ University understands the limitations of compartmentalized knowledge which is not adequate enough to face the challenges of the globalized world. With a mission to prepare the students for life and not just for the acquisition of a degree, it encourages every initiative that would help students make perfect connections with the world outside. Inspired by the educational philosophy of Rousseau, Emerson, Ivan Illich, Paulo Freire, Gandhi, Tagore and Blessed Chavara, the University formulated this concept of Holistic Education more than fifteen years ago and included it in the curriculum and makes necessary changes every year. A group of teachers drawn from across the streams go through the whole process of designing the curriculum through a series of intense discussions under the broad classification of three skills: personal, interpersonal and societal.

Learning Outcome

Striving for Academic Excellence

Improved Personal Skills

Improved Interpersonal Skills

Improved Societal Skills

Citizens who can make effective contribution to Society

Professionals who can adapt to changing times

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Life Long Learners

Ability to pursue excellence

Unit-1

Teaching Hours:6

I Semester UG

Personal Skill : Goal Setting and Cyber Etiquettes

Inter-Personal Skill : Dealing with Competition and Leading and Following

Societal Skill : Gender Sensitization and Community Living

III Semester UG

Personal Skill : Spirituality and Transition to Adulthood

Inter-Personal Skill : Alienation and Blocks in Relationship

Societal Skill : Gender Stereotypes and Good Governance

I Semester PG

Personal Skill : Accountability and Mindful Living

Inter-Personal Skill : Alienationand Blocks in Relationship

Societal Skill : Gender Sensitization and Sustainable Development

Essential Text Books:

Recommended Reading:

ME235 - BASICS OF MECHANICAL ENGINEERING (2016 Batch)

Total Teaching Hours for Semester:60

No of Lecture Hours/Week:4

Max Marks:100

Credits:3

Course Objective

· The Source of conventional and renewable energy recourses

· Fundamental concepts of thermodynamics and heat transfer

· Elementary concepts on prime movers like IC Engines and turbines

· Basic principles of refrigeration and air-conditioning.

· Concepts of power transmission system

· The various metal joining process.

· The Basic theory of machine tools.

Learning Outcome

- To be able to distinguish between different energy recourses
- To demonstrate basic thermodynamic and heat transfer concepts
- To distinguish between SI and CI engines and their working principles
- To explain the working of turbines and their applications
- To describe the functioning of refrigeration and air-conditioning
- To be able to demonstrate work with machine tools and metal joining operations

Unit-1

Teaching Hours:10

Non Conventional Resources

Solar Power, Solar Thermal energy harvesting, solar collectors, solar pond (principle of operation only), Solar photovoltaic principle. Wind Energy, Ocean Thermal, Geo- thermal, Tidal energy and bio mass energy- working principle. Brief on bio-fuels. Merits and demerits of different energy resources.

Unit-1

Teaching Hours:10

Conventional Resources

Petroleum based solid, liquid and gaseous fuels. Combustion and atmospheric pollution due to combustion of fuels. Brief on Emission norms.

Unit-2

Teaching Hours:12

Heat Transfer

Applications of heat transfer. Modes of Heat transfer. Description of conduction, convection and radiation heat transfer-basic governing equations. Fins – types and applications. Heat exchangers-types. (only descriptions)

Unit-2

Teaching Hours:12

Thermodynamics and heat transfer Thermodynamics-Basic concepts

State, path, process (reversible and irreversible), and cycle, System, surroundings and boundary. Closed system, Open system and Isolated Systems. I Law of Thermodynamics (conservation of energy). Concept of Internal energy and Enthalpy. Limitations of I Law and Introduction to II law (statements and brief description). Heat engine and Heat pump – Carnot cycle. Concept of entropy. (Simple problems on Carnot efficiency and COP)

Unit-3

Teaching Hours:12

Prime Movers

IC Engines Classification, I.C. Engines parts, 2 Stroke and 4 stroke operations. SI and CI engines, Problems on indicated power, brake power, indicated thermal efficiency, brake thermal efficiency, mechanical efficiency, and specific fuel consumption.A brief description of CRDI, MPFI, GDI and Hybrid Vehicles

Unit-3

Teaching Hours:12

Turbines

Steam Turbine: Properties steam, boilers, fire and water tube boilers (Lancashire and Babcock and Will Cox boiler-working) Classifications of steam turbines, Principle of operation of Impulse and reaction turbines, Delaval’ s turbine, Parson’ s turbine – working principles

Gas Turbine: Working principles and operations of Open cycle and closed cycle gas turbines

Water turbines: Classification, Principles and operations of Pelton wheel, Francis turbine and Kaplan turbine

Unit-4

Teaching Hours:13

Psychometry

Different temperatures and humidity. Components of an air conditioner. Principles and applications of air conditioners, Room air conditioner. Introduction on cryogenics

Unit-4

Teaching Hours:13

Refrigeration and Air-Conditioning

Refrigeration-History and applications. Refrigerants and its properties. Refrigerating effect and unit of Refrigeration. Principle and working of vapor Compression refrigeration and vapour absorption refrigeration:Air-conditioning

Unit-5

Teaching Hours:13

Material Joining

Soldering, Brazing and Welding : Definitions, classification and method of soldering, Brazing and welding. Differences between soldering, Brazing and Welding. Description of Electric, Arc Welding and Oxy-Acetylene Welding.

Unit-5

Teaching Hours:13

Machine Tools and Metal Joining

Lathe Machine, Types, Parts, and different operations like-turning, facing, knurling, tapering and thread cutting.

Drilling Machine- Drilling,, Boring, Counter Boring , and Reaming operation. Radial and vertical drilling machines (simple sketches)

Milling Machine – up milling, down milling, Plane milling, End milling, Slot milling and gear cutting (sketches only for operations)

Essential Text Books:

1. K.R. Gopalkrishna, “A text Book of Elements of Mechanical Engineering”, Subhash Publishers, Bangalore.

2. S. Trymbaka Murthy, “A Text Book of Elements of Mechanical Engineering”, 3rd revised edition,I .K. International Publishing House Pvt. Ltd., New Delhi. 2010.

3. Dr. R. P. Reddy, N. Kapilan, “Elements of Mechanical Engineering”, 1st Edition, Himalaya Publishing House, New Delhi.

Recommended Reading:

Dr. R. P. Reddy, N. Kapilan, “Elements of Mechanical Engineering”, 1st Edition, Himalaya Publishing House, New Delhi.

ME251 - WORKSHOP PRACTICE (2016 Batch)

Total Teaching Hours for Semester:30

No of Lecture Hours/Week:2

Max Marks:50

Credits:2

Course Objective

To provide the students with the hands on experience on different trades of engineering like fitting, welding, carpentry & sheet metal.

Learning Outcome

On successful completion of this module the learner will be able to:

1.Demonstrate an understanding of and comply with workshop safety regulations.

2.Select and perform a range of machining operations to produce a given project.

3.Identify and use marking out tools, handtools, measuring equipment and to work to prescribed tolerances.

4.Demonstrate a knowledge of welding process selection and capabilities.

5.Demonstrate a knowledge of welding, joint design and the application of welding.

Unit-1

Teaching Hours:10

Fitting

a) Study of fitting tools

b) Study of fitting operations & joints

c) Minimum 5 models involving rectangular, triangular, semi circular and dovetail joints.

Unit-1

Teaching Hours:2

Introduction

Description of tools

Unit-2

Teaching Hours:10

Welding

d) Study of electric arc welding tools & equipments

e) Minimum 4 Models - electric arc welding - Butt joint, Lap joint, T joint & L joint.

Unit-3

Teaching Hours:8

Sheet metal

f) Study of development of surfaces

g) Minimum 03 models (Tray,Funnel,Cone)

Unit-4

Teaching Hours:2

Carpentry

Study and demonstration of Carpentry tools, joints and operations.

Essential Text Books:

S. K. H. Choudhury, A. K. H. Choudhury, Nirjhar Roy, “The Elements of Workshop Technology”, Vol 1 & 2, Media Publishers, Mumbai

Recommended Reading:

Kannaiah P. & Narayana K.L., “Manual on Workshop Practice”, Scitech Publications, (1999).

Engineering Practices Lab - Basic Workshop Practice Manual, by Jeyapoovan T., ISBN: 8125918000 (81-259-1800-0)

Bawa H.S., “Workshop Practice”, Tata McGraw Hill Publishing Company Limited, (2007).

PD236 - PROFESSIONAL DEVELOPMENT - I (2016 Batch)

Total Teaching Hours for Semester:55

No of Lecture Hours/Week:4

Max Marks:100

Credits:3

Course Objective

upon Successful completion of this course, the student will have reliably demonstrated the ability to respond effectively, efficiently, and appropriately to writing in ways that demonstrate comprehension and evaluation of its purpose and meaning. pon Successful completion of this course, the student will have reliably demonstrated the ability to respond effectively, efficiently, and appropriately to writing in ways that demonstrate comprehension and evaluation of its purpose and meaning.

Learning Outcome

Able to make an organized, and well prepared oral presentation to meet the needs of individuals and small groups.

- Able to write good academic essays.

- Able to take part in group discussions with a better speaking skill.

- Able to have a better understanding of the Mechanics of English language.

Unit-1

Teaching Hours:12

Business Communication

Defining communication . Classifying communication. Purpose of communication.Process of communication. Principles of communication. Communication structure in Organisations.Importance of communication in management. Oral communication.Barriers of communication.Conversation control, Reflection and Empathy, Two sides of effective oral communication, Effective listening. Verbal & Non Verbal.

Unit-2

Teaching Hours:12

Soft Skills

Personality development, Emotional intelligence, Lateral thinking, Leadership skills, Assertiveness, Teams man ship , Time management, Presentation skills, Group discussions and personal interviews.

Business etiquette, Body Language, Understanding Personal Space, Cross Cultural Communication, Conflict Resolution, Stress Management, Appropriate humour at workplace.

HR interaction on presentation skills

Unit-3

Teaching Hours:12

Functional English Grammar

Parts of Speech, Phrases & Clauses, Tenses, Concord, Passive and Active Voice, Run on, Fragments, Parallel Structure, Vocabulary, Commonly confused and misused words, Idioms, Misplaced & Dangling Modifiers.

Unit-4

Teaching Hours:12

Reading & Writing Skills

- Regular & Extended paragraphs, Types of paragraphs, Topic sentence, Supporting evidence. Analysis of regular & extended Paragraphs. Writing different types of paragraphs.

- Case method of learning:

- HR interaction on case writing

Understanding the case method of learning – different types of cases – Analyzing a case . (Previewing, skimming, reading, scanning). – Do's and don'ts for case preparation. Purpose of writing – Clarity in writing –Principles of effective writing. Pre writing – Writing – Revising – Editing. Specific writing features – Unity & coherence in writing.

- Business letters: Introduction to business letters – writing routine and persuasive letters – positive and negative messages- writing memos.

Unit-5

Teaching Hours:12

Academic Writing

Patterns of Essay development - Analysis of academic essays - Pre writing techniques - Thesis statement and supporting details - Purpose of writing – clarity in writing – Principles of effective writing - unity, coherence, support &sentence skill in writing - Essay outline - Different types of Academic Essays - Narratives, Descriptive, Classification, Comparison and Contrast - Argumentative & Process essays.

Essential Text Books:

Business communication: Concepts , cases and applications – P D Chaturvedi, Mukesh Chaturvedi Pearson.

Recommended Reading:

1. College Writing Skills with Readings: John Langan.

2. Business Communication, process and Product – Mary Ellen Guffey – Thomson Learning.

3. Basic Business Communication – Lesikar , Flatley.

4. Business Communication, M K Sehgal & V Khetrapal, Excel Books.

5. Effective Technical Communication By M Ashraf Rizvi.

6. Business Communication Today by Bovee Thill Scatzman – Pearson & Education , 7th Ed,2003

7. Contemporary Business Communication – Scot Ober-Bitztanntra.

8. Business Communication – Krizan , Merrier, Jones- Thomson Learning.

9. Business Communication – Meenakshi Raman. Prakash Singh.

PH232 - APPLIED PHYSICS# (2016 Batch)

Total Teaching Hours for Semester:90

No of Lecture Hours/Week:6

Max Marks:100

Credits:5

Course Objective

To extend student’s knowledge on the basic concepts and ideas in physics.

To develop scientific attitudes and enable the students to apply the concepts of Physics with the core programmes.

Learning Outcome

At the end of the course, the students would be able to

- Identify the fundamental aspects of modern physics and quantum mechanics.

- Compare classical and quantum free electron theory.

- Outline the salient properties of elastic and dielectric materials.

- Apply the concepts learnt in Laser, Fiber optics and Ultrasonics in the field of Engineering.

- Apply optical phenomenon in technology.

Unit-1

Teaching Hours:14

Modern Physics

Introduction, Planck’s theory - Deduction of Wien’s displacement law and Rayleigh Jean’s law from Planck’s law, Compton effect, de Broglie hypothesis – extension to electron particle. Phase velocity, group velocity, expression for group velocity based on superposition of waves, relation between group velocity and particle velocity. Scanning electron microscope. Problems.

Unit-2

Teaching Hours:12

Quantum Mechanics

Heisenberg's uncertainty principle and its physical significance. Application of uncertainty principle (Non-existence of electron in the nucleus). Second order differential equation for a travelling wave. Wave function. Properties and Physical significance of a wave function Schrodinger - Time independent wave equation – Application: Setting up of a one dimensional Schrödinger wave equation of a particle in a potential well of infinite depth : Probability density and Normalization of wave function – Energy Eigen values and Eigen function. Problems.

Unit-3

Teaching Hours:12

Electrical and Thermal Conductivities of metals

Classical free-electron theory. Introduction, assumptions and limitation of classical free-electron theory. Thermal Conductivity. Wiedemann - Franz law, calculation of Lorentz number.

Quantum free-electron theory – Postulates of quantum fee electron theory, Fermi - Dirac Statistics. Fermi-energy – Fermi factor. Density of states. Carrier concentration in metals. Expression for electrical resistivity/conductivity Temperature dependence of resistivity of metals. Band theory of solids - Merits of Quantum free electron theory. Problems.

Unit-4

Teaching Hours:12

Materials Science and Ultrasonics

Elasticity : Introduction, types of moduli of elasticity - Bending of beams – Single Cantilever - Young's modulus-Non uniform bending. Problems.

Dielectrics : Dielectric constant and polarisation of dielectric materials. Types of polarisation. Equation for internal fields in liquids and solids (one dimensional). Clausius – Mossotti equation. Ferro and Piezo – electricity(qualitative). Frequency dependence of dielectric constant. Important applications of dielectric materials.

Ultrasonics : Ultrasonics production – Magnetostriction and Piezoelectric methods – Application (NDT) non-destructive testing of materials- Flaw detection- Measurement of velocity in liquids. Determination of elastic constants in liquids using Ultrasonic Interferometer.Problems.

Unit-5

Teaching Hours:10

Applied Optics

Optics : Interference – thin films - Air wedge theory and experiment-Testing of flat surfaces. Anti reflection coating single and multi layer. Problems.

Lasers : Principle and production. Einstein's coefficients (expression for energy density). Requisites of a Laser system. Condition for Laser action. Principle, Construction and working of Nd YAG and semiconductor diode Laser. Applications of Laser – Laser welding, cutting and drilling. Measurement of atmospheric pollutants. Problems.

Optical Fibers : Introduction, Principle andPropagation of light in optical fibers. Angle of acceptance. Numerical aperture. Types of optical fibers and modes of propagation. Applications –optical fiber communication system. Problems.

Unit-5

Teaching Hours:10

PHYSICS LABORATORY

LIST OF EXPERIMENTS (Any Eight to be performed)

Basic Measuring Instruments –Vernier Calipers, Screw Gauge, Travelling Microscope

1. Thermal Conductivity of a bad conductor – Lee's disc apparatus

2. Interference at a wedge

3. Young's modulus – Non-uniform bending

4. Laser Diffraction (Determination of grating constant and number of rulings per inch using diffraction grating)

5. Ultrasonic Interferometer

6. Frequency determination – Melde's apparatus

7. Planck's Constant (Determination of Planck's constant using LED or using the principle of photoelectric effect)

8. Verification of Stefan's law

9. Measurement of Dielectric Constant (Charging & discharging of capacitor)

10. Determination of Fermi Energy

11. Photomultiplier Tube - Demonstration only

Essential Text Books:

1. M.N.Avadhanulu and P.G. Kshirsagar, "A Text Book of Engineering Physics", S.Chand & Company Ltd, 9th Edition 2012.
2. John Wiley "Engineering Physics",Wiley India Pvt. Ltd, 1st Edition 2014.
3. S.O. Pillai, "Solid State Physics", New Age International, 6th Edition 2009.
4. S.P. Basavaraju, " Engineering Physics", Revised Edition 2009.
5. Charles Kittel, "Introduction to Solid State Physics" , 8th Edition.
6. Arthur Beiser, "Concepts of Modern Physics" , Special Indian Edition 2009.
7. Ajoy Ghatak, "Optics",4th Edition 2009.

Laboratory

Physics Laboratory Manual for the First / Second Semester B.Tech, CUFE, 2016.

Recommended Reading:

1. R.K. Gaur and S.L. Gupta, "Engineering Physics", Dhanpatrai and Sons, New Delhi, 2001.

2. Sehgal Chopra Sehgal, “ Modern Physics ", Tata McGraw-Hill, 6th Edition, 2005.

3. Halliday, Resnick and Krane, "Fundamentals of Physics Extended",

John Wiley and Sons Inc., New York, 5th Edition, 1997.

4. P.Mani, “Engineering Physics”, Dhanam publishers, Revised Edition 2011.

5. H.J. Sawant, "Engineering Physics", Technical Publications, 1st Edition, 2010.

6. V. Rajendran, “Engineering Physics”, Tata Mcgraw Hill Publishing Company Limited, 1st Edition, 2009.

7. K.Eric Drexler, “Nanosystems - Molecular Machinery, Manufacturing and Computation”, John Wiely & Sons, 2005.

8. J David, N Cheeke , “Fundamentals and Applications of Ultrasonic Waves”, CRC Press 1st Edition, 2002.

9. Frederick J Bueche and Eugene Hecht “Schaum Outline of Theory and Problems of College Physics”, Tata McGraw-Hill, 11th Edition, 2012.

10. M. Ali Omar, “ Elementary Solid State Physics”, Addison-Wesley 1st Edition, 1993.

Laboratory

Sathyaseelan H, “Laboratory Manual in Applied Physics”, New Age International,

3rdEdition, 2012.

CE332 - STRENGTH OF MATERIALS (2015 Batch)

Total Teaching Hours for Semester:60

No of Lecture Hours/Week:5

Max Marks:100

Credits:04

Course Objective

SUBJECT DESCRIPTION:This paper contains five units which are Simple stresses and strains, Bending moment and Shear force, Bending stress, Deflection in beams, Stability of Columns and Torsion. This paper aims at enabling the students to study the characteristics of different materials as structural members

SUBJECT OBJECTIVE: The objective of this subject is to study the internal effects produced and deformations of bodies caused by externally applied forces. The subject projects strength characteristics of different materials and structural members subjected to shear, torsion and bending.

LEVEL OF KNOWLEDGE: Basic

Learning Outcome

The student will be able to understand the concepts and principles applied to members under various loadings and the effects of these loadings.

The student will be able to analyse structural members subjected to tension, compression, torsion, bending and combined stresses using the fundamental concepts of stress, strain and elastic behaviour of materials.

The student will be able to analyse columns and deflections

Unit-1

Teaching Hours:13

UNIT-I (13 HOURS)

SIMPLE STRESSES AND STRAINS: Introduction, Properties of Materials, Stress, Strain, Hook's law, Poisson's Ratio, Stress – Strain Diagram for structural steel and non ferrous metals, Principles of superposition, Total elongation of tapering bars of circular and rectangular cross sections. Elongation due to self – weight, Composite section, Volumetric strains, expression for volumetric strain, Elastic constants, relationship among elastic constants, Thermal stresses (including thermal stresses in compound bars). Thin cylinderssubjected to pressure, change in length, diameter and volume.

Unit-2

Teaching Hours:12

UNIT-II (12 HOURS)

BENDING MOMENT AND SHEAR FORCE IN BEAMS: Introduction, Types of beams, loadings and supports, Shearing force and Bending moment, Sign convention, Relationship between loading, shear force and bending moment, Shear force and bending moment equations, SFD and BMD with salient values for cantilever beams, simply supported beams and overhanging beams considering point loads, UDL, UVL and Couple.

Unit-3

Teaching Hours:12

UNIT-III (12 HOURS)

BENDING STRESS, SHEAR STRESS IN BEAMS: Introduction – Bending stress in beam, Assumptions in simple bending theory, Pure bending derivation of Bernoulli's equation, Modulus of rupture, Section modulus, Flexural rigidity, Expression for horizontal shear stress in beam, Shear stress diagram for rectangular, symmetrical 'I' and 'T' section (Fletched beams not included).

Unit-4

Teaching Hours:12

UNIT- IV (12 HOURS)

DEFLECTION OF BEAMS: Introduction – Definitions of slope, deflection, Elastic curve derivation of differential equation of flexure, Sign convention, slope and deflection for standard loading classes using Macaulay's method for prismatic beams and overhanging beams subjected to point loads, UDL and Couple.

Unit-5

Teaching Hours:11

UNIT-V (11 HOURS)

ELASTIC STABILITY OF COLUMNS: Introduction – Short and long columns, Euler's theory on columns, Effective length slenderness ration, radius of gyration, buckling load, Assumptions, derivations of Euler's Buckling load for different end conditions, Limitations of Euler's theory, Rankine's formula and problems.

TORSION OF CIRCULAR SHAFTS: Introduction – Pure torsion-torsion equation of circular shafts, Strength and stiffness, Torsional rigidity and polar modulus, Power transmitted by shaft of solid and hollow circular sections and simple problems.

Essential Text Books:

BIBILOGRAPHY:

TEXT BOOKS:

Basavarajaiah and Mahadevappa, “Strength of Materials”, Khanna Publishers, New Delhi.

Bhavikatti S.S., “Strength of Materials”, Vikas Publishing House Pvt. Ltd., New Delhi

Bansal, R.K., “Strength of Materials”, Laxmi Publications, 2007.

Punmia .B.C, Ashok Jain, Arun Jain,“Mechanics of Materials”, Lakshmi Publications, New Delh

REFERENCE BOOKS:

Chakarborty, “Strength of Materials”, S K Kataria and Sons

Dhawan, R K ‘A Text Book on Strength of Materials”, Jalandhar , PHI

James M. Gere, “Mechanics of Materials”, 5th Edition, Thomson Learning Ltd., New Delhi

Nash W.A., “Strength of Materials”, Tata McGraw-Hill Education Pvt. Ltd

Natrajan, V., "Elements of Strength of Materials", New Delhi, Oxford and IBHPublishing Co.

Negi L.S., “Strength of Materials”, Tata McGraw-Hill Education Pvt. Ltd

Popov E P, “Mechanics of Solids”, PHI

Prakash Rao D.S, “Introduction to Strength of Materials”, Universities press Publishers.

Prasad V S “Structural mechanics", Galgotia publications Pvt ltd.

Punmia, BC. "Strength of Materials", Delhi, Standard Publishers Distributors.

Ram Chandra, "Applied Mechanics and Strength of Materials", Delhi: Standard

Ramamrutham, S., "Strength of Materials", New Delhi Dhanpat Rai and Sons.

Rattan S.S., “Strength of Materials”, Tata McGraw-Hill Education Pvt. Ltd

Sadhu Singh “Strengths of Materials”, Standard Publishers, New Delhi

Singer, “Strength of Materials”, Harper and Row Publications.

Srinath L S, et, al “Strength of Materials”, MC Millan, New Delhi

Subramanyam, “Strength of Materials”, Oxford University Press, Edition 2005

Surendrs singh, “Strength of Materials”, Tata McGraw-Hill Education Pvt. Ltd

Timoshenko and Young, “Elements of Strength of Materials”, Affiliated East-West Press.

Vazirani, V N and Ratwani, M M., "Analysis of Structures Vol. I", Delhi, KhannaPublishers.

Recommended Reading:

Basavarajaiah and Mahadevappa, “Strength of Materials”, Khanna Publishers, New Delhi.

Bhavikatti S.S., “Strength of Materials”, Vikas Publishing House Pvt. Ltd., New Delhi

Bansal, R.K., “Strength of Materials”, Laxmi Publications, 2007.

Punmia .B.C, Ashok Jain, Arun Jain,“Mechanics of Materials”, Lakshmi Publications, New Delhi

CE333 - SURVEYING (2015 Batch)

Total Teaching Hours for Semester:45

No of Lecture Hours/Week:3

Max Marks:100

Credits:3

Course Objective

The objective of this subject is to study and understand the basic principles of surveying and types of surveying and its importance in field by using instruments

Learning Outcome

On completion of the course the student would able to:

1. Use the survey equipment to measure angles and distance.

2. to measure differences in elevation, draw and utilize contour plots, and calculate volumes for earthwork.

3. Adjust the survey equipment's'.

to plot the curves for highways and railways, calculate area and volumes for earthwork.

Unit-1

Teaching Hours:9

Introduction : Definition of Surveying, Classification of Surveys, Uses of Surveying, Units of measurements, Basic principles of surveying, Errors-Classification-Precision and accuracy.

Principles and methods of Distance measurement: Chain tape and EDM devices, Ranging of lines -Direct and Indirect, Chain Surveying- Accessories required, Booking of chain survey work -Field book entries, conventional symbols.

Directions- Meridians and Bearings, Declination computations, Traversing, types of traverse, latitude and departure, closing error, balancing a traverse, Omitted measurement with simple problems.

Unit-2

Teaching Hours:12

LEVELLING: Principles and basic definitions, Fundamental axes and part of a dumpy level, Types of adjustments and objectives, Temporary adjustments of a dumpy level, Sensitiveness of bubble tube, Curvature and refraction correction, Type of leveling, Simple leveling, Reciprocal leveling, Profile leveling, Cross sectioning, Fly leveling, Booking of levels, Rise and fall method and Height of instrument method, comparison Arithmetic checks, Fly back leveling, Errors and precautions.

CONTOURING: Contours and their characteristics, Methods of contouring, direct and indirect methods, Interpolation techniques, Uses of contours, Numerical problems on determining inter visibility, Grade contours and uses.

Unit-3

Teaching Hours:10

Theodolite survey: Theodolite and types, Fundamental axes and parts of a transit theodolite.Uses of theodolite, Temporary adjustments of a transit theodolite. Measurement of horizontal angle - Methods of repetition and reiteration. Measurement of vertical angles.

Trigonometric leveling: Determination of elevation of objects when the base is accessible and inaccessible by single plane and double plane method.

Unit-4

Teaching Hours:12

CURVE SETTING: Curves – Necessity – Types, Simple curves, Elements, Designation of curves, setting out simple curves by linear methods, setting out curves by Rankines deflection angle method (Simple numerical problems). Elements of compound curves, reverse and transition curves (without problems).

Unit-5

Teaching Hours:9

Areas and volumes: Calculations of area from cross staff surveying. Area calculation by Trapezoidal rule and Simpsons rules. Computations of volumes by trapezoidal rule and prismoidal rule.

Construction survey: Basic definitions -Line, grade, stakes controls. Setting out of water supply and sewer lines and setting out of culverts.

Essential Text Books:

Duggal S.K., “Surveying”,Vol-I, Tata McGraw Hill - Publishing Co. Ltd. New Delhi.

Kanitkar T.P. & Kulkarni S.V, “Surveying Levelling- Part I & II”, Pune, Vidhyarthi Gruha Prakashana

Punmia B.C., “Surveying -Vol-1& II”, Laxmi Publications, New Delhi.

ALOK “Plane Surveying”, S. Chand and Company Ltd., New Delhi.

Arora S.K., “Surveying -Vol-I”, Standard Book House, Delhi, 2005

Arther Bannister et al., “Surveying”, Pearson Education, India

Basak N., “Surveying”, Tata McGraw-Hill Education Pvt. Ltd

Chandra A.M., “Plane surveying -Vol-1”, New age International ® Ltd.

Deshpande, RS; "A Text Book Surveying and Levelling"; Poona, United BookCorporation

Hussain, SK and Nagraj, MS; "Text Book of Surveying"; New Delhi, S Chandand Co Ltd.

James M. Anderson & Edward M. Mikhail, “Introduction to Surveying”

Kanetkar,TP and Kulkarni, SV., "Surveying and Levelling -Vol.1”, Poona, AVG Parkashan

Kocher, CL; "A Text Book of Surveying"; Ludhiana, Katson Publishing House

Milton O. Schimidt –Wong, “Fundamentals of Surveying”, Thomson Learning

Narinder Singh; "Surveying"; New Delhi, Tata McGraw Hill Publishing Co Ltd.

Roy S.K., “Fundamentals of Surveying”,Prentice Hall of India.

Venkataramiah. C, “Textbook of Surveying”, Universities press

Survey of India Publication on maps.

Recommended Reading:

CE334 - FLUID MECHANICS (2015 Batch)

Total Teaching Hours for Semester:60

No of Lecture Hours/Week:4

Max Marks:100

Credits:4

Course Objective

The objective of this subject is to study the fundamentals of fluid flow and its behaviour so as to equip the students to learn related subjects and their applications in the higher semesters.

Learning Outcome

After completion of the course, the student will have the knowledge of,

a) Fluid Properties and Classification of fluid,

b) Fluid Pressure and its measurement,

c) Calculation of centre of pressure and hydrostatic force on submerged surfaces in water,

d) Kinematics of fluids and stream function,

e) Dynamics of Fluids and application of Bernoulli's equation and

f) Flow through pipes and measurement.

Unit-1

Teaching Hours:13

INTRODUCTION

INTRODUCTION: Scope and importance of Fluid Mechanics, Definition of Fluid, Distinction between solids & fluid, Distinction between liquid & gas fluid continuum

FLUID PROPERTIES AND CLASSIFICATION OF FLUID: Mass density, Specific Volume, Specific Weight Relative density, Definition, units and Dimensions, Viscosity, Newton's law of viscosity, Newtonian and Non- Newtonian Fluids, Ideal and Real fluids, Compressibility, Vapour pressure, surface tension, Definitions, units and dimensions, Equation for stability of bubble, Capillarity, theory and problems, Problems on Newton's law of viscosity

FLUID PRESSURE AND ITS MEASUREMENT: Definition of pressure, units and dimensions, Pressure at a point, Pascal's law, Hydrostatic pressure law, Absolute and Gauge pressure, Measurement of pressure, Simple Manometer theory and problems, Differential manometer theory & Problems, Mechanical pressure gauges

Unit-2

Teaching Hours:14

KINEMATICS OF FLUIDS:

Description of fluid flow, Lagrangian and Eulerian approaches. Classification of flow, steady & unsteady, uniform and non-uniform, Definition of path line, streamline, streak line, stream tube, one, two, three dimensional flows, Rotational and ir-rotational flow, Acceleration of flow, One dimensional flow, derivation of continuity equation in differential form, Definition of velocity potential, stream functions, stream line, equi-potential line, Relation between velocity potential and stream function, Laplace equation. Problem on continuity equation, Problem on velocity potential and stream function

Unit-2

Teaching Hours:14

HYDROSTATICS:

Definition of total pressure, Center of pressure, Centroid, centroidal depth, depth of center of pressure, Equation for hydrostatic force and depth of center of pressure on plane surfaces (vertical and inclined), Problems on hydrostatic force vertically submerged surfaces, Problems on inclined submerged surfaces, Hydrostatic force on submerged curved surfaces, problems, Pressure diagram, problems

Unit-3

Teaching Hours:10

DYNAMICS OF FLUID FLOW:

Concept of Inertia force and other forces causing motion, Derivation of Euler's equation and Bernoulli's equation with assumption and limitation, Modification of Bernoulli's equation, problem on Bernoulli's equation without and with losses. Application of Bernoulli's equation - Pitot tube, problem, Venturimeter, problems, Momentum equation, problems

Unit-4

Teaching Hours:10

FLOW THROUGH PIPES

Flow through pipes, Reynolds number, classification of flow, Definition of hydraulic gradient, energy gradient., Major and minor losses in pipe flow, Equation for head loss due to friction (Darcy-Weishbach equation)–Friction factor for commercial pipes, Minor losses (types), equation for head loss due to sudden expansion. – Problem on minor losses, Pipes in series, pipes in parallel and equivalent pipe, Problems.

Unit-5

Teaching Hours:13

FLOW MEASUREMENTS:

Flow through Orifices; classification, Hydraulic co-efficient of an Orifice and relation between them. Equation for co-efficient of velocity, problems, Submerged and large rectangular Orifices, Flow through mouth pieces, classification, equation for discharge and pressure head for an external cylindrical mouth piece. Flow over notches, classification, Equation for discharge over rectangular and trapezoidal notches, Equation for discharge over V-notch, problems, Cippoletti notch, and problems. Types of Nappe, ventilation of weirs, Broad crested weirs, problems, .Submergedweirs, equation for discharge, problems

Essential Text Books:

TEXT BOOKS:

1. Bansal. R. K., “Fluid Mechanics and Hydraulic Machines”, Lakshmi Publications, New Delhi.

2. Jain, A.K., “Fluid Mechanics”, Khanna Publishers, New Delhi.

3. Modi. P.N., and Seth S.M., “Fluid Mechanics and Hydraulics” Standard Book House, New Delhi

REFERENCE BOOKS:

1. Arora K.R., “Fluid Mechanics, Hydraulic and Hydraulics”, Standard Book House, New Delhi

2. Fay, “Introduction to Fluid Mechanics”, PHI learning Private Limited

3. John F. Douglas et al., “Fluid Mechanics”, Pearson Education, India.

4. Mohanty., “Fluid Mechanics”, 2nd ed., PHI learning Private Limited

5. Rao B. C. S., “Fluid Mechanics and Machinery”, Tata McGraw-Hill Education Pvt. Ltd

6. Rathakrishnan., “Fluid Mechanics: An Introduction”, 2nd ed., PHI learning Private Limited

7. Som S.K., “Introduction to Fluid Mechanics and Fluid Machines”, Tata McGraw-Hill Education Pvt. Ltd

8. Subramanya. K., “1000 Solved Problems in Fluid Mechanics: Includes Hydraulic Machines”, Tata McGraw-Hill Education Pvt. Ltd

9. Yunus A Cengel, John M., Bhattacharya, “Fluid Mechanics”, Tata McGraw-Hill Education Pvt. Ltd

Recommended Reading:

CE335 - BUILDING MATERIALS AND CONSTRUCTION (2015 Batch)

Total Teaching Hours for Semester:45

No of Lecture Hours/Week:3

Max Marks:100

Credits:3

Course Objective

The objective of this subject is to help students identify the traditional building materials and also understand the different building construction elements, method of construction and cost effective construction

Learning Outcome

After completion of this course the students would be able to:

· Use the different construction materials for various works based on the properties of the materials.

· Would be able to use the different type’s masonry as per the requirement.

· Would be able to use the different plastering and painting based on the internal walls, external walls and ceiling.

· Would be able to choose the different types of flooring and roof materials based on the user and site requirements.

· Would be able to choose the different types of staircases, doors and windows as per the site and user requirement.

· Would be able to design cost effective construction.

Unit-1

Teaching Hours:12

CONSTRUCTION MATERIALS: Stones, classification of rocks, characteristics of good stones, common building stones and applications, tests on stones, deterioration and preservation.

Bricks, constituents of good brick earth and classification, manufacturing of bricks and tests, Tiles, manufacturing, properties, and types of tiles, timber, classification of trees, uses, seasoning, defects etc

Unit-2

Teaching Hours:14

FOUNDATIONS: Preliminary Investigation of Soil, Bearing Capacity of Soil, Bearing Capacity of Soil, Safe Bearing Capacity of Soil, Classification of Foundations, Introduction to Different type of foundation, Masonry footings, isolated footings. Combined and strap RCC footings, Raft footing, and Pile foundations. (Friction and Load bearing piles)

MASONRY: Definition of terms used in masonry, Bonds in Brickwork, English Bond, Flemish Bond, Reinforced brickwork, Joints in Stone Masonry, Rubble Masonry, Coursed Rubble Masonry, Uncoursed rubble masonry, Random rubble masonry, Ashlar Masonry, Masonry design requirements as per IS 1905.

MASONRY ARCHES: Classification, Stability of an arch, Lintels, Types and classifications, Functions, Method of constructions, Chejja, Functions, Method of constructions, Canopy, Functions, Method of construction, Balcony, Functions, Method of construction, Shoring, Underpinning, Scaffolding

Unit-3

Teaching Hours:14

FLOORS AND ROOFS: Types of flooring (Materials and method of laying), Granolithic, Mosaic, Ceramic, Marble, Polished Granite, Industrial flooring, Flat Roof (R.C.C.), Sloped roof (R.C.C and Tile roof), Lean to roof, Wooden truss (King post and queen post trusses

), steel trusses, Weather proof course for RCC Roof.

STAIRS, DOORS AND WINDOWS: Types (Classifications) and Technical terms in stairs, Requirements of a good stair. Geometric Design of RCC Dog Legged and open well stairs. (Plan and sectional elevation of stairs), Doors, Types, Paneled doors, Glazed doors, Flush doors, Collapsible and rolling shutters, Louvered doors, Revolving, sliding and swing doors, Windows, Types, Paneled, Glazed, Bat window, Dormer window, Louvered and corner window, Ventilators

Unit-4

Teaching Hours:10

PLASTERING AND PAINTING: Purpose of Plastering, Materials of plastering, Lime mortar, Cement Mortar, Methods of plastering, Stucco plastering, Lath plastering, Purpose of Painting, Types of Paints, Application of paints to new and old surfaces, Distemper, Plastic emulsion, Enamel, Powder coated painting to walls and iron and steel surfaces, Polishing of wood surface

Unit-5

Teaching Hours:10

INTRODUCTION TO COST EFFECTIVE CONSTRUCTION: Necessity, Advantages, Pre-fabrication techniques, Pre cast doors and windows (Pre cast frames and shutters), Alternative Building Materials, Hollow concrete blocks, Stabilized mud blocks, Micro concrete tiles, Precast roofing elements

MISCELLANEOUS TOPICS: Form Work, Form work Details, RCC columns, Beams, Floors, Slip forming, Damp proof construction

Essential Text Books:

TEXT BOOKS:

1. Singh. G, “Building Construction and Materials”, Standard Book House, New Delhi, Twelveth Edition, 2012.

2. Birdie. G.S and Ahuja. T. D, “Building Construction and Construction Materials”, Dhanpat Rai Publishing House, New Delhi, Fourth Revised Edition, 2012.

3. Gupta. R. K, “Civil Engineering Materials & Construction Practices”, Jain Brothers, New Delhi, Third Revised and Enlarged Edition, 2010.

4. Soni. S. K, “Building Materials and Construction”, S. K. Kataria & Sons, New Delhi, 2013.

REFERENCE BOOKS:

1. Watson, D, “Time Saver Standards For Building Materials & Systems – Design Criteria and Selection Data”, Tata McGraw Hill, New Delhi, 2009.

2. Bhargava. D. K, “Specifications of Buildings And Methods of Measurement”, JBA Publishers, New Delhi, 2007.

3. Ching. F. D. K, “Building Construction Illustrated”, Wiley Student Edition, New Delhi, Third Edition, 2006.

4. Barry. R, “The Construction of Buildings- Vol. 1, 2, 3, 4, and 5”, Affiliated East-West Press Pvt. Ltd, New Delhi, Sixth Edition, 1999.

5. Chudley. R and Greeno. R, “Building Construction Hand Book”, Elsevier, New Delhi, 2010.

6. Leger. E, “Complete Building Construction”,Wiley India, New Delhi, 4th Edition, 2003.

7. Arora. S. P and Bindra. S. P, “The Text Book of Building Construction”, Dhanpat Rai Publications, New Delhi, 2010.

8. Shrivastava. U. K, “Building Materials Technology”, Galgotia, New Delhi, 2012.

9. Varghese. P. C, “Building Construction”, Prentice Hall of India, New Delhi, 2010.

10. Varghese. P. C, “Building Materials”, Prentice Hall of India, New Delhi, 2009.

11. Bhavikatti. S. S, “Building Construction”, Vikas Publishing House, New Delhi, 2012.

12. Bhavikatti. S. S, “Materials of Construction”, I. K. International Publishing House, New Delhi, 2013.

13. Gambir. M.L and Jamwal. N, “Building Materials”, Tata McGraw Hill, New Delhi, 2011.

14. Duggal. S. K, “Building Materials”, New age International Publishers, New Delhi, Third Revised Edition, 2010.

15. Rangawala. S.C and Rangawala. K.S, “Engineering Materials [Material Science]”, Charotar Publishing House, Anand, India, Thirty Seventh Revised and Enlarged Edition, 2010.

16. Rangawala. S. C, Rangawala. K. S and Rangawala. P. S, “Building Construction”, Charotar Publishing House, Anand, India, Twenty ninth edition, 2011.

17. Deodhar. S.V, “Civil Engineering Materials”, Khanna Publishers, New Delhi, Sixth Edition, 2012.

18. Rajput. R.K, “Engineering Materials (Including Construction Materials)”, S. Chand, New Delhi, 2010.

19. Kumar. S, “Building Construction”, Standard Publishers Distributors, New Delhi, 19th Revised and Enlarged Edition, 2008.

20. Punmia. B. C, Jain. A.K and Jain. A.K, “Building Construction”, Laxi Publications, New Delhi, 10th Edition, 2011.

21. Arora. N. L and Gupta. B. R, “Building Construction”, Satya Parakashan, New Delhi, 2011.

Recommended Reading:

CE336 - PROFESSIONAL DEVELOPMENT-II (2015 Batch)

Total Teaching Hours for Semester:60

No of Lecture Hours/Week:4

Max Marks:100

Credits:4

Course Objective

The subject makes an attempt to incorporate all basic concepts and practices of management, Business functions , entrepreneurship and economics that provides the foundation framework to guide the formative knowledge of Management Concepts .

Learning Outcome

At the end of the course , the students would be capable of relating the principles of management with the Environment of Business & economics, personal experiences and case studies will be discussed in the class.

Unit-1

Teaching Hours:12

PRINCIPLES OF MANAGEMENT

Introduction: Definition of management, nature, purpose and functions, level and types of managers, Manager/Non-Manager, Managerial Roles, Essential Managerial Skills, Key personal characteristics for Managerial success. Evolution and various schools to management thoughts, continuing management themes – quality and performance excellence, global awareness, learning organization, Characteristics of 21st century Executives. Social responsibility of managers.

Unit-2

Teaching Hours:12

Planning and Organising

Planning: Meaning and nature of planning, types of plans, steps in planning process; Objectives: meaning, setting and managing objectives – MBO method: concept and process of managing by objectives; Strategies: definition, levels of strategies, its importance in an Organization; Policies: meaning, formulation of policies; Programs: meaning, nature; Planning premises: concept, developing effective planning premises; Decision making, steps in decision making, approaches to decision making, types of decisions and various techniques used for decision making.

Organizing: Organizing as managerial function – organization structure, formal and informal organization. Traditional Organization Structures – Functional, Divisional and Matrix Structure

Directions in organizational Structures – Team structure, network structure, boundary less structure

Organizing Trends and Practices – Chain of command, unity of command, span of control, delegation and empowerment, decentralization and use of staff, organizational design and organizational configuration.

Unit-3

Teaching Hours:12

Leading and Controlling as a function of management

Leadership and vision, Leadership traits, classic Leadership styles, Leaders behaviour – Likert's four systems, Managerial Grid. Overlapping role of leader and managers. The organizational context of communication, Directions of communications, channels of communication, Barriers to communication. Motivation and rewards, rewards and performance. Hierarchy of need theory and two factor theory. Integrated model of motivation.

Controlling: Control function in management, The basic control process. Types of control – feed forward, concurrent and feedback controls. Factors in control effectiveness.

Unit-4

Teaching Hours:12

Business Management

FINANCE – Introduction to Financial Management and scope of Financial Management, Sources of funds. MARKETING – Introduction to Marketing management, Marketing Mix- 4P's and Services Marketing. HRM- Introduction , Organisation Structure, Types of Resource Selection. OPERATIONS MANAGEMENT – Introduction to Operations Management , Project Management – CPM & PERT.

Unit-5

Teaching Hours:12

ENTREPRENEURSHIP

Introduction- Definition, Nature and importance of Entrepreneurs, Role of entrepreneurship in economic development, Challenges faced by entrepreneurs - individuals - from family - from groups - from community - from society,Entrepreneurial process: Identify and evaluate opportunities, Develop a Business plan, Determine the resources required, Manage the Enterprise,Ethics and Social responsibility of Entrepreneurship. Intrapreneurship, Establishment of Intrapreneurship in organizations, The legal forms of entrepreneurial organization. Intellectual Property: Trademark, Copyright, Patents, Geographical Indications (GI) of goods, Design.

Essential Text Books:

1. Management– J.R. Schermerhorn Jr. Wiley India, New Delhi 2004.

2. Management-Concepts and Cases-V.S.P.Rao, Excel Books

3. Management - A Global and Entrepreneurial Perspective - Harold Koontz, Heinz Weihrich - TMH 12th edition, 2008.

4. Management – Stephen P. Robbins, M. Caulter, Pearson, PHI, 9e, 2008.

5. Management - Ricky W. Griffin Eigth Edition, 2005, Biztantra

6. Fundamentals of Management-Stephen P Robbins et all, Pearson Publications,Fifth edition

7. Management-Richard L. Daft, Cegage learning

Chandra, P. (2010). Fundamentals of financial management. Tata McGraw-Hill Education.

Kotler,P. Marketing management, New Delhi: Prentice Hall of India Publications

Human Resource Management, Text & Cases – VSP Rao, Excel Books, 2005

Human Resource Management – Text & Cases – K. Ashwatappa; 5th Edition,

TMH.

5. Chase, R. B. & Nicholas, A. J., & et al. (2010). Operations management for competitive advantage. New Delhi: Tata McGraw Hill.

Entrepreneurship – Robert D Hisrich, Michael P Peters, Dean A Shepherd – 6th Edition.

Entrepreneurship - Kuratko. Donald F &Hodgetts, Richard M, (2007).New Delhi: Thomson.

Entrepreneurship – Rajeev Roy, Oxford higher education,2009

Entrepreneurship text and cases – P.Narayana Reddy, 2012

Recommended Reading:

Business Newaspapers and Business Journals.

CE351 - MATERIALS TESTING LABORATORY (2015 Batch)

Total Teaching Hours for Semester:30

No of Lecture Hours/Week:2

Max Marks:50

Credits:02

Course Objective

SUBJECT DESCRIPTION:This paper contains ten experiments. This paper aims at enabling the students to study the properties and strength characteristics of different materials

SUBJECT OBJECTIVE: The objective of this subject is to study the various properties (Physical and Mechanical) of building materials

Learning Outcome

1. The student will be able to understand the basic concepts and behaviour of the materials

2. The student will be able to understand the properties and strength characteristics of different building materials

Unit-1

Teaching Hours:30

LEVEL OF KNOWLEDGE: Basic/Working

1. Tension test on Mild steel and HYSD bars (3 HOURS).

2. Compression test of Mild Steel, Cast iron and Wood (3 HOURS).

3. Torsion test on Mild Steel circular sections (3 HOURS).

4. Bending Test on Wood Under two point loading (3 HOURS).

5. Shear Test on Mild steel (3 HOURS).

6. Impact test on Mild Steel (Charpy & Izod) (3 HOURS).

7. Hardness tests on ferrous and non-ferrous metals – Brinell's, Rockwell and Vicker's (3 HOURS).

8. Test on Bricks and Tiles (3 HOURS).

9. Tests on Fine aggregates – Moisture content, Specific gravity, Bulk density, Sieve analysis and Bulking (6 HOURS).

10. Tests on Coarse aggregates – Absorption, Moisture content, specific gravity, Bulk density and Sieve analysis (6 HOURS).

11. Demonstration of Strain gauges and Strain indicators.

NOTE: All tests to be carried out as per relevant BIS Codes

Essential Text Books:

"Relevant IS Codes"

Davis, Troxell and Hawk, "Testing of Engineering Materials", International Student Edition – McGraw Hill Book Co. New Delhi.

Fenner, "Mechanical Testing of Materials", George Newnes Ltd. London

Gambhir M.L., "Concrete Manual", Dhanpat Rai & Sons- New Delhi.

Holes K. A., "Experimental Strength of Materials", English Universities Press Ltd. London.

Kukreja C.B., Kishore K.Ravi Chawla., "Material Testing Laboratory Manual", Standard Publishers & Distributors 1996

Suryanarayana. A.K, "Testing of Metallic Materials", Prentice Hall ofIndia Pvt. Ltd., New Delhi

Recommended Reading:

“Relevant IS Codes”

Gambhir M.L., “Concrete Manual”, Dhanpat Rai & Sons- New Delhi..

Kukreja C.B., Kishore K.Ravi Chawla., “Material Testing Laboratory Manual”, Standard Publishers & Distributors 1996

Suryanarayana. A.K, “Testing of Metallic Materials”, Prentice Hall ofIndia Pvt. Ltd., New Delhi

CE352 - SURVEYING PRACTICE (2015 Batch)

Total Teaching Hours for Semester:30

No of Lecture Hours/Week:2

Max Marks:50

Credits:2

Course Objective

The objective of this practice is to train the students in basics of surveying to enter professional surveying work/in civil engineering field.

Learning Outcome

: After completion of this course the students would be able to:

· Determine difference in elevation, draw the longitudinal section and out simple curves.

· Communicate verbally during outdoor laboratory exercises and record field measurements and other data in the manner common to the surveying profession.

- Work in small teams with individuals of diverse cultural backgrounds.

- Operate and use surveying equipment in a manner that does not jeopardize the safety of team members, the surveying equipment used, or the environment.

Unit-1

Teaching Hours:30

EXERCISE–I

To determine difference in elevation between two points using fly leveling technique & to conduct fly back leveling. Booking of levels using both HI and Rise & Fall method

EXERCISE–II

To determine difference in elevation between two points using reciprocal points using reciprocal leveling and to determine the collimation error

EXERCISE–III

To conduct profile leveling for water supply /sewage line and to draw the longitudinal section to determine the depth of cut and depth of filling for a given formation level

EXERCISE–IV

Measurement of horizontal angles with method of repetition and reiteration using theodolite, Measurement of vertical angles using theodolite

EXERCISE–V

To determine the elevation of an object using single plane method when base is accessible and inaccessible

EXERCISE –VI

To determine the distance and difference in elevation between two inaccessible points using double plane method

EXERCISE –VII

To set out simple curves using linear methods - offsets from chords produced

EXERCISE–VIII

To set out simple curves using Rankine's deflection angles method

EXERCISE–IX

To set out the center line of a simple rectangular room suing offset from base line.

EXERCISE–X

To set out center lines of columns of a building using two base lines at right angles.

DEMONSTRATION: Chain and accessories, compass and accessories, plane table and accessories.

Essential Text Books:

Duggal S.K., “Surveying”, Vol-I”, Tata McGraw Hill - Publishing Co. Ltd. New Delhi.

Kanitkar T.P. & Kulkarni S.V, “Surveying Levelling-Part I & II”,Pune Vidhyarthi Gruha Prakashana

Punmia. B.C., “Surveying Vol–1”, Laxmi Publications, New Delhi

Recommended Reading:

HOL - HOLISTIC EDUCATION (2015 Batch)

Total Teaching Hours for Semester:12

No of Lecture Hours/Week:1

Max Marks:50

Credits:1

Course Objective

Christ University understands the limitations of compartmentalized knowledge which is not adequate enough to face the challenges of the globalized world. With a mission to prepare the students for life and not just for the acquisition of a degree, it encourages every initiative that would help students make perfect connections with the world outside. Inspired by the educational philosophy of Rousseau, Emerson, Ivan Illich, Paulo Freire, Gandhi, Tagore and Blessed Chavara, the University formulated this concept of Holistic Education more than fifteen years ago and included it in the curriculum and makes necessary changes every year. A group of teachers drawn from across the streams go through the whole process of designing the curriculum through a series of intense discussions under the broad classification of three skills: personal, interpersonal and societal.

Learning Outcome

Striving for Academic Excellence

Improved Personal Skills

Improved Interpersonal Skills

Improved Societal Skills

Citizens who can make effective contribution to Society

Professionals who can adapt to changing times

Awareness / Appreciation of Diversity

Strive to be better Human Beings

Life Long Learners

Ability to pursue excellence

Unit-1

Teaching Hours:6

I Semester UG

Personal Skill : Goal Setting and Cyber Etiquettes

Inter-Personal Skill : Dealing with Competition and Leading and Following

Societal Skill : Gender Sensitization and Community Living

III Semester UG

Personal Skill : Spirituality and Transition to Adulthood

Inter-Personal Skill : Alienation and Blocks in Relationship

Societal Skill : Gender Stereotypes and Good Governance

I Semester PG

Personal Skill : Accountability and Mindful Living

Inter-Personal Skill : Alienationand Blocks in Relationship

Societal Skill : Gender Sensitization and Sustainable Development

Essential Text Books:

Recommended Reading:

MA331 - MATHEMATICS - III (2015 Batch)

Total Teaching Hours for Semester:60

No of Lecture Hours/Week:4

Max Marks:100

Credits:3

Course Objective

This course develops the skills of the students in the areas of mechanical as well civil engineering. It will prepare the students for their effective studies in a large number of core engineering subjects.

Learning Outcome

Students would be able to know the different transforms in mathematics to solve the real world problems.

Unit-1

Teaching Hours:12

Fourier Series

Periodic functions, Dirichlet’s conditions – General Fourier series – Odd and even functions – Half range sine and cosine series – Complex form of Fourier Series – Harmonic Analysis.

Unit-2

Teaching Hours:12

Fourier Transform

Fourier integral theorem (without proof) – Fourier transform pair – Sine and Cosine transforms – Properties – Transforms of simple functions – Transform of the derivative and the derivative of the transform - Convolution theorem – Parseval’s identity.

Unit-3

Teaching Hours:14

Partial Differential Equations

Formation of PDE, Solution of homogeneous PDE involving derivative with respect to one independent variable only (Both types with given set of conditions), solution of non- homogeneous PDE by direct integration, Method of separation of variables. (First and second order equations) Solution of Lagrange's linear PDE of the type P p +Q q= R

Derivation of one dimensional wave and heat equations. Various possible solutions of these by the method of separation of variables. D'Alembert's solution of wave equation. Two dimensional Laplace's equation – various possible solutions. Solution of all these equations with specified boundary conditions. (Boundary value problems)

Unit-4

Teaching Hours:10

Numerical Methods ? I

Numerical solutions of algebraic and transcendental equations by Newton - Raphson and Regula - Falsi methods.

Finite differences (Forward and Backward differences) Interpolation, Newton's forward and backward interpolation formulae. Divided differences – Newton's divided difference formula. Lagrange's interpolation and inverse interpolation formulae.

Unit-5

Teaching Hours:12

Calculus of Variations

Variation of a function, Variational problems, Euler's equation and its solution, Standard variation problems including geodesics, minimal surface of revolution, hanging chain and Brachistochrone problems. Functional, functionals involving higher order derivatives.

Essential Text Books:

TEXT BOOK:

1. Dr. B. S. Grewal, “Higher Engineering Mathematics”, 39th Edition, Khanna

Publishers, July 2005.

REFERENCE BOOKS:

1. Erwin Kreyszig, “Advanced Engineering Mathematics”, 8th Edition, John Wiley & Sons,Inc. 2005.

2. B.V. Ramana, “Higher Engineering Mathematics”, Tata-Macgraw Hill, 2009

3. Glyn James, “Advanced Modern Engineering Mathematics”, Pearson Education.

4. S. C. Malik, Savita Arora, “Mathematical Analysis”, 2nd Edition, New Age International (P) Ltd., 2002.

5. George F. Simmons and Steven G. Krantz, “Differential Equation, Theory, Technique and Practice”, Tata McGraw – Hill, 2006.

6. M. D. Raisinghania, “Ordinary and Partial Differential Equation”, Chand (S.) & Co. Ltd., India, March 17, 2005

H. K. Das & Rajnish Verma, “Higher Engineering Mathematics”, S. Chand & Company Ltd., 2011.

Recommended Reading:

CE432 - CONCRETE TECHNOLOGY (2015 Batch)

Total Teaching Hours for Semester:60

No of Lecture Hours/Week:3

Max Marks:100

Credits:3

Course Objective

At the end of this course the student shall have knowledge on use of admixtures, design of mix, durability and testing of cement concrete in hardened state and about special concretes.

Learning Outcome

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

· Identify the functional role of ingredients of concrete and apply this knowledge to mix design philosophy

· Acquire and apply fundamental knowledge in the fresh and hardened properties of concrete

· Evaluate the effect of the environment on service life performance, properties and failure modes of structural concrete and demonstrate techniques of measuring the Non Destructive Testing of concrete structure

· Develop an awareness of the utilisation of waste materials as novel innovative materials for use in concrete.

Design a concrete mix which fulfills the required properties for fresh and hardened concrete.

Unit-1

Teaching Hours:5

Cement

INTRODUCTION, Importance of Bogue's compounds, Structure of a Hydrated Cement Paste .Volume of hydrated product, porosity of paste and concrete, transition ZoneElastic Modulus, factors affecting strength and elasticity of concrete. Rheology of concrete in terms of Bingham's parameter

Unit-2

Teaching Hours:10

Admixtures: Mineral admixtures

Fly ash, Silica fume, GCBS, and their effect on concrete property in fresh state and hardened state.

Unit-2

Teaching Hours:10

Admixtures: Chemical admixtures

INTRODUCTION,Mechanism of chemical admixture, Plasticizers and super Plasticizers and their effect on concrete property in fresh and hardened state, Marsh cone test for optimum dosage of superplasticizer, retarder, accelerator. Air-entraining admixtures, new generation super plasticiser

Unit-3

Teaching Hours:12

Mix Design

Introduction, Factors affecting mix design. design of concrete mix by BIS method using IS10262 and current American (ACI). design of concrete mix by BIS method using IS10262 and current British (BS) methods. Provisions in revised IS10262-2004

Unit-4

Teaching Hours:14

Durability of Concrete

Introduction, Permeability of concrete, chemical attack. Acid attack, efflorescence, Corrosion in concrete. Thermal conductivity, thermal diffusivity, specific heat. Aggregate Reaction, IS456-2000 requirement for durability.

Unit-4

Teaching Hours:14

Tests on Hardened Concrete

Effect of end condition of specimen, capping. H/D ratio, rate of loading, moisture condition. Compression, tension and flexure tests.Tests on composition of hardened concrete-cement content, original w/c ratio. NDT tests concepts-Rebound hammer, pulse velocity methods

Unit-5

Teaching Hours:18

Special Concrete

READY MIXED CONCRETE - manufacture, transporting, placing, precautions, Methods of concreting

Pumping, under water concreting, shotcrete, High volume fly ash concrete concept

properties, typical mix Self compacting concrete concept, materials, tests, properties, application and typical mix

Ferro cement - materials, techniques of manufacture, properties and application.

tension including pre-cracking stage and post-cracking stages, behavior in flexure and shear

FIBER REINFORCED CONCRETE - Fibers types and properties, Behavior of FRC in compression

properties and applications, typical mix.

Typical light weight concrete mix High density concrete and high performance concrete-materials

LIGHT WEIGHT, HIGH DENSITY & HIGH PERFORMANCE CONCRETE - Light weight concrete-materials properties and types

Essential Text Books:

Gambhir M.L "Concrete Manual", Dhanpat Rai & Sons, New Delhi

Krishna Raju N "Concrete Mix Design", Sehgal Publisher

Mehta P K & P J M Monteiro, "Concrete", Prentice Hall, New Jersey (Special Student Edition by Indian Concrete Institute Chennai)

Neville, A.M"Properties of Concrete", ELBS Edition, Longman Ltd., London

Shetty M S"Concrete Technology",

"ACI: Code for Mix Design"

"IS: 10262-2004"

Recommended Reading:

Aitcin P C"High Performance Concrete", E and FN, London

John Newman“Advanced Concrete Technology Constituent materials”, Ban Seng Choo- London

John Newman“Advanced Concrete Technology Processes”, Ban Seng Choo, - London.

Power T.C“Properties of Fresh Concrete”, E and FN, London

Prasad. J C GK Nair, “Non-Destructive Test and Evaluation of Materials”, Mc Graw Hill.

SanthakumarA R,“Concrete Technology”, Oxford University Press

CE433 - STRUCTURAL ANALYSIS - I (2015 Batch)

Total Teaching Hours for Semester:60

No of Lecture Hours/Week:4

Max Marks:100

Credits:4

Course Objective

To enable the students with the comprehensive methods of structural analysis with emphasis on structural elements of different geometry and boundary conditions.

Learning Outcome

The students who successfully complete this course will have the ability to:

1. Determine the static determinacy and indeterminacy in a structure, and also be able to calculate the degree of static indeterminacy and kinematic indeterminacy.

2. Determine the deflection in a structure by Area Moment Method, Conjugate Beam Method, Energy Method, Unit Load Method and using Castigilano’s theorem.

3. Determine the Support reactions, Shear Force and Bending Moments by using the concept of Consistent Deformation for Propped Cantilevers and Fixed Beams and using Clapeyron's theorem of three moments for continuous beams.

4. Determine the Shear Force and Bending Moments for Rolling Loads using Influence Line Method for simply supported rigid beams.

Unit-1

Teaching Hours:15

Introduction and Deflection

INTRODUCTION TO STRUCTURAL SYSTEMS: History of Structural Analysis, Structural Engineering, Steps in Structural Engineering and Requirements of Structural analysis, Forms of structures, one, two, three dimensional structural systems, Various loads to be considered in the analysis, Assumptions in Structural analysis, Conditions of equilibrium, Degree of freedom, Determinate and indeterminate structures [Static and Kinematics]Linear and Nonlinear structures and Concept of Superposition for linear systems.

DEFLECTION OF BEAMS: Moment area method, Conjugate beam method.

ANALYSIS OF PLANE TRUSSES: Analysis of statically determinate Plane trusses by method of joints.

Unit-2

Teaching Hours:12

Strain Energy

STRAIN ENERGY: Strain energy and complimentary strain energy, Strain energy due to axial load, bending and shear, Theorem of minimum potential energy, Law of conservation of energy, Principle of virtual work, The first and second theorem of Castigliano, problems on beams, frames and trusses, Betti’s law, Clarke - Maxwell’s theorem of reciprocal deflection. Deflection of beams and trusses using strain energy and unit load methods

Unit-3

Teaching Hours:12

Arches and Cables

ARCHES AND CABLES: Two hinged parabolic arch, two hinged Circular Arch. Three hinged circular and parabolic arches with supports at same levels and different levels, Determination of thrust, shear and bending moment, Analysis of cables under point loads and UDL, length of cables (Supports at same levels and at different levels).

Unit-4

Teaching Hours:12

Analysis of Beams by Consistent Deformation Method

ANALYSIS OF BEAMS: Consistent deformation method – Propped cantilever and fixed beams, Strain Energy method – Propped cantilever and fixed beams. Clapeyron’s theorem of three moments – continuous beams and fixed beams

Unit-5

Teaching Hours:9

Rolling Loads and Influnce Lines

ROLLING LOAD AND INFLUENCE LINES: Rolling load analysis for simply supported beams for several point loads and UDL. Influence line diagram for reaction, SF and BM at a given section for the cases mentioned

Essential Text Books:

Bhavikatti, S S “Structural Analysis” Vol. I & II,Vikas Publishing House Pvt., New Delhi, Fourth Edition, 2011.

Pandit G. S,Gupta S.P and Gupta. R, “Theory of Structures”, Vol. – I, Tata McGraw Hill, New Delhi. Sixth Reprint, 2011

Punmia B.C., Jain A. K and Jain. A. K“Theory of Structures”, Laxmi Publication, New Delhi, Twelfth Edition, 2010.

Reddy C. S., “Basic Structural Analysis”, Tata McGraw Hill, New Delhi, Third Edition, 2012.

REFERENCE BOOKS:

Kinney S., “Indeterminate Structural Analysis”, Oxford Publishing House, New Delhi, 1957.

Wang. C. K, “Indeterminate Structural Analysis”, Tata McGraw Hill, New Delhi, 2010.

Ghali. A, Neville. A. M and Brown. T. G, “Structural Analysis A Unified Classical And Matrix Approach”Spon Text, London, Sixth Edition, 2013.

Hibbeler. R. C, “Structural Analysis”, Pearson, New Delhi, Sixth Edition, 2011.

Schodek. D. L and Bechthold. M, “Structures” PHI Learning, New Delhi, Seventh Edition, 2014.

Leet. K. M and Uang. C. M, “Fundamentals of Structural Analysis”, Tata McGraw Hill, New Delhi, 2003.

Menon. D, “Structural Analysis”,Narosa Publishing House, New Delhi, 2010.

Rao. D. S. P, “Structural Analysis – A Unified Approach”, United Press, Hyderabad, 1996.

Rajan. S. D, “Introduction to Structural Analysis & Design”, Wiley India, New Delhi, 2001.

West. H. H and Geschwindner. L.F, “Fundamentals of Structural Analysis”, Wiley Student Edition, New Delhi, Second Edition, 2011.

McKenzie. W. M. C, “Examples in Structural Analysis”, CRC Press, London, 2013.

Norris. C. H and Wilbur. J. B, “Elementary Structural Analysis”,Tata McGraw Hill, New Delhi, Fourth Edition, 2003.

Arbabi. F, “Structural Analysis and Behaviour”, McGraw Hill Education, New Delhi, 2014.

Laursen. H, “Structural Analysis”, McGraw Hill Education, New Delhi, Third Edition, 2014.

Bedenik. B and Besant. C, “Analysis of Engineering Structures”, Harwood Publishing, West Sussex, 1999.

Thandavamoorthy, “Structural Analysis”,Oxford University Press, New Delhi, First Edition, 2011.

Jain. A. K, “Advanced Structural Analysis- With Finite Element and Computer Applications”, Nem Chand, Roorkee, Second Edition, 2009.

Roy. S.K and Chakrabarty. S, “Fundamentals of Structural Analysis With Computer Analysis and Applications”, S. Chand & Co, New Delhi, Second Edition, 2011.

Vazirani. V. N, Ratwani. M. M and Duggal. S. K, “Analysis of Structures Vol. II- Theory, Design & Details of Structures”, Khanna Publishers, New Delhi, Sixteenth Edition, 2011.

Recommended Reading:

Bhavikatti, S S “Structural Analysis” Vol. I & II,Vikas Publishing House Pvt., New Delhi, Fourth Edition, 2011.

Pandit G. S,Gupta S.P and Gupta. R, “Theory of Structures”, Vol. – I, Tata McGraw Hill, New Delhi. Sixth Reprint, 2011

Punmia B.C., Jain A. K and Jain. A. K“Theory of Structures”, Laxmi Publication, New Delhi, Twelfth Edition, 2010.

Reddy C. S., “Basic Structural Analysis”, Tata McGraw Hill, New Delhi, Third Edition, 2012.

CE434 - ADVANCED SURVEYING (2015 Batch)

Total Teaching Hours for Semester:60

No of Lecture Hours/Week:4

Max Marks:100

Credits:03

Course Objective

To work with total station

To understand the data models and data structures used for spatial data

To acquire knowledge in basic concepts of Photogrammetry and Mappin

To acquire knowledge about concepts of Remote sensing, sensors and their characteristics

Learning Outcome

After completion of this course the students will be able to

Work with total station

Understand the data models and data structures used for spatial data

Acquire knowledge in basic concepts of Photogrammetry and Mapping

Acquire knowledge about concepts of Remote sensing, sensors and their characteristics

Unit-1

Teaching Hours:12

Total Station

Introduction, features of total station, angle and distance measurement, control panel, setting up and orienting a total station, electronic data recording, Field procedure to run a traverse survey.

Unit-1

Teaching Hours:12

Photogrammetry

Introduction to Geodetic Surveying, Photogrammetry: Introduction – Basic Principles- Photo theodolites - Definitions – Horizontal and Vertical angle from terrestrial photography – Horizontal position of a point from photo graphic measurement from camera horizontal axis- Elevation of point by photographic measurement –focal length.

Unit-2

Teaching Hours:12

Remote Sensing

Introduction –Historical sketch of Remote Sensing-Idealized remote sensing – Basic principles of remote sensing – Electromagnetic energy electromagnetic spectrum – Wave length regions and their application in remote sensing – characteristics of solar radiation – Basic radiation law –EM radiation and atmosphere – Interaction of EM radiation with earth surface –remote sensing observation platform – sensors – applications

Unit-3

Teaching Hours:12

Geographic Information Systems

Definitions: The four M's concept – contributing disciplines for GIS, GIS objectives – components of a GIS – Topology – Data structures –Data base management –Errors in GIS – GIS software package – Linkage of GIS to remote sensing – application areas of GIS and remote sensing

Unit-4

Teaching Hours:12

GIS concepts and spatial models

Introduction, spatial information, temporal information, conceptual models of spatial information, representation of geographic information. GIS functionality – Introduction, data acquisition, preliminary data processing, data storage and retrieval, spatial search and analysis, graphics and interaction

Unit-5

Teaching Hours:12

Computer Fundamentals of GIS and Data storage

Fundamentals of computers vector/raster storage character files and binary files, file organization, linked lists, chains, trees, coordinate systems and map projection: Rectangular polar and spherical coordinates, types of map projections, choosing a map projections. Digitizing Editing and Structuring Map Data: Entering the spatial data (digitizing), the non spatial, associated attributes, linking spatial and nonspatial data, use of digitizers and scanners of different types of GIS and remote sensing data integration techniques.

Unit-5

Teaching Hours:12

Global positioning system

Working Principle and its applications

Essential Text Books:

I. Books:

A: Required:

1. .Remote Sensing and Image Interpretation – Lille Sand, John Wiley and Sons

2. Reddy. M. A, “Text Book of Remote Sensing and Geographical Information Systems”, BS Publications, Hyderabad, Fourth Edition, 2013.

B: Reference:

1. Elements of Photogrammetry – Paul R Wolf, McGraw International

2. .Principles of GIS – Peter A Burrough, Oxford Publications

3. .GIS and Computer Cartography – Christopher Jones, Longman Publications GIS – Bemhardsen, Wiley Publications.

Recommended Reading:

1. .Remote Sensing and Image Interpretation – Lille Sand, John Wiley and Sons

2. Reddy. M. A, “Text Book of Remote Sensing and Geographical Information Systems”, BS Publications, Hyderabad, Fourth Edition, 2013

Elements of Photogrammetry – Paul R Wolf, McGraw International

CE435 - HYDRAULICS AND HYDRAULIC MACHINES (2015 Batch)

Total Teaching Hours for Semester:60

No of Lecture Hours/Week:4

Max Marks:100

Credits:4

Course Objective

The objective of this subject is to study and understand the Properties of fluids, Behavior of fluids, their significance, and understand the Construction and Principle of working of different types of Water Turbines, different types of Pumps and its Efficiencies.

Learning Outcome

On completion of the course, the student would be able to:

Classify fluids, study its properties, and measure its pressure. The student would also be able to calculate the centre of pressure and hydrostatic force on submerged surface in water, dynamic of fluids and application of Bernoulli's equation and would be able to measure flow through pipes.

Unit-1

Teaching Hours:15

FLOW IN OPEN CHANNELS:

Definition of open channels, classification, difference between pipe flow & open channel flow, types of flow, Geometric properties of open channels. Uniform flow in open channels, Chezy's and Manning's formulae. Problems on uniform flow, Most economical open channels. Derivation of conditions for rectangle, triangle and trapezoidal sections, Problems on most economical sections, Most economical circular channels derivations and problems.

Specific energy, definitions, specific energy curve, conditions for minimum specific energy and maximum discharge, Critical flow in rectangular channels, problems, Hydraulic jump in rectangular channels, derivations with Froude number concept, Problems on Hydraulic Jump, venturi flume.

Unit-2

Teaching Hours:15

WATER HAMMER IN PIPES:

Definition, Equation for pressure rises due to gradual closure of valves. Equation for pressure due to sudden closure of valves in rigid & elastic pipes, problems, Surge tanks, their functions & types.

Unit-2

Teaching Hours:15

DIMENSIONAL ANALYSIS & MODEL SIMILITUDE:

Introduction to Dimensional Analysis, units & dimensions, table of Dimensions, Dimensional Homogeneity, Methods of Analysis (Raleigh's & Buckingham's method, Problems on Raleigh's & Buckingham's methods, Model Studies, Introduction, comparison with Dimensional Analysis, Similitude, Dimensionless parameters. Types of models, Froude's models theory & problems, Reynold's models, Theory problems, Scale effects

Unit-3

Teaching Hours:8

IMPACT OF JET ON FLAT VANES:

Introduction to Impulse – momentum equation and its applications, Force exerted by a jet on a fixed target, Derivations, Force exerted by a Jet on a moving target, Derivations.

Unit-3

Teaching Hours:8

IMPACT OF JET ON CURVED VANES

Force exerted by a jet on a series of curved vanes, Concept of velocity triangles, Equation for work done & efficiency, Problems o force exerted by a Jet on a series of curved valves

Unit-4

Teaching Hours:15

HYDRAULIC TURBINES (Impulse turbines):

Introduction, Types and classifications, Pelton Wheel, theory, equation for work done and efficiency, design parameters, Problems on Pelton Wheel.

Unit-4

Teaching Hours:15

HYDRAULIC TURBINES (Reaction turbines):

Francis Turbine – Theory, equation for work done and efficiency, design parameters, Problems on Francis turbine, Kaplan turbine – Theory, equation for work done & efficiency, Design parameters, Problems on Kaplan turbine.

Unit-4

Teaching Hours:15

HYDRAULIC TURBINES (Performance):

Draft tubes: types, Equation for efficiency problems, Cavitations in turbines, governing of turbines, governing of turbines, Specific speed of a turbine, Equation for the specific speed, problems, Unit quantities of a turbine, definitions, equations and problems, Characteristics curves of a turbine, general layout of an hydroelectric plant.

Unit-5

Teaching Hours:7

CENTRIFUGAL PUMPS:

Definition of pump, classification, Description & general principle of working, priming & methods, Work done & efficiencies of a centrifugal pump, Minimum starting speed, cavitation in centrifugal pumps, Multistage pumps, Problems on Centrifugal pumps

Essential Text Books:

ESSENTIAL READING:

Bansal R.K., “Text Book on Fluid mechanics & Hydraulic Machines”, Laxmi publications

Modi P.N. & Seth S. M., “Hydraulics & Fluid Mechanics”, Standard Book House, New Delhi

Raghunath. H.M., “Fluid Mechanics & Machinery”, CBS Publishers

Recommended Reading:

RECOMMENEDED READING:

Arora .K.R., “Hydraulics & Fluid Mechanics”, Standard Book house, NewDelhi

Gupta. S.C., “Fluid Mechanics and Hydraulic Machines”, Pearson Education, India

Jain, A.K., “Fluid Mechanics”, Khanna Publishers, New Delhi.

James. F. Cruise, Vijay P. Singh, Mohsan M. Sherif, “Elementary Hydraulics”, (1st Edition) Thomson Learning.

John F. Douglas et al., “Fluid Mechanics”, Pearson Education, India.

Rao. B. C. S, “Fluid Mechanics and Machinery”, Tata McGraw-Hill Education Pvt. Ltd

Som .S.K., “Introduction to Fluid Mechanics and Fluid Machines”, Tata McGraw-Hill Education Pvt. Ltd

Subramanya K., “1000 Solved Problems in Fluid Mechanics: Includes Hydraulic Machines”, Tata Mc Graw-Hill Education Pvt. Ltd

Subramanya K., “Flow in Open Channels”, Tata McGraw-Hill Education Pvt. Ltd

CE436 - BUILDING PLANNING AND DRAWING (2015 Batch)

Total Teaching Hours for Semester:60

No of Lecture Hours/Week:4

Max Marks:100

Credits:04

Course Objective

SUBJECT DESCRIPTION: This paper contains five units. This paper emphasis on Building Drawing completely and

To make the students aware about the basic principles of Building Drawing

Make the students to prepare working drawing of component of buildings

Make the students to draw plan, elevation and section of buildings

Make the students to prepare drawing for functional design of building and line diagram

SUBJECT OBJECTIVE: This paper aims at enabling the students to prepare Working drawing of Building Components and Building Drawing and Line diagram.

LEVEL OF KNOWLEDGE: Basic/working

Learning Outcome

On completion of this course the students willhave the knowledge of preparing working drawing of Building Components and Planning of Building, Drawing and Line diagram.

Unit-1

Teaching Hours:15

UNIT- I(15HOURS)

To prepare working drawing of component of buildings i) Stepped wall footing and isolated RCC column footing, ii) Fully panelled and flush doors, iii) Half panelled and half-glazed window, iv) RCC doglegged and open well stairs, v) Steel truss.

Unit-2

Teaching Hours:10

UNIT- II(10HOURS)

Functional design of building (Residential, Public and Industrial), positioning of various components of buildings, orientation of buildings, building standards, bye laws, set back distances and calculation of carpet area, plinth area and floor area ratio.

Unit-3

Teaching Hours:18

UNIT- III(18HOURS)

Development of plan, elevation, section and schedule of openings from the given line diagram of residential buildings, i) Two bed room building, ii) Two storeyed building.

Unit-4

Teaching Hours:12

UNIT- IV(12HOURS)

Functional design of building using inter connectivity diagrams(bubble diagram), development of line diagram only for following building i) Primary health centre, ii) Primary school building, iii)College canteen iv) Office building

Unit-5

Teaching Hours:5

UNIT-V(05HOURS)

For a given single line diagram, preparation of water supply, sanitary and electrical layouts

Essential Text Books:

REFERENCE BOOKS:

Gurucharan Singh and Subash Chander “Civil engineering Drawing”

Gurucharan Singh, “Building Construction”, Standard Publishers &distributors, New Delhi

National Building Code, BIS, New Delhi

Shah M. G., and Kale C. M., “Building Drawing and Planning with an Integrated approach to Built Environment”, Tata McGraw-Hill Education Pvt. Ltd., New Delhi

Sikka .V.B., Kataria. S. K & Sons. “A course in Civil engineering Drawing”,

Varghese, “Building Construction”, PHI learning Private Limited

Sushil Kumar, “Building construction”, Standard Publishers, Distributors, Delhi, 1994

Recommended Reading:

Shah M. G., and Kale C. M., “Building Drawing and Planning with an Integrated approach to Built Environment”, Tata McGraw-Hill Education Pvt. Ltd., New Delhi

CE451 - HYDRAULICS AND HYDRAULIC MACHINERY LABORATORY (2015 Batch)

Total Teaching Hours for Semester:30

No of Lecture Hours/Week:2

Max Marks:50

Credits:2

Course Objective

To study the behavior of fluids.

Learning Outcome

Students will be able to understand the behavior of fluids on different hydraulic sturcutes, behaviour of fluides on various outlets, major and minor losses due to pipe contraction, bending, expansion.

Unit-1

Teaching Hours:30

List of Exercises

EXERCISE -I: Calibration of V-notch

EXERCISE -II: Calibration of rectangular or Trapezoidal notch (6 HOURS).

EXERCISE - III: Calibration of Ogee weir

EXERCISE - IV: Calibration of Broad crested weir (6 HOURS).

EXERCISE - V: Calibration of Venturi flume.

EXERCISE - VI: Calibration of Venturi meter. (6 HOURS).

EXERCISE -VII: Determination of Darcy's friction factor for a straight pipe. (3 HOURS).

EXERCISE - VIII: Determination of minor loss constants (Bend, Sudden contraction, sudden expansion)(3 HOURS).

EXERCISE-IX: Determination of vane coefficient for flat and hemispherical vanes (3 HOURS).

EXERCISE-X: Determination of hydraulic coefficient of a vertical orifice (3 HOURS).

EXERCISE-XI: Performance tests on a single stage or multi stage centrifugal pump (constant speed) (3 HOURS).

EXERCISE- XII: Performance tests on a Pleton wheel (3 HOURS).

EXERCISE-XIII: Performance tests on Francis or Kaplan turbine (3 HOURS).

EXERCISE- XIV: Demonstration of working of Rain gauges (3 HOURS).

Essential Text Books:

ESSENTIAL READING:

Bansal R.K., “Text Book on Fluid mechanics & Hydraulic Machines”, Laxmi publications

Modi P.N. & Seth S. M., “Hydraulics & Fluid Mechanics”, Standard Book House, New Delhi

Raghunath. H.M., “Fluid Mechanics & Machinery”, CBS Publishers

Recommended Reading:

RECOMMENEDED READING:

Arora .K.R., “Hydraulics & Fluid Mechanics”, Standard Book house, NewDelhi

Gupta. S.C., “Fluid Mechanics and Hydraulic Machines”, Pearson Education, India

Jain, A.K., “Fluid Mechanics”, Khanna Publishers, New Delhi.

James. F. Cruise, Vijay P. Singh, Mohsan M. Sherif, “Elementary Hydraulics”, (1st Edition) Thomson Learning.

John F. Douglas et al., “Fluid Mechanics”, Pearson Education, India.

Rao. B. C. S, “Fluid Mechanics and Machinery”, Tata McGraw-Hill Education Pvt. Ltd

Som .S.K., “Introduction to Fluid Mechanics and Fluid Machines”, Tata McGraw-Hill Education Pvt. Ltd

Subramanya K., “1000 Solved Problems in Fluid Mechanics: Includes Hydraulic Machines”, Tata Mc Graw-Hill Education Pvt. Ltd

Subramanya K., “Flow in Open Channels”, Tata McGraw-Hill Education Pvt. Ltd

CE452 - CONCRETE TECHNOLOGY LABORATORY (2015 Batch)

Total Teaching Hours for Semester:24

No of Lecture Hours/Week:2

Max Marks:50

Credits:2

Course Objective

The objective of this lab is to expose students to different standard test methods pertaining to cement and cement concrete.

Learning Outcome

Upon completion of this lab course the studetns should be able to

1. Understand the importance of the different test methods and its applications in the construction industry

2. Perform tests independently as per the IS recommendations

2. Provide a clear inference from the obtained results in the laboratory

Unit-1

Teaching Hours:12

TESTS ON CEMENT

1.1 Fineness of Cement

1.2 Normal Consistency of Cement

1.3 Initial and Final Setting time of Cement

1.4 Specific Gravity of Cement

1.5 Soundness of Cement

1.6 Compressive Strength of Cement

Unit-2

Teaching Hours:6

TESTS ON AGGREGATE

2.1 Specific gravity, void ratio, porosity, and bulk desnity of aggregate

2.2 Sieve Analysis of Fine and Coarse Aggregate

2.3 Bulking of Sand

Unit-3

Teaching Hours:6

TESTS ON FRESH AND HARDENED CONCRETE

1.1 Workability of Fresh Cement Concrete

1.2 Compressive Strength of Cement Concrete

1.3 Splitting Tesnile Strength of Cement Concrete

Essential Text Books:

Recommended Reading:

HOL - HOLISTIC EDUCATION (2015 Batch)

Total Teaching Hours for Semester:12

No of Lecture Hours/Week:1

Max Marks:50

Credits:1

Course Objective

Christ University understands the limitations of compartmentalized knowledge which is not adequate enough to face the challenges of the globalized world. With a mission to prepare the students for life and not just for the acquisition of a degree, it encourages every initiative that would help students make perfect connections with the world outside. Inspired by the educational philosophy of Rousseau, Emerson, Ivan Illich, Paulo Freire, Gandhi, Tagore and Blessed Chavara, the University formulated this concept of Holistic Education more than fifteen years ago and included it in the curriculum and makes necessary changes every year. A group of teachers drawn from across the streams go through the whole process of designing the curriculum through a series of intense discussions under the broad classification of three skills: personal, interpersonal and societal.

Learning Outcome

Striving for Academic Excellence

Improved Personal Skills

Improved Interpersonal Skills

Improved Societal Skills

Citizens who can make effective contribution to Society

Professionals who can adapt to changing times

Awareness / Appreciation of Diversity

Strive to be better Human Beings

Life Long Learners

Ability to pursue excellence

Unit-1

Teaching Hours:6

I Semester UG

Personal Skill : Goal Setting and Cyber Etiquettes

Inter-Personal Skill : Dealing with Competition and Leading and Following

Societal Skill : Gender Sensitization and Community Living

III Semester UG

Personal Skill : Spirituality and Transition to Adulthood

Inter-Personal Skill : Alienation and Blocks in Relationship

Societal Skill : Gender Stereotypes and Good Governance

I Semester PG

Personal Skill : Accountability and Mindful Living

Inter-Personal Skill : Alienationand Blocks in Relationship

Societal Skill : Gender Sensitization and Sustainable Development

Essential Text Books:

Recommended Reading:

MA431 - MATHEMATICS - IV (2015 Batch)

Total Teaching Hours for Semester:60

No of Lecture Hours/Week:4

Max Marks:100

Credits:4

Course Objective

The course aims to develop the skills of the students in the areas of all engineering. This will be necessary for their effective studies in a large number of

engineering subjects and able to apply and solve problems arising in applications. The course will also serve as a prerequisite for post graduate and specialized studies and

research.

Learning Outcome

This paper contains five units which are Numerical Methods, Complex Variables, Series Solution of Differential Equation and Special Function with Statistics and

Probability. This paper emphasizes the basic concepts and methods of probability, discrete and continuous random variables are considered.

Unit-1

Teaching Hours:12

NUMERICAL METHODS - II

Numerical differentiation using Newton's forward and backward interpolation formulae.

Numerical Integration- Simpson's one third and three eighth's value, Weddle's rule. (All formulae / rules without proof)

Numerical solutions of first order and first degree ordinary differential equations : Taylor series method – Euler method, Fourth order Runge – Kutta method for solving first and second order equations and modified Euler methods. Milne's and Adams-Bash forth predictor and corrector methods (All formulae without Proof).

Unit-2

Teaching Hours:14

COMPLEX VARIABLES

Analytic functions, Cauchy – Riemann equations in Cartesian and polar forms, Properties of analytic functions. Conformal transformation – Definition. Discussion of transformations, Bilinear transformations. Complex line integrals, Cauchy's theorem, Cauchy's integral formula. Taylor's and Laurent's series (Statements only) Singularities, Poles, Residues, Cauchy's residue theorem (statement only).

Unit-3

Teaching Hours:10

SERIES SOLUTION OF ORDINARY DIFFERENTIAL EQUATIONS AND SPECIAL FUNCTIONS

Series solution – Frobenius method, Series solution of Bessel's D.E. leading to Bessel function of fist kind. Equations reducible to Bessel's D.E., Series solution of Legendre's D.E. leading to Legendre Polynomials. Rodirgue's formula

Unit-4

Teaching Hours:14

PROBABILITY & STATISTICS

Random variables – Discrete and continuous random variables. Probability mass function (pmf), Probability density function (pdf), cumulative distribution function (cdf), mean, variance, Theoretical distribution - Binomial, Poisson, Normal and Exponential distributions. Curve fitting by the method of least squares, correlation and regression.

Unit-5

Teaching Hours:10

NUMERICAL TECHNIQUES TO SOLVE PARTIAL DIFFERENTIAL EQUATIONS

Finite difference solution of one dimensional heat equation by explicit and implicit methods – One dimensional wave equation and two dimensional Laplace and Poisson equations.

Essential Text Books:

1. Dr. B. S. Grewal, "Higher Engineering Mathematics", 39th Edition, Khanna Publishers, July 2005.

2. Murray R. Spiegel, John Schiller, R. Alu Srinivasan, "Theory and Problems of Probability and Statistics", Schaum's series, Tata-Macgraw Hill, 2004.

Recommended Reading:

1. Erwin Kreyszig, “Advanced Engineering Mathematics”, 8th Edition, John Wiley & Sons, Inc., 2005

2. B.V. Ramana, “Higher Engineering Mathematics”, Tata-Macgraw Hill, 2009

3. Glyn James, “Advanced Modern Engineering Mathematics”, Pearson Education.

4. Sheldon M. Ross, “Introduction to Probability Models”, 9th Edition, Academic Press, 2008

5. Oliver C. Ibe, “Fundamentals of Applied Probability and Random Process”, Academic Press, 2007

CE531 - STRUCTURAL ANALYSIS - II (2014 Batch)

Total Teaching Hours for Semester:60

No of Lecture Hours/Week:4

Max Marks:100

Credits:4

Course Objective

The objective of this course is to enable the students to take an integral look at the theories of structural analysis with proper emphasis on structural elements of different geometry and boundary conditions.

Learning Outcome

On completion of the course, the students would be able to analyse effects of loads on physical structures and of internal forces, deflection and to verify the no unstable failure can occur.

UNIT 1

Teaching Hours:10

SLOPE DEFLECTION METHOD: Introduction, Sign convention, Development of slope-deflection equations and Analysis of Beams and Orthogonal Rigid jointed plane frames (non-sway) with kinematic redundancy less than/equal to three. (Members to be axially rigid) Analysis of rigid jointed plane frames (sway, members assumed to be axially rigid and kinematic redundancy ≤ 3) by slope deflection method

Unit-2

Teaching Hours:10

MOMENT DISTRIBUTION METHOD: Introduction, Definition of terms- Distribution factor, Carry over factor, Development of method and Analysis of beams and orthogonal rigid jointed plane frames (non-sway) with kinematic redundancy less than/equal to three. (Members to be axially rigid) Analysis of rigid jointed plane frames (sway, members assumed to be axially rigid and kinematic redundancy ≤ 3) by moment distribution methods.

Unit-3

Teaching Hours:10

KANIS METHODS: Introduction, Basic Concept, Analysis of Continuous beams and Analysis of rigid jointed non-sway plane frames.

Unit-4

Teaching Hours:20

FLEXIBILITY MATRIX METHOD OF ANALYSIS: Introduction, Development of flexibility matrix for plane truss element and axially rigid plane framed structural elements and Analysis of plane truss and axially rigid plane frames by flexibility method with static indeterminacy ≤3.

STIFFNESS MATRIX METHOD OF ANALYSIS: Introduction, Development of stiffness matrix for plane truss element and axially rigid plane framed structural elements. And Analysis of plane truss and axially rigid plane frames by stiffness method with kinematic indeterminacy ≤3.

Unit-5

Teaching Hours:10

BASIC PRINCIPLES OF DYNAMICS: Basic principles of Vibrations and causes, periodic and a periodic motion, harmonic and non-harmonic motion. Period and frequency, Forced and Free Vibration, Damping and Equations of Single Degree of Freedom System with and without damping

Essential Text Books:

Books:

1.Bhavikatti, S S “Structural Analysis” Vol. I & II, Vikas Publishing House Pvt.

2. Gupta S.P., Pandit G.S and Gupta R., “Theory of Structures”, Vol. 2, Tata McGraw Hill Publication Company Ltd

3. Pumia B.C., and Jain R.K., “Strength of Materials and theory of structures”,Vol I & II, Laxmi Publication New Delhi

Reference:

1. Ashok K. Jain, “Advanced Structural Analysis”, Nem Chand & Bros., Roorkee, India.

2. Aslam Kassimali, “Structural Analysis”, Thomson Learning.

3. Clough R.W. and Penzin J., “Dynamics of Structures”, Tata Mc Graw Hill Publications.

4. Negi and Janjid, “Structural Analysis”, Tata Mc Graw Hill Publications

5. Norris C.H., Wilbur J.B., “Elementary Structural Analysis”, Mc Graw Hill International Book Edition.

6. Prakash Rao D.S., “Structural Analysis”, a Unified Approach, University Press.

7. Reddy C.S. “Basic Structural Analysis”, Second Edition, Tata McGraw Hill Publication Company Ltd.

8. Sterling Kinney. J., “Indeterminate Structural Analysis”,Oxford and IBH Publishing Co

9. Thandava Murthy, “Analysis of Structures”, Oxford University Press,Edition 2005

10. Wang C.K., “Intermediate Structural Analysis”, Mc Graw Hill Publications

Recommended Reading:

Strucutral analysis by R.C.Hibbeler

Advanced methods of structural analysis by Igor A. Karnovsky

Strucutral analysis of historical construction by Paulo B.Lourenco

CE532 - DESIGN OF RCC ELEMENTS (2014 Batch)

Total Teaching Hours for Semester:60

No of Lecture Hours/Week:4

Max Marks:100

Credits:4

Course Objective

The objective of this subject is to study basic Principles, Analysis and Design concepts of R.C.C. structural components.

Learning Outcome

On completion of course, the student would be able to design various components of a reinforced concrete structures viz; beams, slabs, columns, footings and staircases, by using IS456: 2000 codal provisions, having studied the properties of reinforced concrete.

Unit-1

Teaching Hours:15

GENERAL FEATURES OF REINFORCED CONCRETE

Introduction, Design Loads, Materials for Reinforced Concrete and Code requirements, Design Philosophy – Limit State Design principles. Philosophy of limit state design, Principles of limit states, Factor of Safety, Characteristic and design loads, Characteristic and design strength.

Unit-1

Teaching Hours:15

FLEXURE AND SERVICEABILITY LIMIT STATES

General Specification for flexure design of beams-practical requirements, size of beam, cover to reinforcement-spacing of bars. General aspects of serviceability-Deflection limits in IS: 456 – 2000-Calculation of deflection (Theoretical method), Cracking in structural concrete members, Calculation of deflections and crack width.

Unit-1

Teaching Hours:15

PRINCIPLES OF LIMIT STATE DESIGN AND ULTIMATE STRENGTH OF R.C. SECTION

General aspects of Ultimate strength, Stress block parameters for limit state of collapse, Ultimate flexural strength of singly reinforced rectangular sections, Ultimate flexural strength of doubly reinforced rectangular sections, Ultimate flexural strength of flanged sections, Ultimate shear strength of RC sections, Ultimate torsional strength of RC sections, Concepts of development length and anchorage, Analysis examples of singly reinforced, doubly reinforced, flanged sections, shear strength and development length.

Unit-2

Teaching Hours:12

DESIGN OF BEAMS

Design procedures for critical sections for moment and shears. Anchorages of bars, check for development length, Reinforcement requirements, Slenderness limits for beams to ensure lateral stability, Design examples for simply supported and Cantilever beams for rectangular and flanged sections.

Unit-3

Teaching Hours:10

DESIGN OF SLABS

General consideration of design of slabs, Rectangular slabs spanning one direction, Rectangular slabs spanning in two directions for various boundary conditions. Design of simply supported, cantilever and continuous slabs as per IS: 456 – 2000.

Unit-4

Teaching Hours:15

DESIGN OF FOOTINGS

Introduction, load for footing, Design basis for limit state method, Design of isolated rectangular footing for axial load and uniaxial moment, design of pedestal.

Unit-4

Teaching Hours:15

DESIGN OF COLUMNS

General aspects, effective length of column, loads on columns, slenderness ratio for columns, minimum eccentricity, design of short axially loaded columns, design of column subject to combined axial load and uniaxial moment and biaxial moment using SP – 16charts.

Unit-5

Teaching Hours:8

DESIGN OF STAIR CASES

General features, types of stair case, loads on stair cases, effective span as per IS code provisions, distribution of loading on stairs, Design of stair cases.

Essential Text Books:

Bhavikatti. S. S., “Design of RCC Structural Elements”, Vol-I, New Age International Publications, New Delhi

Jain. A.K., “Limit State method of design”, Nemichand and Bros.,Roorkee

Punmia.B.C., Ashok kumar Jain & Arun kumar Jain, “Limit State design of Reinforced concrete”, Laxmi Publication, New Delhi.

Recommended Reading:

Ghosh, “Practical Design of Reinforced Concrete Design”, PHI learning Private Limited

Krishna Raju. N., “Structural Design and Drawing”, Universities press

Krishnamurthy, “Structural Design and Drawing”, CBS publishers, New Delhi.

Krishnaraju. N., “Design of Reinforced concrete structures”, 3rd edition CBS publishers, New Delhi

Park and Pauly. “Reinforced Concrete”, John wiley and Sons, New York

Sinha. S.N, “Reinforced Concrete design”, Tata McGraw-Hill Education Pvt. Ltd

Unnikrishna Pillai and Devdas Menon “Reinforced concrete Design’, Tata McGraw Hill Publishers Company Ltd., New Delhi, 2006.

Unnikrishna Pillai and Devdas Menon. S., “Reinforced Concrete Design”, Tata McGraw-Hill Education

Varghese, “Limit State of Reinforced Concrete Design”, 2nd ed., PHI learning Private Limited

SP-16 – “Only Design charts pertaining to column design”.

IS: 456 – 2000

CE533 - GEOTECHNICAL ENGINEERING - I (2014 Batch)

Total Teaching Hours for Semester:60

No of Lecture Hours/Week:4

Max Marks:100

Credits:4

Course Objective

The objective of this subject is to study and understand the basic concepts of Soil mechanics and Properties, behavior of soil and their significance under Compaction, Consolidation and Shear strength.

Learning Outcome

By the end of the programme the student should be able to:

Identify the importance and role of geotechnical engineering within the Civil Engineering profession.

Recognise and describe a range of soil and rock types

Understand and apply the Principle of Effective Stress

Identify appropriate tests and strength criteria for rocks and soils.

Unit-1

Teaching Hours:13

Introduction

History of soil mechanics, Definition, origin and formation of soil. Phase Diagram, Voids ratio, Porosity, Percentage Air Voids, Air content, Degree of saturation, Moisture content, Specific gravity, Bulk density, Dry density, Saturated density, Submerged density and their inter relationships.

Unit-1

Teaching Hours:13

Index Properties of soils

Water content , Specific Gravity, Particle size distribution, Relative Density, Consistency limits and indices, insitu density, Activity of Clay,

Unit-2

Teaching Hours:12

Determination of Index properties

Laboratory methods of determination of index properties of soils: Moisture content, Specific gravity, Particle size distribution (Sieve analysis and Hydrometer analysis only), Liquid Limit- Casagrande and cone penetration methods, Plastic limit and shrinkage limit determination.

Unit-2

Teaching Hours:12

Classification of soils

Purpose of soil classification, basis for soil classification, Particle size classification – MIT classification and IS classification, Textural classification. Unified soil classification and IS classification - Plasticity chart and its importance, Field identification of soils.

Unit-3

Teaching Hours:12

FLOW OF WATER THROUGH SOILS

Darcy’s law- assumption and validity, coefficient of permeability and its determination (laboratory and field)

factors affecting permeability, permeability of stratified soils, Seepage velocity, Superficial velocity and coefficient of percolation,effective stress concept-total pressure and effective stress, quick sand phenomena, Capillary Phenomena.

Unit-4

Teaching Hours:10

Consolidation of soils

Definition, Mass-spring analogy, Terzaghi’s one dimensional consolidation theory-assumption and limitations (no derivation), Normally consolidated, under consolidated and over consolidated soils, pre-consolidation pressure and its determination by Casagrande’s method. Consolidation characteristics of soil (Cc, av, mv and Cv), Time rate of consolidation.

Unit-4

Teaching Hours:10

Compaction of soils

Definition, Principle of compaction, Standard and Modified proctor's compaction tests, factors affecting compaction, effect of compaction on soil properties, Field compaction control, Proctor needle. Compacting equipments, Dynamic compaction, vibroflotation

Unit-5

Teaching Hours:13

Determination of consolidation and shear properties of soil

Laboratory one dimensional consolidation test, Determination of consolidation characteristics of soils-compression index, and coefficient of consolidation, determination of coefficient of consolidation by square root of time fitting method, logarithmic time fitting method and rectangular hyperbola method. Measurement of shear parameters- Direct shear test, unconfined compression test, Triaxial compression test and vane shear test, Test under different drainage conditions.

Unit-5

Teaching Hours:13

Shear strength of soils

Concept of shear strength, Mohr's strength theory, Mohr-s Zcoulomb theory, conventional and modified failure envelops, Total and effective shear strength parameters, Concept of pore pressure, factors affecting shear strength of soils, Sensitivity and Thixotropy of clay.

Essential Text Books:

1. Dr. K R Arora, “Soil Mechanics and Foundation Engineering (1996)”, 8th Edition, standard Publishers and

Distributors, New Delhi

2. Punmia B.C., “Soil Mechanics and Foundation Engg (2005)”, 16th Edition Laxmi Publications Co, New

Delhi

3. Venkatrahmaiah C., “Geotechnical Engineering (2006)”, 3rd Edition New Age International (P) Ltd.,

new Delhi.

Recommended Reading:

1. Alam Singh and Chowdhary G. R., “Soil Engineering in Theory and Practice (1994)”,

CBS Publishers and Distributors Ltd., New Delhi.

2. Bowles,Joseph E; "Engineering Properties of soils and their Measurement"; McGraw

Hill.

3. Braja, M. Das, “Principles of Geotechnical Engineering; (2002)”, Fifth Edition, Thomson Business Information India (P) Ltd., India

4. Budhu, “Soil Mechanics and Foundations”, Wiley India Pvt. Ltd

5. Craig R.F, “Soil Mechanics (1987)”, Van Nostr and Reinhold Co. Ltd

6. Gopal Ranjan and Rao. A.S.R, “Basic and Applied Soil Mechanics (2000)”, New Age International (P) Ltd., New Delhi

7. Lambe, “Soil Mechanics SI Version”, Wiley India Pvt. Ltd

8. Ranjan Gopal and Rao A.S.R. “Basic and Applied Soil Mechanics”, New Age Publication (P) Ltd., New Delhi

8. A. V. Narasimha Rao and C. Venkataramaiah"Numerical Problems, examples and objective Questions in Geotechnical Engineering" University Press

9. BIS Codes IS 6403 (latest edition) and IS 1498 (latest edition)

CE534 - HYDROLOGY AND WATER RESOURCES ENGINEERING (2014 Batch)

Total Teaching Hours for Semester:60

No of Lecture Hours/Week:4

Max Marks:100

Credits:4

Course Objective

The objective of this subject is to study the basics and importance of Hydrologyand Water Resources

Learning Outcome

On completion of the course, the student would be able to:

Study the Hydrological cycle, measure, compute and present the precipitation data. The student would be also be able to estimate evaporation, infiltration, evapo-transportation and runoff. The student would also be able to plot hydrographs, study the groundwater hydrology, well hydraulics, and reservoir sedimentation, important water resources, rainwater harvesting and measure stream flow.

Unit-1

Teaching Hours:12

INTRODUCTION:

Definition of hydrology. Importance of hydrology. Global water availability. India's water availability. Practical applications of hydrology. Hydrologic cycle (Horton's qualitative and engineering representations)

Unit-1

Teaching Hours:12

PRECIPITATION:

Definition. Forms and types of precipitation. Measurement of rain fall using Symon's and Syphon type of rain gauges. Optimum number of rain gauge stations. Consistency of rainfall data (double mass curve method). Computation of mean rainfall (arithmetic average, Thiessen's polygon and Isohyetal methods). Estimation of missing rainfall data (Arithmetic average, normal ratio and regression methods). Presentation of precipitation data (moving average curve, mass curve, rainfall hyetographs, intensity – duration - frequency curves).

Unit-2

Teaching Hours:13

LOSSES FROM PRECIPITATION:

Introduction. Evaporation: Definition, Process, factors affecting, measurement using IS Class A Pan. Estimation using empirical formulae. Infiltration: Definition, factors affecting infiltration capacity, measurement (double ring infiltrometer). Harton's infiltration equation, infiltration indices RUNOFF: Definition. Concept of catchment. Water budget equation. Components. Factors affecting. Rainfall - runoff relationship using simple regression analysis. Evapotranspiration: AET, PET, Factors affecting evapotranspiration, Measurement of evapotranspiration, Pennman's equation and Blaney Criddle's formula and problems.

Unit-3

Teaching Hours:12

HYDROGRAPHS:

Definition. Components of Hydrograph. Unit hydrograph and its derivation from simple storm hydrogaphs. Base flow separation. S–curve and its uses

Unit-3

Teaching Hours:12

GROUND WATER HYDROLOGY AND WELL HYDRAULICS:

Scope and importance of ground water hydrology. Aquifer parameters. Steady radial flow into wells in unconfined and confined aquifers. Types of wells, Methods of construction

Unit-4

Teaching Hours:13

RESERVOIR SEDIMENTATION:

Introduction. Process of erosion. Factors affecting erosion. Sediment yield. Reservoir Sediment control. Determination of Sediment Yield at a reservoir site (Using sample recorder)

Unit-4

Teaching Hours:13

STREAM FLOW MEASUREMENT:

Introduction. Measurement of stage. Measurement of discharge by Area–Velocity method and slope area method. Simple stage discharge relation.

Unit-5

Teaching Hours:10

WATER RESOURCES:

Introduction. Water wealth. River basins and their potential. Importance of water resources projects in India. Water resources development in Karnataka.

Unit-5

Teaching Hours:10

RAIN WATER HARVESTING:

Introduction. Small scale and small tank harvesting. Urban rain water harvesting. Methods of ground water recharge.

Essential Text Books:

ESSENTIAL READING:

Jayarami Reddy, “A Text Book of Hydrology”, Lakshmi Publications, New Delhi

Raghunath. H.M., “Hydrology”, Wiley Eastern Publication, NewDelhi

Subramanya K, “Engineering Hydrology”, Tata McGraw Hill, New Delhi.

Recommended Reading:

RECOMMENEDED READING:

Das and Saikia, “Hydrology”, PHI learning Private Limited

Garg S.K., “Hydrology and Water Resources Engineering”, Khanna Publishers, New Delhi

Linsley, Kohler and Paulhus, “Applied Hydrology”, Wiley Eastern Publication, New Delhi.

Mays, “Ground Resources Engineering”, Wiley India Pvt. Ltd

Patra. K. C., “Hydrology and water Resoucres Engineering”., Narosa publishing House, New Delhi

Sharma R.K., and Sharma, “Hydrology and Water Resources Engineering”, Oxford and IBH, New Delhi

Todd, “Ground Water Hydrology”, Wiley Eastern Publication, New Delhi.

Ven Te Chow, “Hand Book of Hydrology”

Viessman, Jr. and Lewis, “Introduction to Hydrology”, PHI learning Private Limited

CE535 - TRANSPORTATION ENGINEERING - I (2014 Batch)

Total Teaching Hours for Semester:60

No of Lecture Hours/Week:4

Max Marks:100

Credits:4

Course Objective

The objective of this subject is to build a Strong, Stable and Deep concept in Highway Engineering, and also to have a clear picture in the details of Design, Construction and Maintenance of Highway structures coming under this field.

Learning Outcome

On completion of the course, the student would be able to:

Understand the importance of transportation for growth of country, geometric requirement of highway. The student would also design the pavement materials and thickness; understand the procedure of highway construction and financing.

Unit-1

Teaching Hours:12

PRINCIPLES OF TRANSPORTATION ENGINEERING

Importance of Transportation. Different modes of transportation, characteristics and comparison of different modes. Jayakar committee recommendations and implementation.

Unit-1

Teaching Hours:12

HIGHWAY DEVELOPMENT AND PLANNING

Road Types and classification, road patterns. Planning surveys, Master plan – saturation system of road planning, phasing road development programme Road Development in India, 1st, 2nd & 3rd 20-year road development plan and problems only on 3rd 20-year road plan. Present scenario of road development in India (NHDP & PMGSY) and in Karnataka (KSHIP & KRDCL) –problems on best alignment among alternate proposals and phasing, Road Development Plan Vision 2021.

Unit-2

Teaching Hours:18

HIGHWAY ALIGNMENT AND SURVEYS

Ideal alignment, factors affecting alignment, engineering surveys for new and realignment projects.

Unit-2

Teaching Hours:18

HIGHWAY GEOMETRIC DESIGN-2

Sight distance, Types and importance - Design of horizontal and vertical alignment – Numerical problems on above (No derivation of formulae).

Unit-2

Teaching Hours:18

HIGHWAY GEOMETRIC DESIGN-1

Importance, Factors controlling the design of geometric elements, highway cross section elements – pavement surface characteristics, camber, width of carriageway, shoulder width, formation width, right of way, typical cross section of roads.

Unit-3

Teaching Hours:12

PAVEMENT MATERIALS

Properties and requirements of subgrade soils, HRB and IS soil classification. Determination of CBR and Modulus of subgrade reaction of soil. Properties and requirements of road aggregates, Bitumen – Tar – Emulsion – Cutback, Just mention the types of tests on aggregates, bitumen and cut back for evaluating the required properties. Numerical problems on above.

Unit-3

Teaching Hours:12

PAVEMENT DESIGN

Types of pavements – Design factors, Determination of ESWL by equal stress criteria and problems. IRC method of flexible pavement design based on CSA method using IRC: 37 – 2001. Stresses in rigid pavement and design of rigid pavement as per IRC: 58 –2011 excluding design of joints.

Unit-4

Teaching Hours:10

PAVEMENT CONSTRUCTION

Specifications, construction steps and quality control tests for earthwork in cutting, filling and preparation of subgrade, Granular sub base course, Granular base / sub-base courses such as WBM, WMM, CRM, bituminous binder course (BM and DBM), common types of bituminous surfacing courses such as surface dressing, premixed carpet (PMC) and bituminous concrete and Rigid pavement (DLC and PQC).

Unit-4

Teaching Hours:10

HIGHWAY DRAINAGE SYSTEM

Surface and Sub-subsurface drainage system for road pavements, types, functions and basic design principles.

Unit-5

Teaching Hours:8

HIGHWAY ECONOMICS AND FINANCING

Highway user benefits – VOC using charts only – Highway costs – Economic analysis by annual cost method and benefit cost ratio method, NPV and IRR methods. Numerical problems on above. Highway financing – BOT, BOOT and Annuity concepts

Unit-5

Teaching Hours:8

PAVEMENT MAINTENANCE

Pavement failures, Types, Causes and remedies. Maintenance of highways. Principles of pavement evaluation – functional and structural evaluation

Essential Text Books:

Kadiyali, L.R., “Highway Engineering, Khanna Publishers”, New Delhi.

Khanna, S.K. and Justo, C.E.G., ‘Highway Engineering”, Nem Chand and Bros, Roorkee (2003).

Subramanyam, K.P., “Transportation Engineering–I”, Scitech Publications, Chennai.

Recommended Reading:

“Relevant IRC codes”

Bindra, SP; "A Course on Highway Engineering" New Delhi, Dhanpat Rai andSons

Chakroborty and Das, “Principles of Transportation Engineering”, PHI learning Private Limited

Duggal AK, “Maintenance of Highway – a Reader”, TTTI, Sector 26, Chandigarh

Duggal AK, Puri VP., "Laboratory Manual in Highway Engineering",Delhi, New Age Publishers (P) Ltd

Khanna S. K., and Justo CEG, “Highway Material Testing Laboratory Manual”, Nemchand and Bros. Roorkee.

Khanna, SK and Justo, CEG, "Highway Engineering" Roorkee Nem Chand andBros.

Mannering, “Principals of Highway Engineering and Traffic Analysis”, Wiley India Pvt. Ltd

MORT & H, IRC, “Specifications for Roads and Bridges”, New Delhi (2001).

Partha Chakra Borthy, “Principles of Transportation Engineering”, Prentice-Hall

Ponnuswamy S., “Bridge Engineering”, Tata McGraw-Hill Education Pvt. Ltd

Priyani, VB, "Highway and Airport Engineering" Anand, Charotar Book Stall

Rao, GV’ Transportation Engineering

Sehgal, SB; and Bhanot, KL; "A Text Book on Highway Engineering and Airport" Delhi, S Chand and Co

Sharma, RC; and Sharma, SK; "Principles and Practice of Highway Engineering", New Delhi, Asia Publishing House

Vaswani, NK, "Highway Engineering" Roorkee Publishing House.

Yoder. E.J., “Principals of pavement Design”, John Wiley and Sons”, New Delhi‘

CE536 - APPLIED ENGINEERING GEOLOGY (2014 Batch)

Total Teaching Hours for Semester:60

No of Lecture Hours/Week:4

Max Marks:100

Credits:04

Course Objective

SUBJECT DESCRIPTION:This paper covers topic like Introduction to Geology, Mineralogy, Types of rocks, Petrology. Geomorphology and geodynamic, Structural geology, Geological site investigation, Ground water technology, Geomatics and Environmental Geology

SUBJECT OBJECTIVE: The objective of this subject is to study the General Geology and Engineering Geology. This paper aims at enabling the students to study importance and role Geology in Civil Engineering

LEVEL OF KNOWLEDGE: Basic

Learning Outcome

This course will provide an introduction to the discipline of engineering geology, with the purpose of allowing an understanding of how the fundamental principles of geological sciences influence the design and construction of engineering structures.

By the end of the course the student should be able to:

- recognise and describe common geological formations of relevance to civil engineering;

- demonstrate a basic knowledge of sedimentary, igneous and metamorphic rocks, their formation and occurrence in different tectonic environments;

- demonstrate an ability to interpret geological maps and construct elementary geological cross-sections and infer subsurface structure.

Unit-1

Teaching Hours:14

UNIT- I (14HOURS)

INTRODUCTION:Role and importance of Geology in Civil Practices like Urban Planning and Development, with particular reference to housing and Lay-out designing, flood control, ground water development, – Internal structure of the earth and its Composition

MINERALOGY:Rock forming and economic minerals, - Physical properties of minerals, chemical composition and uses of the following minerals.

DESCRIPTION:Quartz varieties, Rock crystal, Rose quartz, Milky quartz, Amethyst, Agate, Flint, chert, chalcedony, jasper, bloodstone and opal. Feldspars: orthoclase, plagioclase & Mirocline,

MICA GROUP: Muscovite, Biotite. Amphibole Group: Hornblende, Pyroxene Group: Augite, Silicates: Olivine, serpentine, Asbestos, Kaoline, Talc, Garnete, Sulphates, Barite, Gypsum, Oxides: Corundum. Carbonate Group: Calcite, Dolomite, Magnetite, Ore- Minerals: Magnetite, Hematite, Limonite, Iron pyrite, Chalcopyrite, Pyrolusite, Chromite, Galena & Bauxite.

Unit-2

Teaching Hours:12

UNIT-II (12 HOURS)

PETROLOGY: Introduction, Definition and Classification, – IGNEOUS ROCKS: Forms, Classifications, Textures, Descriptions and Engineering uses of Granite, Syenite, Dionite, Gabbro, Dunite, Porphyries, Pegmatite, Dolerite, Basalt, Rhyolite, and Pumice SEDIMENTARY ROCKS: Definition Classification, Primary structures. Description and engineering uses of Sandstones, Limestones, shale, Conglomerate, Breccia, & Laterite. METAMORPHIC ROCKS: Definition kinds of Metamorphism, Description and Engineering uses of Gneiss, Quartzite, Marble, Slate, Phyllite, Schists, and Charnokite.

Suitability of Igneous, Sedimentary & Metamorphic rocks in Hydro – Electric projects, Irrigation Projects, Multi-purpose dams & Reservoirs, heavy industries, communication lines, like. Highways, Railway lines, air-ports, foundation for Atomic Power Plants etc.

Unit-3

Teaching Hours:10

UNIT-III (10 HOURS)

GEOLOGY & GEOGRAPHY: Igneous Rocks; Physical geography, Economic geography & Social or human geography. Sedimentary Rocks; Physical geography, Economic geography & Social or human geography. Metamorphic Rocks; Physical geography, Economic geography & Social or human geography.Hard & Soft Rocks, Islands, Coastal Plains, deserts etc

GEOMORPHOLOGY AND GEODYNAMIC: Epigine and Hypogene geological agents, weathering of Rocks, Kinds weathering, Soil and Soil Profile, Classification, Erosion, Conservation, Geological work of Rivers. – Landslides - Causes and Remedial measures,–Earth Quakes - Causes and effects, Concept of Plate tectonics, Engineering consideration and Seismic resistant structures.

Unit-4

Teaching Hours:12

UNIT- IV (12 HOURS)

STRUCTURAL GEOLOGY:Definition – Outcrops, Dip and strike, Compass clinometer. – Description of Folds, Faults, Joints, Unconformities and their recognition in field and Considerations in Civil engineering Projects.

GEOLOGICAL SITE INVESTIGATION: Selection of sites for Dams and Reservoir, Silting up of Reservoirs and remedies. Selection of sites for Tunnels. Selection of sites for Bridges and Highways. Rocks as a material for Construction as Foundation, Decorative, Flooring and Roofing, Concrete, Aggregate, Road Metal, Railway Ballast with examples

NATURAL DISASTERS & THEIR MANAGEMENT: Role of geology in natural disasters. Different rocks hosting different natural disasters, like Earthquakes, Land Slides, toxicity of ground water etc.

Unit-5

Teaching Hours:12

UNIT-V (12 HOURS)

GROUND WATER TECHNOLOGY:Hydrological cycle, water Bearing Properties of Rocks and Soils, Aquifer and its types, Geological and Geophysical methods of Ground water Exploration. Electrical Resistivity method, Seismic method, Interpretation of resistivity curves for ground water studies and Civil Engineering Works, Selection of Well sites, Artificial Recharge of Ground Water by different method. Water Harvesting, field and urban. Geological Parameters in water harvesting – with some case studies

GEOMATICS AND ENVIRONMENTAL GEOLOGY:Application of Remote Sensing and GIS Techniques in Civil Engineering Projects, GPS (Global Positioning System) and its uses, Study of Topo sheets, Impact of Mining, Quarrying and Reservoirs on Environment.

Essential Text Books:

TEXT BOOKS:

Mukerjee. P.K., “A Text Book of Geology”, World Press Pvt., Ltd., Calcutta

Narayana Swamy B.S., “Engineering Geology”,

Parbin Singh, “Engineering and General Geology”, Katson Publishing House, Ludhiana

REFERENCE BOOKS:

Arthur Holmes, “Physical Geology”

Billings M.P., “Structural Geology”

EGH Blyth and M.H. de Freitas, “A Geology for Engineers (7th Edition)”, Elsevier Science

Krynine and Judd, “Principles of Engineering Geology and Geotechniques”

Mathur, “Elements of Geology”, PHI learning Private Limited

Mathur, “Guide to Field Geology”, PHI learning Private Limited

Ravi P. Gupta, “Remote Sensing Geology”, Springer Veriag (NY).

Read, Rutley’s H. H., “Elements of Mineralogy”

Todd. D.K., “Ground Water Hydrology”, John Wiley & sons - New York

Tyrrell .G.W., “Principles of Petrology”, Asia Publishing House -Bombay

Valdiya K.S., “Environmental Geology”

Venkat Reddy. D., “Engineering Geology for Civil Engineers”, Oxford and IBH Publishing Co

Rama Krishna T L “Anatomy of Planet Earth”

Rama Krishna T L “Planet Earth the Stock Exchange”

Rama Krishna T L “Mineral Rock Guide of Karnataka”

Rama Krishna T L “Mineral Rock Guide of Goa”

17. Rama Krishna T L “Preparation and Study of Topographic maps”

Recommended Reading:

TEXT BOOKS:

Mukerjee. P.K., “A Text Book of Geology”, World Press Pvt., Ltd., Calcutta

Narayana Swamy B.S., “Engineering Geology”,

Parbin Singh, “Engineering and General Geology”, Katson Publishing House, Ludhiana

CE551 - APPLIED ENGINEERING GEOLOGY LABORATORY (2014 Batch)

Total Teaching Hours for Semester:30

No of Lecture Hours/Week:2

Max Marks:50

Credits:02

Course Objective

SUBJECT DESCRIPTION:This paper contains ten experiments. This paper aims at enabling the students to study identification minerals and rocks in field practically.

SUBJECT OBJECTIVE: The objective of this subject is to study the application of the geologic sciences to engineering practice and its importance.

LEVEL OF KNOWLEDGE: Basic/Working

Learning Outcome

By the end of the course the student should be able to:

- recognise and describe common geological formations of relevance to civil engineering;

- demonstrate a basic knowledge of sedimentary, igneous and metamorphic rocks, their formation and occurrence in different tectonic environments;

- demonstrate an ability to interpret geological maps and construct elementary geological cross-sections and infer subsurface structure.

Unit-1

Teaching Hours:30

Identification of Minerals based on their Physical Properties, Chemical composition and uses.

P1 Quartz and its varieties: Rock crystal, Rose quartz, Milky quartz, Amethyst, Grey quartz, Blood stone, Flint, Agate, Chert, Jasper, Chalcedony and Opal.

P2 Feldspar group-Orthoclase, Microcline, Plagioclase, Muscovite, Biotite, Hornblende, Augite, Olivine, Serpentine, Asbestos, Kaolin, Talc, Garnet, Corundum, Gypsum and Baryte

P3 Carbonates – Calcite, Dolomite, Magnesite. Ore-minerals – Magnetite, Hematite, Limonite, Chromite, Ironpyrite, Chalcopyrite, Pyrolusite, Psilomelane, Bauxite and Galena. Identification of rocks based on their Geological properties

P4 Igneous rocks: Granite, Syenite, Diorite, Gabbro, Dunite, Porphyres, Dolerite, Pegmatite, Basalt, Rhyolite, and Pumice.

P5 Sedimentary rocks: Sandstone, Limestone, Shale, Breccia, Conglomerate and Laterite.

P6 Metamorphic Rocks: Gneiss, Quartzite, Marble, Slate, Phyllite, Schists and Charnockite.

P7 Thickness problems - 3 Types

P8 Dip and strike problems – 3 Types

P9 Bore hole problems (On level ground)

P10 Study and interpretation of standard structural geological maps

P11 Lab Internal Test

Essential Text Books:

REFERENCE BOOKS:

Gurappa .K .M, “Study and Interpolation of standard geological maps”

Sathyanarayana Swamy. B. S., “Engineering Geology Lab Manual”

Recommended Reading:

CE552 - COMPUTER AIDED DESIGN LABORATORY (2014 Batch)

Total Teaching Hours for Semester:30

No of Lecture Hours/Week:2

Max Marks:50

Credits:2

Course Objective

To familiarize and give hands-on training to students Use of AUTOCAD in Civil Engineering Drawings and Use of commercially available software for the analysis in civil engineering structures

Learning Outcome

On completion of the course, the student will be able to draft the Architectural plan, elevation and section of buildings and will be able to analyse the basic structures two dimensional structures independently

Unit-1

Teaching Hours:4

BASICS OF AUTOCAD:

DRAWING TOOLS:Lines, Circle, Arc, Polyline, Multiline, Polygon, Rectangle, Spline, Ellipse, Modify tools: Erase, Copy, Mirror, Offset, Array, Move, Rotate, Scale, Stretch, Lengthen, Trim, Extend, Break, Chamfer and Fillet, Using Text: Single line text, Multiline text, Spelling, Edit text, Special Features: View tools, Layers concept, Dimension tools, Hatching, Customising toolbars, Working with multiple drawings.

Unit-2

Teaching Hours:12

USE OF AUTOCAD IN CIVIL ENGINEERING DRAWINGS

USE OF AUTOCAD IN CIVIL ENGINEERING DRAWINGS: Following drawings are to be prepared for the data given using AUTOCAD

Cross section of Foundation - masonry wall, RCC columns (isolated)

Different types of staircases

Lintel and Chajja

RCC slabs and beams

Drawing of Plan, elevation and sectional elevation of single storied residential and public buildings given the single line diagram and preparing excavation plan.

Unit-3

Teaching Hours:8

STRUCTURAL ANALYSIS SOFTWARE:

STRUCTURAL ANALYSIS SOFTWARE: Use of commercially available software for the analysis of

Propped cantilever beams

Fixed beams

Continuous beams

2D Portal frames-single storied and multistoried

Unit-4

Teaching Hours:6

USE OF EXCEL IN CIVIL ENGINEERING PROBLEMS:

USE OF EXCEL IN CIVIL ENGINEERING PROBLEMS:Use of spread sheet for the following civil engineering problems

SFD and BMD for Cantilever and simply supported beam subjected to uniformly distributed and uniformly varying load acting throughout the span

Design of singly reinforced and doubly reinforced rectangular beams

Computation of earthwork

Design of horizontal curve by offset method

Essential Text Books:

1. AUTOCAD Manual.

2. STAAD Pro Maunal

Recommended Reading:

1. Jayaram M. A and Prasad D. S. R, "CAD in Civil Engineering - A laboratory Referral, Revised Edition, Sapan Book House, Bangalore,2010

ME531 - DESIGN OF MACHINE ELEMENTS - I (2014 Batch)

Total Teaching Hours for Semester:60

No of Lecture Hours/Week:4

Max Marks:100

Credits:04

Course Objective

This course "Design of Machine Elements -I" is designed with the following objectives :

The student shall gain appreciation and understanding of the design function in mechanical engineering, the steps involved in designing and the relation of design activity with manufacturing activity.

Shall be able to choose proper materials to different machine elements depending on their physical and mechanical properties. Thus he shall be able to apply the knowledge of material science in real life usage.

Student shall gain a thorough understanding of the different types of failure modes and criteria. He will be conversant with various failure theories and be able to judge which criterion is to be applied in which situation.

Student shall gain design knowledge of the different

t types of elements used in the machine design process. Eg., fasteners, shafts, couplings etc. and will be able to design these elements for each application

Learning Outcome

- To describe the various design process.

- To explain the various problem solving strategies.

- To explain the embodiment design and detail design.

- To explain the parameters of failures.

o To explain the parameter design and tolerance design.

Will acquire skill to do select proper material for specific application.

Will be in a position to do design for industrial application.

Will be able to do design of mechanical elements.

Will have sufficient ability to optimize.

Enhances the capabilities to assume suitable technical specifications.

Unit-1

Teaching Hours:12

INTRODUCTION

Definitions: normal, shear, biaxial and tri axial stresses, Stress tensor, Principal Stresses. Engineering Materials and their mechanical properties, Stress-Strain diagrams, Stress Analysis, Design considerations: Codes and Standards.

Unit-1

Teaching Hours:12

DESIGN FOR STATIC & IMPACT STRENGTH

Static loads and factor of safety, Theories of failure: Maximum normal stress theory, Maximum shear stress theory, Maximum strain theory, Strain energy theory, Distortion energy theory. Failure of brittle and ductile materials, Stress concentration, Determination of Stress concentration factor.

Unit-2

Teaching Hours:12

Impact Strength

Introduction, Impact stresses due to axial, bending and torsional loads, effect of inertia.

Unit-2

Teaching Hours:12

DESIGN FOR FATIGUE STRENGTH

Introduction :S-N Diagram, Low cycle fatigue, High cycle fatigue, Endurance limit, Modifying factors: size effect, surface effect, Stress concentration effects, Fluctuating stresses, Goodman and Soderberg relationship, stresses due to combined loading, cumulative fatigue damage.

Unit-3

Teaching Hours:12

THREADED FASTENERS

Stresses in threaded fasteners, Effect of initial tension, Design of threaded fasteners under static, dynamic and impact loads, Design of eccentrically loaded bolted joints.

Unit-3

Teaching Hours:12

DESIGN OF SHAFTS

Torsion of shafts, design for strength and rigidity with steady loading, ASME codes for power transmission shafting, shafts under fluctuating loads and combined loads.

Unit-4

Teaching Hours:12

COTTER AND KNUCKLE JOINTS, KEYS AND COUPLINGS

Design of Cotter and Knuckle joints, Keys: Types of keys, Design of keys, Couplings: Rigid and flexible couplings, Flange coupling, Bush and Pin type coupling and Oldham's coupling.

Unit-5

Teaching Hours:12

Riveted and Welded Joints

Types, rivet materials, failures of riveted joints, Joint Efficiency, Boiler Joints, Lozanze Joints, Riveted Brackets. Welded Joints – Types, Strength of butt and fillet welds, eccentrically loaded welded joints.

Unit-5

Teaching Hours:12

Power Screws

Mechanics of power screw, Stresses in power screws, efficiency and self-locking, Design of Power Screw, Design of Screw Jack: (Complete Design).

Essential Text Books:

1. Mechanical Engineering Design, Joseph E Shigley and Charles R. Mischke. McGraw Hill International edition, 6th Edition 2009.

2. Design of Machine Elements, V.B. Bhandari, Tata McGraw Hill Publishing Company Ltd., New Delhi, 2nd Edition 2007.

Recommended Reading:

1. Design Data Hand Book, K. Lingaiah, McGraw Hill, 2nd Ed.

2. Data Hand Book, K. Mahadevan and Balaveera Reddy, CBS Publication

3. Design Data Hand Book, H.G. Patil, Shri Shashi Prakashan, Belgaum.

1. Machine Design, Robert L. Norton, Pearson Education Asia, 2001.

2. Design of Machine Elements, M. F. Spotts, T. E. Shoup, L. E. Hornberger, S. R. Jayram and C. V. Venkatesh, Pearson Education, 2006.

3. Machine Design, Hall, Holowenko, Laughlin (Schaum's Outlines series) Adapted by S.K. Somani, Tata McGraw Hill Publishing Company Ltd., New Delhi, Special Indian Edition, 2008.

4. Fundamentals of Machine Component Design, Robert C. Juvinall and Kurt M Marshek, Wiley India Pvt. Ltd., New Delhi, 3rd Edition, 2007.

ME533 - DYNAMICS OF MACHINES (2014 Batch)

Total Teaching Hours for Semester:60

No of Lecture Hours/Week:4

Max Marks:100

Credits:4

Course Objective

Student will acquire knowledge of kinematic analyses of rigid body systems , concepts of planar, inverse, Newtonian dynamic analyses of mechanisms and machines, concepts of three-dimensional, inverse, Newtonian dynamic analyses of fixed-axis rotation of non-symmetric bodies,concepts of static and dynamic mass balancing and flywheels, concepts of generalized forces and the Principle of Virtual Work.

Learning Outcome

- Understanding of the concepts of displacement, velocity and acceleration as vectors and how to determine them.

- Understanding of the notion of a force as a vector.

- Ability to understand concepts of kinetic, potential and mechanical energies and the concept of a conservative force.

- Ability to correctly draw the free-body diagram (FBD) for the system.

- Ability to conduct dynamic force analysis for various mechanisms.

- Ability to do analysis of frictions in different members like belt drives.

- Ability to do analysis for balancing of rotating masses and reciprocating masses.

- Ability to do governor mechanism classification and analyze the forces in the mechanisms.

Unit-1

Teaching Hours:12

Static Force Analysis

Introduction: Static equilibrium. Equilibrium of two and three force members. Members with two forces and torque. Free body diagrams. Principle of virtual work. Static force analysis of four bar mechanism and slider-crank mechanism with and without friction.

Unit-2

Teaching Hours:12

Dynamic Force Analysis

D'Alembert's principle, Inertia force, inertia torque. Dynamic force analysis of four-bar mechanism and slider crank mechanism. Dynamically equivalent systems. Turning moment diagrams and flywheels. Fluctuation of Energy. Determination of size of flywheels.

Unit-3

Teaching Hours:12

Balancing of Rotating Masses

Static and dynamic balancing. Balancing of single rotating mass by balancing masses in same plane and in different planes. Balancing of several rotating masses by balancing masses in same plane and in different planes.

Unit-3

Teaching Hours:12

Friction and Belt Drives

Definitions: Types of friction: laws of friction, Friction in pivot and collar bearings. Belt drives: Flat belt drives. ratio of belt tensions, centrifugal tension, power transmitted.

Unit-4

Teaching Hours:12

Governors

Types of governors; force analysis of Porter and Hartnell governors. Controlling force. stability, sensitiveness. Isochronism, effort and power .

Unit-4

Teaching Hours:12

Balancing of Reciprocating Masses

Inertia effect of crank and connecting rod, single cylinder engine, balancing in multi cylinder-inline engine (primary & secondary forces), V-type engine; Radial engine – Direct and reverse crank method.

Unit-5

Teaching Hours:12

Analysis of Cams

Analysis of Tangent cam with roller follower and Circular arc cam operating flat faced and roller followers. Undercutting in Cams.

Unit-5

Teaching Hours:12

Gyroscope

Vectorial representation of angular motion. Gyroscopic couple. Effect of gyroscopic couple on ship, plane disc, aeroplane, stability of two wheelers and four wheelers.

Essential Text Books:

1 Theory of Machines, Sadhu Singh, Pearson Education. 2nd edition. 2007.

2 Theory of Machines, Rattan S.S. Tata McGraw Hill Publishing Company Ltd., New Delhi, 3rd Edition, 2009.

Recommended Reading:

1.“Theory of Machines & Mechanisms", J.J. Uicker, , G.R. Pennock, J.E. Shigley. OXFORD 3rd Ed. 2009

2.Mechanism and Machine Theory, A.G.Ambekar PHI, 2007.

ME534 - TURBO MACHINES (2014 Batch)

Total Teaching Hours for Semester:60

No of Lecture Hours/Week:4

Max Marks:100

Credits:4

Course Objective

o To understand the basics of turbomachineryand to identify various types of turbomachinery. To understand the major turbo machinery operations and its basics.

o To understand the 2D and 3D steady flow phenomena in turbomachine components

o Apply the Euler's equation for turbo machinery to analyze energy transfer in turbo machines.

o To compute efficiencies of various turbo machines and to Analyze and select axial-flow turbines and compressors.

o To understand and Analyze and select radial-flow turbo machines for various industrial applications.

o To carry various Performance thermal cycle analysis on turbines.

Learning Outcome

- Students will understand the 2D and 3D steady flow phenomena in turbomachine components
- Students will apply the Euler's equation for turbo machinery to analyze energy transfer in turbo machines.
- Students will compute efficiencies of various turbo machines and to Analyze and select axial-flow turbines and compressors.

Unit-1

Teaching Hours:12

Introduction and Energy Exchange in Turbomachines

Introduction: Definition of turbomachine, parts of turbomachines, Comparison with positive displacement machines, Classification, Static and Stagnation states- Incompressible fluids and perfect gases, Application of first and second law‟s of thermodynamics to turbomachines, Efficiencies of turbomachines. Problems.

Energy exchange in Turbomachines: Euler‟s turbine equation, Alternate form of Euler‟s turbine equation, Velocity triangles for different values of degree of reaction, Components of energy transfer, Degree of Reaction, utilization factor, Relation between degree of reaction and Utilization factor, Problems.

Unit-2

Teaching Hours:12

General Analysis of Turbomachines

Radial flow compressors and pumps – general analysis, Expression for degree of reaction, velocity triangles, Effect of blade discharge angle on energy transfer and degree of reaction, Effect of blade discharge angle on performance, Theoretical head

– capacity relationship, General analysis of axial flow pumps and compressors, degree of reaction, velocity triangles, Problems.

Unit-3

Teaching Hours:12

Dimensional Analysis and Steam Turbines

Dimensionless analysis and thermodynamics of fluid flow: Dimensionless parameters and their significance, Effect of Reynold‟s number, Unit and specific quantities, model studies. Overall isentropic efficiency, stage efficiency (their comparison) and polytropic efficiency for both compression and expansion processes. Reheat factor for expansion process.

Steam Turbines: Classification, Single stage impulse turbine, condition for maximum blade efficiency, stage efficiency, Need and methods of compounding, Multi-stage impulse turbine, expression for maximum utilization factor, Reaction turbine – Parsons‟s turbine, condition for maximum utilization factor, reaction staging. Problems.

Unit-4

Teaching Hours:12

Hydraulic Turbines

Classification, Different efficiencies, Pelton turbine – velocity triangles, design parameters, Maximum efficiency. Francis turbine - velocity triangles, design parameters, runner shapes for different blade speeds. Draft tubes- Types and functions. Kaplan and Propeller turbines - velocity triangles, design parameters. Problems.

Unit-5

Teaching Hours:12

Centrifugal Pumps and Compressors

Centrifugal Pumps: Classification and parts of centrifugal pump, different heads and efficiencies of centrifugal pump, Minimum speed for starting the flow, Maximum suction lift, Net positive suction head, Cavitation, Need for priming, Pumps in series and parallel. Problems.

Centrifugal Compressors: Stage velocity triangles, slip factor, power input factor, Stage work, Pressure developed, stage efficiency and surging and problems.

Axial flow Compressors: Expression for pressure ratio developed in a stage, work done factor, efficiencies and stalling. Problems.

(Note: Since dimensional analysis is covered in Fluid Mechanics subject, questions on dimensional analysis may not be given for examinations. However, dimensional parameters and model studies may be given more weightage.)

Essential Text Books:

An Introduction to Energy Conversion, Volume III, Turbomachinery, V. Kadambi and Manohar Prasad, New Age International Publishers, reprint 2008.

Turbines, Compressors & Fans, S. M. Yahya, Tata McGraw Hill Co. Ltd., 2nd edition, 2002

Recommended Reading:

1. Principals of Turbomachines, D. G. Shepherd, The Macmillan Company (1964).

2. Fluid Mechanics & Thermodynamics of Turbomachines, S. L. Dixon, Elsevier (2005).

3. Turbomachine, B.K.Venkanna PHI, 2007

ME535 - MANUFACTURING PROCESS - III (2014 Batch)

Total Teaching Hours for Semester:60

No of Lecture Hours/Week:4

Max Marks:100

Credits:4

Course Objective

Develop understanding of basic and advanced manufacturing processes and capabilities of each.

Extend basis knowledge to solve manufacturing processes related problems.

Develop an understanding of Concurrent Engineering and the importance to manufacturing industries.

Enhance ability to determine what is given and what to find.

Learn to make engineering judgments.

Learn the impact that modern manufacturing techniques have on human advancement.

Understand what manufacturing processes references are available.

Discuss current manufacturing issues.

Emphasize the problem solving process and application techniques.

Learning Outcome

Will be able to implement specific advanced and emerging manufacturing technologies in modern industry.

Will be able to describe the process of machining in various types of materials.

Will describe the operations and utilization of lathe, drilling, milling, grinding machine, etc.

Will describe the tool nomenclature, and design the tool for specific operations.

Will apply merchant's analysis for tool wear, failure and life.

Unit-1

Teaching Hours:12

Introduction and Concepts

Classificationof metal working processes, characteristics of wrought products, advantages and limitations of metal working processes.Concepts of true stress, true strain, triaxial & biaxial stresses. Determination of flow stress. Principal stresses, Tresca & Von-Mises yield criteria, concepts of plane stress & plane strain.

Unit-1

Teaching Hours:12

Effects of parameters

Temperature, strain rate, friction and lubrication, hydrostatic pressure in metalworking, Deformation zone geometry, workability of materials, Residual stresses in wrought products.

Unit-2

Teaching Hours:12

Rolling

Classification of Rolling processes. Types of rolling mills, expression for RoIling load. Roll separating force. Frictional losses in bearing, power required in rolling, Effects of front & back tensions, friction, friction hill. Maximum possible reduction. Defects in rolled products. Rolling variables, simple problems.

Unit-2

Teaching Hours:12

Forging

Classification of forging processes. Forging machines & equipment. Expressions for forging pressures & load in open die forging and closed die forging by slab analysis, concepts of friction hill and factors affecting it. Die-design parameters. Material flow lines in forging. Forging defects, Residual stresses in forging. Simple problems.

Unit-3

Teaching Hours:12

Extrusion

Types of extrusion processes, extrusion equipment & dies, deformation, lubrication & defects in extrusion. Extrusion dies, Extrusion of seamless tubes. Extrusion variables, simple problem.

Unit-3

Teaching Hours:12

Drawing

Drawing equipment & dies, expression for drawing load by slab analysis, power requirement. Redundant work and its estimation, optimal cone angle & dead zone formation, drawing variables, Tube drawing, classification of tube drawing, simple problems.

Unit-4

Teaching Hours:12

Sheet & metal forming

Forming methods, dies & punches, progressive die, compound die, combination die. Rubber forming. Open back inclinable press (OBI press), piercing, blanking, bending, deep drawing, LDR in drawing, Forming limit criterion, defects of drawn products, stretch forming. Roll bending & contouring, Simple problems.

Unit-5

Teaching Hours:12

Powder metallurgy

Basic steps in Powder metallurgy brief description of methods of production of metal powders, conditioning and blending powders, compaction and sintering application of powder metallurgy components, advantages and limitations.

Unit-5

Teaching Hours:12

High Energy Rate forming Methods

Principles, advantages and applications, explosive forming, electro hydraulic forming, Electromagnetic forming.

Essential Text Books:

ESSENTIAL READINGS:

1. Mechanical metallurgy (SI units), G.E. Dieter, Mc Graw Hill pub.2001
2. Manufacturing Process – III, Dr. K.Radhakrishna, Sapna Book House, 2009.

Recommended Reading:

RECOMMENDED READING:

Materials and Processes in Manufacturing, E.paul, Degramo, J.T. Black, Ronald, A.K. Prentice -hall of India 2002

Principles of Industrial metal working process, G.W. Rowe, CBSpub. 2002

Manufacturing Science, Amitabha Ghosh & A.K. Malik - East -Westpress 2001

Technology of Metal Forming Process, Surendra kumar, PHI – 2008.

ME536 - COMPUTER AIDED MACHINE DRAWING (2014 Batch)

Total Teaching Hours for Semester:50

No of Lecture Hours/Week:4

Max Marks:100

Credits:4

Course Objective

- To visualize an object and convert it into a drawing.

- To gain knowledge of conventional representation of various machining and mechanical details as per IS.

- To become conversant with 2-D and 3-D drafting.

- Gaining the knowledge of CAD software and its features for effective representation of machine components and their assembly.

- Understand the format and Standards of Machine Drawing.

- Understand the technical information on machine drawings.

- Understanding and drawing of various views and machine components.

- Learning how to assemble and disassemble important parts used in major mechanical engineering applications.

Learning Outcome

- Will be able to read and understand the machine drawings.

- Will be able to prepare machine components drawings.

- Will be able to do assembly drawings.

- Will be in a position to do drawings and assembly using computer.

INTRODUCTION:

Review of graphic interface of the software. Review of basic sketching commands and navigational commands. Starting a new drawing sheet. Sheet sizes. Naming a drawing, Drawing units, grid and snap.

Unit-1

Teaching Hours:12

Sections of Solids

Sections of Pyramids, Prisms, Cubes, Tetrahedrons, Cones and Cylinders resting only on their bases (No problems on, axis inclinations, spheres and hollow solids). True shape of sections.

Unit-1

Teaching Hours:12

Orthographic Views

Conversion of pictorial views into orthographic projections. of simple machine parts with or without section. (Bureau of Indian Standards conventions are to be followed for the drawings) Hidden line conventions. Precedence of lines.

Unit-2

Teaching Hours:8

Thread Forms

Thread terminology, sectional views of threads. ISO Metric (Internal & External) BSW (Internal & External) square and Acme. Sellers thread, American Standard thread.

Unit-2

Teaching Hours:8

Fasteners

Hexagonal headed bolt and nut with washer (assembly), square headed bolt and nut with washer (assembly) simple assembly using stud bolts with nut and lock nut. Flanged nut, slotted nut, taper and split pin for locking, counter sunk head screw, grub screw, Allen screw.

Unit-3

Teaching Hours:8

Keys & Joints

Parallel key, Taper key, Feather key, Gibhead key and Woodruff key

Unit-3

Teaching Hours:8

Riveted Joints

Single and double riveted lap joints, butt joints with single/double cover straps (Chain and Zigzag, using snap head rivets). cotter joint (socket and spigot), knuckle joint (pin joint) for two rods.

Unit-4

Teaching Hours:8

Couplings

Split Muff coupling, Protected type flanged coupling, pin (bush) type flexible coupling, Oldham's coupling and universal coupling (Hooks' Joint)

Unit-5

Teaching Hours:14

Assembly Drawings

1. Plummer block (Pedestal Bearing)

2. Rams Bottom Safety Valve

3. I.C. Engine connecting rod

4. Screw jack (Bottle type)

5. Tailstock of lathe

6. Machine vice

7. Tool Head of a shaper

Essential Text Books:

1. 'A Primer on Computer Aided Machine Drawing-2007', Published by VTU, Belgaum.

2. 'Machine Drawing', N.D.Bhat & V.M.Panchal

Recommended Reading:

1. 'A Text Book of Computer Aided Machine Drawing', S. Trymbaka Murthy, CBS Publishers, New Delhi, 2007

2. 'Machine Drawing', K.R. Gopala Krishna, Subhash Publication.

3. 'Machine Drawing with Auto CAD', Goutam Pohit & Goutham Ghosh, 1st Indian print Pearson Education, 2005

4. 'Auto CAD 2006, for engineers and designers', Sham Tickoo. Dream tech 2005

5. 'Machine Drawing', N. Siddeshwar, P. Kanniah, V.V.S. Sastri, published by Tata Mc GrawHill,2006

ME551 - FLUID MECHANICS AND MACHINES LAB (2014 Batch)

Total Teaching Hours for Semester:30

No of Lecture Hours/Week:2

Max Marks:50

Credits:2

Course Objective

OBJECTIVE:

- To develop skills in the field of fluid mechanics and machines.
- Verify the principles of the course
- Application of the theory , Understanding of fundamentals of the subject.
- Be in a position to relate theory and practice,

Learning Outcome

- Will be able to apply the concepts of fluid mechanics and machines, appreciate its application in various engineering application.
- Will be able to perform various test of fluid mechanics and machines for various mechanical properties.
- Will be able to carry out performance tests on fluid mechanics and machines.
- To develop scientific, technical and experimental skills to the students.
- To correlate the theoretical principles with application based studies.

Unit-1

Teaching Hours:15

PART-A

1. Determination of coefficient of friction of flow in a pipe.

2. Determination of minor losses in flow through pipes.

3. Determination of force developed by impact of jets on vanes.

4. Calibration of flow measuring Devices like

a) Orifice Plate Meter

b) Nozzle

c) Venturimeter

d) V-notch

Unit-2

Teaching Hours:15

PART-B

1. Performance testing of Turbines

Francis Turbine

Kaplan Turbines

Pelton wheel

2. Performance testing of Pumps

(i) Single stage / Multi stage centrifugal pumps

(ii) Reciprocating pump

3. Performance test of a two stage Reciprocating Air Compressor

4. Performance test on an Air Blower

Essential Text Books:

1. Manual will be supplied by the Course Instructor

Recommended Reading:

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ME552 - ENERGY CONVERSION ENGINEERING LABORATORY (2014 Batch)

Total Teaching Hours for Semester:34

No of Lecture Hours/Week:2

Max Marks:50

Credits:2

Course Objective

- To develop skills in the field of energy conversion engineering.

- Verify the principles of the course

- Application of the theory , Understanding of fundamentals of the subject.

o Be in a position to relate theory and practice,

Learning Outcome

o Will be able to apply the concepts of energy conversion engineering, appreciate its application in various engineering application.

o Will be able to perform various test of energy conversion engineering for various mechanical properties.

o Will be able to carry out performance tests on energy conversion engineering.

o To develop scientific, technical and experimental skills to the students.

o To correlate the theoretical principles with application based studies.

Unit-1

Teaching Hours:12

Minor Experiments

1. 1. Determination of Flash Point and Fire Point of oil using Abel's (closed cup) apparatus.

2. 2. Determination of Flash Point and Fire Point of oil using Pensky and Martin (closed cup) apparatus.

3. 3. Determination of Flash Point and Fire Point of oils using Cleavland (open cup) apparatus.

4. 4. Determination of calorific value of a gaseous fuel.

5. 5. Determination of Kinematic viscosity and Absolute viscosity of oil using Redwood Viscometer.

6. 6. Determination of Kinematic viscosity and Absolute viscosity of oil using Saybolts Viscometer.

7. 7. Representation of valve timing diagram of a 4 – Stroke Single Cylinder Diesel Engine.

Unit-2

Teaching Hours:13

Major Experiments

1. 1. Performance test on a 4 – Stroke Single Cylinder Diesel Engine.

2. 2. Performance test on a 2 – Stroke Petrol Engine.

3. 3. Performance test on a Variable Compression Ratio Diesel Engine.

4. 4. Performance test on a 4 – Stroke Single Cylinder Petrol Engine and motoring test.

5. 5. Performance Test on a Multi Cylinder 4 – Stroke Petrol Engine and Morse Test.

Essential Text Books:

1. A course in I.C. Engines, M. L. Mathur and R. P. Sharma 20001.

2. Internal Combustion Engines, Colin R. Ferguson C. John Wiley & sons, 1986

Recommended Reading:

1. I.C. Engines, Edward. F. Obert, Harper International edition, 1973.
2. Internal Combustion Engines, Ganeshan, Tata McGraw Hill, 2nd Edition, 2003.
3. Engineering Fundamentals of the I.C. Engine, Willard W. Pulkrabek. 1998.
4. Combustion Engine Process, Lichty, Judge 2000

MTME135 - ADVANCED DESIGN OF MECHANICAL SYSTEM (2014 Batch)

Total Teaching Hours for Semester:52

No of Lecture Hours/Week:4

Max Marks:100

Credits:4

Course Objective

- To known role of failure prevention analysis in mechanical design.

- Fatigue life estimation using S-N approach.

- Life estimation by ε-N approach.

- To understand the Statistical Aspects of Fatigue.

Learning Outcome

- Students can able to estimate life of the simple mechanical components through various fatigue design approaches.

- Students can carry out fatigue testing for different test specimens.

- Students can able to demonstrate Surface Failure due to fatigue.

Unit-1

Teaching Hours:12

Fatigue of Materials

Introductory concepts, High cycle and low cycle fatigue, Fatigue design models ,Fatigue design methods ,Fatigue design criteria, Fatigue testing, Test methods and standard test specimens, Fatigue fracture surfaces and macroscopic features, Fatigue mechanisms and microscopic features.

Unit-1

Teaching Hours:12

Introduction

Role of failure prevention analysis in mechanical design ,Modes of mechanical failure, Review of failure theories for ductile and brittle materials including Mohr's theory and modified Mohr's theory, Numerical examples.

Unit-2

Teaching Hours:12

Stess-Life (S-N) Approach:

S-N curves, Statistical nature of fatigue test data, General S-N behavior, Mean stress effects, Different factors influencing S-N behaviour, S-N curve representation and approximations, Constant life diagrams, Fatigue life estimation using S-N approach.

Unit-2

Teaching Hours:12

Strain-Life(ε-N)approach

Monotonic stress-strain behavior ,Strain controlled test methods ,Cyclic stress-strain behavior ,Strain based approach to life estimation, Determination of strain life fatigue properties, Mean stress effects, Effect of surface finish, Life estimation by ε-N approach.

Unit-3

Teaching Hours:10

Statistical Aspects of Fatigue

Definitions and quantification of data scatter, Probability distributions, Tolerance limits, Regression analysis of fatigue data, Reliability analysis, Problems using the Weibull distribution.

Unit-3

Teaching Hours:10

LEFM Approach

LEFM concepts, Crack tip plastic zone, Fracture toughness, Fatigue crack growth, Mean stress effects, Crack growth life estimation.

Unit-4

Teaching Hours:8

Fatigue from Variable Amplitude Loading

Spectrum loads and cumulative damage, Damage quantification and the concepts of damage fraction and accumulation, Cumulative damage theories, Load interaction and sequence effects, Cycle counting methods, Life estimation using stress life approach.

Unit-5

Teaching Hours:8

Surface Failure

Introduction, Surface geometry, Mating surface, Friction, Adhesive wear, Abrasive wear, Corrosion wear, Surface fatigue spherical contact, Cylindrical contact, General contact, Dynamic contact stresses, Surface fatigue strength.

Essential Text Books:

1. Metal Fatigue in engineering, Ralph I. Stephens, Ali Fatemi, Robert .R. Stephens, Henry o. Fuchs,

John wiley Newyork, Second edition. 2001.

2. Failure of Materials in Mechanical Design, Jack. A. Collins, John Wiley, Newyork 1992.

3. Machine Design, Robert L. Norton, Pearson.

Recommended Reading:

1. Fatigue of Materials, S.Suresh, Cambridge university press, Cambridge, U.K.

2. Fundamentals of Metal Fatigue Analysis, Julie.A.Benantine Prentice Hall,1990

3. Fatigue and Fracture, ASM Hand Book, Vol 19,2002.

CE631 - ENVIRONMENTAL ENGINEERING-I (2014 Batch)

Total Teaching Hours for Semester:60

No of Lecture Hours/Week:4

Max Marks:100

Credits:4

Course Objective

The objective of this course is to study the water and its quality and system of water supply to the public, create general awareness among the students regarding these environmental issues. The importance of environmental science and environmental studies cannot be disputed.

Learning Outcome

An ability to identify, formulate, and solve Environmental engineering problems.

Unit-1

Teaching Hours:10

UNIT 1

INTRODUCTION: Human activities and environmental pollution. Requirement of Water for various beneficial uses. Need for protected water supply. DEMAND OF WATER: Types of water demands- domestic demand in detail, institutional and commercial, public uses, fire demand. Per capita consumption ?factors affecting per capita demand, population forecasting, different methods with merits &demerits- variations in demand of water. Fire demand ? estimation by Kuichling?s formula, Freeman formula & national board of fire under writers? formula, peak factors, design periods &factors governing the design periods

Unit-2

Teaching Hours:11

UNIT 2

SOURCES: Surface and subsurface sources ? suitability with regard to quality and quantity COLLECTION AND CONVEYANCE OF WATER: Intake structures ?different types of intakes; factor of selection and location of intakes. Pumps-Necessity, types ? power of pumps; factors for the selection of a pump. Pipes? Design of the economical diameter for the rising main; Nomograms ? use; Pipe appurtenances

Unit-3

Teaching Hours:12

UNIT 3

QUALITY OF WATER: Objectives of water quality management. Concept of safe water, wholesomeness & palatability, water born diseases. Examination of Water:- Objectives ? Physical chemical and Microbiological Examinations, (IS: 3025 and IS: 1622) using analytical and instrumental techniques. Drinking water standards BIS & WHO guidelines. Health significance of Fluoride, Nitrates and heavy metals like Mercury, Cadmium, Arsenic etc Sampling of water for examination.WATER TREATMENT: Objectives ? Treatment flow-chart. Aeration-Principles, types of Aerators

Unit-4

Teaching Hours:15

UNIT 4

SEDIMENTATION: Theory, settling tanks, types, design. Coagulant aided sedimentation, jar test, chemical feeding, flash mixing, and clari-flocculator. FILTARTION: Mechanism ? theory of filtration, types of filters, slow sand, rapid sand and pressure filters including construction, operation, cleaning and their design ? excluding under drainage system ? back washing of filters. Operational problems in filters DISINFECTION: Theory of disinfection, types of disinfection, Chlorination, chlorine demand, residual chlorine, use of bleaching powder. UV irradiation treatment ? treatment of swimming pool water SOFTENING: Definition, methods of removal of hardness by lime soda process and zeolite process RO & Membrane technique

Unit-5

Teaching Hours:12

UNIT 5

MISCELLANEOUS TREATMENT: Removal of color, odor, taste, use of copper sulfate, adsorption technique, fluoridation and defluoridation. DISTRIBUTION SYSTEMS: System of supply, service reservoirs and their capacity determination, methods of layout of distribution systems. MISCELLANEOUS: Pipe appurtenances, various valves, type of fire hydrants, pipefitting, Layout of water supply pipes in buildings

Essential Text Books:

"Manual on Water supply and treatment" –CPHEEO, Ministry of Urban Development, New Delhi

Garg. S. K., "Water supply Engineering", Khanna Publishers

Punima. B C., and Ashok Jain, "Environmental Engineering-I"

Venugopala Rao, "Text Book of Environmental Engineering", PHI learning Private Limited

Recommended Reading:

CE632 - DESIGN AND DRAWING OF RCC STRUCTURES (2014 Batch)

Total Teaching Hours for Semester:60

No of Lecture Hours/Week:4

Max Marks:100

Credits:04

Course Objective

SUBJECT DESCRIPTION:This paper contains two units which cover Layout Drawing, General layout of building, Beam and Slab floor system, Continuous beams, Staircase, Column footing, Combined footing, Retaining walls, Water tanks and Simple Portal Frames are covered.

SUBJECT OBJECTIVES:

To familiarize the various steps involved in the Design Process and drawing

To learn to use standard practices and standard data

LEVEL OF KNOWLEDGE: Basic/Advanced/Working

Learning Outcome

On completion of this course the students willhave the knowledge of various steps involved in the Design Process and Preparing Working Drawing for the field user by means standard practices and standard data

Unit-1

Teaching Hours:30

MANUAL DRAWING

UNIT-I (14 (T) + 19 (D) HOURS)

Layout Drawing: General layout of building showing, position of columns, footings, beams and slabs with notations and abbreviations.

Beam and Slab floor system, continuous beams.

Staircase: Dog legged and Open well.

Column footing: Column and footing (Square and Rectangle).

Unit-2

Teaching Hours:30

DESIGN AND MANUAL DRAWING

UNIT-II (14 (T) + 22 (D) HOURS)

Rectangular Combined footing slab and beam type.

Retaining walls (Cantilever and counter fort type).

Circular and Rectangular water tanks resting on ground (Flexible base and Rigid base), using IS: 3370 (Part IV) only.

Simple Portal Frames (Single bay & Single storey)

Essential Text Books:

REFERENCE BOOKS:

Bhavikatti .S.S., “Design of RCC Structural Elements”, Vol-I, New Age International Publications, New Delhi

Ghosh, “Practical Design of Reinforced Concrete Design”, PHI learning Private Limited

Jain. A.K., “Limit State method of design”, Nemichand and Bros.,Roorkee

Krishna Raju. N., “Structural Design and Drawing”, Universities press

Krishnamurthy, “Structural Design and Drawing”, CBS publishers, New Delhi.

Krishnaraju. N., “Design of Reinforced concrete structures”, (IS: 456 – 2000) 3rd edition CBS publishers, New Delhi

Park and Pauly. “Reinforced Concrete”, John wiley and Sons, New York

Punmia.B.C., Ashok kumar Jain & Arun kumar Jain, “Limit State design of Reinforced concrete”, Laxmi Publication, New Delhi.

Sinha. S.N, “Reinforced Concrete design”, Tata McGraw-Hill Education Pvt. Ltd

Unnikrishna Pillai and Devdas Menon “Reinforced concrete Design”, Tata McGraw Hill Publishers Company Ltd., New Delhi, 2006.

Varghese, “Limit State of Reinforced Concrete Design”, 2nd ed., PHI learning Private Limited

Jai Krishna and Jain, OP; "Plain and Reinforced Concrete", Vol. I, Roorkee,Nem Chand and Bros

Handoo, BL; Mahajan, VM and Singla, DR; "Elementary of RCC Design", NewDelhi, Satya Prakashan

Mallick, SK; and Gupta, AP; "Reinforced Concrete", New Delhi, Oxford andIBH Publishing Co

Punmia, BC; "Reinforced Concrete Structure Vol I", Delhi Standard PublishersDistributors

Sushil Kumar, "Treasurers of Reinforced Concrete Design", Delhi StandardPublishers Distributors

Ramamurtham, S; "Design and Testing of Reinforced Structures", DelhiDhanpat Rai and Sons

Dayaratnam, P; "Design of Reinforced Concrete Structures", New Delhi,Oxford and IBH Publishing Co.

Gambhir, M.L., "Reinforced Concrete Design", Macmillan India Limited

Ram Chandra “Reinforced Concrete Design”

IS: 456 – 2000

SP-16 – “Only Design charts pertaining to column design”

Recommended Reading:

1. Bhavikatti .S.S., “Advanced RCC Design”, New Age International Publications, New Delhi2. Krishna Raju. N., “Structural Design and Drawing”, Universities press

3.Krishnamurthy, “Structural Design and Drawing”, CBS publishers, New Delhi.

CE633 - TRANSPORTATION ENGINEERING-II (2014 Batch)

Total Teaching Hours for Semester:60

No of Lecture Hours/Week:4

Max Marks:100

Credits:4

Course Objective

The objective of this subject is to build a strong, stable and deep concept in different means of transportation, evaluation of various transportation projects and also to have a clear picture in the details of design, construction and maintenance of structures coming under this field

Learning Outcome

On completion of the course, the student would be able to:

Understand the various elements of railway, geometric requirement of railway track. The student would also understand the requirements of airport, tunnel and harbor ports.

Unit-1

Teaching Hours:12

INTRODUCTION: Role of railways in transportation, Indian Railways, selection of routes

PERMANENT WAY: Introduction, requirements for an ideal permanent way, typical cross sections of single and double line B.G. tracks – in cutting, embankment and electrified tracks. Gauges and types of gauges with dimensions. Coning of wheels and tilting of rails. Track stresses in rails, sleepers, ballast and subgrade. Problems on these. Rails functions requirements, types of rail sections, length of rails, defects in rails. Wear on rails, rail joints, welding of rails, creep of rails.

BALLAST AND SLEEPERS: Functions, requirements, types, track fittings and fasteners, calculation of quantity of materials needed for laying a track. Traction and tractive resistances, tractive power, Hauling capacity. Problems on above

Unit-2

Teaching Hours:16

GEOMETRIC DESIGN OF TRACK

Necessity of Geometric Design of railway track, gradient and types of gradient. Speed of train, curve, transition curve, super elevation, cant- deficiency, negative cant- speed calculation based on Indian Railways Formulae for High speed tracks only-problems on above.

Unit-2

Teaching Hours:16

POINTS AND CROSSING

Necessity and its components, turnout, design of turnout, Types of switches, crossings, track junctions. Stations and yards, marshalling yard, signalling and interlocking, track defects, track maintenance, level crossing, Indian Railway standards (no derivations, only relevant problems). Equipment in stations and yards such as turn-table, water columns, fouling marks, buffer stops etc.

Unit-3

Teaching Hours:12

INTRODUCTION: Introduction to airport engineering, Recent Development by AAI. Layout of an airport with component parts and functions of each, Aircraft Characteristics – Airport Classifications – Site selection- Regional Planning.

RUNWAY DESIGN: Orientation of runway by using wind rose diagram, the runway configurations- basic length of the runway –corrections to runway length by ICAO and FAA specification- runway cross sections- problems on above.

TAXIWAY DESIGN: Factors affecting the layout of the taxiway geometrics of taxiway design of Exit taxiways- ICAO Specifications. Problems on above

VISUAL AIDS: Airport marking – lightings- ILS, other navigational aids.

Unit-4

Teaching Hours:10

TUNNELS: Introduction – types of tunnels, advantages and disadvantages, economics of tunnelling, tunnel surveying, transferring of centreline and gradient from the earth surface to inside the tunnel working face. Design of shape and size of tunnel. Soil classification and methods of tunnelling in soft soil (only Forepoling and Neddle Beam method). Liner Plate Method of tunnelling. Tunnelling in rock - vertical shafts, pilot tunnelling, methods of tunnelling in hard rock. Mucking and methods, drilling and drilling patterns. Tunnel lining and tunnel ventilation

Unit-5

Teaching Hours:10

HARBOURS: Introductions, classifications, natural phenomenon affecting the design of harbour viz. wind, wave, tide and currents. Harbor layout with component parts, breakwaters, wharfs and Quays, Jetties and Piers, Dry Dock and Wet Dock, Slipways, Navigational aids. Warehouse and Transit shed.

Essential Text Books:

Khanna, Arora and Jain M. G., and Jain S. S., “Airport Planning and Design”, Nemchand Roorkee

Saxena and Arora., “A Text of Railway Engineering”, Dhanpat Rai and Sons New Delhi.

Srinivasan.R, “Harbour, Dock & Tunnel Engineering”, Charotar Publishing House.

Recommended Reading:

Agarwal M.M., “Indian railway Track”, Jaico Publications, Bombay.

Algia, JS “Bridge Engineering”, Anand Charotar Book Stall

Antia , “Railway Track Engineering”

Deshpande, R: “A Text Book of Railway Engineering”, Poonam United Book Corporation

Horonjeff., “Planning and Design of Airports” Tata Mc Graw hill Publications, New Delhi

Khanna, Arora and Jain M. G., and Jain S. S., “Airport Planning and Design”, Nemchand Roorkee

Mundrej J. S., “Railway track Engineering”, Chartor Publishing House Pvt. Ltd.

Oza H.P. and Oza G.H., “Docks and Harbour Engineering”, Charotar Publishing House

Rangwala, SC; “Bridge Engineering”, Aand, Charotar Book Stall

Rangwala, SC; ‘Railway Engineering”, Anand, Charotar Book Stall

Satish Chandra and Agarawal, M.M., “Railway Engineering”, Oxford University Press, New Delhi

Vaswani, NK; “Railway Engineering”, Roorkee Publishing House

Victor Johnson, “Essentials of Bridge Engineering”, Oxford and IBH

CE634 - GEOTECHNICAL ENGINEERING-II (2014 Batch)

Total Teaching Hours for Semester:60

No of Lecture Hours/Week:4

Max Marks:100

Credits:4

Course Objective

The objective of this subject is to learn certain fundamentals related to Subsoil exploration, Drainage and Dewatering, Stresses in Soil and Flow nets, Lateral Earth Pressure, Stability of Earth Slopes, S B C of Soil and Foundation settlement.

Learning Outcome

Expected outcome of this course is to get a brief overview of various concepts in sub soil explorations, and gain a fundamental knowledge about safety and stability criteria of soils under various conditions.

The course aims to acquaint the student with the concept of soil as an engineering material and familiarize them with concepts of the stresses and stress conditions in soils; factors affecting soil strength and stress strain behavior; seepage and water flow through soils and their effects on soil stresses and strength; lateral earth pressure; slope stability concepts; bearing capacity of soils; deformation and settlement characteristics of soils.

Unit-1

Teaching Hours:13

SUBSURFACE EXPLORATION

Importance of exploration program, Methods of exploration: Boring, sounding tests, geophysical methods- Electrical resistivity and Seismic refraction methods.Types of samples undisturbed, disturbed and representative samples. Samplers, sample disturbance, area ratio, Recovery ratio, clearance tabilisation of boreholes -Typical bore log. Number and depth of borings for various civil engineering structures, soil exploration report.

Unit-1

Teaching Hours:13

DRAINAGE AND DEWATERING

Location of ground water table in fine and coarse grained soils. Determination of ground water level by Hvorselev's method. Control of ground water during excavation: Dewatering- Ditches and sumps, well point system, Shallow well system, Deep well system, Vacuum method, Electro- Osmosis method.

Unit-2

Teaching Hours:12

FLOWNETS

Laplace equation (no derivation) assumptions and limitations only, characteristics and uses of flow nets, Methods of drawing flow nets for Dams and sheet piles. Estimating quantity of seepage and Exit gradient. Determination of phreatic line in earth dams with and without filter. Piping and protective filter, graded filter.

Unit-2

Teaching Hours:12

STRESSES IN SOILS

Boussinesq’s and Westergaard’s theories for concentrated, circular, rectangular, line and strip loads. Comparison of Boussinesq’s and westergaard’s analysis. Pressure distribution diagrams, contact pressure, New mark’s chart

Unit-3

Teaching Hours:10

LATERAL EARTH PRESSURE

Active and Passive earth pressures, Earth pressure at rest, Earth pressure coefficient. Earth pressure theories- Rankine’s and Coulomb’s –assumptions and limitations, Graphical solutions for active earth pressure (cohesionless soil only) –Culmann’s and Rebhann’s methods Lateral earth pressure in cohesive and cohesion less soils, Earth pressure distribution.

Unit-4

Teaching Hours:10

STABILITY OF EARTH SLOPES

Types of slopes, causes and type of failure of slopes. Definition of factor of safety, Stability of finite and infinite slopes-

Method of slices, Friction Circle method, Fellineous method, Taylor’s stability number

Unit-5

Teaching Hours:15

FOUNDATION SETTLEMENT

Settlement Analysis, Data for settlement analysis, computation of settlement, Concept, immediate, consolidation and secondary settlements (no derivations), Tolerance. BIS specifications for total and differential settlements of footings and rafts.

Unit-5

Teaching Hours:15

BEARING CAPACITY

Definitions of ultimate, net and safe bearing capacities, Allowable bearing pressure. Terzaghi’s and Brinch Hansen’s bearing capacity equations-assumptions and limitations Bearing capacity of footing subjected to eccentric loading. Effect of ground water table on bearing capacity. Plate load test, Standard penetration test, cone penetration test

Essential Text Books:

Budhu, “Soil Mechanics and Foundations”, Wiley India Pvt. Ltd

Murthy V.N.S., “Soil Mechanics and Foundation Engineering (1996)”, 4th Edition, UBS Publishers and Distributors, New Delhi

Punmia B.C., “Soil Mechanics and Foundation Engg (2005)”, 16th Edition Laxmi Publications Co, New Delhi

Recommended Reading:

Alam Singh and Chowdhary G.R., “Soil Engineering in Theory and Practice (1994)”, CBS Publishers and Distributors Ltd., New Delhi

Bowles J. E., “Foundation Analysis and Design (1996)”, 5th Edition, McGraw Hill Pub. Co. New York.

Braja M. Das, “Principles of Geotechnical Engineering (2002)”, 5th Edition, Thomson Business Information India (P) Ltd., India.

Craig R.F, “Soil Mechanics (1987)”, Van Nostrand Reinhold Co.Ltd

Gopal Ranjan and Rao A.S.R, “Basic and Applied Soil Mechanics (2000)”, New Age International (P) Ltd., Newe Delhi.

Gopal Ranjan and Rao. A.S.R, “Basic and Applied Soil Mechanics (2000)”, New Age International (P) Ltd., New Delhi

Iqbal H. Khan, “Text Book of Geotechnical Engineering (2005)”, 2nd Edition, PHI, India.

Lambe, “Soil Mechanics SI Version”, Wiley India Pvt. Ltd

Sitraram T.G. and Ramamurthy T.N., “Geotechnical Engineering”, S. Chand & Co. New Delhi

Venkatrahmaiah. C., “Geotechnical Engineering(2006)”, 3rd Edition, New Age International (P) Ltd., Newe Delhi.

CE635 - IRRIGATION ENGINEERING AND HYDRAULIC STRUCTURES (2014 Batch)

Total Teaching Hours for Semester:60

No of Lecture Hours/Week:4

Max Marks:100

Credits:4

Course Objective

To make Students to realize the importance and use of Water Resources, Hydraulic structures and its uses and a basic understanding of Irrigation and Hydraulic structures design

Learning Outcome

On completion of the course the student would be able to:

Calculate water requirement of crops, do a basic design of canals, cross drainage works, diversion works, gravity dam and earthen dam, spillways and energy dissipaters and also be able to determine the storage capacity and yield of reservoirs.

Unit-1

Teaching Hours:13

INTRODUCTION:

Definition. Benefits and ill effects of irrigation. Sources of water for irrigation. Systems of irrigation: Surface and ground water, flow irrigation, Lift irrigation, Bhandhara irrigation. Methods of irrigation in India– Potential and development

Unit-1

Teaching Hours:13

IRRIGATION AND WATER REQUIREMENTS OF CROPS:

Definition of duty, Delta and Base period, Relationship between Duty, Delta and Base period, Factors affecting duty of water. Crops and crop seasons in India, Crops grown in Karnataka, their seasons, local names. Agro-climatic zones of Karnataka. Irrigation efficiency, frequency of irrigation

Unit-2

Teaching Hours:13

CANALS:

Definition. Types of canals, Alignment of canals. Design of canals by Kennedy’s and Lacey’s method

Unit-2

Teaching Hours:13

CANAL WORKS:

Canal regulators: Classification and suitability. Canal drops: Classification. Hydraulic design principles for notch type drop. Cross drainage works: Classification. Hydraulic design principles for an aqueduct

Unit-3

Teaching Hours:13

DIVERSION WORKS:

Definition. Layout. Types of weirs and Barrages. Design of Impermeable floors – Bligh’s and Lane’s theories – Simple design problems. Khosla’s theory – Method of independent variables, Exit gradient (No design problem)

Unit-3

Teaching Hours:13

RESERVOIRS:

Definitions. Investigation for reservoir sites. Storage zones. Determination of storage capacity and yield of a reservoir using mass curve

Unit-4

Teaching Hours:12

EARTHEN DAMS:

Introduction. Types of earthen dams. Failure of earthen dams. Preliminary design. Drainage arrangements. Phreatic line. Stability analysis under sudden draw down using Sweedish slip circle method

Unit-4

Teaching Hours:12

GRAVITY DAMS:

Definition. Forces acting on a Gravity dam. Modes of failures. Elementary and practical profile. Low and high gravity dams. Simple analysis problems, Principal stresses. Drainage galleries

Unit-5

Teaching Hours:9

SPILLWAYS:

Definition. Types of Spillways. Design Principles for an Ogee Spillway. Energy dissipaters: Types and introduction to IS Stilling basins (No design problems).

Essential Text Books:

ESSENTIAL READING:

Modi P.N., “Irrigation, Water Resources, and Water Power Engineering”, Standard Book House, New Delhi

Punmia B.C., and Pande Lal., “Irrigation and Water Power Engineering”, Laxhmi Publications, New Delhi

Sharma R.K., “Text Book of Irrigation Engineering and Hydraulic Structures”, Oxford and IBH Publishing Co., New Delhi

Recommended Reading:

RECOMMENEDED READING:

Asawa, C L, “Irrigation Engineering”,

Basak N.N., “Irrigation Engineering”, Tata McGraw-Hill Education Pvt. Ltd

Bharat Singh, “Fundamentals of Irrigation Engineering”, Roorkee, Nem Chandand Bros

Das and Saikia, “Irrigation and Water Power Engineering”, PHI learning Private Limited

Garg S.K., “Irrigation Engineering and Hydraulic Structures”, Khanna Publications, New Delhi

Majumdar, “Irrigation Water Management-Principals and Practice”, PHI learning Private Limited

Michael A.M., “Irrigation Theory and Practices”, Vikas Publications, New Delhi

Patra. K. C., “Hydrology and water Resources Engineering”., Narosa publishing House, New Delhi

Priyani BB, “The Fundamental Principles of Irrigation and Water Power”

Sahasra Budhe , “Irrigation Engineering and Hydraulic Structures”, Dhanpath Rai Publications, New Delhi.

Sharma, RK; “Text Book of Irrigation Engineering and Hydraulics Structures”, New Delhi, Oxford and IBH Publishing Company

Sharma, SK; “Principles and Practice of Irrigation Engineering”, New Delhi, Prentice Hall of India Pvt. Ltd.

Singhal, RP; “A Text Book on Irrigation Engineering”, Singhal publications

Varshney RS, Gupta SC, Gupta RL etc.“Theory and Design of IrrigationStructures”, Vol. I and II

Viessman, Jr. And Lewis, “Introduction to Hydrology”, PHI learning Private Limited

Wan. E. Houk, “Irrigation Engineering”, Vol. I and II

BIS Codes

CE636A - MATRIX METHOD OF STRUCTURAL ANALYSIS (2014 Batch)

Total Teaching Hours for Semester:60

No of Lecture Hours/Week:4

Max Marks:100

Credits:4

Course Objective

The objective of this subject is to familiarise the students in Analysis of Structures by Advanced Methods

Learning Outcome

Determine the static determinacy and indeterminacy in a structure, and also be able to calculate the degree of kinematic indeterminacy.

Determine the forces in a structure by Force or flexibility method.

Determine the displacements and the forces in a structure by stiffness or displacement method .

Study framed structures and perform an evaluation of the actions and displacements produced by specific disturbances.

Unit-1

Teaching Hours:12

Introduction to flexibility method, Element flexibility matrix, Principle of contra gradience, and Force Transformation Matrix, Member Flexibility matrix, Construction of structure flexibility matrix. Matrix determination of the displacement vector, Determination of member force. Analysis of axially rigid continuous beams by flexibility method using Force Transformation Matrix

Unit-2

Teaching Hours:14

Analysis of rigid plane frames with axially rigid members by flexibility method using Force Transformation Matrix. Analysis of trusses by flexibility method Using Force Transformation Matrix

Unit-3

Teaching Hours:12

Fundamentals of the stiffness method, equivalent joint loads, Displacement Transformation matrix. Member stiffness matrix, Total or System stiffness matrix, Truss analysis by stiffness method using Displacement Transformation Matrix

Unit-4

Teaching Hours:11

Continuous Beam and rigid frame analysis with axially rigid members by stiffness method using Displacement Transformation Matrix

Unit-5

Teaching Hours:11

Introduction to direct stiffness method, Local and global co-ordinate system, Transformation Of variables, Transformation of the member displacement matrix, Transformation of the member Force matrix, Transformation of the member stiffness matrix, Transformation of the stiffness Matrix of the member of a truss, Transformation of the stiffness matrix of the member of the Rigid frame, Overall stiffness matrix, Boundary conditions, Computation of internal forces. Analysis of trusses and continuous beams by direct stiffness method

Essential Text Books:

(T1) Mukhopadhyay. M, “Matrix, finite elements, Computer and Structural analysis”, Oxford &IBW, 1984

(T2) Pandit. G.S. & Gupta.S P, “Structural Analysis A Matrix Approach”, Tata Mc Graw-Hill, 1981

(T3) Weaver. W., and Gere J.M., “Matrix Analysis of framed structures”, CBS publishers and Disributers, 1986

Recommended Reading:

(R1) Jain A.K.., “Elementary Structural Analysis with Computer Applications” Nemchand and Brothers, India

(R2) Karde Stuncer. H., “Elementry Matrix Analysis of Structures”, Mc Graw Hill 1974

(R3) Martin. H.C, “Introduction to Matrix Methods of Structural analysis”, International text book Company, 1996

(R4) Negi L. S., and Jangid R.S, “Structural Analysis”, Tata Mc Graw-Hill, 1997

(R5) Rajshekharan, S., and Sankara Subramanian. G, “Computational structural Mechanics”, PHI, 2001

(R6) Reddy .C.S, “Basic structural Analysis”, Tata Mc Graw-Hill, 1996

CE636B - TRAFFIC ENGINEERING (2014 Batch)

Total Teaching Hours for Semester:60

No of Lecture Hours/Week:4

Max Marks:100

Credits:04

Course Objective

The objective of this subject is to familiarize the students with Road and Traffic characteristics and Studies, Flow Theories, Analysis, Regulation and its Control.

Learning Outcome

After the successful completion , the students will be able analyse and understand traffic characteristics and regulation.

Unit-1

Teaching Hours:11

INTRODUCTION: Definition, objectives of Traffic Engineering and scope of Traffic Engineering. TRAFFIC CHARACTERISTICS: Road user characteristics, vehicular characteristics – static and dynamic characteristics, power performance of vehicles, Resistance to the motion of vehicles – Reaction time of driver –Problems on above.

Unit-2

Teaching Hours:13

TRAFFIC STUDIES: Various types of traffic engineering studies, data collection, analysis objectives and method of study – Definition of study area – Sample size and analysis.

INTERPRETATION OF TRAFFIC STUDIES: Classified traffic Volume at mid block and intersections, PCU, origin and destination, spot speed, speed and delay, parking – on street parking, off street parking, Accident – causes, analysis measures to reduce accident – problems on above.

Unit-3

Teaching Hours:11

TRAFFIC FLOW THEORIES: Traffic flow theory, Green shield theory –Goodness of fit, - correlation and regression analysis (linear only) – Queuing theory, Car following theory and relevant problems on above.

Unit-4

Teaching Hours:11

STATISTICAL ANALYSIS: Poisson's distribution and application to traffic engineering. Normal Distribution – Significance tests for observed traffic data, Chi Square test – problems on above. Traffic forecast – simulation technique.

Unit-5

Teaching Hours:14

TRAFFIC REGULATION AND CONTROL: Driver, vehicle and road controls – Traffic regulations – one way – Traffic markings, Traffic signs, Traffic signals – Vehicle actuated and synchronized signals – Signals coordination. Webster's method of signal design, IRC method, traffic rotary elements and designs, traffic operation – Street lighting, Road side furniture, Relevant problems on above. INTELLIGENT TRANSPORT SYSTEM: Definition, Necessities, Application in the present traffic scenario

Essential Text Books:

Kadiyali L. R., “Traffic Engineering & Transport Planning”, Khanna Publishers

Khanna & Justo, “Highway Engineering”, Nemchand & Bros, Roorkee (UA).

Matson & Smith, “Traffic Engg”. Mc.Graw Hill and Co.

Recommended Reading:

RECOMMENEDE READING:

“Highway Capacity Manual” – 2000.

Chakroborty and Das, “Principles of Transportation Engineering”, PHI learning Private Limited

Drew D R., “Traffic flow theory and Control”, Mc. Graw Hill and Co., New York

Jotin Khistey and Kentlal, “An introduction to traffic engineering”, PHI

Mannering, “Principals of Highway Engineering and Traffic Analysis”, Wiley India Pvt. Ltd

Mc Shane & Roess, “Traffic Engineering”, PHI

Pignataro, “Traffic Engineering”, - Prentice Hall

Wells G R., “Traffic Engineering – an Introduction”, Griffin, London.

CE651 - GEOTECHNICAL ENGINEERING LABORATORY (2014 Batch)

Total Teaching Hours for Semester:30

No of Lecture Hours/Week:2

Max Marks:50

Credits:2

Course Objective

The objective of subject is to provide an introduction to Practical soil Mechanics, to perform testing of Soil Materials as used in practice and to apply Soil Mechanics Concept

Learning Outcome

Student will be able to perform varrious tests on soil and anaysis the same.

Unit-1

Teaching Hours:30

List of Experiments

1. Tests for determination of specific gravity and moisture content (3 HOURS).

2. Grain size analysis of soil sample (sieve analysis) (3 HOURS).

3. In situ density by core cutter and sand replacement methods (3 HOURS).

4. Consistency Limits – Liquid Limit (Casagrande and Cone Penetration Methods), plastic limit and shrinkage limit (3 HOURS).

5. Standard Proctor Compaction Test and Modified Proctor Compaction Test (3 HOURS).

6. Coefficient of permeability by constant head and variable head methods (3 HOURS).

7. Strength Tests (9 HOURS).

a. Unconfined Compression Test

b. Direct Shear Test

c. Triaxial Compression Test (undrained)

8. Consolidation Test- Determination of compression index and coefficient of consolidation (3 HOURS).

9. Laboratory vane shear test (3 HOURS).

10. Determination of CBR value (3 HOURS).

11. a. Demonstration of miscellaneous equipments such as Augers, Samplers, Rapid Moisture meter, Proctor's needle.

b. Demonstration of Hydrometer Test

c. Demonstration of Free Swell Index and Swell Pressure Test

d. Demonstration of determination of relative density of sands.

Essential Text Books:

1. K R Arora , " Soil Mechanics and Foundation Engineering", 10th Edition, Standard Publishers Distributers, Delhi.

Recommended Reading:

Bowles J.E., "Engineering Properties of Soil and Their Measurements (1988)", - McGraw Hill Book Co. New York.

Head K.H., "Manual of Soil Laboratory Testing", (1986) Vol. I, II, III, Princeton Press, London

Lambe T.W., "Soil Testing for Engineers", Wiley Eastern Ltd., New Delhi

BIS Codes of Practice: IS 2720(Part-3/Sec. 1) – 1987; IS 2720(Part – 2)- 1973; IS 2720 (Part – 4) – 1985; IS 2720 (Part – 5) –1985; IS 2720 (Part – 6) – 1972; IS 2720 (Part – 7) – 1980; IS 2720(Part – 8) – 1983; IS 2720 (Part – 17) – 1986; IS 2720 (Part - 10) –1973; IS 2720 (Part – 13) – 1986; IS2720 (Part 11) – 1971; IS2720(Part 15) – 1986; IS 2720 (Part 30) – 1987; IS 2720 (Part 14) –1977; IS 2720 (Part – 14) – 1983; IS 2720 (Part – 28) – 1974; IS 2720 (Part – 29) – 1966, IS 2720 (Part-60) 1966

CE652 - EXTENSIVE SURVEY PROJECT (2014 Batch)

Total Teaching Hours for Semester:30

No of Lecture Hours/Week:2

Max Marks:50

Credits:02

Course Objective

An extensive survey training involving Investigation and Design of Projects (as mentioned in syllabus) is to be conducted for 2 weeks (14 days). The student shall submit a project report consisting of Designs and Drawings.

Learning Outcome

To familiarise the students in Extensive Survey Training Involving Investigation and Design of the Existing Works.

Unit-1

Teaching Hours:2

Reconnaissance

General instructions, Reconnaissance of the sites and fly levelling to establish bench marks.

Unit-2

Teaching Hours:7

NEW TANK PROJECT

The work shall consist of

i) Alignment of center line of the proposed bund, Longitudinal and cross sections of the center line.

ii) Capacity surveys.

iii) Details at Waste weir and sluice points.

iv) Canal alignment.

Unit-3

Teaching Hours:7

WATER SUPPLY AND SANITARY PROJECT

Examination of sources of water supply, Calculation of quantity of water required based on existing and projected population. Preparation of village map by any suitable method of surveying (like plane tabling), location of sites for ground level and overhead tanks underground drainage system surveys for laying the sewers.

Unit-4

Teaching Hours:7

HIGHWAY PROJECT

Preliminary and detailed investigations to align a new road (min. 1 to 1.5 km stretch) between two obligatory points. The investigations shall consist of topographic surveying of strip of land for considering alternate routes and for final alignment. Report should justify the selected alignment with details of all geometric designs for traffic and design speed assumed. Drawing shall include key plan initial alignment, final alignment, longitudinal section along final alignment, typical cross sections of road. (Drawing should be preferably done using AutoCAD)

Unit-5

Teaching Hours:7

OLD TANK PROJECT

The work shall consist of

i) Alignment of center line of the existing and proposed bund, Longitudinal and cross sections of the center line.

ii) Capacity surveys.

iii) Details at Waste weir and sluice points.

Essential Text Books:

Recommended Reading:

ME631 - DESIGN OF MACHINE ELEMENTS - II (2014 Batch)

Total Teaching Hours for Semester:60

No of Lecture Hours/Week:4

Max Marks:100

Credits:04

Course Objective

This course “Design of Machine Elements -II” is designed with the following objectives :

The student shall gain appreciation and understanding of the design function in mechanical engineering, the steps involved in designing and the relation of design activity with manufacturing activity.

Shall be able to choose proper materials to different machine elements depending on their physical and mechanical properties. Thus he shall be able to apply the knowledge of material science in real life usage.

Student shall gain a thorough understanding of the different types of failure modes and criteria. He will be conversant with various failure theories and be able to judge which criterion is to be applied in which situation.

Student shall gain design knowledge of the different types of elements used in the machine design process. Eg., fasteners, shafts, couplings etc. and will be able to design these elements for each application

Learning Outcome

- To describe the various design process.
- To explain the various problem solving strategies.
- To explain the embodiment design and detail design.
- To explain the parameters of failures.

- To explain the parameter design and tolerance design.

Will acquire skill to do select proper material for specific application.

Will be in a position to do design for industrial application.

Will be able to do design of mechanical elements.

Will have sufficient ability to optimize.

Enhances the capabilities to assume suitable technical specifications.

Unit-1

Teaching Hours:13

Curved Beams

Stresses in curved beams of standard cross sections used in crane hook, punching presses & clamps, closed rings and links

Unit-1

Teaching Hours:13

Springs

Types of springs-stresses in Helical coil springs of circular and non-circular cross sections. Tension and compression springs, springs under fluctuating loads, Leaf Springs: Stresses in leaf springs. Equalized stresses, Energy stored in springs, Torsion, Belleville and Rubber springs.

Unit-2

Teaching Hours:11

Springs

Types of springs-stresses in Helical coil springs of circular and non-circular cross sections. Tension and compression springs, springs under fluctuating loads, Leaf Springs: Stresses in leaf springs. Equalized stresses, Energy stored in springs, Torsion, Belleville and Rubber springs.

Unit-3

Teaching Hours:13

Spur & Helical Gears:

Spur Gears: Definitions, stresses in gear tooth: Lewis equation and form factor, Design for strength, Dynamic load and wear load. Helical Gears: Definitions, formative number of teeth, Design based on strength, dynamic and wear loads.

Unit-3

Teaching Hours:13

Bevel and Worm Gears:

Definitions, formative number of teeth, Design based on strength, dynamic and wear loads. Worm Gears: Definitions, Design based on strength, dynamic, wear loads and efficiency of worm gear drives.

Unit-4

Teaching Hours:11

Clutches & Brakes:

Design of Clutches: Single plate, multi plate and cone clutches. Design of Brakes:Block and Band brakes: Self locking of brakes: Heat generation in Brakes.

Unit-5

Teaching Hours:11

Lubrication and Bearings

Lubricants and their properties, Mechanisms of Lubrication bearing modulus, coefficient of friction, minimum oil film thickness, Heat Generated, Heat dissipated, Bearing Materials, Examples of journal bearing and thrust bearing design.

Unit-5

Teaching Hours:11

IC Engine Parts:

Design of piston, connecting rod and crank shaft.

Essential Text Books:

1. Mechanical Engineering Design, Joseph E Shigley and Charles R. Mischke. McGraw Hill International edition, 6th Edition 2003.

2. Design of Machine Elements, V. B Bhandari, Tata McGraw Hill Publishing Company Ltd., New Delhi, 2nd Edition 2007

Recommended Reading:

1. Machine Design, Robert L. Norton, Pearson Education Asia, 2001.

2. Design of Machine Elements, M. F. Spotts, T. E. Shoup, L. E. Hornberger, S. R. Jayram and C. V. Venkatesh, Pearson Education, 2006.

3. Machine Design, Hall, Holowenko, Laughlin (Schaum's Outlines series) Adapted by S.K. Somani, Tata McGraw Hill Publishing Company Ltd., New Delhi, Special Indian Edition, 2008.

4. Machine Design, A CAD Approach: Andrew D DIMAROGONAS, John Wiley Sons, Inc, 2

ME632 - HEAT AND MASS TRANSFER (2014 Batch)

Total Teaching Hours for Semester:60

No of Lecture Hours/Week:4

Max Marks:100

Credits:4

Course Objective

- Students will understand the basic concepts of conduction, convection and radiation heat transfer.

- Students will understand how to formulate and be able to solve one and two dimensional conduction heat transfer problems. Solution techniques will include both closed form and numerical methods. Convection effects will be included as boundary conditions.

- Students will understand the fundamentals of the relationship between fluid flow, convection heat transfer and mass transfer.

- Students will apply empirical correlations for both forced and free convection to determine values for the convection heat transfer coefficient. They will then calculate heat transfer rates using the coefficients.

- Students will understand the basic concepts of radiation heat transfer to include both black body radiation and gray body radiation.

- Students will be able to evaluate radiation view factors using tables and the view factor relationships.

Learning Outcome

- Students gain in depth knowledge in various modes of heat transfer equipping them to apply this knowledge in real life engineering situations like design of IC engines, heat exchangers, etc.

- Students obtain sound theoretical knowledge on heat conduction enabling them to design energy efficient industrial systems.

- Students acquire adequate knowledge in heat transfer in convection and radiation modes that will enable them to conceptualize, design and commission alternate energy systems.

- A sound knowledge in “Heat and Mass Transfer” coupled with the understanding of Thermodynamics enables students in developing green technologies that are essential in the future for sustainable development.

Unit-1

Teaching Hours:11

Introductory Concepts and Definitions.

Modes of heat transfer: Basic laws governing conduction, convection, and radiation heat transfer; Thermal conductivity; convective heat transfer coefficient; radiation heat transfer; combined heat transfer mechanism. Boundary conditions of 1st, 2nd and 3rd kind.

Derivation of general three dimensional conduction equation in Cartesian coordinate, special cases, discussion on 3-D conduction in cylindrical and spherical coordinate systems (No derivation). One dimensional conduction equations in rectangular, cylindrical and spherical coordinates for plane and composite walls. Thermal resistance concept and its importance. Overall heat transfer coefficient. Thermal contact resistance

Unit-2

Teaching Hours:12

On dimensional Transient Conduction

Conduction in solids with negligible internal temperature gradient (Lumped system analysis), Use of Transient temperature charts (Heisler's charts) for transient conduction in slab, long cylinder and sphere; use of transient temperature charts for transient conduction in semi-infinite solids. Numerical Problems.

Unit-2

Teaching Hours:12

Variable Thermal Conductivity.

Derivation for heat flow and temperature distribution in plane wall. Critical thickness of insulation without heat generation. Heat transfer in extended surfaces of uniform cross-section without heat generation, Long fin, short fin with insulated tip and without insulated tip and fin connected between two heat sources. Fin efficiency and effectiveness. Numerical problems.

Unit-3

Teaching Hours:13

Free or Natural Convection.

Application of dimensional analysis for free convection- physical significance of Grashoff number; use of correlations of free convection in vertical, horizontal and inclined flat plates, vertical and horizontal cylinders and spheres, Numerical problems.

Unit-3

Teaching Hours:13

Concepts and Basic Relations in Boundary Layers.

Flow over a body velocity boundary layer; critical Reynolds number; general expressions for drag coefficient and drag force; thermal boundary layer; general expression for local heat transfer coefficient; Average heat transfer coefficient; Nusselt number. Flow inside aduct- velocity boundary layer, hydrodynamic entrance length and hydro dynamically developed flow; flow through tubes (internal flow discussion only). Numericals based on empirical relation given in data handbook.

Unit-4

Teaching Hours:13

Force Convection.

Applications of dimensional analysis for forced convection. Physical significance of Reynolds, Prandtl, Nusselt and Stanton numbers. Use of various correlations for hydro dynamically and thermally developed flows inside a duct, use of correlations for flow over a flat plate, over a cylinder and sphere. Numerical problems.

Unit-4

Teaching Hours:13

Heat Exchangers.

Classification of heat exchangers; overall heat transfer coefficient, fouling and fouling factor; LMTD, Effectiveness-NTU methods of analysis of heat exchangers. Numerical problems.

Unit-5

Teaching Hours:11

Radiation Heat Transfer.

Thermal radiation; definitions of various terms used in radiation heat transfer; Stefan-Boltzman law, Kirchoff's law, Planck's law and Wein's displacement law. Radiation heat exchange between two parallel infinite black surfaces.

Radiation heat exchange between two parallel infinite gray surfaces; effect of radiation shield; intensity ofradiation and solid angle; Lambert's law; radiation heat exchange between two finite surfaces-configuration factor or view factor. Numerical problems.

Essential Text Books:

1. Heat & Mass transfer, Tirumaleshwar, Pearson education 2006
2. Heat transfer-A basic approach, Ozisik, Tata Mc Graw Hill 2002

Recommended Reading:

1. Heat transfer, a practical approach, Yunus A- Cengel Tata Mc Graw Hill
2. Principles of heat transfer, Kreith Thomas Learning 2001

3. Fundamentals of heat and mass transfer, Frenk P. Incropera and David P. Dewitt, John Wiley and son's.

4. Heat transfer, P.K. Nag, Tata Mc Graw Hill 2002.

ME633 - FINITE ELEMENT METHODS (2014 Batch)

Total Teaching Hours for Semester:52

No of Lecture Hours/Week:4

Max Marks:100

Credits:4

Course Objective

- To provide the student with some knowledge and analysis skills in applying basiclaws in mechanics and integration by parts to develop element equation for a springelement and steps used in solving the problem by finite element method. (A, B, C)

- To develop the student's skills in applying the basic matrix operation to form a global matrix equation and enforce the concept of steps in obtaining solutions for a truss structures' (A,B,C)

- To develop the student's skills in applying the Hermit interpolation functions to solve beam problems. (A,B,C)

- To provide the student with some knowledge and analysis skills in forming basic data required in a FEM computer program. (A,B,C)

- To develop the student's skills in applying the Gaussian quadrature in computing integration in FEM. (A, B, C)

- To provide the student with some knowledge in isoparametric transformation.(A,B,C)

Learning Outcome

- Know the behavior of the element under different loading condition.
- Able to model irregular bodies and also find the areas of it.
- To find approximate solution for differential equations.
- To minimize an error using FEA software and get faster solution.

Unit-1

Teaching Hours:12

Introduction:

Equilibrium equations in elasticity subjected to body force, traction forces, and stress-strain relations for plane stress and plane strains. General description of Finite Element Method, Application and limitations. Types of elements based on geometry. Node numbering, Half band width.

Unit-2

Teaching Hours:12

Basic Procedure:

Euler - Lagrauge equation for bar, beam (cantilever / simply supported fixed) Principle of virtual work, principle of minimum potential energy, Raleigh's Ritz method. Direct approach for stiffness matrix formulation of bar element. Galerkin's method.

Unit-3

Teaching Hours:12

Interpolation Models:

Interpolation polynomials- Linear, quadratic and cubic. Simplex complex and multiplex elements. 2D PASCAL's triangle. CST elements-Shape functions and Nodal load vector, Strain displacement matrix and Jacobian for triangular and rectangular element.

Unit-3

Teaching Hours:12

Solution of 1-D Bars:

Solutions of bars and stepped bars for displacements, reactions and stresses by using penalty approach and elimination approach. Guass-elimination technique.

Unit-4

Teaching Hours:12

Higher Order Elements

Langrange's interpolation, Higher order one dimensional elements-Quadratic and cubic element and their shape functions. Shape function of 2-D quadrilateral element-linear, quadric element Iso-parametric, Sub parametric and Super parametric elements. numerical integration : 1, 2 and 3 gauge point for 1D and 2D cases.

Unit-4

Teaching Hours:12

Trusses

Stiffness matrix of Truss element. Numerical problems.

Unit-5

Teaching Hours:12

Heat Transfer:

Steady state heat transfer, 1D heat conduction governing equations. Functional approach for heat conduction. Galerkin's approach for heat conduction. 1D heat transfer in thin fins.

Unit-5

Teaching Hours:12

Beams:

Hermite shape functions for beam element, Derivation of stiffness matrix. Numerical problems of beams carrying concentrated, UDL and linearly varying loads.

Essential Text Books:

1 Finite Elements in Engineering, T.R.Chandrupatla, A.D Belegunde, 3rd Ed PHI.

2 Finite Element Method in Engineering, S.S. Rao, 4th Edition, Elsevier, 2006.

Recommended Reading:

1.Finite Element Methods for Engineers U.S. Dixit, Cengage Learning, 2009

2.Concepts and applications of Finite Element Analysis, R.D. Cook D.S Maltus, M.E Plesha, R.J.Witt, Wiley 4th Ed, 2009

3.Finite Element Methods, Daryl. L. Logon, Thomson Learning 3rd edition, 2001.

4.Finite Element Method, J.N.Reddy, McGraw -Hill International Edition.

ME634 - MECHATRONICS AND MICROPROCESSORS (2014 Batch)

Total Teaching Hours for Semester:60

No of Lecture Hours/Week:4

Max Marks:100

Credits:4

Course Objective

- Implement Mechatronic solutions to a given specification.

- Produce software solutions for a modern microprocessor-based Mechatronic system.

- Apply knowledge of control, sensors and actuators to control a Mechatronic system.

- Demonstrate the competence in developing advanced microprocessor-based Mechatronic products.

Learning Outcome

- Will be in a position to understand and implement the control engineering concepts in real life applications.

- Can effectively use the various electro mechanical sensors for building various devices in real life applications.

- Can use the various soft various soft wares to simulate and understand the functioning of mechatronic devices.

- Effective use of microprocessors in mechanical applications

Unit-1

Teaching Hours:12

Review of Transducers and Sensors

Definition and classification of transducers. Definition and classification of sensors. Principle of working and applications of light sensors, proximity sensors and Hall effect sensors.

Unit-1

Teaching Hours:12

Introduction to Mechatronic Systems

Measurement and control systems Their elements and functions, Microprocessor based controllers.

Unit-2

Teaching Hours:12

Signal Conditioning

Introduction to signal conditioning. The operational amplifier, Protection, Filtering, Wheatstone bridge, Digital signals Multiplexers, Data acquisition, Introduction to Digital system. Processing Pulse-modulation.

Unit-2

Teaching Hours:12

Electrical Actuation Systems

Electrical systems, Mechanical switches, solid-state switches, solenoids, DC & AC motors, Stepper motors and their merits and demerits.

Unit-3

Teaching Hours:12

Introduction to Microprocessors

Evolution of Microprocessor, Organization of Microprocessors (Preliminary concepts), basic concepts of programming of microprocessors.

Review of concepts - Boolean algebra, Logic Gates and Gate Networks, Binary & Decimal number systems, memory representation of positive and negative integers, maximum and minimum integers. Conversion of real, numbers, floating point notation, representation of floating point numbers, accuracy and range in floating point representation, overflow and underflow, addition of floating point numbers, character representation.

Unit-4

Teaching Hours:12

Logic Function

Data word representation. Basic elements of control systems 808SA processor architecture terminology such as CPU, memory and address, ALU, assembler data registers, Fetch cycle, write cycle, state, bus, interrupts. Micro Controllers. Difference between microprocessor and micro controllers. Requirements for control and their implementation in microcontrollers. Classification of micro controllers.

Unit-5

Teaching Hours:12

Organization & Programming of Microprocessors

Introduction to organization of INTEL 808S-Data and Address buses, Instruction set of 8085, programming the 8085, assembly language programming.

Unit-5

Teaching Hours:12

Central Processing Unit of Microprocessors

Introduction, timing and control unit basic concepts, Instruction and data flow, system timing, examples of INTEL 8085 and INTEL 4004 register organization.

Essential Text Books:

1. Mechatronics, W.Bolton, Longman, 2Ed, Pearson Publications, 2007.

2. Microprocessor Architecture, Programming And Applications With 8085/8085A, R.S. Ganokar, Wiley Eastern.

Recommended Reading:

1. Mechatronics and Microprocessors, K.P.Ramchandran, G.K.Vijayraghavan, M.S.Balasundran, Wiley, 1st Ed, 2009

2. Mechatronics - Principles, Concepts and applications – Nitaigour and Premchand Mahilik - Tata McGraw Hill- 2003.

3. Mechatronics Principles & applications, Godfrey C. Onwubolu, Elsevier. .

4. Introduction Mechatronics & Measurement systems, David.G. Aliciatore & Michael. B. Bihistaned, Tata McGraw Hill, 2000.

ME636 - HYDRAULICS AND PNEUMATICS (2014 Batch)

Total Teaching Hours for Semester:60

No of Lecture Hours/Week:4

Max Marks:100

Credits:4

Course Objective

- Upon completion of this course students will demonstrate an understanding of Hydraulic andPneumatic principles, equipment, Seals and industries.

- Students will be able to identify anddescribe the basic operation of Hydraulic / Pneumatic systems, the various equipmentused in their operation, Hydraulic / Pneumatic terms as well as actuator Sealing Devicedesign / material strengths and weaknesses.

- Students will be able to troubleshoot Hydraulic/Pneumatic equipment and Seals.

Learning Outcome

- Will be in position to device various circuit for hydraulic and pneumatic applications.

- Will be in position to develop various hydraulic and pneumatic devices.

- To understand and illustrate the working of various types of pumps.

- To understand and illustrate the working of various hydraulic and pneumatic devices.

Unit-1

Teaching Hours:12

Introduction to Hydraulic Power

Definition of hydraulic system, advantages, limitations, applications, Pascal's law, structure of hydraulic control system, problems on Pascal's law.

Unit-1

Teaching Hours:12

Hydraulic Actuators and Motors

Classification cylinder and hydraulic motors, Linear Hydraulic Actuators [cylinders], single and double acting cylinder, Mechanics of Hydraulic Cylinder Loading, mounting arrangements, cushioning, special types of cylinders, problems on

cylinders, construction and working of rotary actuators such as gear, vane, piston motors, Hydraulic Motor Theoretical Torque, Power and Flow Rate, Hydraulic Motor Performance, problems, symbolic representation of hydraulic actuators (cylinders and motors).

Unit-1

Teaching Hours:12

The source of Hydraulic Power

Pumps Classification pumps, Pumping theory of positive displacement pumps, construction and working of Gear pumps, Vane pumps, Piston pumps, fixed and variable displacement pumps, Pump performance characteristics, pump Selection factors, problems on pumps.

Unit-2

Teaching Hours:12

Hydraulic Circuit Design And Analysis

Control of Single and Double Acting Hydraulic Cylinder, Regenerative circuit, Pump Unloading Circuit, Double Pump Hydraulic System, Counter balance Valve Application, Hydraulic Cylinder Sequencing Circuits, Automatic cylinder

reciprocating system, Locked Cylinder using Pilot check Valve, Cylinder synchronizing circuit using different methods, factors affecting synchronization, Hydraulic circuit for force multiplication, Speed Control of Hydraulic Cylinder, Speed Control of Hydraulic Motors, Safety circuit, Accumulators, types, construction and applications with circuits.

Unit-2

Teaching Hours:12

Control Components in Hydraulic Systems

Classification of control valves, Directional Control Valves- Symbolic representation, constructional features of poppet, sliding spool, rotary type valves solenoid and pilot operated DCV, shuttle valve, check valves, Pressure control valves - types, direct operated types and pilot operated types. Flow Control Valves - compensated and non-compensated FCV, needle valve, temperature compensated, pressure compensated, pressure and temperature compensated FCV, symbolic representation.

Unit-3

Teaching Hours:12

Introduction to Pneumatic Control

Definition of pneumatic system, advantages, limitations, applications, Choice of working medium. Characteristic of compressed air. Structure of Pneumatic control System, fluid conditioners and FRL unit.

Unit-3

Teaching Hours:12

Maintenance of Hydraulic System

Hydraulic Oils - Desirable properties, general type of Fluids, Sealing Devices, Reservoir System, Filters and Strainers, wear of Moving Parts due to solid -particle Contamination, temperature control (heat exchangers), Pressure switches, trouble shooting.

Unit-3

Teaching Hours:12

Pneumatic Actuators

Linear cylinder - Types, Conventional type of cylinder- working, End position cushioning, seals, mounting arrangements- Applications. Rod - Less cylinders types, working, advantages, Rotary cylinders- types construction and application, symbols.

Unit-4

Teaching Hours:12

Pneumatic Control Valves

DCV such as poppet, spool, suspended seat type slide valve, pressure control valves, flow control valves, types and construction, use of memory valve, Quick exhaust valve, time delay valve, shuttle valve, twin pressure valve, symbols.

Unit-4

Teaching Hours:12

Signal Processing Elements

Use of Logic gates - OR and AND gates in pneumatic applications. Practical Examples involving the use of logic gates, Pressure dependant controlstypes - construction - practical applications, Time dependent controls principle. Construction, practical applications.

Unit-4

Teaching Hours:12

Pneumatic Control

Direct and indirect actuation pneumatic cylinders, speed control of cylinders - supply air throttling and Exhaust air throttling and Exhaust air throttling.

Unit-5

Teaching Hours:12

Electro- Pneumatic Control

Principles - signal input and out put, pilot assisted solenoid control of directional control valves, Use of relay and contactors. Control circuitry for simple signal cylinder application.

Unit-5

Teaching Hours:12

Multi- Cylinder Application

Coordinated and sequential motion control, Motion and control diagrams. Signal elimination methods, Cascading method- principle, Practical application examples (up to two cylinders) using cascading method (using reversing valves).

Unit-5

Teaching Hours:12

Compressed Air

Production of compressed air- Compressors Preparation of compressed air- Driers, Filters, Regulators, Lubricators, Distribution of compressed air Piping layout.

Essential Text Books:

1. “Fluid Power with Applications”, Anthony Esposito, Sixth edition, Pearson Education, Inc, 2000.

2. 'Pneumatics and Hydraulics', Andrew Parr, Jaico Publilishing Co

Recommended Reading:

1. 'Oil Hydraulic systems', Principles and Maintenance S. R. Majurr, Tata Mc Graw Hill Publishing Company Ltd. - 2001

2. 'Industrial Hydraulics', Pippenger, Hicks" McGraw Hill, New York

3. 'Hydraulic & Pneumatic Power for Production', Harry L. Stewart

4. 'Pneumatic Systems', S. R. Majumdar, Tata Mc Graw Hill Publish 1995

5. Power Hydraulics' Michael J Pinches & John G Ashby, Prentice Hall

ME651 - HEAT AND MASS TRANSFER LABORATORY (2014 Batch)

Total Teaching Hours for Semester:34

No of Lecture Hours/Week:2

Max Marks:50

Credits:2

Course Objective

To develop skills in the field of heat & mass transferengineering.

Verify the principles of the course,Application of the theory , Understanding of fundamentals of the subject.

Be in a position to relate theory and practice,

Learning Outcome

Will be able to apply the concepts of heat & mass transferengineering, appreciate its application in various engineering application.

Will be able to perform various test of heat & mass transferengineering for various mechanical properties.

Will be able to carry out performance tests on heat & mass transferengineering.

To develop scientific, technical and experimental skills to the students.

To correlate the theoretical principles with application based studies.

Unit-1

Teaching Hours:12

Minor Experiments

1. 1. Determination of Thermal Conductivity of a Metal Rod.

2. 2. Determination of Overall Thermal Conductivity of a Composite wall.

3. 3. Determination of Heat Transfer Coefficient in a Free Convection on a Vertical Tube.

4. 4. Determination of Emissivity of a Surface.

5. 5. Determination of Stefan-Boltzman Constant.

Unit-2

Teaching Hours:12

Major Experiments

1. 1. Determination of Heat Transfer Coefficient in a Forced Convention Flow through a Pipe.

2. 2. Determination of Overall heat transfer coefficient in Drop wise and film wise condensation.

3. 3. Determination of LMDT and Effectiveness in a Parallel Flow and Counter Flow Heat

Exchangers.

4. 4. Performance Test on a Vapour Compression Refrigeration System.

5. 5. Experiment on Unsteady Conduction Heat Transfer.

6. 6. Determination of Effectiveness of a Metallic Pin Fin.

Essential Text Books:

1. Heat & Mass transfer, Tirumaleshwar, Pearson education 2006

2. Heat transfer-A basic approach, Ozisik, Tata Mc Graw Hill 2002

Recommended Reading:

1. Heat transfer, a practical approach, Yunus A- Cengel Tata Mc Graw Hill

2. Principles of heat transfer, Kreith Thomas Learning 2001

3. Fundamentals of heat and mass transfer, Frenk P. Incropera and David P. Dewitt, John Wiley and son's.

4. Heat transfer, P.K. Nag, Tata Mc Graw Hill 2002.

ME652 - COMPUTER AIDED MODELING AND ANALYSIS LABORATORY (2014 Batch)

Total Teaching Hours for Semester:42

No of Lecture Hours/Week:2

Max Marks:50

Credits:2

Course Objective

To develop skills in the field of computer aided modeling and analysis.

Verify the principles of the course, Application of the theory, Understanding of fundamentals of the subject.

Be in a position to relate theory and practice,

Learning Outcome

Will be able to apply the concepts of computer aided modeling and analysis engineering, appreciate its application in various engineering application.

Will be able to perform various computer modeling and analysis for various mechanical elements.

Will be able to carry out computer aided analysis.

- To develop scientific, technical and experimental skills to the students.

- To correlate the theoretical principles with application based studies.

Unit-1

Teaching Hours:42

Part-A

Bars of constant cross section area, tapered cross section area and stepped bar

2. Trusses – (Minimum 2 exercises)

3. Beams – Simply supported, cantilever, beams with UDL, beams with varying load etc (Minimum 6 exercises)

Unit-1

Teaching Hours:42

Part-B

1. Stress analysis of a rectangular plate with a circular hole

2. Thermal Analysis – 1D & 2D problem with conduction and convection boundary conditions(Minimum 4 exercises)

3. Dynamic Analysis

1. Fixed – fixed beam for natural frequency determination

2. Bar subjected to forcing function

3. Fixed – fixed beam subjected to forcing function

Essential Text Books:

1. A first course in the Finite element method, Daryl L Logan, Thomason, Third Edition

2. Fundaments of FEM, Hutton – McGraw Hill, 2004

Recommended Reading:

1. Finite Element Analysis, George R. Buchanan, Schaum SerSEMESTER VII

MTME234 - FRACTURE MECHANICS (2014 Batch)

Total Teaching Hours for Semester:52

No of Lecture Hours/Week:4

Max Marks:100

Credits:4

Course Objective

- Introduction to fracture mechanics principles.
- To find Stress intensity factors and plane strain fracture toughness for different components.
- To known the concepts of LEFM and EPFM.

Learning Outcome

- Students can able to describe fracture mechanics approach to design.
- Selection of proper nondestructive testing method to analyze a physical structure.
- Students can able to demonstrate Fracture and Fatigue Control in Structures.

Unit-1

Teaching Hours:6

Fracture mechanics principles

Introduction and historical review, Sources of micro and macro cracks. Stress concentration due to elliptical hole, Strength ideal materials, Griffith's energy balance approach. Fracture mechanics approach to design. NDT and Various NDT methods used in fracture mechanics, Numerical problems.

Unit-2

Teaching Hours:12

Plasicity effects, Irwin plastic zone correction

Dugdale approach. The shape of the plastic zone for plane stress and plane strain cases, Plastic constraint factor. The Thickness effect, numerical problems.

Unit-2

Teaching Hours:12

The Airy stress function.

Complex stress function. Solution to crack problems. Effect of finite size. Special cases, Elliptical cracks, Numerical problems.

Unit-3

Teaching Hours:14

The energy release rate, Criteria for crack growth

The crack resistance(R curve). Compliance, J integral. Tearing modulus. Stability.

Unit-3

Teaching Hours:14

Determination of Stress intensity factors and plane strain fracture toughness

Introduction, analysis and numerical methods, experimental methods, estimation of stress intensity factors. Plane strain fracture toughness test, The Standard test. Size requirements. Non-linearity. Applicability.

Unit-4

Teaching Hours:12

Dynamics and crack arrest

Crack speed and kinetic energy. Dynamic stress intensity and elastic energy release rate. Crack branching. Principles of crack arrest. Crack arrest in practice. Dynamic fracture toughness.

Unit-4

Teaching Hours:12

Elastic plastic fracture mechanics

Fracture beyond general yield. The Crack-tip opening displacement. The Use of CTOD criteria. Experimental determination of CTOD.Parameters affecting the critical CTOD.Use of J integral. Limitation of J integral.

Unit-5

Teaching Hours:6

Fatigue crack propagation and applications of fracture mechanics

Crack growth and the stress intensity factor. Factors affecting crack propagation. variable amplitude service loading, Means to provide fail-safety, Required information for fracture mechanics approach, Mixed mode (combined) loading and design criteria.

Essential Text Books:

Elementary Engineering Fracture Mechanics - David Brock, Noordhoff.

Fracture Mechanics-Fundamental and Application - Anderson, T.L CRC press1998.

Recommended Reading:

Engineering fracture mechanics - S.A. Meguid Elsevier.

Fracture of Engineering Brittle Materials, Applied Science - Jayatilake, London.

Fracture and Fatigue Control in Structures - Rolfe and Barsom, , Prentice Hall.

Introduction to fracture mechanics - Karen Hellan, McGraw Hill.

Fundamentals of V fracture mechanisms - Knott, Butterworths.

Fracture –Liefbowitz Volime II.

CE731 - ENVIRONMENTAL ENGINEERING - II (2013 Batch)

Total Teaching Hours for Semester:60

No of Lecture Hours/Week:4

Max Marks:100

Credits:4

Course Objective

The objective of this course is to study the Design of sewers and Materials of sewers, appurtenances and characterization, Effluents and its Treatment, the importance of Environmental science and Environmental studies cannot be disputed.

Learning Outcome

The completion of this course would enable learners to have a basic knowledge of the different types of wastewater discharge, storage and treatment techniques and also the design of the same which has become an essential part of today’s construction.

Unit-1

Teaching Hours:8

INTRODUCTION

Necessity for sanitation, methods of domestic waste water disposal, types of sewerage systems and their suitability. Dry weather flow, factors affecting dry weather flow, flow variations and their effects on design of sewerage system; computation of design flow, estimation of storm flow, rational method and empirical formulae of design of storm water drain. Time of concentration

Unit-2

Teaching Hours:13

DESIGN OF SEWERS

Hydraulic formulae for velocity, effects of flow variations on velocity, self cleansing and non scouring velocities, Design of hydraulic elements for circular sewers flowing full and flowing partially full (No derivations).

Unit-2

Teaching Hours:13

MATERIALS OF SEWERS

Sewer materials, shapes of sewers, laying of sewers, joints and testing of sewers, ventilation and cleaning of sewers.

Unit-3

Teaching Hours:13

WASTE WATER CHARACTERIZATION

Sampling, significance, techniques and frequency. Physical, Chemical and Biological characteristics, Aerobic and Anaerobic activity, CNS cycles. BOD, COD and their significance & problems

Unit-3

Teaching Hours:13

SEWER APPURTENANCES

Catch basins, manholes, flushing tanks, oil and grease traps, Drainage traps. Basic principles of house drainage. Typical layout plan showing house drainage connections, maintenance of house drainage

Unit-4

Teaching Hours:13

TREATMENT OF WASTE WATER

Flow diagram of municipal waste water treatment plant. Preliminary & Primary treatment:Screening, grit chambers, skimming tanks, and primary sedimentation tanks – Design criteria & Design examples

Unit-4

Teaching Hours:13

DISPOSAL OF EFFLUENTS

Disposal of Effluents by dilution, self purification phenomenon. Oxygen sag curve, Zones of purification, Sewage farming, sewage sickness, Effluent Disposal standards for land, surface water & ocean. Numerical Problems on Disposal of Effluents. Streeter Phelps equation.

Unit-5

Teaching Hours:13

SECONDARY TREATMENT

Suspended growth and fixed film bioprocess. Trickling filter–theory and operation, types and designs. Activated sludge process- Principle and flow diagram, Modifications of ASP, F/M ratio. Design of ASP. Anaerobic Sludge digestion, Sludge digestion tanks, Design of Sludge drying beds. Low cost waste treatment method. Septic tank, Oxidation Pond and Oxidation ditches – Design. Reuse and recycle of waste water.

Essential Text Books:

Fair, Geyer and Okun“Water and Wastewater Engineering Vol – II”,John Willey Publishers, New York.

Metcalf and Eddy Inc: “Waste Water Treatment, Disposal and Reuse”,Tata McGraw Hill Publications.

Recommended Reading:

“Manual on Waste Water Treatment”, CPHEEO, Ministry of Urban Development, New Delhi.

CE732 - DESIGN OF STEEL STRUCTURES (2013 Batch)

Total Teaching Hours for Semester:60

No of Lecture Hours/Week:4

Max Marks:100

Credits:4

Course Objective

The objective this paper is to study the Design of Structural Steel members subjected to Compressive, Tensile and Bending loads, as per current codal provisions including connections.

Learning Outcome

Students can understand the basic concepts of steel structures and its design principles according to Indian codal provisons. Can gain knowledge how to design the Structural Steel members that are subjected to Compressive, Tensile and Bending loads. And also can attain the basic knowledge on connections between various elements of steel structures.

Unit-1

Teaching Hours:8

STRUCTURAL FASTENERS

Bolted and welded connections, HSFG Bolts, standard notations specifications strength of bolts, strength of HSFC bolts, Design of bolted connections, Brackets connections, Welds-standard notations fillet and Butt welds – Defects in welds, Strength of welds, Design of welded connections, Brackets connections.

Unit-1

Teaching Hours:8

INTRODUCTION

Advantages and disadvantages of Steel structures, Loads and load combinations, Structural forms, Discussions of design concepts. IS code provisions. Fire resistance and ductility of steel. Structural fasteners

Unit-2

Teaching Hours:13

DESIGN OF TENSION MEMBERS

Axially loaded tension members and their connections, design of lug angles, Design of truss ties and joints.

Unit-3

Teaching Hours:13

DESIGN OF COMPRESSION MEMBERS

Angle struts. Columns including built up sections, Laced and Battened systems. Members subjected to uniaxial bending, column splicing, column bases-simple slab base, gusseted base grillage foundation.

Unit-4

Teaching Hours:13

DESIGN OF FLEXURAL MEMBERS

Simple and built-up sections. Laterally supported compression flange. Web crippling and web buckling, deflection. Laterally unsupported compression flange, Design of purlins

Unit-5

Teaching Hours:13

TYPES OF CONNECTIONS

Beam to Beam, Beam to Column connections – bolted and welded. Framed and seated connections (moment resistant connections not included).

Essential Text Books:

Arya and Ajamani“Design of Steel Structures”,Nem Chand & Bros. Roorkee.

Dayarathnam P“Design of Steel Structures”,A.H. Wheeler & Co.Ltd.

Subramanian N“Design of Steel Structures”,Oxford University, Press

“IS: 800 – 2007, SP 6 (1) – 1984 or Steel Table”.

Recommended Reading:

Duggal SK, "Design of Steel Structures", Standard Publishers Distributors.

Negi L S“Design of Steel Structures”,Tata Mc Graw Hill Publishers.

RaghupatiH M“Design of Steel Structures”

CE733 - PRE-STRESSED CONCRETE (2013 Batch)

Total Teaching Hours for Semester:60

No of Lecture Hours/Week:4

Max Marks:100

Credits:4

Course Objective

At the end of this course the student shall have knowledge of Methods of Prestressing, Advantages of Prestressing Concrete, the losses involved and the design methods for Prestressed Concrete Elements under codal provisions.

Learning Outcome

At the end of this course the student can gain knowledge on basic principles of prestressing, methods of Prestressing, advantages of Prestressing Concrete over RCC and analysis of prestressed structural elements. And also they can understand the concept of losses in prestress and the design methods for Prestressed Concrete Elements as per IS codal provisions.

Unit-1

Teaching Hours:12

ANALYSIS OF SECTIONS FOR FLEXURE

Stresses in concrete due to pre-stress and loads, stresses in steel due to loads, Cable profiles.

Unit-1

Teaching Hours:12

BASIC PRINCIPLES OF PRESTRESSING

Fundamentals, Load balancing concept, Stress concept, centre of Thrust. Pre-tensioning and post tensioning systems, tensioning methods and end anchorages

Unit-1

Teaching Hours:12

MATERIALS

High strength concrete and steel, Stress-Strain characteristics and properties.

Unit-2

Teaching Hours:12

DEFLECTIONS

Deflection of a pre-stressed member – Short term and long term deflections, Elastic deflections under transfer loads and due to different cable profiles. Deflection limits as per IS 1343. Effect of creep on deflection, load verses deflection curve, methods of reducing deflection

Unit-2

Teaching Hours:12

LOSSES OF PRE-STRESS

Various losses encountered in pre-tensioning and post tensioning methods, determination of jacking force.

Unit-3

Teaching Hours:12

LIMIT STATE OF COLLAPSE

Flexure-IS Code recommendations–Ultimate flexural strength of sections. Shear - IS Code recommendations, shear resistance of sections, shear reinforcement. Limit state of serviceability – control of deflections and cracking

Unit-4

Teaching Hours:12

DESIGN OF END BLOCKS

Transmission of prestress in pretensioned members, transmission length, Anchorage stress in post-tensioned members. Bearing stress and bursting tensile force-stresses in end blocks-Methods, I.S. Code, provision for the design of end block reinforcement.

Unit-5

Teaching Hours:12

DESIGN OF BEAMS

Design of pre-tensioned and post-tensioned symmetrical and asymmetrical sections. Permissible stress, design of prestressing force and eccentricity, limiting zone of pre-stressing force cable profile

Essential Text Books:

Krishna Raju N “Pre-stressed Concrete”, Tata Mc. Graw Publishers.

Dayarathnam P“Pre-stressed Concrete”, Oxford and IBH Publishing Co

Krishna Raju N “Prestressed Concrete”, N. Krishna Raju, TataMcgrawhill, 3rd edition, 1995.

Lin T.Y. and H. Burns “Design of Prestressed concrete structures”, John Wiley & Sons, 1982.

Pandit.G.S and Gupta.S.P “Prestressed Concrete”, CBS Publishers, 1993.

Rajgopalan N “Pre-stressed Concrete”

Sinha N C & S.K. Roy “Fundamental of pre-stressed concrete”

T.Y. Lin T Y and Ned H. Burns “Design of pre-stressed concrete structures”, John Wiley & Sons, New York.

IS: 1343: 1980

Recommended Reading:

CE734 - QUANTITY SURVEYING AND ESTIMATION (2013 Batch)

Total Teaching Hours for Semester:60

No of Lecture Hours/Week:4

Max Marks:100

Credits:4

Course Objective

Whatever type of Dwelling, Building or Construction is to be undertaken, some form of cost estimate is required to determine the economic feasibility of the project and arrange appropriate finance. Before construction commences, a more detailed estimate is usually prepared in order that the actual cost of the project may be forecast with confidence. This paper summarises the estimating methods to be adopted. At the end of this course the student shall be able to estimate the material quantities, prepare a Bill of quantities, make Specifications and prepare tender documents. Student should also be able to Prepare value Estimates.

Learning Outcome

Students can understand the various aspects of Estimating of Quantities and rate analysis of items of works involved in Buildings, Water Supply and Sanitary Works, Road Works and irrigation works. Students can understand how to do the valuation of Properties and Preparation of Reports for Estimation of various items. The students will be able to estimate the material quantities, prepare a Bill of quantities, make Specifications and prepare tender documents. Student should also be able to Prepare value Estimates.

Unit-1

Teaching Hours:15

ESTIMATION

Study of various drawings with estimates, important terms, units of measurement, abstract Methods of taking out quantities and cost ? center line method, long and short wall method or crossing method. Preparation of detailed and abstract estimates for the following Civil Engineering works ? Buildings ? RCC framed structures with flat, sloped RCC roofs with all Building components.

Unit-2

Teaching Hours:15

SPECIFICATIONS

Definition of specifications, objective of writing specifications, essentials in specifications, general and detail specifications of common item of works in buildings.

Unit-2

Teaching Hours:15

ESTIMATE

Different type of estimates, approximate methods of estimating buildings, cost of materials. Estimation of wooden joineries such as doors, windows & ventilators

Unit-2

Teaching Hours:15

ESTIMATES

Steel truss (Fink and Howe truss), manhole and septic tanks.

Unit-3

Teaching Hours:11

RATE ANALYSIS

Definition and purpose. Working out quantities and rates for the following standard items of works ? earth work in different types of soils, cement concrete of different mixes, bricks and stone masonry, flooring, plastering, RCC works, centering and form work for different RCC items, wood and steel works for doors, windows and ventilators.

Unit-4

Teaching Hours:10

MEASUREMENT OF EARTHWORK FOR ROADS

Methods for computation of earthwork – h cross sections – mid section formula or average end area or mean sectional area, trapezoidal & prismoidal formula with and without cross slopes.

Unit-5

Teaching Hours:9

CONTRACTS

Types of contract – essentials of contract agreement – legal aspects, penal provisions on breach of contract. Definition of the terms – Tender, earnest money deposit, security deposit, tender forms, documents and types. Comparative statements, acceptance of contract documents and issue of work orders. Duties and liabilities, termination of contract, completion certificate, quality control, right of contractor, refund of deposit. Administrative approval – Technical sanction. Nominal muster roll, measurement books – procedure for recording and checking measurements –preparation of bills.

Essential Text Books:

Basin P L“Quantity Surveying”, S. Chand & Company: New Delhi.

Birde, G S “Text book of Estimating & Costing”, Dhanpath Rai andsons: New Delhi.

Chakraborti, M; “Estimating, Costing and Specification in Civil Engineering”,Calcutta

Dutta, BN; “Estimating and Costing”

Kohli D D and R.C. Kohli “A text book on Estimating, Costing and Accounts”, S. Chand: New Delhi.

Kohli, D; and Kohli, RC; “A Text Book on Estimating and Costing (Civil) withDrawings”, Ambala Ramesh Publications

Nanavati J “Professional Practice for Civil Engineers”,

Pasrija, HD; Arora, CL and S. Inderjit Singh, “Estimating, Costing and Valuation(Civil)”, Delhi, New Asian Publishers

Rangwala S C “Estimating & Specification”, S.C. Rangwala: Charotar publishing house, Anand.

Rangwala, BS; “Estimating and Costing”. Anand, Charotar Book Stall

Recommended Reading:

Birde, G S “Text book of Estimating & Costing”, Dhanpath Rai andsons: New Delhi.

Chakraborti, M; “Estimating, Costing and Specification in Civil Engineering”,Calcutta

Dutta, BN; “Estimating and Costing”

CE735 - DESIGN AND DRAWING OF BRIDGES (2013 Batch)

Total Teaching Hours for Semester:60

No of Lecture Hours/Week:4

Max Marks:100

Credits:04

Course Objective

SUBJECT DESCRIPTION: This paper covers the Principles of design of bridge Structures such as Slab Culvert, R C T Beam Bridge, Composite Bridge, and Types of Foundations.

SUBJECT OBJECTIVE: Student must have comprehensive design knowledge related to bridge structures, systems that are likely to be encountered in professional practice

LEVEL OF KNOWLEDGE: Basic/Working

Learning Outcome

OUTCOME: By the end of the course the student should be able to:

- develop an understanding of and appreciation for basic concepts in proportioning and design of bridges in terms of aesthetics, geographical location and functionality

- help the student develop an intuitive feeling about the sizing of bridge elements, i.e. develop a clear understanding of conceptual design.

- understand the load flow mechanism and identify loads on bridges

- carry out a design of bridge starting from conceptual design, selecting suitable bridge, geometry to sizing of its elements

Unit-1

Teaching Hours:4

UNIT –I (04 HOURS)

BRIDGE PRELIMINARIES: Classification of bridges and standard loads, Bridge-definition, components of bridges, various classification, types of bridges, forces to be considered for the design, IRC standards.

HYDRAULIC DESIGN: Methods of finding design discharge, natural, artificial and linear water ways, afflux, and economic span.

SUBSTRUCTURES AND FOUNDATIONS: Types of abutments, piers and wing walls, forces to be considered for the design, Types of foundations and forces to be considered for the design, depth of scour.

Unit-2

Teaching Hours:14

UNIT – II (14 HOURS)

DESIGN AND DRAWING OF RC SLAB CULVERT for IRC class-AA loading, & class A loading. Design of pipe culvert. Empirical design of bank connections. Drawing slab culvert & pipe culvert for given site particulars

Unit-3

Teaching Hours:14

UNIT- III (14 HOURS)

DESIGN AND DRAWING OF RC T BEAM BRIDGE with cross beams by Piegaud's and Courbon's method for class-AA loading, empirical design of substructures and foundations.

Unit-4

Teaching Hours:14

UNIT- IV (14 HOURS)

DESIGN OF COMPOSITE BRIDGE: Design of composite bridge for EUDL, Shear connectors-design requirements for shear connectors. Drawing of composite bridge

Unit-5

Teaching Hours:14

UNIT- V (14 HOURS)

Typical Design and detailing of approach slab, Hand rails- Typical design and detailing of slab culverts and girder bridges as per MOT standards.

Essential Text Books:

BIBILOGRAPHY:

TEXT BOOKS:

Johnson–victor“Essentials of Bridge Engineering”, Oxford IBH Publications, New Delhi.

Krishna Raju N“Design of Bridges”,Oxford IBH Publications, New Delhi.

REFERENCE BOOK:

Jagadish T. R. & Jayaram M. A“Design of Bridge Structures”,Prentice Hall of India, New Delhi.

Recommended Reading:

CE736 - ADVANCED CONCRETE TECHNOLOGY (2013 Batch)

Total Teaching Hours for Semester:60

No of Lecture Hours/Week:4

Max Marks:100

Credits:04

Course Objective

SUBJECT DESCRIPTION:This paper is designed to give an insight into the role of admixtures, mix design, in preparation of concrete, durability of concrete, testing of hardened concrete. Special concretes like Ready mixed concrete, fibre reinforced concrete, light weight, High density and High performance concrete.

SUBJECT OBJECTIVE: At the end the student shall have a knowledge use of admixtures, design of mix, durability and testing concrete in hardened state and about special concretes.

LEVEL OF KNOWLEDGE: Advanced

Learning Outcome

On successful completion of this subject the learner will be able to

Explain the properties of the constituent materials of concrete

Explain the properties of fresh concrete

Explain the properties of hardened concrete including strength and durability

Design concrete concrete mixes and apply statistical quality control techniques to concrete quality

Carry out the test procedures for the principal laboratory properties of fresh and hardened concrete

Unit-1

Teaching Hours:9

UNIT-I (09 HOURS)

Importance of Bogue's compounds, Structure of a Hydrated Cement Paste, Volume of hydrated product, porosity of paste and concrete, transition Zone, Elastic Modulus, factors affecting strength and elasticity of concrete, Rheology of concrete in terms of Bingham's parameter. Properties on Cement, aggregates and their test, concrete-Types and tests on concrete

Unit-2

Teaching Hours:10

UNIT-II (10HOURS)

ADMIXTURES: CHEMICAL ADMIXTURES - Mechanism of chemical admixture, Plasticizers and Super-plasticizers and their effect on concrete property in fresh and hardened state, Marsh cone test for optimum dosage of super-plasticizer, retarder, accelerator, Air-entraining admixtures, new generation super-plasticizer.

MINERAL ADMIXTURE-Fly ash, Silica fume, GCBS, and their effect on concrete property in fresh state and hardened state.

Unit-3

Teaching Hours:8

UNIT-III (08 HOURS)

MIX DESIGN - Factors affecting mix design, design of concrete mix by BIS method using IS: 10262 and current American (ACI)/ British (BS) methods. Provisions in revised IS: 10262-2009

Unit-4

Teaching Hours:15

UNIT-IV (15HOURS)

DURABILITY OF CONCRETE - Introduction, Permeability of concrete, chemical attack, acid attack, efflorescence, Corrosion in concrete. Thermal conductivity, thermal diffusivity, specific heat. Alkali Aggregate Reaction, IS: 456-2000 requirement for durability.

TEST ON HARDENED CONCRETE - Effect of end condition of specimen, capping, H/D ratio, rate of loading, moisture condition. Compression, tension and flexure tests. Tests on composition of hardened concrete-cement content, original w/c ratio. NDT tests concepts-Rebound hammer, pulse velocity methods.

Unit-5

Teaching Hours:18

UNIT-V (18HOURS)

READY MIXED CONCRETE - manufacture, transporting, placing, precautions, Methods of concreting-Pumping, under water concreting, shotcrete, High volume fly ash concrete concept, properties, typical mix Self compacting concrete concept, materials, tests, properties, application and typical mix.

FIBER REINFORCED CONCRETE - Fibers types and properties, Behavior of FRC in compression, tension including pre-cracking stage and post-cracking stages, behavior in flexure and shear.

FERRO CEMENT-materials, techniques of manufacture, properties and application LIGHT WEIGHT, HIGH DENSITY & HIGH PERFORMANCE CONCRETE - Light weight concrete-materials properties and types. Typical light weight concrete mix, High density concrete and high performance concrete-materials, properties and applications, typical mix.

Essential Text Books:

REFRENCE BOOKS:

1. “ACI: Code for Mix Design”

2. “IS: 10262-2004”

3. A M Neville J.J Brooks “Concrete Technology”,Pearson Education .

4. Aitcin P C“High Performance Concrete”, E and FN, London.

5. Gambhir M.L “Concrete Manual”, Dhanpat Rai & Sons, New Delhi

6. John Newman“Advanced Concrete Technology Constituent materials”, Ban Seng Choo- London

7. John Newman“Advanced Concrete Technology Processes”, Ban Seng Choo, - London.

8. Krishna Raju N “Concrete Mix Design”, Sehgal Publishers

9. Mehta P K & P J M Monteiro, “Concrete”, Prentice Hall, New Jersey (Special Student Edition by Indian Concrete Institute Chennai)

10. Neville, A.M“Properties of Concrete”, ELBS Edition, Longman Ltd., London

11. Power T.C“Properties of Fresh Concrete”, E and FN, London

12. Prasad. J C G K Nair, “Non-Destructive Test and Evaluation of Materials”, Mc Graw Hill.

13. SanthakumarA R,“Concrete Technology”, Oxford University Press.

14. Shetty M S“Concrete Technology”,

Recommended Reading:

CE751 - ENVIRONMENTAL ENGINEERING LABORATORY (2013 Batch)

Total Teaching Hours for Semester:30

No of Lecture Hours/Week:2

Max Marks:50

Credits:2

Course Objective

The primary objective of this lab is to learn water and wastewater engineering testing procedures

Learning Outcome

The student learns to determine the solids content in Sewage, Chlorides and Sulphates, Alkalinity, Acidity & pH, Calcium, Magnesium &Total Hardness, Dissolved Oxygen, BOD & COD, percentage of available chlorine in bleaching powder, Residual Chlorine & Chlorine Demand, Optimum Dosage of Alum & Turbidity, Iron & Fluorides

Unit-1

Teaching Hours:20

ANALYSIS OF WATER QUALITY PARAMETERS

1. Determination of Alkalinity, Acidity and pH.
2. Electrical conductivity. Determination of Chlorides and Sulphates.
3. Determination of Dissolved Oxygen
4. Determination of Calcium, Magnesium and Total Hardness
5. Determination of Fluorides SPANDS Method.
6. Determination of Iron. Phenanthroline method.
7. Jar Test for Optimum Dosage of Alum, Turbidity determination by Nephelometer
8. Determination of sodium and potassium by flame photometer.

9. Determination of percentage of available chlorine in bleaching powder, Residual Chlorine and Chlorine Demand.

10. MPN Determination

Unit-2

Teaching Hours:10

ANALYSIS OF WASTE-WATER QUALITY PARAMETERS

1. Determination of Solids in Sewage: Total Solids, Suspended Solids, Dissolved Solids, Volatile Solids, Fixed Solids, Settleable Solids.

2. Determination of BOD.

3. Determination of COD.

Determination Nitrates by spectrophotometer

Essential Text Books:

"Manual of Water and Wastewater Analysis", NEERI Publication.

"Standard Methods for Examination of Water and Wastewater (1995)", American Publication – Association, Water Pollution Control Federation, American Water Works Association, Washington DC.

IS Standards: "2490-1974, 3360-1974, 3307-1974",

Recommended Reading:

Sawyer and Mc Carthy "Chemistry for Environment Engineering",

CE752 - CONCRETE AND HIGHWAY MATERIALS LABORATORY (2013 Batch)

Total Teaching Hours for Semester:30

No of Lecture Hours/Week:4

Max Marks:50

Credits:02

Course Objective

SUBJECT DESCRIPTION: This paper covers testing of cement, fresh & hardened concrete, aggregates, bituminous materials & mixes.

SUBJECT OBJECTIVE: The primary objective of this lab is to demonstrate concrete & Highway materials testing procedures.

LEVEL OF KNOWLEDGE: Basic/Working

Learning Outcome

1. On completion of this course the students willhave the knowledge of mechanical properties of the building and road materials and its behaviour

2. The student will be able to handle equipments and testing of building and highway materials independently.

3. The student will be able asses the quality of materials practically in the field

Unit-1

Teaching Hours:30

CEMENT: Normal Consistency, Setting time, Soundness by Autoclave method, Compression strength test and Air permeability test for fineness, Specific gravity of cement.

FRESH CONCRETE: Workability – slump, Compaction factor and Vee Bee tests.

HARDENED CONCRETE: Compression strength and Split tensile tests. Test on flexural strength of RCC beams, Permeability of concrete.

AGGREGATES: Crushing, abrasion, impact and Shape tests (Flaky, Elongation, Angularity number) Specific gravity and water absorption.

BITUMINOUS MATERIALS AND MIXES: Specific Gravity, Penetration, Ductility, Softening point, Flash and fire point, Viscosity. Marshall Stability tests

Essential Text Books:

Relevant IS Codes and IRC Codes.

“Highway Material Testing Laboratory Manual”,Nemi Chand &Bros.

Gambhir M L “Concrete Manual”, Dhanpat Rai & sons New – Delhi

Recommended Reading:

CE771 - INTERNSHIP (2013 Batch)

Total Teaching Hours for Semester:1

No of Lecture Hours/Week:1

Max Marks:0

Credits:2

Course Objective

Internship is a course in which students participate in a professional work environment, documenting their experiences. Students build upon previous knowledge and experiences by working within a professional work setting. The course is designed to allow students to enhance their professionalism, gain career knowledge, and consider various career options.

In addition to academic coursework, students are required to complete an internship as a part of their degree. This degree requirement offers the chance to apply coursework in real-world settings, more effectively preparing students for their professional career.

Learning Outcome

The primary purpose of the experiential (internship) requirement is to provide experiential learning to students outside of the classroom. Students will gain vital skills and experience that they will be able to use throughout their professional career. Through these experiences, students sample potential specialties, explore workplace culture, and gain the experiences necessary to build a marketable résumé. Additionally, internships provide students with an opportunity to build up their community of relationships, which become useful when seeking employment after graduation. Interning allows students the opportunity to apply their knowledge and skills in a real-life situation and to develop professional experience in a structured, nurturing environment. During the internship, students become a part of the organization or company (paid or unpaid) and are expected to conduct themselves in a professional manner at all times, in accordance with the Faculty of Engineering,Christ University Internship Code of Conduct.

Unit-1

Teaching Hours:60

The students of Under Graduate and Post Graduate programs are required to do 60 days and 30 days compulsory internships in their respective programmes before they register for their final year.

I. Student Eligibility Criteria:

To be eligible for an Internship credit a student must:

1. Must be enrolled for BTech in Civil Engineering in Under Graduate Programme or for MTech in Structural Engineering in Post Graduate Programme.

2. Should be making good progress toward the degree.

3. Should be registered as student in Department of Civil Engineering. Christ University.

4. Should have completed at least 50% of the courses registered for.

II. Internship Requirements for Credit:

i. Thirty days of internship is needed per credit hour for Under Graduate Programme and Fifteen days of internship is needed for Post Graduate Programme.

ii. Actual credit hours granted for an internship experience are based not only on time spent, but also on the nature of the internship itself. The maximum number of internship credits that can be earned toward the degree is two.

iii. Grading for internships is done by the internal guide assigned by the Head of the Civil Engineering Department.

iv. A significant learning experience in the practical application of academic curriculum.

v. Close supervision by the external mentor or guide nominated by the company or organization and the internal faculty guide assigned to the students is essential to oversee the actual progress and to evaluate performance.

vi. Evaluation letter from the employer / of the external guide along with the completion date.

vii. Written internship report in the prescribed format to the internal faculty guide, describing the specific accomplishments, the general experience and the degree to which these fulfilled the original internship objectives.

viii. Presentation of the internship experience to be made in consultation with the internal guide and the schedule provided to the student.

ix. Any other guidelines provide by the civil engineering department to the student.

GOALS AND OBJECTIVES

The internship is an educational experience integrating classroom theories into a professional work setting by providing the opportunity to meet the following goals and objectives.

I. Professional – Ex: “To acquire professional experience to…”

a. Understand professional practice and adherence to codes of professional ethics, including ethical decision making.

b. Sharpen aspects of professionalism, including honesty/integrity, reliability/responsibility, respect for others, compassion/empathy, advocacy

c. Develop new knowledge and skills (see appendix A for knowledge and skills by major)

II. Work independently and with others, both within and outside the organization/company, applying professional knowledge and skills

a. Observe the functioning of the org/company, including the administration and activities

b. Build upon previous knowledge and experiences by working within and critically appraising a professional setting

c. Gain career knowledge and evaluate career options and goals

III. Academic – Ex: “To apply theories and research to…”

a. Apply concepts and skills gained from academic experience to a professional work setting

b. Apply technology and analytical skills to a specific work setting

IV. Personal – Ex: “To further develop and integrate personal characteristics such as…”

a. Self-awareness and emotional stability, interpersonal and group process skills, communication, collaboration, problem-solving skills, cultural competence, professional ethics and behavior.

PROCEDURE FOR COMPLETING INTERNSHIP

The Department of Civil Engineering, Faculty of Engineering, Christ University should approve the internship prior to internship start date.

A. Before the Internship Begins…

i. Check academic eligibility

ii. Secure an internship

iii. Complete and submit approval

B. Request online

i. Register as needed

C. During the Internship…

i. Complete total of 60 days (minimum) for BTech and 30 Days (minimum) for MTech

ii. Communicate issues with OCS/Internship Coordinator

D. As the Internship Concludes…

i. Submit an internship summary

ii. Supervisor submits evaluation

E. Forms:

i. Internship Approval Request

ii. Internship Summary Report

iii. Supervisor Evaluation Form

F. Note to the students:

Before the Internship Begins…

Academic Eligibility: A student must meet the following requirements to be academically eligible for their internship. If you are unsure whether or not you meet these requirements, be sure to meet with your academic advisor. If you do not meet these requirements, but have been offered an internship, you are encouraged to complete the internship if it does not interfere with your coursework, but you will not be allowed to utilize that experience to fulfill your requirement.

i. Academic good standing, with a cumulative GPA of 2.0 +

General Internship Information:

Time Requirements and Course Registration Information:

i. 60 Days for BTech and 30 Days for MTechin your chosen organization/company –Number of days cannot be split between different internships.

ii. Grading: If the internship report is not complete before the commencement of the VII semester, in which you are registered you shall not be eligible for the grading and subsequently the credits as per the curriculum.

iii. Internship carries 2credits.

Essential Text Books:

Recommended Reading:

BTCY01 - CYBER SECURITY (2013 Batch)

Total Teaching Hours for Semester:30

No of Lecture Hours/Week:2

Max Marks:50

Credits:2

Course Objective

This course is aimed at providing a comprehensive overview of the different facets of Cyber Security. In addition, the course will detail into specifics of Cyber Security with Cyber Laws both in Global and Indian Legal environments.

Learning Outcome

At the end of the course, students will be able to

understand various characteristics of secured cyber communication and various threats to it

apply some of the cyber security principles in their daily life

Unit-1

Teaching Hours:6

Security Fundamentals

4 As Architecture Authentication Authorization Accountability, Social Media, Social Networking and Cyber Security.

Cyber Laws, IT Act 2000-IT Act 2008-Laws for Cyber-Security, Comprehensive National Cyber-Security Initiative CNCI – Legalities.

Unit-2

Teaching Hours:6

Cyber Attack and Cyber Services

Computer Virus – Computer Worms – Trojan horse.

Vulnerabilities - Phishing - Online Attacks – Pharming - Phoarging – Cyber Attacks - Cyber Threats - Zombie- stuxnet - Denial of Service Vulnerabilities - Server Hardening-TCP/IP attack-SYN Flood.

Unit-3

Teaching Hours:6

Cyber Security Management

Risk Management and Assessment - Risk Management Process - Threat Determination Process -Risk Assessment - Risk Management Lifecycle.

Security Policy Management - Security Policies - Coverage Matrix

Business Continuity Planning - Disaster Types - Disaster Recovery Plan - Business Continuity Planning Process.

Unit-4

Teaching Hours:6

Vulnerability

Vulnerability - Assessment and Tools: Vulnerability Testing - Penetration Testing Black box- white box

Architectural Integration: Security Zones - Devices viz Routers, Firewalls, DMZ.

Configuration Management - Certification and Accreditation for Cyber-Security.

Unit-5

Teaching Hours:6

Authentication and Cryptography

Authentication - Cryptosystems - Certificate Services

Securing Communications: Securing Services - Transport – Wireless - Steganography and

NTFS Data Streams

Intrusion Detection and Prevention Systems: Intrusion - Defense in Depth - IDS/IPS -IDS/IPS Weakness and Forensic Analysis

Cyber Evolution: Cyber Organization - Cyber Future

Essential Text Books:

1. Matt Bishop, Introduction to Computer Security, Pearson, 6th impression, ISBN: 978-81-7758-425-7.

2. Thomas R, Justin Peltier, John, Information Security Fundamentals, Auerbach Publications.

3. Atul Kahate, Cryptography and Network Security 2nd Edition, Tata McGrawHill.

4. Nina Godbole, Sunit Belapure, Cyber Security, Wiley India 1st Edition 2011.

5. Jennifer L. Bayuk and Jason Healey and Paul Rohmeyer and Marcus Sachs, Cyber Security Policy Guidebook, Wiley; 1 edition , 2012, ISBN-10: 1118027809

6. Dan Shoemaker and Wm. Arthur Conklin, Cybersecurity: The Essential Body Of Knowledge, Delmar Cengage Learning; 1 edition (May 17, 2011) ,ISBN-10: 1435481690

7. Stallings, “Cryptography & Network Security - Principles & Practice”, Prentice Hall, 3rd Edition 2002.

Recommended Reading:

CE831 - PAVEMENT DESIGN (2013 Batch)

Total Teaching Hours for Semester:60

No of Lecture Hours/Week:4

Max Marks:100

Credits:04

Course Objective

This paper covers mainly design of rigid and flexible pavements, failures, maintenance and evaluation.

Learning Outcome

Student gains knowledge on designing rigid and flexible pavements for different serviceability conditions of roads.

Unit-1

Teaching Hours:12

INTRODUCTION: Desirable characteristics of pavement, types and components, Difference between Highway pavement and Air field pavement – Design strategies of variables – Functions of sub-grade, sub base – Base course – surface course – comparison between Rigid and flexible pavement. FUNDAMENTALS OF DESIGN OF PAVEMENTS: Design life – Traffic factors – climatic factors – Road geometry – Subgrade strength and drainage, Stresses and deflections, Boussinesqs theory – principle, Assumptions –Limitations and problems on above - Busmister theory – Two layered analysis – Assumptions – problems on above.

Unit-2

Teaching Hours:12

DESIGN FACTORS: Design wheel load – contact pressure – ESWL concept – Determination of ESWL by equivalent deflection criteria – Stress criteria – EWL concept. FLEXIBLE PAVEMENT DESIGN: Assumptions – McLeod Method –Kansas method – Tri-axial method - CBR method – IRC Method (old) - CSA Method using IRC 37-2001, problems on above.

Unit-3

Teaching Hours:12

STRESSES IN RIGID PAVEMENT: Principle – Factors - wheel load and its repetition – properties of sub grade - properties of concrete. External conditions – joints – Reinforcement – Analysis of stresses – Assumptions –Westergaard's Analysis – Modified Westergaard equations – Critical stresses– Wheel load stresses, Warping stress – Frictional stress – combined stresses(using chart / equations) - problems on above.

Unit-4

Teaching Hours:12

DESIGN OF RIGID PAVEMENT: Design of C.C. Pavement by IRC: 38 –2002 for dual and Tendem axle load – Reinforcement in slabs –Requirements of joints – Types of joints – Expansion joint – contraction joint– warping joint – construction joint – longitudinal joint, Design of joints, Design of Dowel bars, Design of Tie bars – problems of the above.

Unit-5

Teaching Hours:12

FLEXIBLE PAVEMENT FAILURES, MAINTENANCE AND EVALUATION: Types of failures, causes, remedial/maintenance measures n flexible pavements – Functional Evaluation by visual inspection and unevenness measurements - Structural Evaluation by Benkelman Beam Deflection Method, Falling weight deflectometer, GPR Method. Design factors for Runway Pavements - Design methods for Airfield pavements and problems on above. RIGID PAVEMENT FAILURES, MAINTENANCE AND EVALUATION: Types of failures, causes, remedial/maintenance measures in rigid pavements – Functional Evaluation by visual inspection and unevenness measurements. Design factors for Runway Pavements – Design methods for Airfield pavements.

Essential Text Books:

"Relevant IRC codes"

Kadiyalli L R & N B. Lal "Principles & Practices of Highway Engineering"

Khanna & Justo "Highway Engineering",

Yang H. Huang "Pavement Analysis & Design", II edition.

Recommended Reading:

Subha Rao"Principles of Pavement Design"

Yoder and Witzack "Principles of Pavement Design", 2nd edition, John Wileys and Sons

CE832 - DESIGN OF MASONRY STRUCTURES (2013 Batch)

Total Teaching Hours for Semester:60

No of Lecture Hours/Week:4

Max Marks:100

Credits:4

Course Objective

This paper covers the design of masonry walls, at the end of the course student has a comprehensive design knowledge related to masonry structures, systems that are likely to be encountered in professional practice

Learning Outcome

Students will be able to design the masonry strucutres

Students would get the known of different types of masonry structures and their elements

Unit-1

Teaching Hours:14

MASONRY UNITS, MATERIALS, TYPES & MASONRY CONSTRUCTION

Brick, stone and block masonry units – strength, modulus of elasticity and water absorption of masonry materials –classification and properties of mortars, selection of mortars. Defects and errors in masonry construction, cracks in masonry, types, reasons for cracking, methods of avoiding cracks. STRENGTH AND STABILITY: Strength and Stability of concentrically loaded masonry walls, effect of unit strength, mortar strength, joint thickness, rate of absorption, effect of curing, effect of ageing, workmanship, strength formulae and mechanism of failure for masonry subjected to direct compression.

Unit-2

Teaching Hours:12

PERMISSIBLE STRESSES

Permissible compressive stress, stress reduction and shape reduction factors, increase in permissible stresses for eccentric vertical and lateral loads, permissible tensile and shear stresses. DESIGN CONSIDERATIONS: Effective height of walls and columns, opening in walls, effective length, effective thickness, slenderness ratio, eccentricity, load dispersion, arching action, lintels.

Unit-3

Teaching Hours:12

LOAD CONSIDERATIONS FOR MASONRY

Wall carrying axial load, eccentric load with different eccentricity ratios, walls with openings, free standing wall. DESIGN OF MASONRY WALLS: Design of load bearing masonry for building up to 3 storeys using IS: 1905 and SP: 20 procedures

Unit-4

Teaching Hours:11

REINFORCED MASONRY

Application, flexural and compression elements, shear walls.

Unit-5

Teaching Hours:11

MASONRY WALLS IN COMPOSITE ACTION

Composite wall-beam elements, in filled frames.

Essential Text Books:

Dayaratnam P“Brick and Reinforced Brick Structures”, Oxford & IBH, 1987.

Henry, A.W“Structural Masonry”, Mc millan Education Ltd., 1990.

Recommended Reading:

Sinha B.P. Davies S.R“Design of masonry structures”, E &FNspon 1997

IS: 1905–1987 “Code of practice for structural use of un-reinforced masonry- (3rd revision) BIS”, New Delhi.

SP:20 (S&T) – 1991, “Hand book on masonry design and construction (1st revision) BIS”, New Delhi.

CE833 - ENVIRONMENTAL IMPACT ASSESSMENT (2013 Batch)

Total Teaching Hours for Semester:60

No of Lecture Hours/Week:4

Max Marks:100

Credits:4

Course Objective

Over the past three decades, environmental impact assessment has been an important foundation for public and private development and planning decisions. In development disputes, the interaction between communities and government and special interests and the private sector shape the fabric of neighborhoods, cities and regions around the world. The objective of this paper is to create the awareness about environmental impact on earth and for assessment among the students community this paper has been introduced as elective.

Learning Outcome

Students will be able to understand Environmental impact on Development Activity and Ecological Factors, Need for EIA Studies, Baseline Information, EIA guidelines for Development Projects, also will be able to assess and predict the impacts on Water resource developmental projects, Highway projects: Nuclear-Power plant projects, mining projec etc.

Unit-1

Teaching Hours:12

UNIT 1

Development Activity and Ecological Factors EIA, EIS, FONSI. Need for EIA Studies, Baseline Information, Step-by-step procedures for conducting EIA, Limitations of EIA

Unit-2

Teaching Hours:12

UNIT 2

Frame work of Impact Assessment. Development Projects-Environmental Setting, Objectives and Scope, Contents of EIA, Methodologies, Techniques of EIA.

Unit-3

Teaching Hours:12

UNIT 3

Assessment and Prediction of Impacts on Attributes Air, Water, Noise, Land Ecology, Soil, Cultural and Socio-economic Environment. EIA guidelines for Development Projects, Rapid and Comprehensive EIA

Unit-4

Teaching Hours:12

UNIT 4

EIA guidelines for Development Projects, Rapid and Comprehensive EIA. Public Participation in Environmental Decision making. Practical Considerations in preparing Environmental Impact Assessment and Statements

Unit-5

Teaching Hours:12

UNIT 5

Salient Features of the Project Activity-Environmental Parameter Activity Relationships- Matrices. EIA for Water resource developmental projects, Highway projects: Nuclear-Power plant projects, mining project (Coal, Iron ore).

Essential Text Books:

Anjaneyalu. Y“Environment Impact Assessment”,

Jain R.K“Environmental Impact Analysis”, Van Nostrand Reinhold Co.

“Guidelines for EIA of developmental Projects Ministry of Environment and Forests, GOI”,

Larry W. Canter “Environment Impact Assessment”,Mc Graw Hill Publication.

Recommended Reading:

NEPA - National Environmental Protection agency reports on Various projects

CE871 - PROJECT WORK (2013 Batch)

Total Teaching Hours for Semester:60

No of Lecture Hours/Week:4

Max Marks:200

Credits:6

Course Objective

Objective of this paper is to

· Creativity of students applied to solve development problems of our people and State through Science and Technology

· Enrich collegiate education through finding solutions to real life problems.

Improve understanding and develop methodology of solving complex issues

Learning Outcome

Students will acquire the ability to make links across different areas of knowledge and to generate, develop and evaluate ideas and information so as to apply these skills to the project task. Students will acquire collaborative skills through working in a team to achieve common.

Unit-1

Teaching Hours:60

Details

The topic for the Project Work may be from any Civil Engineering and interdisciplinary area related to Civil Engineering as mentioned in content at B.E. (Civil). Project/Practical work at B.E. (Civil) will comprise of literature survey/problem formulation /preparation of experimental setup as the case may be of the identified problem.

The project report shall be presented in the following form.

1. Definition of the problem.
2. Exhaustive literature survey.
3. Analysis based on type of problem. (as given above)
4. Conclusions, scope for further work.
5. References.

The Project Report shall be submitted in the prescribed standard format (04 copies) to the HOD, after the certification of the concerned guide and HOD.

v Assessment of Project Work

· Continuous Internal Assessment:100 Marks

· Presentation assessed by Panel Members

- Assessment by Guide

- End Semester Examination:100 Marks

- Viva Voce

- Demonstration

- Project Report

Essential Text Books:

Recommended Reading:

CE872 - COMPREHENSION (2013 Batch)

Total Teaching Hours for Semester:30

No of Lecture Hours/Week:2

Max Marks:50

Credits:2

Course Objective

Students are encouraged to use various teaching aids such as over head projectors, power point presentation and demonstrative models. This will enable them to gain confidence in facing the placement interviews and intended to increase the score they earn on the upcoming exam above what they would otherwise earn.

Learning Outcome

Students will acquire the skills to communicate effectively and to present ideas clearly and coherently to specific audience in both the written and oral forms. Students will be able to learn on their own, reflect on their learning and take appropriate actions to improve it.

Unit-1

Teaching Hours:30

Seminar shall be presented in the department in presence of a committee (Batch of Teachers) constituted by HOD. The seminar marks are to be awarded by the committee. Students shall submit the seminar report in the prescribed standard format. The topic for the Seminar may be related to Civil Engineering area and interdisciplinary area related to Civil

v Assessment of Comphrension

- Continuous Internal Assessment: 50 Marks

- Presentation assessed by Panel Members

Essential Text Books:

Recommended Reading: