

<b>I SEMESTER, B.Tech.-Civil</b>				
<b>Sr.No.</b>	<b>Course Code</b>	<b>Subject</b>	<b>L-T- P</b>	<b>Credits</b>
<b>1</b>	<b>CE 101</b>	<b>Engineering Mechanics</b>	<b>3-1-0</b>	<b>4</b>
<b>2</b>	<b>ME 101</b>	<b>Engineering Graphics with AutoCAD</b>	<b>0-0-2</b>	<b>2</b>
<b>3</b>	<b>CS 101</b>	<b>Introduction to computers and programming</b>	<b>3-0-1</b>	<b>4</b>
<b>4</b>	<b>MA 102</b>	<b>Advanced Calculus &amp; Differential Equations</b>	<b>3-1-0</b>	<b>4</b>
<b>5</b>	<b>CH 103</b>	<b>Environmental Science</b>	<b>3-0-0</b>	<b>3</b>
<b>6</b>	<b>HU101</b>	<b>English and Professional Communications-I</b>	<b>2-1-0</b>	<b>3</b>
<i>Total Contact Hrs=17 hrs. lectures+ 4 hrs. tutorials+ 6 hrs. lab=27 hrs</i>			<b>TOTAL</b>	<b>20</b>

# SIR PADAMPAT SINGHANIA UNIVERSITY, UDAIPUR

## COURSE CONTENTS

First year (I<sup>ST</sup> Semester) Batch: 2009-2013

L T P C

3 1 0 4

**Course Code: CE-101**

**Course Name: Engineering Mechanics**

*Objective: In Civil and Mechanical engineering, students require a sound knowledge of engineering mechanics and its applications. This course introduces students to the principles of engineering mechanics of particles and rigid bodies.*

### **PART-I STATICS**

**INTRODUCTION TO ENGINEERING MECHANICS:** Introduction, system of units, fundamental laws of engineering mechanics, system of forces and characteristics of forces.

**COPLANAR CONCURRENT FORCE SYSTEM:** Introduction, Composition of forces, resolution of forces, equilibrium of connected bodies, free body diagram.

**COPLANAR NONCONCURRENT FORCE SYSTEM:** Introduction, moment of force, couple, resolution of force in to force and couple, reactions at supports for various types of structures.

**CENTROID AND CENTRE OF GRAVITY:** Centroid, Centre of gravity, difference, axis of symmetry, centroid from first principle, centroid of composite section, moment of inertia, parallel axis theorem, perpendicular axis theorem, polar moment of inertia, moment of inertia of standard sections, mass moment of inertia, moment of inertia of composite bodies.

**ANALYSIS OF TRUSS AND PIN JOINTED FRAMES:** Plane truss, Perfect and imperfect frame, nature of forces in member, method of joints, method of section.

**FRICITION:** Introduction, definitions, types of frictions, laws of friction, angle of repose, equilibrium of body lying on inclined plane, wedge friction, wedge friction.

**VIRTUAL WORK:** Introduction, work, virtual work, principle of virtual work.

## **PART-II DYNAMICS**

**INTRODUCTION TO DYNAMICS:** Basic terms, types of motions, general principles of dynamics.

**KINEMATICS OF PARTICLES:** Introduction, rectilinear motion, rotational method, plane curvilinear motion, circular motion.

**KINEMATICS OF RIGID BODIES:** Introduction, Plane motion of rigid body, I.C.R., Velocity and Acceleration diagrams.

**WORK ENERGY METHOD:** Work, work done by a varying force, work done by a torque, power, power developed by torque, motion of connected bodies, work done by spring.

**IMPULSE MOMENTUM:** Linear impulse And momentum, connected bodies, conservation of momentum.

### **Reference Books:**

**A text book of engineering mechanics by Dr. R.k. Bansal**

**Engineering mechanics ( revised edition) by S.S. Bhavikatti and K.G. Rajeshkarrapa**

**A text book of engineering mechanics by Dr. R.s. Khurmi**

**Mechanics for engineers: statics and dynamics by Beer Ferdinand and Johnston**

**Applied mechanics by Hervey F. Girvin**

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**COURSE CONTENTS**

**First year (1<sup>ST</sup> Semester) Batch: 2009-2013**

**L T P C**

**0 0 2 2**

**Course Code: ME-101**

**Course Name: Engineering Graphics and Auto CAD**

*Objective:*

*This course introduces the students of Civil and Mechanical engineering branches to engineering graphics and its applications, primarily using the Auto CAD software.*

**Geometrical Drawing**-Plane and solid Geometry. Engineering Drawing Instruments and their use. BIS conventions for layout of sheets, borderlines, title block, lines, lettering.

**Geometrical constructions, scales, dimensions, conic sections, special curves.**

**Orthographic Projection, Projection of points, projection of straight lines, projection of planes.**

**Prisms, cylinder, axis perpendicular to one plane and parallel to the other, axis parallel to both the planes, axis inclined to both H.P. and V.P.**

**Types of auxiliary planes, projection of a point on A.V.P. inclined to V.P. axis inclined to both H.P. and V.P.**

**Sectional views:** sectional plane perpendicular to H.P. and Parallel to V.P. and vice versa, true shape sections. Intersection of surfaces, development of surfaces.

**Isometric Projection, Oblique Projection, perspective Projection.**

**AutoCAD :**

Basic commands of 2D drafting, dimensioning, concept of layer, view ports, layouts, modelspace, paperspace. Introduction drawing database, blocks, attributes, 2D drawings, isometric drawing using isoplanes.

**Reference Books:**

1. **Engineering drawing by N.D. Bhatt**
2. **An Introduction to Engineering Drawing by Luzzader**
3. **Auto Cad 2002 by Duff**
4. **Engineering Drawing by Gill**

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## **COURSE CONTENTS**

**First year (1<sup>ST</sup> Semester) Batch: 2009-2013**

**L T P C**

**3 0 1 4**

**Course Code: CS-101**

**Course Name: Introduction to Computers And Programming**

### **COMPUTER SYSTEM:**

Basics of computer systems, history, types, capability and limitations of computer systems. Hardware organization: Anatomy of a digital computer, CPU, Accumulator and instruction characteristics, internal architecture of CPU, instruction cycle. Microprocessors, Motherboards, Memory Units: Hierarchy, Primary Memory, Secondary Memory. Input and Output Devices, Input Output ports, Power supplies, Number system & Conversions. Operating System Basics, Data Management System basics, Data and information, File concepts, File organization.

### **BASICS OF PROGRAMMING LANGUAGES:**

Low level programming languages, High Level programming languages, Assembler, Compiler, Interpreter. C Programming Basics: Basic program construction; console I/O (printf, scanf); preprocessor directives, comments, data types, type conversions, operators - arithmetic , relational , logical , conditional, increment/decrement; library functions ; header files.

### **LOOPS AND DECISION STATEMENTS:**

For loop, while loop, do loop; various forms of if statement, switch statement, break statement, continue statement, go to statement.

## **ARRAYS AND STRINGS:**

Declaring an array, Initializing arrays, accessing the array elements, working with multidimensional arrays, declaring and initializing string variables, arithmetic operations on characters, string handling functions (string's).

## **POINTERS:**

Declaring and initializing pointers, pointer expressions, pointer increment and scale factor, pointers and arrays, pointers and strings.

## **FUNCTIONS:**

Defining functions, passing arguments to functions, returning values from functions, reference arguments, variables and storage classes, static functions, pointers and functions.

## **STRUCTURES:**

Declaring and initializing a structure, accessing the members of a structure, nested structures, array of structures, using structures in functions, pointers and structures.

## **FILES:**

Reading and writing to text and binary files; character I/O, string I/O, file pointers, error handling, redirection, command line arguments.

## **Reference Books:**

**Brian K Williams & Stacey C. Sawyer, Using Information Technology, TMH, 2003**

**A. K. Sharma , Fundamentals of computers and programming with C, Dhanpat Rai Publications, Daryagaj, New Delhi**

**Dennis M Ritchie, Brian W. Kernigham, The C Programming Language, PHI, 1988**

**K. N. King, C Programming – A modern approach, WW Norton & Co., 1996**

**Dennis P. Curtin, Kim Foley, Kunal Sen, Cathleen Morin, Information Technology, MH, 19**

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**COURSE CONTENTS**

**First year (I<sup>ST</sup> Semester) Batch: 2009-2013**

**L T P C**

**3 1 0 4**

**Course Code: MA 102**

**Course Name: Advanced Calculus and Differential Equations**

*Objective: Students will develop an understanding of the fundamental concepts of the calculus, differential equations and linear algebra and connect them with real world problems from other disciplines. Students would also develop mathematical reasoning and problem solving abilities.*

**Linear algebra:** Elementary Row Operations on matrices; Echelon matrices; Row Reduction; Gaussian Elimination; Homogeneous systems; Linear Dependence & Independence of vectors; Elementary properties of linear dependence and independence. Rank of a matrix, Consistency of linear systems. Characteristic polynomial and Cayley-Hamilton theorem; Eigenvalues and Eigenvectors; Diagonalization.

**Differential Calculus:** Successive Derivatives. Taylor's and Maclaurin's Theorems with remainders; Taylor and Maclaurin's infinite series. Concavity; Points of Inflexion. Asymptotes of Cartesian curves. Curvature. Curve tracing (Cartesian curves). Standard Cartesian and Polar curves. Partial derivatives; Directional Derivatives and Gradient; Chain Rules; Euler's Theorem on Homogeneous functions; Increments and Differentials; Total Differential; Jacobian; Small Errors and Approximate calculations; Maxima and Minima of functions of two variables; Lagrange's multiplier method.

**Integral Calculus:** Double integrals, Change of order of integration, Quadric Surfaces (standard quadric surfaces), Application of Double Integration –Area, Volume; Double Integrals in Polar Coordinates, Triple Integrals; Applications of Triple integrals- Moments, Center of Mass. Length of curves ;Surfaces and Volumes of solids of Revolution; Beta and Gamma Functions.

**Ordinary Differential Equations:** Order and degree of ODE. ODE of first order and first degree: Separable equations; Homogeneous equations; Exact equations and equations reducible to exact form; Linear equations and equations reducible to linear form. Linear Differential equations of higher order with constant coefficients.

**References:**

- 1 Shanti Narayan Differential and integral calculus.**
- 2. Kreszig. E. Advanced Engineering Mathematics**
- 3. Grewal B S Higher Engineering Mathematics**
- 4. Dass H K Advanced Engineering Mathematics**

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**COURSE CONTENTS**

**First year (I<sup>ST</sup> Semester) Batch: 2009-2013**

**L T P C**

**3 0 0 3**

**Course Code: CH-103**

**Course Name: Environmental Science**

*Objective:*

*This paper introduces the students to the basics of environmental science. Major issues like renewable and non renewable sources of energy, pollution problems and their social impact, the guidelines for pollution control, and the management of natural resources are studied from a scientific perspective. Global issues like acid rain, ozone depletion, climatic changes and population explosion are also discussed.*

**1. Natural Resources:**

Multidisciplinary nature of environmental studies Natural resources: renewable, non renewable resources, natural resources, associated problems, forest resources, water resources, mineral resources, food resources, energy resources, land resources.

**2. Ecosystems:**

Concept of an ecosystem. - Structure and function of an ecosystem. - Producers, consumers and decomposers. - Energy flow in the ecosystem - Ecological succession. - Food chains, food webs and ecological pyramids. - Introduction, types, characteristic features, structure and function of the following Ecosystem:

a. Forest ecosystem

b. Grassland ecosystem

c. Desert ecosystem

d. Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries)

### **3. Biodiversity and its conservation:**

Definition, magnitude of diversity, levels of biodiversity (genetic, species, community and ecosystems), gradients, values, threats of biodiversity, bio-geographical classification of India and world IUCN red data book, status of threatened species, conservation of biology and biodiversity, hotspots of biodiversity, role of an individual in conservation of natural resources, equitable uses of resources for sustainable life style, International efforts for conservation of biodiversity, biodiversity conservation in India

### **4. Environmental Pollution:**

Definition, Cause, effects and control measures of:

#### **Air pollution:**

Introduction, classification of air pollutants, Characteristics and biochemical effects of some air pollutants, effects of air pollutants on man and the environment, air monitoring, atmospheric sampling, analytical and instrumental techniques used in the estimation of atmospheric pollutant and methods used for the control of air pollutants.

#### **Water Pollution:**

Introduction, classification of water pollutant, organic waste, sewage and agricultural run off, inorganic pollutant, suspended solids, water quality standards, Sources, characteristics and effects of water pollutant from textile industry, paper and pulp industry, fertilizer industry, soaps and detergents.

#### **Radioactive pollution and Thermal pollution:**

Introduction, Sources of thermal pollution, fundamentals of radiations, types of radiations, sources of radioactive pollution and effects of radioactive pollution (somatic and genetic effects).

### **Chemical pollution:**

Chemical pollution through fertilizers, pesticides, detergents and toxic metals in industrial waste Hg, Cd, Pb, Cr, Zn, Cu, As, Ni, Se, Sn, Sb, F, Be etc.

### **Marine pollution:**

Introduction, nature and effects of marine pollution, sources of marine pollution and control of marine pollution. Marine pollution in India.

### **Noise pollution:**

Sources of noise pollution (industrial source, transport, household, public address system, agricultural machines, defense equipments), effects of noise pollution and control of noise pollution.

## **5. Current environmental issues:**

Global warming and green house effect, Acid rain, Ozone its importance and depletion of ozone layer, Eutrophication, PAN formation and its disaster. Disaster management: floods, earthquake, cyclone and landslides.

## **6. Electric and magnetic fields in the environment:**

Introduction, regions in the electromagnetic spectrum, health effects due to electromagnetic fields, introduction to Extremely low frequency Radio and Microwave field. Effect of exposure to extremely low frequencies on humans and animals, Applications of microwaves in environmental science Microwave radiations and their biological effects on human beings. Biological effects of UV radiations.

## **7. Solid waste Management:**

Causes, effects and control measures of urban and industrial wastes.

## **8. Social Issues and the Environment:**

From Unsustainable to Sustainable development -Urban problems related to energy -Water conservation, rain water harvesting, water shed management -Resettlement and rehabilitation of people; its problems and concerns. Case Studies -Environmental ethics: Issues and possible

solutions. Waste land reclamation. –Consumerism and waste products. - Environment Protection Act. -Air (Prevention and Control of Pollution) Act. -Water (Prevention and control of Pollution) Act -Wildlife Protection Act -Forest Conservation Act -Issues involved in enforcement of environmental legislation. -Public awareness.

## **9. Human Population and the Environment:**

Population growth, variation among nations. Population explosion - Family Welfare Programme.

### **REFERENCE BOOKS:**

**(1) G.M. Masters, Introduction to Environment Engineering and Science, Prentice-Hall India, Second Indian Reprint, 1995.**

**(2)Kiely, G., Environmental Engineering, Irwin McGraw-Hill, Singapore, 1998.**

**(3) J.Glynn Henry and G.W. Heinke, Environmental Science and Engineering, 2nd ed., Prentice Hall, 1996.**

**(4) Metcalf and Eddy, Wastewater Engineering, Treatment, Disposal and Reuse, Tata McGraw Hill, 1995.**

**(5)A.R. W. Jackson and J.M. Jackson, Environmental Sciences: The Environment and Human Impact, Longman Publishers, 1996.**

**(6)N. Lee and C. Kirkpatrick (Eds.) Sustainable Development and Integrated Appraisal in a Developing World, Edward, Elgar, UK, 2000.**

**(7)Environmental studies by Benny Joseph (McGraw hill), Perspectives in environmental studies by kaushik and kaushik (new age international publishers)**

**(8)Environmental chemistry and pollution control by S.S.Dara, Elements of environmental engineering by K.N.Duggal(S.chand and company)**

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**COURSE CONTENTS**

**First year (I<sup>ST</sup> Semester) Batch: 2009-2013**

**L T P C**

**2 1 0 3**

**Course Code: HU-101**

**Course Name: English And Professional Communication-I**

*Objective: The aim of this foundational course is to develop a level of competence in spoken and written English which will enable students to communicate more effectively in the academic, professional and social arenas.*

**RESEARCHING COMMUNICATION:** Communication Skills is an essential prerequisite for success. The module thus emphasizes upon the ability to communicate effectively and to verbatise one's thought precisely.

**COMMUNICATION PROCESS:** Scope and Function, Importance of good communication skills.

**EFFECTIVE SPEAKING, ACTIVE COMMUNICATION, BARRIERS IN COMMUNICATION**

**TYPES OF COMMUNICATION: VERBAL AND NON-VERBAL**

**DESCRIPTION OF LANGUAGE AND ITS PEDAGOGIC APPLICATIONS:** It is the basic core for the development of English Grammar and is designed to raise progressively the level of proficiency of the normal input to a stage where they can embark on the use of English Language for library and communicative purposes.

**CORRECT USAGE:** Mood of Verbs, Basic Sentence Patterns

**CONDITIONALS, REPORTED SPEECH**

**ACTIVE AND PASSIVE VOICE APPROPRIATE USE OF PREPOSITIONS AND CONJUNCTIONS**

**VOCABULARY DRILLS:** Effective Communication skill is a product of conscious effort, methodical learning and per servant practice. Use of appropriate words, proper construction of sentences, decorous language and enhancement of vocabulary forms the base of this component.

**ENRICHING VOCABULARY**

**USING VOCABULARY IN DIFFERENT CONTEXT**

**USE OF IDIOMATIC EXPRESSIONS AND PHRASES**

**WORD FORMATION: SUFFIX AND PREFIXES:** The teaching and learning methodology follow a rigorous regime involving challenging assignments. A variety of learning tools will be used for the acquisition of knowledge and skills. Curriculums delivery will be through Lectures, Session, brainstorming sessions, self-learning seminars, extension lectures and panel discussions with professionals from the industry.

**Reference Books:**

**Effective Business Communication by S.K. Agarwal,P.K.singh.**

**Technical Communication principles and pactice by Meenakshi Raman, Sangeeta Sharma.**

**Communication Techniques by Dr.Padmasree ,Dr Leena Vyas ,Neelkanth Publishers.**