



Indrashil University

(Established by an Act under the Gujarat Private Universities Act, 2009)

A Life Sciences University

Sustained Excellence with Relevance

School of Engineering B. Tech. First Year (All Branches)

Proposed Course Curriculum

w.e.f Academic Year 2019-20

B.TECH. (All Branches) ENGINEERING PROGRAMME (w.e.f. academic year 2019-20)

Semester : 1		Minimum Semester Credit Required :21 Cumulative Semester Credit Required : 21	
Course Code	Subject Name	L-T-P	Credits
CHE101	Engineering Chemistry	3-0-2	4
MATH 101	Engineering Mathematics-I	3-1-0	4
HS 101	Communication Skills – I	2-2-0	4
TA 101 / TA 102	Computer Programming / Engineering Graphics	3-0-2/2-0-4	4/4
HS 102	Soft Skills – I	2-0-0	0
ES 101 / ES 102	Engineering Mechanics / Electrical Technology	2-1-2/3-0-2	4/4
WS101	Engineering Workshop	0-0-2	1
	Total	15-4-8/15-3-10	21/21
Semester : 2		Minimum Semester Credit Required :22 Cumulative Semester Credit Required : 43	
Course Code	Subject Name	L-T-P	Credits
PHY 101	Engineering physics	3-0-2	4
MATH 102	Engineering Mathematics-II	3-1-0	4
HS 103	Communication Skills – II	2-2-0	4
TA 102 / TA 101	Engineering Graphics / Computer Programming	2-0-4/3-0-2	4/4
HS 104	Soft Skills – II	2-0-0	0
ES 102 /ES 101	Electrical Technology / Engineering Mechanics	3-0-2/2-1-2	4/4
ES 103	Environmental science	2-0-0	2
	Total	17-3-8/17-4-6	22/22

Date: 1st August, 2019



Indrashil University
School of Engineering
First Semester, 2019-20

Course Handout

Course No.:	CHE 101
Course Title:	<u>Engineering Chemistry</u>
Credit Structure (L-T-P-C):	3-0-2-4
Instructor in Charge:	Lec and Lab.:- Dr. A. D. Krishna iict.krishna@gmail.com
Team of Instructors:	Lec and Lab.:- Dr. A. D. Krishna <u>iict.krishna@gmail.com</u>

Course Description:

Chemical methods and analysis, Different types of volumetric and gravimetric analysis, acid base, redox titrations, conductometric, Titrations, Hardness of water, EDTA method, Complexometric Titrations, COD, BOD of water, Water purification techniques, Metal, properties of metals, metals and corrosion, prevention Corrosion, order, molecularity, rate, rate constant, Zero, first and Second order reaction, Catalysis, types of catalysis, theories involved in catalysis, Introduction to different functional groups, nomenclature General concepts of organic chemistry.

Scope and Objective:

The objective of the Engineering Chemistry course is to acquaint the students with the basic phenomenon/concepts of chemistry that the students face during course of their study in the industry and Engineering field. The student with the knowledge of the basic chemistry will understand and explain scientifically the various chemistry related problems in the industry/engineering field.

The course intends to provide chemical concepts most relevant to engineering students and demonstrate them in an applied context. The course is designed to deal with the principles of various branches of chemistry such as (a) Organic, (b) Inorganic, (c) Physical and (d) Industrial Chemistry. The student is exposed to the principles required to understand important contemporary topics like basic concepts of organic chemistry, engineering materials, Chemical kinetics, Spectroscopy, corrosion science, water management and chemical methods of analysis.

The course begins with the chemical methods and analysis, it also emphasises on introduction to Mole concept, Concept of P^H , metals and alloys, Corrosion. This course also explains the chemical kinetics; catalysis influences the chemical industries, basic concepts of organic chemistry, Introduction to Spectroscopy and applications.

Learning Outcome of the Course:

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

- Explain fundamental concepts of chemistry in Volumetric analysis and chemical methods.
- Explain the structure, components/constitution, physical and chemical properties of engineering materials, metals and alloys, Corrosion.
- Describe corrosion and its control methods
- Use chemical methods of analysis for detection and determination of constituents in materials
- Use the various methods of analysis and treatment of water

Syllabus:

Unit-1: Chemical methods and analysis

Basic concepts of concentration units, Volumetric analysis (simple and acid base, Redox titrations), Conductometry titrations, Concept of P^H .

Unit-II: Water and its Treatment

Introduction, Hardness of water, causes of hardness, types of hardness (temporary and permanent), Expression and units of hardness of water by Complexometric titration, Determination of COD and BOD of Water, Potable water and its specifications, treatment of Potable water, Ozonization.

Unit-III: Metals, Metallurgy and corrosion

Metal extraction methods: Introduction, physical properties of metals, General methods and extraction of Fe from its ore, Alloys steel and its applications. Industrial applications of Fe and Steel, introduction to corrosion, protection of metals from corrosion, organic and inorganic materials.

Unit-IV: Chemical kinetics and Catalysis

Order and molecularity, Rate, Rate constant, Zero, first and second order reactions, Half life period (Only first order), Activation complex theory, Catalysis, types of catalysis, Theory of Catalysis, application of catalysis in chemical industry.

UNIT-V: Organic chemistry

Introduction to different functional groups, Nomenclature, Preparation and properties, alkane, alkene, alkyne, Named reaction, Addition, Elimination, Oxidation reactions (Concepts only). Introduction to polymers and Polymerization.

Unit VI: Spectroscopy

Introduction to spectroscopy, Effect of light on meter, Types of spectroscopy, Beers Law, Lamberts law, Beer-Lamberts Law, λ_{\max} calculation, Various electronic transitions, UV-Spectrophotometer, Direct method analysis of Metal ions (One example).

Engineering Chemistry Lab

10-12 experiments based on the syllabus covered as above will be performed and evaluated on continuous basis.

Text Books:

1. T1. Wiley, "Engineering Chemistry", Wiley, 2nd edition, **2013**.
2. T2. Principles of Physical chemistry by Puri, Sharma and Pathania, Vishal publishers, 47th edition, **2016**.

Reference Books:

1. R1. Jain and Jain, "Engineering Chemistry", Dhanpat Rai Publication, 16th edition, **2016**.
2. R2. Shikha Agarwal, "Engineering Chemistry-Fundamentals and Applications", Cambridge University Press, **2016**.
3. R3. Organic Chemistry - Greeves, Warren, and Wothers Clayden, Oxford University Press, 2nd edition, **2016**.

Evaluation Scheme:

Continuous evaluation process comprising of components like attendance, assignment, class tests, comprehensive examinations, presentations, group discussions, etc.

Date:



Indrashil University
School of Engineering
First Semester, 2018-19

Course Handout

Course No.:	MATH 101
Course Title:	Engineering Mathematics-I
Credit Structure (L-T-P-C):	3-1-0-4
Instructor in Charge:	

Course Description:

An engineer needs to deal with the real world problems and to solve it, the problem should be converted into a model. For development of modelling skill, logical thinking and analytical skill, an engineering student should have some knowledge of basic mathematical tools and techniques. Based on this, the course is designed to give an adequate exposure to the theory and applications of basic calculus, and linear algebra. The knowledge of these topics will help the students to incorporate their concurrent and subsequent engineering studies.

Course Objectives:

The objectives of this course are to have the students be able to:

- Explain different mean value theorem of calculus
- Explain different properties of a single variable function
- Explain the concept of successive and partial differentiation and their applicability
- Successfully apply the concept of convergence of an infinite series
- Optimize a several variable function with and without constraints
- Express a function as a polynomial function
- Successfully apply the matrix operations to solve a linear system of equations.
- Explain the concept of vector space and linear transformation between two vector spaces.
- Calculate the characteristic values and corresponding vectors of a matrix

Learning Outcome of the Course:

This course is to provide students with quantitative and problem-solving skills of ODE, numerical methods, integral calculus, and vector calculus. At the conclusion of this course, students should be able to:

- Analyze several properties of a function and their shapes
- Perform the technique to evaluate the partial derivatives of a function of several variables
- Represent a differentiable function of one independent variable as an infinite sum of powers of it
- Analyze the convergence or divergence of an infinite series
- Analyze a linear system of equations which arises from engineering problem

Syllabus:

Unit 1: Differential Calculus (Functions of one Variable)

7 Hour

Rolle's Theorem, Cauchy's mean value theorem (Lagrange's mean value theorem as a special case), Taylor's and Maclaurin's theorems with remainders, indeterminate forms, concavity and convexity of a curve, points of inflexion, asymptotes and curvature.

Unit 2: Differential Calculus (Functions of several variables)

15 Hour

Limit, continuity and differentiability of functions of several variables, partial derivatives and their geometrical interpretation, differentials, derivatives of composite and implicit functions,

derivatives of higher order and their commutativity, Euler's theorem on homogeneous functions, harmonic functions, Taylor's expansion of functions of several variables, maxima and minima of functions of several variables – Lagrange's method of multipliers.

Unit 3: Sequences and Series

7 Hour

Sequences and their limits, convergence of series, comparison test, Ratio test, Root test, Absolute and conditional convergence, alternating series, Power series.

Unit 4: Linear Algebra

16 Hour

Algebra of matrices, Hermitian, skew-Hermitian and unitary matrices, Vector spaces - linear dependence of vectors, basis, linear transformations, rank and inverse of a matrix, solution of algebraic equations - consistency conditions, Solution of system of linear equations – Gauss & Gauss-Jordan elimination methods, eigenvalues and eigenvectors, Cayley – Hamilton theorem, Diagonalization, Quadratic form.

Text Books:

1. Kreyszig, E., Advanced Engineering Mathematics, John Wiley & Sons
2. Thomas, G.B. and Finney, R.L, Calculus and Analytic Geometry, Addison Wesley Longman
3. Jain R.K., Iyengar S.R.K, Advanced Engineering Mathematics, Narosa Publishers.

Reference Books:

1. B.S. Grewal, "Higher Engineering Mathematics", 42nd edition, Khanna Publishers
2. Differential and Integral Calculus Vol.I and Vol. II by N. Piskunov
3. B.V. Ramana, "Higher Engineering Mathematics", 6th reprint, Tata Mc.Graw – Hill

Evaluation Scheme:

Continuous evaluation process comprising of components like attendance, assignment, class tests, comprehensive examinations, presentations, group discussions, etc.

Date: 01/08/2019



Indrashil University
School of Engineering
B-Tech (All), First Semester, 2019

Course Handout

Course No.:	HS 101
Course Title:	Communication Skills - I
Credit Structure (L-T-P-C):	2-2-0-4
Instructor in Charge:	

Course Description:

In this era of globalization and competition, the ability to deal with industry demand in sundry areas of communication is needed more than ever. As such, the graduating students in Engineering should be equipped with adequate LSRW (Listening, Speaking, and Reading & Writing) skills along with standard forms of business communication. This course would prepare students into confident persons who can communicate with confidence.

Scope and Objective:

This module would equip students with knowledge and skills that are slated below:

- To improve students' oral and written Communication using grammatically correct English
- To introduce students to the expectation and acceptable standards of work in the industry.
- To introduce students to varied forms of verbal & non verbal communication
- To use English language for self expression and public speaking

Learning Outcome of the Course:

- Meeting the set objectives of the course/syllabus
- Level of competency—comprehension, knowledge, synthesis & application
- Skills developed--- linguistic (grammar), listening, reading skills & speaking skills

Syllabus:

Objective

The course is an attempt to integrate the different skills learners need at the first year, first semester level. The focus being on the learner and the teacher acting as a facilitator, the course attempts to develop linguistic, grammatical and communicative competence of the learners.

Unit I: Communication Skills

Importance of Communication Skills, Communication Cycle, Types, Flows, Barriers, Non-verbal communication

Unit II: Listening skills

Types of Listening, Barriers to Effective Listening, Tips to improve Listening Skills

Unit III: Grammar

Parts of Speech, Verbs, Pronoun, Noun, Tenses, Concord

Unit IV: Speaking Skills

Impromptu, Short situational dialogues/conversation, Short speeches, Presentations

Unit V: Reading Skills

Difference between Skimming & Scanning, Identifying main idea and topic, guessing the meanings of words

Unit VI: Writing Skills

Letter writing (Layouts and formats), Writing E-mails, Dos and Don'ts

Text Books:

1. ***“Communication Skills, A Workbook”***- Dr. Sanjay Kumar and Dr. Pushp Lata, Oxford University Press
2. ***“Technical Communication; Principles and Practice”*** – Meenakshi Raman & Sangeeta Sharma, Oxford University Press

Reference Books:

1. ***“Effective Technical Communication”*** -M Ashraf Rizvi
2. ***“Macmillan Foundation English”*** – R.K. Dwivedi & A.Kumar, Macmillan India Limited
3. ***“High School English Grammar”*** –Wren & Martin
4. ***“Communication Skills”*** –Asha Kaul, Tata Mcgraw Hill, 2nd Ed.
5. ***“Business Correspondence and Report writing”***- R C Sharma and Krishna Mohan, Tata McGraw Hill, 8th Ed.2015

Evaluation Scheme:

Continuous evaluation process comprising of components like attendance, assignment, class tests, comprehensive examinations, presentations, group discussions, etc.

Date: 7th January, 2019



Indrashil University
School of Engineering
Second Semester, 2019-20

Course Handout

Course No.:	TA 101
Course Title:	Computer Programming
Credit Structure (L-T-P-C):	3-0-2-4
Instructor in Charge:	
Team of Instructors:	

Course Description:

Programming is an increasingly important skill, whether you aspire to a career in software development, or in other fields. This course is the first course on programming language which introduces C Programming; however, lessons learned in this course can be used to learn any other programming language. The course will introduce a powerful problem-solving process and to understand the role computation can play in solving problems. This course will teach how to write code by first planning what your program should do, how to compile and run your program, and then how to test and debug it.

Scope and Objective:

This course provides a thorough introduction to the C programming language. The initial lectures will cover basic syntax and grammar and expose students to practical programming techniques. The remaining lectures will focus on more advanced concepts, such as pointers, structures and files. The course will briefly introduce the professional programming practices, such as modularization, commenting, and naming conventions which help in collaborating and programming in teams. The course will develop your confidence to apply programming techniques to problems in a broad range of fields. Given a problem, you would pay attention to the following questions.

- What is an algorithmic solution to the problem?
- How do we translate the algorithm into C code?
- How efficient is the code?
- How maintainable is the code?

The primary objectives of the course are to introduce:

- basic representation of data and how to process data using the representation inside a computer;
- techniques for specifying data, operations on data, and problem solving using a programming language; and
- Systematic techniques and approaches for constructing programs.

Learning Outcome of the Course:

It is expected that by the end of the course, you will be comfortable in:

- attempting algorithmic solutions to problems;
- designing and coding moderate sized programs with a few hundred lines of code; and
- Understanding and modifying code written by others.

Syllabus:

Unit 1:

Introduction to Computer Systems

Data representation: Number systems, Binary, Hex, Octal and their inter conversions, Brief description of Operating Systems, Flow Chart and Algorithms, generation of Computers, basic block diagram of computer, Compiler and Interpreter.

Memory hierarchy concepts: RAM ROM, Cache memory, primary memory, secondary memory.

Unit 2:

Fundamental of C language

Standard I/O in "C", Fundamental data types: Character Types, Integer, Short, Long, Unsigned, Storage Classes: Automatic, Register, Static and External. Format specifiers: - %d, %i, %c, %f, %e, %g, %o, %x.

Operators and Expressions: Using Numeric and Relational Operators, Mixed Operands and Type Conversion, Logical Operators, Bit Operations, Operator Precedence and Associativity, Using relational, logical, bitwise operator with printf() functions.

Introduction to printf() and scanf(), what these function return.

Conditional Program Execution: Applying If and Switch Statements, Nesting If and Else.

Unit 3:

Program Loops and Iteration

Uses of While, Do and For Loops, Multiple Loop Variables, precise programming (how to make program shorter).

Using relational, logical, bitwise operator within if statements.

Arrays: Array Notation and Representation, Manipulating Array Elements using Multidimensional Arrays, Arrays of Unknown or Varying Size, Character Arrays, String Functions.

Unit 4:

Functions

Function with no return and no argument, function with return and no argument, function with no return but argument, function with return and argument. Call by value and call by reference, passing array as function argument, passing pointer as function argument, passing structure as function argument, Recursion and Recursive Function.

Unit 5:

Introduction to structures, pointers and file management

Pointers: Declaration, Operations on pointers, passing pointers to a function, Pointers and arrays, Array of Pointers.

Structures & Unions: Defining a structure, processing a structure, User defined data types, Structure and pointers, passing structure to a function, Self-referential structures, Unions.

File Management: File operations, Creating and processing a data file, Command line arguments.

Computer Programming Lab

10-12 experiments based on the syllabus covered as above will be performed and evaluated on continuous basis.

Text Books:

1. **T1.** Brian W. Kernighan and Dennis M. Ritchie, The C programming language, Second edition, Prentice Hall or Pearson Education, 2015.

2. **T2.** Paul Deitel and Harvey Deitel, C how to program, Seventh edition, Prentice Hall or Pearson Education, 2015.

Reference Books:

1. **R1.** Jeri R. Hanly and Elliot B. Koffman, Problem Solving and Program Design in C, Seventh Edition, Pearson Education, 2013.
2. **R2.** Stephen G. Kochan, Programming in C, Fourth Edition, Pearson Education, 2015.
3. **R3.** Herbert Schildt, C: The Complete Reference, Fourth Edition, McGraw-Hill, 2010.
4. **R4.** Yale Patt and Sanjay Patel, Introduction to Computing Systems: From bits & gates to C & beyond, Second edition, McGraw Hill, 2004.
5. **R5.** R.Geoff Dromey, How to Solve it By Computer, First Edition, Pearson Education, 1982/2009.

Evaluation Scheme:

Continuous evaluation process comprising of components like attendance, assignment, class tests, comprehensive examinations, presentations, group discussions, etc.

Date: 18th May, 2019



Indrashil University
School of Engineering
First Semester, 2019-20

Course Handout

Course Code:	TA 102
Course Title:	Engineering Graphics
Credit Structure (L-T-P-C):	2-0-4-4
Instructor in Charge:	
Team of Instructors:	

Course Description:

Engineering Graphics is the primary medium for development and communicating design concepts. This course is taught at the First year level and is common for all the discipline of engineering. It is introductory in nature and uses AutoCAD for drawing. Computerized drafting is an upcoming technology and provides accurate and easily modifiable graphics entities, easy data storage and retrieval facility and enhances creativity.

Scope and Objective:

This course aims at training students in various concepts of Engineering Graphics with the use of AutoCAD. The latest ISI code of practice is followed. The course covers AutoCAD commands, orthographic projections, pictorial drawings, techniques for auxiliary projections, spatial geometry, geometric solids and sections, development and intersection of surfaces.

Learning Outcome of the Course:

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

1. Describe the spatial relationship between observer, object and projection plane
2. Describe concept of hidden lines for invisible surfaces for first and third angle projection methods
3. Demonstrate proper use of AutoCAD software for drafting
4. Draw the orthographic projections from isometric views
5. Draw isometric drawings for a given orthographic projections
6. Draw auxiliary and section views
7. Apply these skills in developing new products using AutoCAD

Syllabus:

UNIT-1 Introduction

Introduction to Engineering Graphics, Standards used in Engineering Graphics, SP 46, Types of line, Dimensioning systems, Scales and basic command used in Software packages to drafting.

Unit 2: Engineering Curves

Types and application of engineering curves, mathematics interpretation and computer implementation of Conics, involutes, helix and cycloids.

Unit 3: Orthographic Projections

Methods of Projection, projection of point, line, planes, and simple solid like regular pyramid, prism, cone and cylinder. Section of solids, orthographic projection of mechanical components.

Unit 4: Isometrics Projections

Theory of Isometric View and projections. Isometric projection of simple mechanic components. Conversion from orthographic projection to Isometric Projections.

Unit 5: Development of Surfaces

Theory and method of Development of surfaces. Exercises to be solved in class and executed in Software package.

Engineering Graphics Lab

10-12 experiments based on the syllabus covered as above will be performed and evaluated on continuous basis.

Text Books:

1. T1. Kulkarni DM, Rastogi AP and Sarkar AK, "*Engineering Graphics with AutoCAD*", Prentice Hall India, New Delhi, 2009.

Reference Books:

2. R1. Bhatt ND, "*Engineering Drawing*", 53rd Edition, Charotar Publishing House, 2014.
3. R2. D.A. Jolhe, "*Engineering Drawing: With an Introduction to AutoCAD*", Tata McGraw Hill.

Evaluation Scheme:

Continuous evaluation process comprising of components like attendance, assignment, class tests, comprehensive examinations, presentations, group discussions, etc.

Date: 1st August, 2019



Indrashil University
School of Engineering
First Semester, 2019-20

Course Handout

Course No.:	HS 102
Course Title:	Soft Skills-I
Credit Structure (L-T-P-C):	2-0-0-0
Instructor in Charge:	

Course Description:

Keep in view, the Industrial Requirement for employment, the course is designed to train the students of engineering. In a transformation-focused business environment, **engineers** with demonstrable **soft skills** are the ones who get the jobs. Too often, **engineers** focus only on their technical skills and abilities, largely ignoring **soft skills**. This course will prepare students to adopt themselves with ease to the industry environment, thus rendering them as prospective assets to the industries. The course will equip the students with the necessary communication skills that would go a long way in helping them in their profession. The soft skills provides strong practical orientation to the students and helps them in building and improving their skills in communication, the effective use of English, business correspondence, presentations, team building, leadership, time management, group discussions, interviews, and inter-personal skills.

Scope and Objective:

Effective communication and interpersonal skills are crucial to increase employment opportunities and to compete successfully in the business environment. The real key to the effectiveness of professionals is their ability to put their domain knowledge into effective practice. In this context, soft skills have a crucial role to play. Soft skills provide students with a strong conceptual and practical framework to build, to develop and to manage teams. They play an important role in the development of the students' overall personality, thereby enhancing their career prospects.

Learning Outcome of the Course:

As students you will be able to:

- Develop your personal traits.
- Expose your personality effectively.
- Develop good relations with different types of persons concerned.
- Develop skill of public speech.
- Understand and converse with your higher authorities/ subordinates
- To enhance performance at Placement Interviews, Group Discussions and other recruitment exercises

Syllabus:

Unit 1:

Self Analysis and Attitude

- SWOT Analysis
- Who am I?
- Factors influencing Self Perception
- Importance of Self Confidence
- Self Esteem
- Challenges and lessons from attitude
- Understanding positive and negative attitudes
- Etiquettes

Unit-2:

Goal Setting

- Immediate, Short term, Long term
- Smart Goals
- Strategies to Achieve Goals

Unit-3:

Problem Solving and Decision Making

- Identifying and Defining the Problem
- Solving the Problem
- Thinking Critically
- Group Decision Making and Problem Solving
- Decision Support Tools

Unit-4:

Interpersonal Skills

- Understanding Professional Relationship
- Respecting Social Protocols
- Networking Professionally
- Showing Basics Office Courtesies
- Socializing Professionally
- Displaying Optimism and Enthusiasm
- Recovering from Difficult Interpersonal Situations
- Technology@ Work : Enhancing Your Online Persona

Unit-5:

Personal Skills

- Body Language
- Time Management
- Negotiation Skills
- Persuasion Skill

Text Books:

1. **T1:** Soft Skills for Everyone by Jeff Butterfield, Cengage Learning India Pvt Ltd (2017)

Reference Books:

1. **R1:** Personality Development and Soft Skills by Barun K Mitra
2. **R2:** The Road Less Travelled by M. Scott Peck
3. **R3:** Lateral Thinking: Creativity Step by Step by Edward de Bono
4. **R4:** Teach Yourself to Think by Edward de Bono
5. **R5:** Six Thinking Hats by Edward de Bono

Evaluation Scheme:

Continuous evaluation process comprising of components like attendance, assignment, class tests, presentations, case studies, etc.

Since it is non-credit course, the students should be qualified/ non-Qualified depending upon their marks and grades obtained.

Date: 7th January, 2019



Indrashil University
School of Engineering
First Semester, 2018-19

Course Handout

Course No.:	ES 101
Course Title:	Engineering Mechanics
Credit Structure (L-T-P-C):	2-1-2-4
Instructor in Charge:	

Course Description:

Engineering Mechanics is a fundamental engineering course which is applicable to both the core and new age engineering disciplines. It deals with the characteristics and behavior of variety of materials (metals, plastics, ceramics, composite materials, etc.) under variety of load conditions (tensile, compressive and shear, flexure and torsional, indentation, impact, buckling, etc.). It is a predecessor course to study the courses such as Strength of Material, Machine Design, etc.

Scope and Objective:

Variety of load (tensile, compressive and shear, flexure and torsional, indentation, impact, buckling, etc.) applied to engineering systems are studied and their aggregate effect is analyzed

Load capacity of physical objects is analyzed as per their physical dimensions and material characteristics

Applications of Friction

Learning Outcome of the Course:

Understanding of the combination of Forces and Couple applied on engineering systems and their effect such as

- the resulting stress and strain developing accompanied by the resulting deformation and disintegration of the object
- the resulting translator and rotating motion of the object
- combination of above effects
- Properties of the object such as the modulus of elasticity and strength for tensile, compressive and shear loading

Syllabus:

Equilibrium:

Free body diagram; equations of equilibrium; problems in two and three dimensions; plane frames and trusses.

Friction:

Laws of Coulomb friction, problems involving large and small contact surfaces; square threaded screws; belt friction; rolling resistance.

Kinematics and Kinetics of particles:

Particle dynamics in rectangular coordinates cylindrical coordinates and in terms of path variables; central force motion.

Properties of areas:

Moments of inertia and product of inertia of areas, polar moment of inertia, principal axes, principal moments of inertia, shear force and bending moment diagram and deflection of beam.

Concept of stress and strain:

Normal stress, shear stress, state of stress at a point, ultimate strength, allowable stress, factor of safety; normal strain, shear strain, Hooke's law, Poisson's ratio, generalized Hooke's law; analysis of axially loaded members and concepts of thermal stress and strain.

Torsion:

Torsion of cylindrical bars, torsional stress, modulus of rigidity and deformation.

Flexural loading:

Shear and moment in beams; load, shear and moment relationship; shear and moment diagrams; flexure formula; shear stress in beams; deflection of beams.

Transformation of stress and strain:

Transformation of stress and strain, principal stresses, principal strains, Mohr's circle for stress and strain.

Combined loading:

Axial and Torsional load; Axial and bending load; axial, torsional and bending load.

Column:

Buckling of slender columns, Euler bucking load for different end conditions.

Engineering Mechanics Lab

10-12 experiments based on the syllabus covered as above will be performed and evaluated on continuous basis.

Text Books:

1. S. B. Junnarkar and H. J. Shah, Mechanics of Structures: Volume 1 - A Text-book for Engineering Students, 32nd edition, Charotar publication at Anand, 2016
2. S. B. Junnarkar and H. J. Shah, Applied Mechanics, 18th edition, Charotar Publication at Anand; 2013

Reference Books:

1. J.L. Meriam, L.G. Kraige, and J. N. Bolton, Dynamics (Engineering Mechanics), 8th edition, John Wiley & Sons Inc, 2015
2. J. L. Meriam, L. G. Kraige, Statics (Engineering Mechanics) John Wiley & Sons, 2006
3. Popov E.P., Engineering mechanics of solids, Prentice Hall of India Private Limited, 2004
4. F.P. Beer, John Dewolf and E.R. Johnston, Mechanics of materials, 7th edition, McGraw-Hill Education, 2014
5. Timoshenko and Gere, Introduction to solid mechanics, PWS Pub Co., 1997
6. Irving H. Shames, Strength of materials, 3rd edition, Pearson, 1999
7. William A Nash, Merle C. Potter, Elements of strength of materials, Schaum's Outline of Strength of Materials, 5th edition, McGraw-Hill, 2010

Evaluation Scheme:

Continuous evaluation process comprising of components like attendance, assignment, class tests, comprehensive examinations, presentations, group discussions, etc.

Date:



Indrashil University
School of Engineering
First & Second Semester

Course Handout

Course No.:	ES 102
Course Title:	Electrical Technology
Credit Structure (L-T-P-C):	3-0-2-4
Instructor in Charge:	Dhaivat Pandya

Course Description:

This is the foundation course to all the major branches. This subject will focus upon principles, the techniques to study, analysis and solve the behavior of all types of electrical and electronics circuits.

Scope and Objective:

- To develop an ability to identify, formulate, and solve electrical engineering problems.
- To develop ability to Integrate and use systems or devices incorporating modern electrical, Electronics and modern engineering tools for product design, development and manufacturing.

Learning Outcome of the Course:

- Will have an ability to apply knowledge of mathematics and science in Electrical systems
- Will have an ability to provide solutions for Electrical problems by designing and conducting experiments, interpreting and analyzing data, and reporting the results.
- Will have comprehensive understanding of the entire range of electronic devices, analog and digital circuits.
- Will have confidence to apply engineering solutions with professional, ethical and social responsibilities.

Syllabus:**Unit-1****07 Hours**

DC Circuits: Ohm's Law, Resistance in series and parallel connection, Delta-Star and Star-Delta Transformation, Kirchoff's Law, Nodal and Mesh Analysis, Network Theorems-Thevenin's, Norton, Superposition, Maximum Power Transfer Theorem

Unit-2**05 Hours**

Single phase AC Circuits: Single phase EMF generation, Representation of sinusoidal waveform, average and effective values of sinusoidal, Phasor representation, Analysis of pure R,L,C circuit, Series R-L,R-C,R-L-C circuit, Series and parallel resonance.

Unit-3**05 Hours**

Poly Phase AC Circuits: Three phase EMF generation, delta and Y – connections, line and phase quantities, solution of three phase circuits, balanced and unbalanced load, phasor diagram, measurement of power in three phase circuits, balanced and unbalanced, three phase three wire and three phase four wire system with balanced and unbalanced star and delta connected loads.

Unit-4**06 Hours**

Electromagnetism: Terms related to magnetic circuit, Series and parallel magnetic circuit, Difference and analogy of magnetic and electric circuit, Force on current carrying conductor placed in magnetic field, Static and Dynamically induced emf, B – H curve, solution of magnetic

circuits, Faraday's law of electromagnetic induction, self and mutual inductance, energy stored in magnetic field, hysteresis and eddy current losses, magnetic force of attraction and its application,

Unit-5

06 Hours

Introduction to Power System: Sources of energy; General structure of electrical power systems, Power transmission and distribution via overhead lines and underground cables, Steam, Hydel and Nuclear power generation-Energy conversion, Site Selection, Layout, working and Merits and Demerits, Introduction to Heating and welding.

Unit-6

08 Hours

Electrical Machines:

Transformers- Construction, EMF equation, ratings, phasor diagram on no load and full load, equivalent circuit, regulation and efficiency calculations, open and short circuit tests, auto-transformers.

3-phase Induction Motor-Construction, Working Principle, Types, Torque equation, revolving magnetic field, ratings and equivalent circuit, Torque-speed characteristics, Power stages, Starting of Induction motor.

Unit-7

04 Hours

Cable, Wiring and Illumination: Types of cables, System of wiring, Method of wiring, Nature of light, Definitions, Lightning scheme, Types of lamps

Unit-8

04 Hours

Safety and Protection: Electrical safety precaution, Electrical shock, safety rules, grounding, importance of grounding, circuit protection devices, fuses, MCB, ELCB

Electrical Technology Lab

10-12 experiments based on the syllabus covered as above will be performed and evaluated on continuous basis.

Text Books/Reference Books

1. B. L. Thareja, A. K. Thareja, Electrical Technology, Volume-I, S. Chand and Company Ltd
2. B. L. Thareja, A. K. Thareja, Electrical Technology, Volume-II, S. Chand and Company Ltd
3. V K Mehta, Rohit Mehata, Principles of Power System ,S. Chand and Company Ltd
4. U.A.Bakshi and V.U.Bakshi, Elements of Electrical Engineering, First Edition, Technical Publication, Pune
5. Hughes, Electrical and Electronic Technology, Pearson
6. Parker Smith, Problems in Electrical Engineering, Asia Publishing House
7. Hayt and Kimmerly, Engineering Circuit Analysis, McGrawhill
8. Nagarth and Kimmerly, Electrical Machines, Prentice Hall of India

Evaluation Scheme:

Continuous evaluation process comprising of components like attendance, assignment, class tests, practical, comprehensive examinations, etc.

Date:



Indrashil University
School of Engineering
First Semester

Syllabus

Course No.:	WS101
Course Title:	Engineering Workshop
Credit Structure (L-T-P-C):	0-0-2-1
Instructor in Charge:	

Course Description:

Workshop practice is the backbone of the real industrial environment which helps to develop and enhance relevant technical hand skills required by the technician working in the various engineering industries and workshops. Irrespective of branch, the use of workshop practices in day to day industrial as well domestic life helps to dissolve the problems.

Scope and Objective:

This course aims to Introduction to various shops / sections and workshop layouts. Safety norms to be followed in a workshop should be conveyed to students. Demonstration of hand tools, power tools, machine tools, basic measuring instruments, materials, Marking and measurement in Carpentry, Fitting, Smithy, Welding, Tin smithy, Plumbing and Machine shop.

Learning Outcome of the Course:

At the end of the course, student will be able to,

- apply hand tools and power tools.
- operate machine tools.
- Select the appropriate tools required for specific operation.
- Comprehend the safety measures required to be taken while using the tools
- Enhance knowledge of assembly by using various workshop sections in open ended module

Syllabus:

Unit-1

02 Hours

Introduction: Introduction to various shops / sections and workshop layouts. Safety norms

Unit-2

16 Hours

Various shops: Students are required to prepare one job each in any three of the four shops viz. Fitting, Carpentry, Smithy and Tin smithy.

Unit-3

06 Hours

Power Tool: Students are required to prepare one operation on each power tool/machine Lath Machine, Drill Machine, Grinding Machine, and other power Tool

Unit-4

06 Hours

Open Ended Model Apart from above practice jobs a group of students has to undertake one open ended problem/design problem like working model of Toy,

Text Books/Reference Books

1. Workshop Technology Vol. 1 and 2 by Raghuvanshi B.S. Dhanpat Rai & Sons
2. Mechanical Workshop Practice by K C John, PHI Learning
3. Workshop Practices, H S Bawa, Tata McGraw-Hill

Evaluation Scheme:

Continuous evaluation process comprising of components like attendance, assignment, practical, etc.

Date:



Indrashil University
School of Engineering
Third Semester, 2019-20

Course Syllabus

Course Code: PHY 101

Course Title: Engineering Physics

Credit Structure (L-T-P-C): 3-0-2-4

Instructor in Charge:

Syllabus:

Unit 1: Mechanics

10 Hours

Forces in nature, Newton's laws and particle motion, Conservative and Non-conservative forces, Linear and Angular Momentum, Work, Energy and Power, Rigid body dynamics, Concept of Moment of inertia and radius of Gyration, Elasticity, Concept of stress and strain, Elastic constants and different moduli of elasticity.

Unit 2: Electromagnetic Waves and Electron optics

10 Hours

Vector field, Irrotational Vector fields (Curl), Source of sinks of vector fields – divergence theorem, Basic laws of electricity and magnetism – Different forms, charge conservation laws – Continuity equation, Displacement current, Maxwell's Equation, Electromagnetic waves in free space, Motion of charged particle in electric field, Magnetic field and combined fields.

Unit 3: Optics and Modern Physics

15 Hours

Interference, Types of Interference, Fresnel's biprism, White Light Fringes, Determination of the thickness of a thin sheet of transparent material, interference in thin films, Newton's rings, Michelson interferometer, Feby- Perot interferometer, Diffraction and its types, Franhofer diffraction at a circular aperture, Plane diffraction grating, dispersive power of grating, Resolving power of grating, Prism, Telescope and Microscope, **LASER and its characteristics**, Wave-Particle duality, Physical interpretation of wave function, Schrödinger equation and its solution.

Unit 4: Materials Physics and Nanotechnology

10 Hours

BAND THEORY OF SOLIDS: Introduction, Metals, Insulators and Semiconductors, Energy band gap, Fermi Level and Fermi energy, **Types of Magnetic materials**, Superconductivity, Properties of superconductors, Types of superconductors (Type I and Type II), London's Penetration depth, Applications of Superconductors.

NANOTECHNOLOGY: Introduction to Nano **Science and Nano** technology, Method of Producing, Properties, Physics of nonmaterial, Quantum Confinement, Synthesis of Nano Materials, Shape Memory Alloys and Metallic Glasses.

Engineering Physics Lab:

10-12 experiments based on the syllabus covered as above will be performed and evaluated on continuous basis.

TEXT BOOK:-

1. Engineering Physics, R.K.Gaur and S.L. Gupta, Dhanpat Rai Publications (P) Ltd. 8th Edition
2. A textbook of Engineering Physics, M N Avadhanulu & P G Kshirsagar, S. Chand and Company Ltd

REFERENCE BOOK:-

1. Engineering Mechanics, 2nd Edition, MK Horbola.
2. Principal of Mechanics, J.L Synge and BA.
3. Concept of Modern Physics, Arthur Beiser.

4. Modern Engineering Physics, A.S. Vasudeva, S. Chand and Company Ltd
5. Fundamental of Physics: D.Halliday, R.Resnick and J. Walker, Asian Book PVT.Ltd.

Evaluation Scheme:

Continuous evaluation process comprising of components like attendance, assignment, class tests, practical, comprehensive examinations, etc.

Date:



Indrashil University
School of Engineering
Second Semester, 2019-20

Course Handout

Course No.:	MATH 102
Course Title:	Engineering Mathematics-II
Credit Structure (L-T-P-C):	3-1-0-4
Instructor in Charge:	

Course Description:

Calculus-II & Ordinary differential equation is a five credit course which includes three theoretical lecture hours and two tutorial sessions of one hour each. In this course, basic concepts of ordinary differential equation and its solution methodology, application of integral calculus as well as improper integral, vector calculus, and numerical analysis are introduced. The knowledge of mathematical tools and techniques learned these topics will help the students to incorporate their concurrent and subsequent engineering studies.

Course Objectives:

The objectives of this course are to have the students be able to:

- Explain various methodologies to solve ordinary differential equations (ODE)
- Incorporate the knowledge of ODE to model and solve various real world problem
- Construct interpolating polynomial from a given set of data point.
- Evaluate an integration numerically.
- Find root of a polynomial and transcendental equation.
- Solve a large linear system of equations numerically.
- Analyze the convergence of improper integrals and apply the concept to explain Gamma and Beta function.
- Evaluate the area of a bounded region by using double integration.
- Evaluate the volume of a 3-dimensional object by using triple integral.
- Calculate the gradient and directional derivative of a scalar field.
- Calculate the divergence and curl of a vector field.
- Explain Green's theorem

Learning Outcome of the Course:

This course is to provide students with quantitative and problem-solving skills of ODE, numerical methods, integral calculus, and vector calculus. At the conclusion of this course, students should be able to:

- Apply various methods to solve first and higher order ordinary differential equations
- Apply different numerical techniques to a variety of real world problems, including engineering problems
- Analyze the convergence of improper integrals
- Apply techniques of double and triple integration to a variety of applications, including engineering applications
- Apply vector operations in 3-dimensions

Syllabus:

Unit-I: Ordinary Differential Equations

12 Hour

First order differential equations - exact, linear and Bernoulli's form, Orthogonal trajectories, Second order differential equations with constant coefficients, complementary function, method of variation of parameters, method of undetermined coefficients, higher order linear homogeneous differential equations with constant coefficients, Euler's equations, Simultaneous first order differential equations with constant co-efficient

Unit-II: Integral Calculus**14 Hour**

Reorientation, reduction formulae, Convergence of improper integrals, tests of convergence, Beta and Gamma functions – elementary properties, Differentiation under integral sign, differentiation of integrals with variable limits - Leibnitz rule, Rectification, double and triple integrals, computations of area, surfaces and volumes, change of variables in double integrals - Jacobians of transformations, integrals dependent on parameters – applications

Unit-III: Vector Calculus**7 Hour**

Scalar and vector fields, level surfaces, directional derivative, Gradient, Curl, Divergence, Laplacian, line and surface integrals, Green's theorem

Unit-IV: Numerical Analysis**12 Hour**

Solution of polynomial and transcendental equations - bisection, Newton-Raphson and regula-falsi methods, Finite differences, Newton's forward and backward interpolation formulae, central difference interpolation formulae, Lagrange's Interpolation, Newton's divided difference interpolation, Trapezoidal and Simpson's rules for numerical integration, Gauss's quadrature formula, Numerical solution of system of linear equations – Gauss-Seidel iteration methods

Text Book:

1. Kreyszig, E., Advanced Engineering Mathematics, John Wiley & Sons
2. Thomas, G.B. and Finney, R.L, Calculus and Analytic Geometry, Addison Wesley Longman
3. Jain R.K., Iyengar S.R.K, Advanced Engineering Mathematics, Narosa Publishers

Reference Book:

1. B.S. Grewal, *Higher Engineering Mathematics*, 42nd edition, Khanna Publishers
2. N. Piskunov, *Differential and Integral Calculus Vol.I and Vol. II*
3. B.V. Ramana, *Higher Engineering Mathematics*, 6th reprint, Tata Mc.Graw – Hill

Evaluation Scheme:

Continuous evaluation process comprising of components like attendance, assignment, class tests, comprehensive examinations, presentations, group discussions, etc.

Date: 7th January, 2019



Indrashil University
School of Engineering
Second Semester, 2019

Course Handout

Course No.:	HS 103
Course Title:	Communication Skills- II
Credit Structure (L-T-P-C):	2-2-0-4
Instructor in Charge:	Dr. Namrata Bajaj
	namrata.bajaj@indrashiluniversity.edu.in

Course Description:

The companies these days are grappling with techniques and tactics of effective communication and are attempting to standardize processes and procedures. Further there have been changes in the speaking and documentation styles. Though the basic concepts and principles have not changed, application has become varied. Report writing, Précis and Paragraph will hone their basic writing skills. This course focuses more on oral communication skills along with case study and presentation as key components.

Scope and Objective:

This module would equip students with knowledge and skills that are slated below:

- To acquaint students with oral communication, i.e. presentation and reading skills
- Make them practice of writing précis and paragraph
- Purpose and significance of Report writing
- Furtherance to this, the students will be given practice of using English language through an opportunity of self expression and public speaking through reading news paper and advertisement

Learning Outcome of the Course:

- Be familiar with written communication skills with focus on writing report, précis and paragraph
- Apply their communication ability in comprehending and analyzing moderately difficult English prose and presenting through power point presentation
- Express themselves with clarity on various abstract topics and current affairs pertaining to business, political & societal matters

Syllabus:

Objective

The companies these days are grappling with techniques and tactics of effective communication and are attempting to standardize processes and procedures. Further there have been changes in the speaking and documentation styles. Though the basic concepts and principles have not changed, application has become varied. Report writing, Précis and Paragraph will hone their basic writing skills. This course focuses more on oral communication skills along with case study and presentation as key components

Unit I: Communication & Speaking Skills

Oral Communication: 6 C,s of Communication, conversation in pairs with the help of Cue-cards and effective presentation, individually, of their ideas and feelings in simple English. Situations will be drawn from their everyday experiences, group discussion dynamics and brain storming on current news affairs

Unit II: Grammar & Vocabulary

Advance Grammar: Voice –Active/Passive, Use of Adjective and Adverb, Difference between Simple, Compound and Complex sentence, confusables, affixes, idioms, and one word substitutes.

Unit III: Reading Skills

Reading comprehension of general passages, case lets and advertisements from newspaper/magazines. (Newspaper reading in Tutorials)

Unit IV: Writing Skills

Report Writing, Resume building and job application, précis and paragraph writing

***Tutorials will be based on the above topics**

Text Books:

1. ***“Communication Skills ,A Workbook”***- Pushpalata & Sanjay Kumar, Oxford Publications
2. ***“Technical Communication; Principles and Practice”*** – Meenakshi Raman & Sangeeta Sharma, Oxford University Press

Reference Books:

1. ***“Effective Technical Communication”*** -M Ashraf Rizvi
2. ***“Communication skills Workbook”***, Ria Publication
3. ***“High School English Grammar”*** –Wren & Martin
4. ***“Communication Skills”*** –Asha Kaul, Tata McGraw Hill, 2nd Ed.
5. ***“Business Correspondence and Report writing”***- R C Sharma and Krishna Mohan, Tata McGraw Hill, 8th Ed.2015

Date: 7th January, 2019



Indrashil University
School of Engineering
Second Semester 2018 – 2019

Course Handout

Course Code: HS 104

Course Title: Soft Skills – II

Credit Structure (L-T-P-C): 2-0-0-0

Instructor in Charge:

Team of Instructors

Course Description:

Soft Skills (a vital portion of an individual's personality) is an intangible idea in which the qualities like attitude, ability, integrity, reliability, positivity, flexibility, dependability, punctuality, management, cooperation, habits and practices are combined proficiently to capitalize on a person's work efficacy. Soft Skills do the work of combining all these components in accurate share into skills and shaping them into competencies. These lessons are developed with a view to create awareness of the importance of the soft skills and assist the learners to improve them.

Scope and Objective:

The main objectives of this course are

1. To help the students understand importance of team management.
2. To support them in building a good team and a good leader.
3. To create the ability to work with others.

Syllabus:

UNIT-1 Team Work, Leadership and Management

8 Hours

Advance techniques for leadership, Team Management, Team Building, Group exercise for Team Building, Motivation, Conflict Management and Negotiation. Stress Management and time Management. Interpersonal skills: Understanding Perceptions, Attitudes, and Personality Types.

UNIT-2 Creativity

6 Hours

Out of box thinking, Lateral Thinking

UNIT-3 Corporate Etiquettes

3 Hours

E-mail etiquette, telephone etiquette, dining etiquette office meeting etiquettes, dress etiquette.

UNIT-4 Making Effective Presentations

5 Hours

Patterns & Methods of Presentation, Oral Presentation: Planning & Preparation, To learn the skill of presentation, How to prepare the presentation, Knowing the audience and their requirements, Effective ways to deliver the presentation. How to prepare the multi-media presentation.

UNIT- 5 Group Discussions

8 Hours

Purpose (Intellectual Ability, Creativity, Approach to a Problem, Solving, Tolerance), Group Behavior, Analyzing Performance.

Text Books:

1. **T1:** Soft Skills for Everyone by Jeff Butterfield, Cengage

Reference Books:

1. **R1:** Teamwork in practice by Alison Hardigham, Jaico Publishing House
2. **R2:** Personality Development and Soft Skills by Barun K Mitra
3. **R3:** The Road Less Travelled by M. Scott Peck
4. **R4:** Organizational Behavior by Robbins, Judge, Sanghi
5. **R5:** Lateral Thinking: Creativity Step by Step by Edward de Bono
6. **R6:** Teach Yourself to Think by Edward de Bono
7. **R7:** Six Thinking Hats by Edward de Bono

Evaluation Scheme:

Continuous evaluation process comprising of components like attendance, assignment, class tests, presentations, case studies, etc.

Since it is non-credit course, the students should be qualified/ non-Qualified depending upon their marks and grades obtained.

Date: 7th January, 2019



Indrashil University
School of Engineering
Second Semester, 2018-19

Course Code: ES 103

Course Title: [ENVIRONMENTAL SCIENCE](#)

Credit Structure (L-T-P-C): 2-0-0-2

Instructor in Charge: P CHANDANA
p.chandana@iist.edu.in

Scope and Objective:

The objectives of the course are as below:

1. Creating the awareness about environmental problems of society and industry.
2. Imparting basic knowledge about the environment and its allied problems.
3. Developing an attitude of concern for the environment.
4. Acquiring skills to help the concerned individuals in identifying and solving environmental problems having engineering techniques.

Learning Outcome of the Course:

At the end of the course the student will be able to,

1. Classify the multi-disciplinary nature of the environment and its components.
2. Identify the relevance and importance of the natural resources in the sustenance of life on earth and living standard.
3. Comprehend the importance of ecosystem, biodiversity and natural bio geo chemical cycle.
4. Explain the significance and applications of 4R's in day to day life.

Syllabus:

Unit-1

Introduction to Environment and Environmental Sciences: Definition and Components of Environmental Science, Relationship between the different components of Environment, Man and Environment relationship, Impact of technology on Environment, Environmental Degradation, Importance for different Engineering disciplines.

Global Environmental Issues: Climate Change, Global Warming and Green House Effect, Acid Rain, Depletion of Ozone layer.

Unit-II

Natural Resources: Renewable and Nonrenewable resources, exploitation and conservation, Role of individual in conservation of natural resources.

Water resources: Water sources- Surface and Ground water sources, Indian and Global scenario.

Land as a resource: social issues.

Forest resources: Definition and Classification of Forests Ecological and Economic importance and benefits of forest, Indian scenario, Deforestation: causes and effects, remedial measures.

Unit-III

Environmental Acts and Regulations: List of prevalent Environmental Acts, Brief description related to the purpose with at least five important provisions Water (Prevention and control of pollution) Act 1974, Air (Prevention and control of pollution) Act 1981, Environmental Protection Act, 1986 Organization and Role of Institutions of Gujarat and India like Pollution Control Boards, Environmental Management Institutes, Ecology Commissions, Gujarat Institute

of Desert Ecology, Department of Environment and Forest, Department of Climate Change, Disaster Management Authorities.

Environmental Ethics: Code of Ethics, Importance and limitations of ethics, Environmental Ethics in India.

UNIT-IV

Basic concepts of green building and smart cities:

Green building, Introduction, Objectives, Fundamentals Principles, Benefits of green building. Examples of Green building smart cities- Concept.

Unit V

Concept Of 4R's: Principles, Applications of 4R's considering applications in different engineering branches. Case studies of application of 4R's for different types of wastes like E-waste management, Thermal Power Plant, Dams, Metal and Non-metal wastes, oily wastes, greasy wastes, etc.

Text books:

1. Textbook of Environmental Studies for Undergraduate Courses, Erach Bharucha, Second edition, 2013, Universities Press (India) Private Ltd, Hyderabad.
2. Basics of Environmental Studies, U K Khare, 2011, Tata McGraw Hill

Reference Books:

1. Basics of Environmental Studies, Prof (Dr) N S Varandani ,2013, LAP -Lambert Academic Publishing , Germany
2. Environmental Studies, Anindita Basak, 2009, Dring Kindersley(India)Pvt. Ltd Pearson
3. Textbook of Environmental Studies, Deeksha Dave & S S Kateva , Cengage Publishers.
4. Environmental Sciences, Daniel B Botkin & Edward A Keller Publisher: John Wiley & Sons.
5. Environmental Studies, R. Rajagopalan, Oxford University Press
6. Environmental Studies, Benny Joseph, TMH publishers
7. Environmental Studies, Dr. Suresh K Dhameja, 2007, S K Kataria & Sons New Delhi

Evaluation Scheme:

Continuous evaluation process comprising of components like attendance, assignment, class tests, comprehensive examinations, presentations, group discussions, etc.