Panjab University, Chandigarh

Scheme of Examination and Syllabi for

B.E. (Civil Engineering)

1st and 2nd Semesters for Academic Year 2017-2018

Year: First   **Semester: First**

S. No.	Course Code	Course Name	Scheme of Teaching			Scheme of Exam				Practical*
						Theory				
			L-T-P	Contact hrs/week	Credits	Internal Assessment	University Exam	Total		
1.	MATHS101	Calculus	4-1-0	5	4	50	50	100	-	
2.	CIV101	Introduction to Civil Engineering	4-0-0	4	4	50	50	100	-	
3.	CS101	Programming Fundamental	3-1-3	7	4+1	50	50	100	50	
4.	APH 105	Mechanics	4-0-2	6	4+1	50	50	100	50	
5.	HSS101	Ethics and Self-Awareness	2-0-0	2	2	50	50	100	-	
6.	GS101	Introduction to Environmental Science	3-0-0	3	3	50	50	100	-	
		Total	**20-2-5**	**27**	**23**	**300**	**300**	**600**	**100**	

Year: First   **Semester: Second**

S. No.	Course Code	Course Name	Scheme of teaching			Scheme of Exam				Practical*
						Theory				
			L-T-P	Contact hrs/week	Credits	Internal Assessment	University Exam	Total		
1.	CH201	Applied Chemistry	4-0-3	7	4+1	50	50	100	50	
2.	HSS202	Communication Skills	2-0-0	2	2	50	50	100	-	
3.	MATHS201	Differential Equations and Transforms	4-1-0	5	4	50	50	100	-	
4.	ME203	Workshop Practice	0-0-4	4	2	-	-	-	50	
5.	CIV201	Building Materials and Construction	4-0-0	4	4	50	50	100	-	
6.	CIV202	Fluid Mechanics	4-0-0	4	4	50	50	100	-	
		Total	**18-1-7**	**26**	**21**	**250**	**250**	**500**	**100**	

Summer Vacations training (four weeks):

S. No.	Course Code	Course Name	Scheme of Teaching			Scheme of Exam		Practical*
	*		L-T-P	Contact hrs/week	Credits	Theory		
						Internal Assessment	University Exam	
1.	IPD201	Innovative product design	0-0-20	20	0+2	Nil	Nil	50

Note: Students will undergo four week in-house training during summer vacations in their respective branches. They will be trained to handle laboratory and practical aspects in their field of engineering.

The marks and credits of Innovative product design (IPD201) will be added in the second semester mark-sheet.

* Practical marks are for continuous and end semester evaluation

Course Code	MATHS101
Course Title	Calculus
Type of Course	Core
Course Assessment Methods End Semester Assessment(University Exam) Continous Assessment (Sessional, Assignments, Quiz)	50 50
Course Prerequisites	10+2
Course Objectives (CO)	1. To understand the behavior of infinite series and its use. 2. To learn the concepts of functions of two and more than two variables and their applications. 3. To learn the methods to evaluate multiple integrals and their applications to various problems. 4. To understand the concepts of Vector calculus and their use in engineering problems.
Course Outcome	1. The students are able to test the behaviour of infinite series. 2. Ability to analyze functions of more than two variables and their applications. 3. Ability to evaluate multiple integrals and apply them to practical problems. 4. Ability to apply vector calculus to engineering problems

SYLLABUS

Note for the examiner: The semester question paper will be of 50 Marks having 7 questions of equal marks. Students are required to attempt 5 questions in all. First question, covering the whole syllabus and having questions of conceptual nature, will be compulsory. Rest of the paper will be divided into two parts having three questions each and the candidate is required to attempt two questions from each section.

SECTION-A

FUNCTIONS OF ONE VARIABLE

Sequences and Series: Sequences, Limits of sequences, Infinite series, series of positive terms, Integral test, Comparison test, Ratio test, Root test. Alternating series, Absolute and Conditional Convergence, Leibnitz test. Power series: radius of convergence of power series, Taylor's and Maclaurin's Series, Formulae for remainder term in Taylor and Maclaurin series, Error estimates. (Scope as in Chapter 11, Sections 11.1 – 11.9 of Reference 1).

Integral Calculus: Areas of curves, Length of curves, Volume (disk and washer method) and surface areas of

revolution (Scope as in Chapter 5, Sections 5.6, Chapter 6, 6.1, 6.3, 6.5 of Reference 1).   (11 hours)

DIFFERENTIAL CALCULUS OF FUNCTIONS OF TWO AND THREE VARIABLES

Concept of limit and continuity of a function of two and three variables, Partial derivatives, total derivative, Euler's theorem for homogeneous functions, composite function, differentiation of an implicit function, chain rule, change of variables, Jacobian, Taylor's theorem, Errors and increments**,** Maxima and minima of a function of two and three variables, Lagrange's method of multipliers (Scope as in Chapter 14, Sections 14.1-14.4, 14.6-14.10 of Reference 1).   (10 hours)

INTEGRAL CALCULUS OF FUNCTIONS OF TWO AND THREE VARIABLES

Double and triple integrals, Change of order of integration, Change of Variables, Applications to area, volume and surface area.(Scope as in Chapter 15 of Reference 1).   (9 hours)

VECTOR DIFFERENTIAL CALCULUS

Vector-valued functions and space curves, arc lengths, unit tangent vector, Curvature and torsion of a curve, Gradient of a Scalar field, Directional Derivative (Scope as in Chapter 13, Sections 13.1, 13.3-13.5 Chapter 14, Section 14.5 of Reference 1).   (8 hours)

VECTOR INTEGRAL CALCULUS

Line integrals, Vector fields, Work, Circulation and Flux, Path Independence, Potential functions and Conservative fields, Green's theorem in the plane, Surface Areas and Surface Integrals, Stoke's Theorem, Gauss Divergence Theorem (Statements only) (Scope as in Chapter 16 of Reference 1).   (7 hours)

RECOMMENDED BOOKS			
S.No.	**NAME**	**AUTHORS**	**PUBLISHER**
1.	Calculus	Maurice D. Weir, Joel Hass, Frank R. Giordano, Thomas	11th edition, Pearson Education.
2.	Advanced Engineering Mathematics	E. Kreyszig.	8th edition , John Wiley.
3.	Advanced Engineering Mathematics	Michael D. Greenberg	2nd edition, Pearson Education.
4.	Advanced Engineering Mathematics	Wylie and Barrett	Tata McGraw Hill
5.	Higher Engineering Mathematics	B.V.Ramana	Tata McGraw Hill.
6.	Advanced Engineering Mathematics	R. K. Jain, S. R. K. Iyenger	Narosa Publications

Course Code	CIV101
Course Title	Introduction to Civil Engineering
Type of Course	Core
Course Assessment Methods End Semester Assessment(University Exam) Continous Assessment (Sessional, Assignments, Quiz) Course Prerequisites	 50 50
Course Objectives (CO) Course Outcome	

SYLLABUS

Note for the examiner: A total of eight questions will be asked covering the whole syllabus. Candidate will be required to attempt any five questions.

Introduction to Civil Engineering

Civil engineering and basic human needs, Role of Civil Engineer in infrastructure development Branches of civil engineering.

Surveying

Objectives – Principles – Classification –Uses for Surveying, Chain Surveying, Compass Surveying, Leveling – objectives ,principles, instruments and uses. Modern Tools of Surveying and Mapping: Introduction to Theodolite , Total Station, Global Positioning System, Remote Sensing and Geographic Information System.

Building Materials and their properties

Introduction to Brick, Stone, Lime, Mortar, Cement, Steel, Concrete – Composition, Properties and Uses.

Building Construction and Planning

Buildings – Classification –Requirements of buildings, Components of buildings and their functions. Foundations functions and types, Dampness, Doors and windows (Location and sizes),types of roofs, types of stairs. Elementary principles and basic requirements of a building planning.

Structural Engineering

Classification and Components of a structure, behavior, Types of loads, Bureau of Indian Standards Codes, Introduction to Reinforced Concrete Design and Steel structure Design.

Transportation System

Importance of Transportation, Different modes of transportation system. Roads-Road Patterns, Types of

Roads and components and their crossections. Railway – Cross-section of permanent way- components parts and functions. Aircraft Characteristics, Factors for Site Selection, Airport Classification, General Layout of an Airport. Docks and Harbour classification, Bridges components of a bridge - types of bridges.

Geotechnical Engineering

Types of Rocks, Types of soils, Mechanism of soil formation, Important terminologies.

Hydraulics and Water Resource Development

Introduction to Hydrology, Importance of hydrological data in water resources planning. The hydrologic cycle, Water budget equation, Introduction to diversion headworks, Dams - Purpose, Selection of site, Water logging.

Water Supply/ Sewage disposal

Sources and Standards of drinking water (BIS), water treatment components and functions, Testing of sewage, sewage treatment components and functions.

RECOMMENDED BOOKS

S.No.	NAME	AUTHORS	PUBLISHER
1.	Basic Civil Engineering	Rakesh Beohar	University Press Science
2.	Engineering Materials	S. C. Rangwala	Charotar Publishing House, Delhi
3.	Hydraulic and Fluid Mechanics	Modi and Seth	Standard Book House, Delhi
4.	Surveying Vol. I & II	B. C. Punmia	Laxmi Publications
5.	Highway Engineering	S. K. Khanna and C. E. G. Justo	Nem Chand and brothers
6.	Irrigation and Water Power Engineering	B. C. Punia	Laxmi Publications
7.	Soil Mechanics and Foundation Engineering	B. C. Punia	Laxmi Publications
8.	Building Construction	B. C. Punia	Laxmi Publications
9.	Water Supply and waste water Engineering	S. K. Gard	Khanna Publishers, Delhi

Course Code	CS101
Course Title	**Programming Fundamentals**
Type of Course	Core
Course Assessment Methods End Semester Assessment(University Exam) Continous Assessment (Sessional, Assignments, Quiz) Practical (Continuous and end semester evaluation)	50 50 50
Course Prerequisites	
Course Objectives (CO)	To get basic knowledge of computers, its components and Operating systems and Linux. Shell Commands.
Course Outcome	

SYLLABUS

Note for the examiner: The semester question paper will be of 50 Marks having 7 questions of equal marks. Students are required to attempt 5 questions in all. First question, covering the whole syllabus and having questions of conceptual nature, will be compulsory. Rest of the paper will be divided into two parts having three questions each and the candidate is required to attempt two questions from each section.

SECTION - A

Introduction

Introduction to Programming Languages, Flowcharts, Algorithms, System Software (Assembler, Compiler, Translator, Debugger), Program Structure.   (5 hours)

Basic Constructs of C

Keywords, Identifiers, Variables, Symbolic Constants, Data Types and their storage, Operands, Arithmetic Operators, Relational Operators, Logical Operators, Bitwise Operators, Increment & Decrement Operators,

Expressions, Conditional Expressions, Assignment Operators and Expressions, Type Conversions, Precedence and Order of Evaluation, External Variables and Scope of Variables. Basic Input Output, Formatted I/O.

(7 hours)

Program Control Flow

Statements and Blocks, Conditional Statements, IF, ELSE-IF, Switch Case statements, Control Loops, For, While and Do-While, Go to and Labels. (7 hours)

Arrays & Functions

Arrays, Multi dimensional arrays, strings, pointer arrays, Functions, Function Prototyping, Scope of functions, Arguments, Call by value and call by references, static variables, recursion. (7 hours)

SECTION - B

Structures

Structures, Array of Structures, Typedef, Unions, Bit fields, passing structures as an argument to functions , C-Pre-processor and Macros, Command line arguments. (6 hours)

Pointers

Pointer declaration, initialization, Pointer arithmetic, Pointer to array and Pointer to structure.

(6 hours)

Input and Output

Standard and Formatted Input and Output, File Access & its types, Line Input and Output, Types of Files, Binary & ASCII Files, Error handling, stderr and exit functions. (7 hours)

RECOMMENDED BOOKS			
S.No.	NAME	AUTHORS	PUBLISHER
1.	The C Programming language	Brian Kernighan and	Prentice Hall, 2nd editon, 2007

		Dennis M. Ritchie	
2.	Fundamentals of Information Technology and Computer Programming	V. K. Jain	PHI. Latest edition
3.	C Programming: A Modern Approach	K. N. King	W. W. Norton Company 2nd editon (2008)
4.	C : The Complete Reference	Herbert Schildt	Tata McGraw Hill Publications, 4th editon
5.	Let us C++	Yashwant Kanetkar	BPB Publications
6.	Programming in ANSI C++	E. Balagurusamy	TMH publications, 4th edtion, Reprint(2008)
7.	Programming in ANSI C	Gottfired	Schaum Series, TMH publications, 2nd edtion(1996)

List of Experiments

Instruction for Students: The candidate will be attending a laboratory session of 2 hours weekly and students have

to perform the practical related to the following list.

1. Introduction to basic structure of C program, utility of header and library files.

2. Implementation of program related to the basic constructs in C

3. Program using different data types in C

4. Programs using Loops and Conditional Statements in C

5. Programs using arrays single dimension and multi dimensions in C.

6. Implementation of Matrices and their basic functions such as addition, subtraction, multiplication, inverse.

7. Programs using functions by passing values using call by value and call by reference method

8. Programs related to structures and unions

9. Program to implement array using pointers

10. Programs related to string handling in C

11. Program to manage I/O files and Pointers

Course Code	APH105
Course Title	Mechanics
Type of Course	Core
Course Assessment Methods End Semester Assessment(University Exam) Continous Assessment (Sessional, Assignments, Quiz) Practical (Continuous and end semester evaluation)	 50 50 50
Course Prerequisites	
Course Objectives (CO)	To get basic knowledge of kinematics, types of oscillations and theory of relativity.
Course Outcome	

SYLLABUS

Note for the paper setter: Total of 8 questions be set with 4 from part A and four from part B. Candidate will be required to attempt any 5 questions with at least two questions from each part.

Simple Harmonic Motion
Review of basic kinematics (displacement, velocity, acceleration, time period and phase of vibration) and dynamics (restoring force and energetics) of simple harmonic motion, differential equation of SHM, superposition of two SHM in one dimension, charge oscillations in LC circuits.

(4 hours)

Damped Oscillations
Concept and cause of damping, differential equation of a damped oscillator and different kinds of damping, Methods of describing damping of an oscillator - logarithmic decrement, relaxation time, quality factor, band width. Series LCR circuit as a damped oscillator. (5 hours)

Forced Oscillations
States of forced oscillations, differential equation of forced oscillator – its displacement, velocity and impedance, behaviour of displacement and velocity with driver's frequency, Power, bandwidth, Quality factor and amplification of forced oscillator, resonance in forced oscillators, forced oscillations in series LCR circuit

(5 hours)

Coupled Oscillations
Basic idea of coupled oscillators, Stiffness coupled oscillators and inertia coupled oscillators, normal coordinates, degrees of freedom and normal modes of vibrations (5 hours)

Motion under inverse square force

Force between a Point Mass and Spherical shell. Force between a Point Mass and Solid Sphere, Gravitational and Electrostatic self-energy. Gravitational energy of the Galaxy and of uniform sphere; Orbits and their eccentricity, Two-body problem - reduced mass.   (7 hours)

Special Theory of Relativity

Inertial and non-inertial frames of reference, Galilean transformation, Michelson Morley Experiment, postulates of special theory of relativity, Lorentz transformation, Simultaneity, Length contraction, Time dilation, Doppler effect, Addition of velocities, variation of mass with velocity, mass-energy relation, four vectors, space-time continuum.   (9 hours)

RECOMMENDED BOOKS

S.No.	NAME	AUTHORS	PUBLISHER
1.	Physics of Vibrations and Waves	H. J. Pain	5th edition, John Wiley & Sons
2.	Mechanics	Hans and Puri	

List of Experiments

1. To find the moment of inertia of a flywheel.
2. To determine the value of acceleration due to gravity at a place with kater's pendulum.
3. To determine the velocity of ultrasonics waves in a given liquid.
4. To determine the requency of A.C. mains using a sonometer and an electro-magnet.
5. To find the capacitance of a capacitor using flashing and quenching of a neon lamp.
6. To plot graph between current and frequency in a series LCR circuit and to find the resonant frequency.

Course Code	HSS 101 / HSS 201	
Course Title	Ethics and Self Awareness (theory)	
Type of Course	Core	
Course Assessment Methods End Semester Assessment(University Exam) Continous Assessment (Sessional, Assignments, Quiz)	50 50	
Course Prerequisites	10+2	
Course Objectives (CO)		
Course Outcome		

SYLLABUS

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SECTION - A

Introduction to Ethics

Concept of Ethics – Nature, Scope, Sources, Types, Functions and Factors influencing Ethics, Approaches to Ethics – Psychological, Philosophical and Social, Broader Ethical Issues in Society.   (6 hours)

Values, Norms, Standards and Morality

Concept and Role, Relation with Ethics, Psycho-Social Theories of Moral Development – Kohlberg and Carol Gilligan   (4 hours)

Ethics and Business

Concept of Business Ethics – Nature, Objectives and Factors influencing Business Ethics, 3 C's of Business Ethics, Ethics in Business Activities, Ethical Dilemmas in Business, Managing Ethics   (5 hours)

SECTION – B

Self-Awareness

Concept of Self Awareness – Need, Elements, Self Assessment – SWOT Analysis, Self Concepts – Self-Knowledge, Assertiveness and Self-Confidence, Self-Esteem   (4 hours)

Self-Development

Concept of Self-Development, Social Intelligence, Emotional Intelligence, Managing Time and Stress, Positive Human Qualities (Self-Efficacy, Empathy, Gratitude, Compassion, Forgiveness and Motivation), Personality Development Models – Johari Window, Transactional Analysis, Myers Briggs Type Indicator, Self-Awareness and Self-Development Exercises (11 hours)

RECOMMENDED BOOKS

S.No.	NAME	AUTHOR(S)	PUBLISHER
1.	Business Ethics – Text and Cases	C.S.V. Murthy	Himalaya Publishing House
2.	Business Ethics	Hartman, Laura P. And Chatterjee, Abha	Tata McGraw Hill
3.	Business Ethics and Professional Values	A. B. Rao	Excel Books
4.	Business Ethics – Concepts and cases	Manuel G. Velasquez	Prentice Hall
5.	Issues and Ethics in the Helping Professions	G. Corey, M. Schneider Corey, P. Callanan	Brooks/Cole
6.	Theories of Personality	S. Calvin Hall, Dardner Lindzey and John B. Cambell	Hamilton Printing Company
7.	The Curse of Self-awareness, Egotism and the Quality of Human Life	M. R. Leary	Oxford University Press
8.	Self – Awareness	Allan Twain	

Course Code	GS 101 / GS 201
Course Title	**Introduction to Environment Science**
Type of Course	Core
Course Assessment Methods End Semester Assessment(University Exam) Continous Assessment (Sessional, Assignments, Quiz)	50 50
Course Prerequisites	10+2
Course Objectives (CO)	
Course Outcome	

SYLLABUS

Note for the examiner: The semester question paper will be of 50 Marks having 7 questions of equal marks. Students are required to attempt 5 questions in all. First question, covering the whole syllabus and having questions of conceptual nature, will be compulsory. Rest of the paper will be divided into two parts having three questions each and the candidate is required to attempt two questions from each section.

SECTION - A

General

Introduction, components of the environment, environmental degradation.   (4 hours)

Ecology

Elements of ecology: Ecological balance and consequences of change, principles of environmental impact assessment.   (4 hours)

Air pollution and control

Atmospheric composition, energy balance, climate, weather, dispersion, sources and effects of pollutants, primary and secondary pollutants, green house effect, depletion of ozone layer, standards and control measures.   (6 hours)

PART B

Water pollution and control

Hydrosphere, natural water, pollutants their origin and effects, river/lake/ground water pollution, standards and control.   (6 hours)

Land Pollution

Lithosphere, pollutants (municipal, industrial, commercial, agricultural, hazardous solid wastes): their origin and effects, collection and disposal of solid waste, recovery and conversion methods.   (6 hours)

Noise Pollution

Sources, effects, standards and control.   (6 hours)

RECOMMENDED BOOKS			
S.No.	**NAME**	**AUTHORS**	**PUBLISHER**
1.	Introduction to Environmental Engineering and Science	C. M. Masters	Prentice Hall of India Pvt. Ltd., 1991
2.	Environmental Science	B. J. Nebel	Prentice Hall Inc., 1987

Course Code	CH101 / CH201
Course Title	Applied Chemistry
Type of Course	Core
Course Assessment Methods End Semester Assessment(University Exam) Continous Assessment (Sessional, Assignments, Quiz) Practical (Continuous and end semester evaluation)	50 50 50
Course Prerequisites	10+2
Course Objectives (CO)	To teach the fundamentals of basic chemical sciences essential for the development of new technologies to all branches of engineering.
Course Outcome	1) Thermodynamics will help the students learn different thermodynamic laws, heat changes and energy calculations. 2) Studying catalysis will be beneficial to understand the role and mechanism of various heterogeneous and homogeneous catalysts in increasing reactions rate of many synthetically important chemical reactions. 3) By studying corrosion, the students will learn about basic nature and reasons of corrosion, its impact in many sectors of our lives. 4) Studying spectroscopy will help to understand the basic principles of spectroscopy and its use to determine chemical structures. 5) By studying coordination chemistry and CFT, explanation about different properties of coordination compounds will be given.

SYLLABUS

Note for Examiner: The semester question paper will be of 50 Marks having 7 questions of equal marks. Students are required to attempt 5 questions in all. First question, covering the whole syllabus and having questions of conceptual nature, will be compulsory. Rest of the paper will be divided into two parts having

three questions each and the candidate is required to attempt two questions from each section.

SECTION - A

Thermodynamics: Review of objectives and limitations of chemical thermodynamics, State functions, Thermodynamic equilibrium, work, heat, internal energy, enthalpy, heat capacity, Zeroth law of thermodynamics, First law of thermodynamics, Reversible, isothermal and adiabatic expansion & compression of an ideal gas. Irreversible isothermal and adiabatic expansion of an ideal gas. Carnot cycle and efficiency of reversible engines, Enthalpy change and its measurement. Flame temperature, Second and third law of thermodynamics. Concept of entropy. Gibb's and Helmholtz equations. Simple numerical for calculating w, q, ΔE, ΔH and entropy. (10 hours)

Catalysis: Catalysis and general characteristics of a catalytic reactions, homogeneous catalysis, kinetics of acid, base and enzyme catalysis – Michealis Menten equations. Heterogenous catalysis. Application of catalysis for industrially important processes– hydrogenation (Wilkinson's catalyst), hydroformylation, acetic acid process and Wacker process. (6 hours)

Electrochemistry: Introduction to electrochemistry, types of electrodes, Ion selective electrodes, Reference electrodes, Fuel cells (hydrogen-oxygen, propane-oxygen, methanol-oxygen fuel cells), Corrosion: Types of corrosion, dry and wet corrosion and their mechanisms, types of electrochemical corrosion (galvanic, pitting, waterline, differential aeration, soil, microbiological, inter-granular, stress corrosion), Factors influencing corrosion, Prevention of corrosion. (8 hours)

SECTION - B

Polymer chemistry: Classification of polymers, Mechanism and methods of polymerisation, idea of number average and weight average molecular masses of polymers, preparation, properties and uses of polystyrene, polyester, polyamide, phenol-formaldehyde, silicones and epoxy resins. (5hours)

Spectroscopy: UV- Introduction, Lambert-Beer's Law, selection rules, electronic transitions, Application to simple organic molecules (auxochrome, chromophore), effect of conjugation and solvent on transition of

organic molecules, Woodward-Fieser Rules for calculating λ_{max} for dienes. IR- Introduction, Principle of IR spectroscopy-Fundamental vibrations, Application to simple organic molecules (effect of masses of atoms, bond strength, nature of substituent, hydrogen bonding on IR frequency), sample preparation for IR.

(10 hours)

Coordination chemistry: Introduction, Crystal Field Theory, Splitting of octahedral, tetrahedral and square planar complexes, crystal field stabilization energies of octahedral and tetrahedral complexes and its applications. (6 hours)

RECOMMENDED BOOKS			
S.No.	NAME	AUTHOR(S)	PUBLISHER
1.	Organic Chemistry	Joseph M. Hornback Brooke	Cole Publishing Company U.S.A.
2.	Atkin's Physical Chemistry	Peter Atkins, Julio de Paula	7th Edition, Oxford University Press.
3.	Concise Inorganic Chemistry	J D Lee	Vth Edition, Chapman & Hall, 2003
4.	A Textbook of Engineering Chemistry	Shashi Chawla	Dhanpat Rai & Co. Pvt. Ltd
5.	Introductory Polymer Chemistry	G.S.Mishra	John Wiley & Sons, New York, 1993.
6.	Principles of Physical Chemistry	Puri, Sharma and Pathania	W.H. Freeman & Co, 2008.
7.	Introduction to spectroscopy	D. S. Pavia, G.M. Lasmpman and G.S. Kriz	4th Edition, Thomson learning, Indian Edition 208.
8	Basic Inorganic Chemistry	F.A. Cotton, G. Wilkinson and P.L. Gaus	3rd Ed., John Wiley & Sons.

List of Experiments

Instruction for Students: The candidate will be attending a laboratory session of three hours weekly and has to perform any eight experiments.

1. Volumetric analysis: Iodometric titrations, complexometric titrations, Acid-base titrations (conductometric), Precipitation titrations

2. Analysis of lubricants: Viscosity/surface tension/saponification value/acid value

3. Instrumental techniques for chemical analysis: Conductometry, potentiometry, UV-visible/IR spectrophotometer.

4. Preparation of few organic compounds/inorganic complexes/polymer.

RECOMMENDED BOOKS			
S.No.	NAME	AUTHOR(S)	PUBLISHER
1.	A textbook of Quantitative Inorganic Analysis	A. I. Vogel	Longman Gp. Ltd, 4th editon
2	Essentials of Experimental Engineering Chemistry	Shashi Chawla	Dhanpat Rai and Co. Delhi (2001)
3	Vogel's text book of quantitative chemical analysis	J. Mendham, R. C. Denny, J. D. Barnes and M. J. K. Thomas	Pearson Education

Course Code	HSS202/ HSS102
Course Title	Communication Skills
Type of Course	Core
Course Assessment Methods End Semester Assessment(University Exam) Continous Assessment (Sessional, Assignments, Quiz) Course Prerequisites	50 50
Course Objectives (CO) Course Outcome	

SYLLABUS

Note for the examiner: The semester question paper will be of 50 Marks having 7 questions of equal marks. Students are required to attempt 5 questions in all. First question, covering the whole syllabus and having questions of conceptual nature, will be compulsory. Rest of the paper will be divided into two parts having three questions each and the candidate is required to attempt two questions from each section.

SECTION - A

Fundamentals of Communication Skills

 Scope and Significance of Communication Skills, Listening, Speaking, Reading and Writing   (2 hours)

Writing Skills

Basics of Grammar – Word Order, Sentence Construction, Placing of Subject and Verbs, Parts of Speech, Use of Tenses, Articles, Prepositions, Phrasal Verbs, Active-Passive, Narration   (4 hours)

Vocabulary Building and Writing

 Word Formations, Synonyms, Antonyms, Homonyms, One-Word Substitutes, Idioms and Phrases, Abbreviations of Scientific and Technical Words.   (3 hours)

Speaking Skills

Introduction to Phonetic Sounds, English Phonemes, Stress, Rhythm and Intonation, Countering Stage Fright and Barriers of Communication.   (3 hours)

Reading and Comprehension   (2 hours)

Section – B

Advanced Communication Skills

Scope, Significance, Process of Communication in an organization, Types and Levels,Communication Networks, Technical Communication, Tools of Effective Communication.   (2 hours)

Speaking Skills and Personality Development

Interpersonal Communication, Presentation Skills, Body Language and Voice Modulation, Persuasion,Negotiation and Linguistic Programming, Public Speaking, Group Discussions, Interviews and Case Studies, Power Point Presentations , Relevant to the context and locale, Technical Presentations, Conducting , Meeting and Conferences   (5 hours)

Communication and Media

Social and Political Context of Communication, Recent Developments in Media   (1 hour)

Advanced Techniques in Speaking Skills

Importance of Listening/Responding to native and global accents, Telephonic Interviews and Video Conferencing   (2 hours)

Advanced Techniques in Technical Writing

Job Application, CV Writing, Business Letters, Memos, Minutes, Reports and Report Writing Strategies, E-mail Etiquette, Blog Writing, Instruction Manuals and Technical Proposals   (4 hours)

Practical Sessions

1. Individual presentations with stress on delivery and content

2. Overcoming Stage Fright - Debates, extempore

3. How to discuss in a group - Group Discussion

4. Discussion on recent developments and current debates in the media

5. How to prepare for an Interview and face it with confidence

6. Conducting meeting and conferences

7. Exercises on Composition & Comprehension, Reading Improvement

TEXT BOOKS			
S.No.	NAME	AUTHORS	PUBLISHER
1.	The Essence of Effective Communication	R. Ludlow and F. Panton	Prentice Hall
2.	Unversity Grammer of English	Randolph. Quirk and Greenbaum Sidney	Pearson Education

3.	Effective Technical Communication	M. Rizvi Ashraf	McGraw Hill
4.	Business Communication Today	Bovee L. Courtland, V. Thill John	Pearson Education

REFERENCE BOOKS

S.No.	NAME	AUTHOR(S)	PUBLISHER
1.	Essential of Business Communications	Mary E. Guffrey	South-Western College Publishing
2.	Technical Communications : Principles and Practice	Minakshi Raman and S. Sharma	Oxford University press
3.	Effective Communication	M. V. Rodrigues	Himalaya Publishing House
4.	English Vocabulary in Use	Michael. McCarthy, Felicity O'Dell	Cambridge University Press
5.	The Pronunciation of English	Daniel Jones	University Book Stall
6.	Business Correspondence and Report Writing	R. C. Sharma and K. Mohan	Tata McGraw Hill
7.	Communications for Professional Engineers	Bill Scott	Thomas Teleford Ltd.
8	Handbook for Technical Writing	David A. McMurrey, Buckley Joanne	Cengage Learning
9	Enhancing Employability and Recognizing Diversity	L. Harve, W. Locke, A. Morey	Universities UK and CSU
10	Student Activities for taking charge of your carrer direction and Job Search	R. Locke	Core Publishing
11	Body Language	A. Pease	Sheldon Press
12	Technical Communication: Principles and Practice	Minakshi Raman and S. Sharma	Oxford university Press

Course Code	MATHS201
Course Title	**Differential Equations and Transforms**
Type of Course	Core
Course Assessment Methods End Semester Assessment(University Exam) Continous Assessment (Sessional, Assignments, Quiz)	50 50
Course Prerequisites	Calculus(MATHS101)
Course Objectives (CO)	1. To learn the methods to formulate and solve linear differential equations and their applications to engineering problems 2. To learn the concepts of Laplace transforms and to evaluate Laplace transforms and inverse Laplace transform 3. To apply Laplace transforms to solve ordinary differential equations 4. To learn the concept of Fourier series, integrals and transforms. 5. To learn how to solve heat, wave and Laplace equations.
Course Outcome	1. The student will learn to solve Ordinary Differential equations. 2. The students will be able to apply the tools of Laplace Transforms to model engineering problems and solve the resulting differential equations. **3.** Students will understand the nature and behavior of trigonometric (Fourier) series and apply it to solve boundary value problems.

SYLLABUS

Note for the examiner: The semester question paper will be of 50 Marks having 7 questions of equal marks. Students are required to attempt 5 questions in all. First question, covering the whole syllabus and having questions of conceptual nature, will be compulsory. Rest of the paper will be divided into two parts having three questions each and the candidate is required to attempt two questions from each section.

SECTION – A

Ordinary Differential Equations

Review of geometrical meaning of the differential equation, directional fields, exact differential equations(scope as in chapter 8, sections 8.1 – 8.10 of reference 2), solution of differential equations with constant coefficients; methods of differential operators (scope as in chapter 9, sections 9.1 – 9.5 of reference 2). Non-homogeneous equations of second order with constant coefficients: Solution by method of variation of parameters, reduciton by order (scope as in chapter 9, section 9.7, 9.10 of reference 2). Power series method of solution(scope as in chapter 10, section 10.2 of reference 2)   (13 hours)

Laplace Transforms

Laplace transform, Inverse transforms, shifting, transform of derivatives and integrals. Unit step function, second shifting theorem, Dirac's Delta function. Differentiation and integration of transforms. Convolution Theorem on Laplace Transforms. Application of Laplace transforms to solve ordinary differential equations with initial conditions (Scope as in Chapter 5, Sections 5.1 – 5.5 of Reference 1).   (10 hours)

<center>SECTION – B</center>

Fourier Series and Transforms: Periodic functions, Fourier series, Even and odd series, half range expansions, Complex Fourier Series, Approximation by trigonometric polynomials. Fourier integrals, Fourier Cosine and Sine transforms, Fourier Transforms (Scope as in Chapter 10, Sections 10.1 – 10.5, 10.7 – 10.10 of Reference 1).   (8 hours)

Partial Differential Equations: Partial differential equations of first order, origin, solution of linear partial differential equations of first order, Integral surfaces passing through a given curve (Scope as in Chapter 2, Sections 1, 2, 4, 5 of Reference 4).   (6 hours)

Boundary Value Problems: D'Alembert's solution of wave equation, separation of variables: one dimension and two dimension heat and wave equation, Laplace equation in Cartesian and Polar coordinates (Scope as in Chapter 11, Sections 11.1, 11.3 – 11.5, 11.8 – 11.9 of Reference 1).   (8 hours)

RECOMMENDED BOOKS			
S.No.	NAME	AUTHOR(S)	PUBLISHER
1.	Elements of Partial Differential Equations	Ian N. Sneedon	McGraw Hill,Singapore 1957.
2.	Advanced Engineering	E. Kreyszig.	8th edition , John Wiley.

	Mathematics		
3.	Advanced Engineering Mathematics	Michael D. Greenberg	2nd edition, Pearson Education.
4.	Advanced Engineering Mathematics	Wylie and Barrett	Tata McGraw Hill
5.	Higher Engineering Mathematics	B.V.Ramana	Tata McGraw Hill.
6.	Advanced Engineering Mathematics	R. K. Jain, S. R. K. Iyenger	Narosa Publications
7.	Theory and problems of Differential Equations	Frank Ayers	Shuam outline series, McGraw-Hill, Singapore, 1957

Course Code	ME 203 / ME103
Course Title	Workshop Practice
Type of Course	Core
Course Assessment Methods Practical (Continuous and end semester evaluation)	50
Course Prerequisites	Basic Workshop Practices
Course Objectives (CO)	Know different machines, tools and equipment, Identify different Engineering materials, metals and non-metals. Understand different Mechanisms, Use of Machines, Tools and Equipment. Knowledge of basic Manufacturing Processes in Electronics, Electrical, Machine, Welding, Fitting, Sheet Metal.Smithy, Foundry and Carpentry Workshops.
Course Outcome	Familiarity with common machines, Tools and Equipment in basic Workshop Practices. On hand basic workshop practices in Electronics, Electrical, Machine, Welding, Fitting, Sheet Metal. Smithy, Foundry and Carpentry Workshops in Engineering professions. Applications of Basic Workshop Practices..

SYLLABUS

Instruction for Students: The candidate will be attending a laboratory session of three
hours weekly.
Practice of basic exercises related with different shops. On hand basic workshop practices in Electronics, Electrical, Machine, Welding, Fitting, Sheet Metal. Smithy, Foundry and Carpentry Workshops in Engineering professions.

Welding Workshop :
(Theory)Joining Processes, Welding and its Classification, Welding Processes, Fusion Welding, Pressure Welding, Electric Arc Welding, Gas Welding, Resistance Welding, Metal Inert gas Welding, Welding Joints, Welding Positions, Welding defects, Welding Applications, Basic welding design and Procedures, identification of materials.
Jobs: Butt Joint in Flat Position using SMAW, Lap Joint using Spot Welding, Edge Joint in Horizontal Position using SMAW, Tee Joint in Flat position using SMAW, Corner Joint in vertical position using SMAW. Defect Identification and marking, Edge preparation and Fillet making, Tacking, Distortion identification.

Electronics Workshop

To know about Soldering mechanism and techniques, Familiarity with Electronic Components / symbols, Testing of electronic components, Application of Soldering : Circuit Assembly

List of Jobs :

Practice of Soldering and de-soldering, Identification and testing of a) passive electronic components b) Active electronic components, Assembly of Regulated Power supply circuit.

Electrical Workshop

Introduction of Various Electric wirings, Wiring Systems, Electrical wiring material and fitting, different type of cables, Conduit pipe and its fitting, inspection points, switches of all types, Distribution boards, M.C.B's etc., Electric Shock and its management.

Electric Tools: Conversance with various tools and to carry out the following:

1. Measurement of wire sizes using SWG and micrometer
2. Identification of Phase and neutral in single phase supply

Jobs:

To control a lamp with a single way switch

To control a lamp from two different places

To assemble a fluorescent lamp with its accessories

To control a lamp, fan and a three pin socket in parallel connection with single way switches

Fitting Shop

Introduction of Fitting, different type of operations, Tools, materials, precision instruments like Vernier caliper and Micrometer etc, Safety precautions and Practical demonstration of tools and equipments

Jobs:

To make a square from MS Flat, Punching, Cutting, Filling techniques and practice, Tapping, Counter Drilling.

Smithy Workshop

Introduction of Smithy and Forging process, Tools and Equipment's, Operations, Heat Treatment processes, Advantages, Dis-advantages, Defects and Safety precautions.

Jobs:

Drawing and Upsetting Practice using Open Hearth Furnace, Cold working process practice, Heat Treatment \: Annealing and hardening process

Machine Shop

Application, Function and different parts, Operations of Lathe, Type of Cutting Tools and their materials, Drill machine Types, applications and Functions. Hacksaw machines and functions, Work Holding devices and tools, chucks, Vices, machine Vices, V Block, Measuring Instruments uses, Shaper and Milling machine Applications.

Jobs:

To perform Marking, Facing, Turning,taper Turing, Grooving, Knurling, parting, Drilling, Reaming operations on lathe machine,Hacksawing practice on Power hacksaw,Shaping operation practice on Shaper.

Carpentry Shop

Classification of Tree, Timber. Advantages and uses of Timber, Seasoning of Wood, Tools Used, Defects and

Prevention of Wood.

Jobs:

Tee Joint, Cross Joint,Tenon Joint, L Shape Joint, Practice of Wood Working Lathe, Practice on multi-purpose Planer.

Foundry Shop

Introduction to Foundry, Advantages and Disadvantages of castings process, Introduction to pattern and various hand tools, Ingredients of Green sands, Various Hand Molding processes, Introduction to Casting Defects.

Jobs:

Identification and uses of hand tools, Preparation of Green sand in Muller, Preparation of Sand Mould of Single piece solid pattern, Split pattern, Preparation of Green sand Core, casting of a Mould and study its defects.

RECOMMENDED BOOKS			
S.No.	NAME	AUTHOR(S)	PUBLISHER
1.	Introduction to Basic Manufacturing Processes and Workshop Technology	Rajender Singh	New Age International Publication
2	Manufacturing Processes	Chapman	Viva Books Private Limited

Course Code	CIV 201
Course Title	**Building Materials and Construction**
Type of Course	Core
Course Assessment Methods End Semester Assessment(University Exam) Continous Assessment (Sessional, Assignments, Quiz)	 50 50
Course Prerequisites	
Course Objectives (CO)	To learn the various building materials and standardized laboratory techniques used to evaluate construction materials performance. To understand the various types of masonry works, causes and affects of dampness, various damp proofing methods, understand and utilize basic principles used in Building Construction .
Course Outcome	

SYLLABUS

Note: The examiner shall set 8 questions i. e 4 from each part and students shall be required to attempt a total of 5 questions with at least 2 questions from each part.

SECTION – A

BUILDING STONES

General, Qualities of a good building stone, Deterioration of stones, Preservation of stones, Common building stones of India & their Uses, Artificial stones.

BRICKS
General, Constituents of bricks, desirable and harmful ingredients in brick earth, qualities of good bricks, testing of bricks, strength, Absorption, weathering of bricks. Varieties of fire bricks, sand lime bricks, building tiles- roofing; flooring and wall tiles.

LIME
Cementing material, Characteristics of good quality lime, classification & testing of Lime, Hydraulic test, acid test, setting & slaking of lime, uses of different varieties of lime

TIMBER
Advantages of timber construction, timber trees- exogenous and endogenous trees; soft and hard woods,

structure of tree, felling of trees, defects in timber, characteristics of good timber, uses and testing of timber

CEMENT AND CONCRETE

Constituents of concrete, different types of cements used and their strengths, Ingredients and manufacture of cements. Hydration and compounds of hydration. Properties and various tests of cement

.

SECTION - B

BRICK & STONE MASONRY

Terms used; types of bonds; their merits and demerits; Rubble and ashlar joints in stone masonary, introduction to cement concrete hollow blocks

WALLS AND FOUNDATION

Load bearing and non-load bearing walls, estimation of load on walls and footings, Thickness considerations, partition and cavity walls .

DAMP PROOFING

Sources, Causes of dampness in buildings, bad effects of dampness, methods of damp proofing.

ARCHES AND LINTELS

Introduction to terms used in Arches; different types of arches; brick and stone arches, types and functions of lintels.

DOORS AND WINDOWS

Introduction terms used location of doors and windows, types of doors and windows, Ventilators

PLASTERING, POINTING AND PAINTING

Introduction, objects and types, special materials for plastered surfaces, distempering, white washing and color washing of plastered surfaces.

FLOORS

Introduction, various types of floors commonly used and their suitability for different buildings, anti- termite treatment.

RECOMMENDED BOOKS

S.No.	NAME	AUTHORS	PUBLISHER
1.	Engineering Materials	S. K. Sharma & G. C. Mathur	R. Chand & Co. Delhi
2.	Engineering Materials	S. C. Rangwala	Charotar Publishing House, India
3.	Building Construction	S. K. Sharma	S. Chand
4.	Building Construction	Sushil Kumar	Standard Publishers
5.	Building Construction	B. C. Punmia	Laxmi Publishers

Course Code	CIV202
Course Title	Fluid Mechanics
Type of Course	Core
Course Assessment Methods End Semester Assessment(University Exam) Continous Assessment (Sessional, Assignments, Quiz) Course Prerequisites	50 50
Course Objectives (CO)	The objective of this course is to introduce the students with various types of Fluids and their properties, concept of Fluid Statics, Fluid Dynamics, and Various types of Flows.
Course Outcome	

SYLLABUS

Note: The examiner shall set 8 questions i. e 4 from each part and students shall be required to attempt a total of 5 questions with at least 2 questions from each part.

SECTION - A

FLUID AND THEIR PROPERTIES
Concept of fluid, difference between solids, liquids and gases; ideal and real fluids; Continuum concept of fluid: density, specific weight and relative density; viscosity and its dependence on temperature; surface tension and capillarity, vapor pressure and cavitation: compressibility and bulk modulus; Newtonian and non-Newtonian fluids.

FLUID STATICS
Concept of pressure, Pascal's law and its engineering hydrostatic paradox. Action of fluid pressure on plane (horizontal, vertical and inclined) submerged surface, resultant force and center of pressure, force on a curved surface due to hydrostatic pressure.
Buoyancy and floatation, stability of floating and submerged bodies, Metacentric height and its determination.

FUNDAMENTALS OF FLUID FLOW
Types of fluid flow, Basic Principles of Fluid Flow, Continuity Equation, Acceleration of a Fluid Particle, Rotational and Irrational Motions, Circulation and Vorticity, Velocity Potential, Stream Function, Streamlines, Equipotential Lines and Flow Net, Uses of Flow Net .

FLUID DYNAMICS

Forces acting on Fluid in motion, Euler's equation of motion, Bernoulli's equation, Impulse momentum equation, kinetic energy and momentum correction factors, flow along a curved streamline, free and forced vortex motions.

SECTION –B

LAMINAR FLOWS
Flow regimes and Reynolds number, critical velocity and critical Reynolds number, laminar flow in circular cross section pipes. Navier-stokes equations in Cartesian coordinates (no derivation), meaning of terms, flow between parallel plates, stokes law.

TURBULENT FLOWS
Turbulent flows, scale and intensity, Effects of turbulent flow in pipes and flow losses in pipes, Darcy equation, Minor head losses in pipe fittings.. Equation for velocity distribution in smooth and rough pipes (no derivation).

BOUNDARY LAYER ANALYSIS
Assumption and concept of boundary layer theory. Boundary-layer thickness, displacement, momentum & energy thickness, laminar and turbulent boundary layers on a flat plate; laminar sub-layer, smooth and rough boundaries. Local and average friction coefficients. Seperation and Control.

DIMENSIONAL ANALYSIS AND SIMILITUDE
Fundamental and derived units and dimensions, dimensional homogeneity, Rayleigh's and Buckingham's Pi method for dimensional analysis, dimension less number and their significance, geometric, kinematic and dynamic similarity, model studies.

RECOMMENDED BOOKS

S. No.	NAME	AUTHORS	PUBLISHER
1.	Fluid Mechanics	Dr Baljeet S. Kapoor	New Age Publishers
2.	Fluid Mechanics and Hydraulic Power Engineering	D. S. Kumar	Kataria & Sons
3.	Fluid Mechanics	Victor Streeter	McGraw Hill
4.	Elementary Mechanics of Fluids	Hunter Rouse	J. Willey & Sons
5.	Fluid Mehanics	Frank M White	McGraw Hill
6.	Fluid Mechanics & Hydraulic Machines	S. C. Gupta	Pearson Education
7.	Hydraulics & Fluid Mechanics	Modi and Seth	Standard Book House