BBAI501 Human Values and Professional Ethics (for UG Programs)

SUBJECT CODE	SUBJECT NAME	TEACHING & EVALUATION SCHEME								
		THEORY			PRACTICAL		Th	T	P	CREDITS
		END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BBAI501	Human Values and Professional Ethics	60	20	20	-	-	3	1	-	4

Legends: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical; **C** - Credit;
***Teacher Assessment** shall be based on following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

Course Objectives

The objective of the course is to disseminate the theory and practice of moral code of conduct and familiarize the students with the concepts of "right" and "good" in individual , social and professional context

Course Outcomes

1. Help the learners to determine what action or life is best to do or live
2. Right conduct and good life
3. To equip students with understanding of the ethical philosophies, principles, models that directly and indirectly affect business.

COURSE CONTENTS

UNIT - 1 Human Values

Values; Types, Features and Classification
Sources of Value System
Values across Cultures.

Unit 2 Morality

Norms, Beliefs, Attitude
Moral Norms, Moral Values
Moral Standards

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UNIT 3 Professional Ethics
Ethics; Nature, Characteristics and Needs
Ethics V/s Morals and Values
Ethico-Moral Action
Ethical Codes, Ethical Practices

Unit 4 Nature and Dimensions of Attitude
Components of Attitude
Attitude Formation
Functions of Attitude
Changing Attitude

Unit 5 Moral Values and Character Building
Character; Meaning, Important
Components of Character
Character Development

Suggested Readings

1. *Beteille Andre (1991), Society and Politics in India, Athlone Press, , Latest edition*
2. *Chakraborty S. K. (1999), Values and Ethics for Organizations, oxford university press ,Latest edition*
3. *Fernando, A.C.(2009), Business Ethics - An Indian Perspective, Pearson Education, India, , Latest edition*
4. *Charles D. Fleddermann (2012), "Engineering Ethics", Pearson Education / Prentice Hall, New Jersey, (Indian Reprint) , , Latest edition*
5. *Boatright John R (2012), "Ethics and the Conduct of Business", Pearson Education, New Delhi, , Latest edition*
6. *Crane, Andrew and Matten Dirk (2015), Business ethics, Oxford University Press Inc., New York. ,Latest edition*
7. *Murthy, C.S.V.(2016), Business Ethics – Text and Cases, Himalaya Publishing House Pvt. Ltd., Latest Edition*
8. *Naagrajan,R.R (2016), Professional Ethics and Human Values, New Age International Publications, , Latest edition*
9. *Campbell, V., & Bond, R. (1982). Evaluation of a character education curriculum. In D. McClelland, Education for values. New York: Irvington Publishers, Latest Edition.*
10. *R. S. Dwivedi (1995), "Human Relations and Organizational Behavior: A Global perspective", Macmillan Latest Edition*

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Semester IV (B.Sc. Chemistry Hons)

SUBJECT CODE	Category	SUBJECT NAME	TEACHING & EVALUATION SCHEME								
			THEORY			PRACTICAL		Th	T	P	CREDITS
			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BSHCH 402	HONS	INDUSTRIAL ASPECTS OF ORGANIC CHEMISTRY	60	20	20	0	0	4	0	0	4

Legends: L - Lecture; T - Tutorial/Teacher Guided Student Activity; P – Practical; C - Credit; Q/A – Quiz/Assignment/Attendance, MST Mid Sem Test.
***Teacher Assessment** shall be based on following components: Quiz/Assignment/Project/ Participation in class, given that no component shall exceed more than 10 marks.

Course Objective:

(i) To develop the understanding of fundamentals of Carbon Nanotubes, Organometalic Reagent and Organic Synthesis.
(ii) To develop the understanding of Industrial Aspects of Organic Chemistry.

Course Outcomes:

After completion of the course the students will be able to understand:

(i) Fundamentals of Organic Chemistry.
(ii) Fundamentals of Industrial Aspects of Organic Chemistry.

INDUSTRIAL ASPECTS OF ORGANIC CHEMISTRY

Unit I

Carbon Nanotubes:

Basic concept of C_{60}. Synthesis, Single walled carbon nanotubes, Structure and characterization, Mechanism of formation, chemically modified carbon nanotubes, Doping, Functionalizing nanotubes, Applications of carbon nanotubes.

Unit II

Techniques in Organic Synthesis:

Bio-transformations – Enzyme catalysed reactions, Microwave induced reactions-Principle, conditions, advantages over conventional heating methods- Applications.

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Unit III

Organometallic Reagents:

Synthesis and applications of Grignard reagents-organolithium, Zinc, Copper, compounds in organic synthesis- Homogeneous catalytic reactions hydrogenation, hydroformylation.

Unit IV

Methods in Organic Synthesis-I:

Organosilicon Compounds: Preparation and applications in organic synthesis; Applications of Pd (0) and Pd (II) complexes in organic synthesis- Suzuki and Sonogashira coupling, Heck reaction, Preparation and applications of lithium organocuparates.

Unit V

Methods of Organic Synthesis-II:

Reduction with lithium aluminium hydride, sodium borohydride, alkoxides, bismethoxyethoxyaluminium hydride, boron aluminium hydride and derivatives-catalytic metal hydrogenation-dissolving metal reductions, Non-metallic reducing agents including enzymatic and microbial reductions.

Books:

1. McCabe W.L. and Smith J.C., Unit Operations in Chemical Engineering, Pubs: McGraw Hill Book Company, New York.
2. Perry J.H., Chemical Engineering Handbook, Pubs: McGraw-Hill Book Company, New York.
3. Rao, C. N. R, Muller,A and Cheetam, A.K. (Eds) : The Chemistry of Nanomaterials, Vol.1, and 2, Wiley–VCH, Weinheim.
4. Poole, C. P and Owens,Jr: F. J : Introduction to Nanotechnology Wiley Interscience, New Jersey.
5. Kenneth J. Klabunde (Ed) , Nanoscale materials in Chemistry, WileyInterscience, New York.
6. Cary, F. A and Sundberg, R. I. :Advanced Organic Chemistry, Part A and B, Springer.
7. Smith, M. B. : Organic Synthesis, McGraw-Hill: New York.
8. Bansal R K : Heterocyclic Chemistry, New Age International.
9. Acheson R H : An introduction to the chemistry of Heterocyclic compounds, Wiley

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Semester IV (B.Sc. Chemistry Hons)

SUBJECT CODE	Category	SUBJECT NAME	TEACHING & EVALUATION SCHEME								
			THEORY			PRACTICAL		Th	T	P	CREDITS
			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BSHCH 403	HONS	SPECTROSCOPIC METHODS AND STRUCTURE DETERMINATION	60	20	20	0	0	4	0	0	4

Legends: L - Lecture; T - Tutorial/Teacher Guided Student Activity; P – Practical; C - Credit; Q/A – Quiz/Assignment/Attendance, MST Mid Sem. Test.
***Teacher Assessment** shall be based on following components: Quiz/Assignment/Project/ Participation in class, given that no component shall exceed more than 10 marks.

Course Objective:
(iii)To develop the understanding of fundamentals of Spectroscopy.
(iv)To develop the understanding of structure determination.
(v) To give basic knowledge of Spectroscopic Methods.

Course Outcomes:
After completion of the course the students will be able to understand :

(i) Fundamentals of Spectroscopy.
(ii) Fundamentals of Spectroscopic Methods and Structure Determination.

Spectroscopic Methods and Structure Determination

Unit I
Rotational and Vibrational spectra: Basic principles, selection rule, fundamental vibrations and rotations, Raman Effect. Identification of some representative organic and inorganic compounds.

Electronic spectra: Frank-Condon principle, Fluorescence, Phosphorescence, radiation less transition, electronic spectra of diatomic molecules, chromophores , auxochromes, absorption and intensity shifts, solvent effects, Woodward Fieser rules.

Unit II
Nuclear Magnetic Resonance Spectroscopy: Basic principles, origin of chemical shifts, spin-spin coupling, mechanism of Shielding and deshielding, coupling constants. Shift reagents, Nuclear Overhouser Effect (NOE 1H, and 13C, and spectra of selected compounds..

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Unit III

EPR spectroscopy: Basic principles, origin of g-value , hyperfine and hyperfine coupling, spin orbit coupling, line shape, zero field splitting, Kramer degeneracy, ESR analysis of organic radicals, transition metal complexes of vanadium, copper, cobalt and iron.

Mass spectrometry: Basic principles and instrumentation for EIMS ,mechanism og fragmenation, mass spectral fragmentation of organic compounds, Interpretation of mass spectra of simple molecule, applications to simple organic compounds.

Unit IV

Mössbauer Spectroscopy: Nuclear resonance absorption, recoil energy, Doppler effect, Mössbauer effect, Isomer shift, quadruple interactions, effect of magnetic field, determination of oxidation states of iron (including bioinorganic systems, ferredoxins) tin and cobalt compounds.

Unit V

X-ray Diffraction: X-ray diffraction by single crystal – Space groups –Systematic absences in X-ray data and identification of lattice types , glide planes and screw axes.X-ray intensities, structure factor and its relation to intensity and electron density , phase problem. Structure solution by Heavy atom method and direct method. Determination of absolute configuration of molecules

Electron Diffraction by Gases - Scattering intensity vs Scattering angle, elucidation of structure of simple gas phase molecules.

Neutron Diffraction by Crystals – magnetic scattering, measurement techniques. Elucidation of structure of magnetically ordered unit cell.

Books:

1. C.N. Banwell, Fundamentals of molecular Spectroscopy, TMH, New Delhi.
2. B.P. Straughan and S.Walker Spectroscopy Vol.3, Chapman Hall London.
3. P.M. Silverstein, F. X. Wester, Spectroscopic Identification of Organic Compounds, Wiley.
4. Y.R. Sharma , Elementary Organic Spectroscopy – Principles and Chemical applications, S.Chand.
5. P.S.Kalsi, Spectroscopy of Organic Compounds.
6. Drago, R. S. Physical Methods for Chemistry, (Saunders Company).
7. Nakamoto, K. Infrared and Raman Spectra: Inorganic and Coordination Compounds, (John Wiley).

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Semester IV (B.Sc. Chemistry Hons)

SUBJECT CODE	Category	SUBJECT NAME	TEACHING & EVALUATION SCHEME								
			THEORY			PRACTICAL		Th	T	P	CR EDITS
			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment *				
BSHCH-405	HONS	CHEMICAL TECHNOLOGY (HEAVY AND FINE CHEMICALS)	60	20	20	0	0	4	0	0	4

Legends: L - Lecture; T - Tutorial/Teacher Guided Student Activity; P – Practical; C - Credit; Q/A – Quiz/Assignment/Attendance, MST Mid Sem Test.
***Teacher Assessment** shall be based on following components: Quiz/Assignment/Project/ Participation in class, given that no component shall exceed more than 10 marks.

Course Objective:

(i) To develop the understanding of fundamentals of Chemistry of Heavy Inorganic Chemicals , Heavy Organic Chemicals and Fine Chemicals
(ii) To give basic knowledge of Heavy and Fine Chemicals.

Course Outcomes:
After completion of the course the students will be able to understand:

(i) Fundamentals of Chemistry of Heavy Inorganic Chemicals, Heavy Organic and Fine Chemicals.
(ii) Fundamentals of Heavy and Fine Chemicals.

Unit I
Heavy Inorganic Chemicals

Basic concept of Heavy Inorganic Chemicals and Manufacture of: Ammonium phosphates, super phosphate, carbon blacks,
With reference to: Raw material, Production process and Flow chart, Quality control, Hazards and safety, Effluent management and uses.

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Unit II

Heavy Organic Chemicals

Basic concept of Heavy Organic Chemicals and Manufacture of: zeolites as catalyst. Propargyl alcohol, 1,4-butanediol, vinyl chloride, pyridines, picolines, phthalic anhydrides, glycerol, sorbitol, chloroform.

With reference to: Raw material, Production process and Flow chart, Quality control, Hazards and safety, Effluent management and uses.

Unit III

Basic concept of Fine Chemicals and Manufacture of:Sodium borohydrate, lithium aluminium hydride, sodium ethoxide, paracetamol, indigo, vat dyes. Essential oils, coloring agents- manufacture of some natural and synthetic colors.

With reference to: Raw material, Production process and Flow chart, Quality control, Hazards and safety, Effluent management and uses

Unit IV

Industrial catalysts

Raney nickel, other forms of nickel, palladium and supported palladium, copper chromate, vanadium and platinum based catalyst. Aluminium alkoxides, titanium tetrachloride and titanium dioxide.

Speciality industrial solvents : Synthesis, properties and uses of Dimethyl-formamide (DMF) , Dimethyl sulfoxide (DMSO), Tetrahydrofuran (THF), Dioxane, Diethyl ether and sulfolane.

Unit V

Acids: Manufacture, Properties and uses of Nitric acid, Sulphuric acid, Phosphoric acid and Hydrochloric acid

Industrial Gases: Hydrogen, Nitrogen, Oxygen, Carbon dioxide and Sulphur dioxide.

Alkali: Sources, uses and preparation of sodium chloride, Manufacture and uses of Sodium hydroxide, Sodium carbonate, Sodium bicarbonate and sodium hypochlorite.

Books:

1. Chemical process industries by Shreve R. N. , McGraw Hill
2. Industrial chemistry by B.K. Sharma
3. Introduction to material science and engineering by K.M. Rells, T. Courtney and J. Wulff, Wiley Dastern Pvt. Ltd. New Delhi
4. Unit process in organic synthesis by P.H Groggine, McGrow Hill Kogakusin Ltd.
5. Outline of chemical technology by G.E. Dryen, East West Press. New Delhi
6. Industrial chemicals by Faith et. al. Wiley Interscience, New York
7. Heavy organic chemicals by A. J. Saile, Pargaon Press U.K.

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Name of the Program: B. Sc. (Honours)

SUBJECT CODE	Category	SUBJECT NAME	TEACHING & EVALUATION SCHEME								
			THEORY			PRACTICAL		Th	T	P	CREDITS
			END SEM	MST	Q/A	END SEM	Q/A				
BSHMA 404	Hons	**MATHEMATICS – IV** (Numerical Methods & Linear Programming)	60	20	20	-	-	4	1	-	5

Course Objective

To introduce the students with the Fundamentals of the Numerical Methods & Linear Programming.

Course Outcomes

After the successful completion of this course students will be able to

1. *understand and apply the basics of the Calculus of Finite Difference.*
2. *Interpolate and Extrapolate values.*
3. *apply the techniques to find the Numerical Integration.*
4. *know the principles of the Linear Programming Problems.*
5. *understand and apply the Optimization Techniques.*

Course Content:

BSHMA 401: MATHEMATICS – IV (Numerical Methods & Linear Programming)

UNIT – I

Numerical Methods: Approximate numbers, Significant figures, Rounding off numbers. Error – Absolute, Relative and Percentage.**Operators** - Δ , ∇ and E (Definitions and some relations among them). **Interpolation:** The problem of Interpolation, Equispaced arguments –Difference Tables, Deduction of Newton's Forward Interpolation Formula. Remainder term (expression only). Newton's Backward Interpolation formula (statement only) with remainder term.

UNIT – II

Unequally – spaced arguments –Lagrange's Interpolation Formula (statement only). Numerical problems on Interpolation with both equi- and unequally-spaced arguments. **Number Integration :** Trapezoidal and Simpson's ⅓rd formula (statement only). Problems on Numerical Integration.

UNIT – III

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Solution of Numerical Equation: To find a real root of an algebraic or transcendental equation. Location of root (Tabular method), Bisection method. Newton-Raphson method with geometrical significance. Numerical problems. (Note : emphasis should be given on problems)

UNIT – IV

Linear Programming: Motivation of Linear Programming problem. Statement of L.P.P. formulation of L.P.P. Slack and Surplus variables. L.P.P. is matrix form. Convex set, Hyperplane, Extreme points, Convex Polyhedron, Basic solutions and Basic Feasible Solutions (B.F.S.) Degenerate and Non-degenerate B.F.S. The set of all feasible solutions of an L.P.P. is a convex set. The objective function of an L.P.P. assumes its optimal value at an extreme point of the convex set of feasible solutions. A B.F.S. to an L.P.P. corresponds to an extreme point of the convex set of feasible solutions.

UNIT – V

Fundamental Theorem of L.P.P. (Statement only). Reduction of a feasible solution to a B.F.S. Standard form of an L.P.P. Solution by graphical method (for two variables), by simplex method and method of penalty. Concept of duality. Duality theory. The dual of the dual is the primal. Relation between the objective values of dual and the primal problems. Dual problems with at most one unrestricted variable, one constraint of equality. Transportation and Assignment problem and their optimal solutions.

BOOKS:

1. Numerical methods – E. Balagurusamy (Tata McGraw Hill).
2. Introduction to numerical analysis – F. B. Hilderbrand (TMH Edition).
3. Numerical Analysis – J. Scarborough.
4. Introduction to numerical analysis – Carl Erik Froberg (Addison Wesley Publishing).
5. Numerical methods for science and engineering – R. G. Stanton (Prentice Hall).
6. Linear Programming : Method and Application – S. I. Gass.
7. Linear Programming – G. Hadley.
8. An Introduction to Linear Programming & Theory of Games – S. Vajda.

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U.G. PROGRAM B. Sc. Physics (Hons.)

SEM-IV-P-I

Electrostatics & Magneto statics

SUBJECT CODE	Category	SUBJECT NAME	TEACHING &EVALUATION SCHEME								
			THEORY			PRACTICAL		Th	T	P	CREDITS
			End Sem University Exam	Two Term Exam	Teachers Assessment *	End Sem University Exam	Teachers Assessment*				
BSPH402	DC	Electrostatics & Magneto statics	60	20	20	30	20	3	1	4	6

Legends: L - Lecture; T - Tutorial/Teacher Guided Student Activity; P – Practical; C - Credit;
Q/A – Quiz/Assignment/Attendance, MST MidSem Test.
*Teacher Assessment shall be based on following components: Quiz/Assignment/ Project/Participation in class (Given that no component shall be exceed 10 Marks)

Course Objectives:-

1. To develop the comprehensive understanding of laws of physics related to,Electrostatics,Magnetostatics and ability to apply them for laying the foundation for research and development.
2. To work ethically as member as well as leader in a diverse team.

Course Outcomes:-

1. Student will be able to understand and solve the problems related toElectrostatics.
2. Student will be able to understand and solve the problem related toMagnetostatics
3. Student will be able to determine physical parameter experimentally with optimal usage of resources and complete the assignments in time.

BSPH 402-Electrostatics &Magnetostatics

Unit-1

Electric Circuits AC Circuits: - Complex Reactance and Impedance. Series LCR Circuit: Resonance, Power Dissipation and Quality Factor. and Band Width. Parallel LCR Circuit.Network theorems: - Ideal Constant-voltage and Constant-current Sources. Network Theorems: Thevenin theorem, Norton theorem, Superposition theorem, Reciprocity theorem, and Maximum Power Transfer theorem

Unit-2

Electrostatics Coulombs law in vacuum expressed in vector forms, calculations of electric field E for simple distributions of charge at rest, dipole and quadruple fields. Relation between electric field & electric potential ($E = -\nabla V$), torque on a dipole in a uniform electric field and its energy, flux of the electric field, Gauss's law and its application.. Dielectrics, parallel plate capacitor with a dielectric, dielectric constant, polarization and polarization vector P, relation between displacement vector D, E and P. Molecular interpretation ofClaussius-Mossotti equation

Unit-3

Magnetostatics Force on a moving charge, Lorentz force equation and definition of B, force on a straight conductor carrying current in a uniform magnetic field, torque on a current loop, magnetic dipole moment, angular momentum and gyro magnetic ratio, Biot and Savart's law, Electromagnetic induction, Faraday's Laws, Electromotive force, Integral and differential forms of Faraday's laws, Self and mutual inductance, Transformers, Energy in a static magnetic field, Maxwell's displacement current, Derivations of Maxwell's equations, Electromagnetic field energy density. Poynting vector,

Unit-4

Current Electricity: Steady current, current density J, non-steady currents and continuity equation, Kirchoff's laws and analysis of multi loop circuits, growth and decay of current in LR and CR circuits, decay constants, LCR circuits. AC circuits, complex numbers and their applications in solving AC circuits problems, complex impedance and reactance, series and parallel resonance. Q-factor, power consumed by an A.C. circuit, power factor, Y and Δ networks and transmission of electric power.

Unit-5

Dielectric Properties of Matter Dielectrics:- Electric Field in Matter. Dielectric Constant.Parallel Plate Capacitor with a Dielectric.Polarization, Polarization Charges and Polarization Vector.Electric Susceptibility.Gauss's law in Dielectrics.Displacement vector D. Relations between the three Electric Vectors. Capacitors filled with Dielectrics.

References:

1. Introduction to Electrodynamics: David J. Griffiths, 4th Edition, Printice Hall.
2. Classical Electrodynamics: Jhon David Jackson, Jhon Wiley & Sons.
3. Electrodynamics: Emi Cossor&Bassin Lorraine, Asahi Shimbunsha Publishing Ltd.
4. From Neuron to Brain: Kuffler and Nicholas, Sinauer Associates, Inc Pub. Sunderland, Masschuetts (Reference for topics of Bioelectricity) Department of Higher Education, Government of Mad

List of Experiments:

1. Hall probe method for measurement of resistivity.
2. To Study Series Resonance CKT
3. Charging and discharging of Capacitor through resistance
4. Study of B-H Curve (Magneto statics)
5. To study Parallel Resonance
6. Measurement of Frequency of A.C. mains by electrically maintained vibrating rod.(Electromagnetic induction)
7. Growth and decay of current in LR
8. Determination of e/m using Thomson's method.
9. Verification of Thevenin theorem
10. Verification of Norton theorem
11. Verification of Superposition theorem
12. Verification of Maximum Power Transfer theorem.

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U.G. PROGRAM B. Sc. Physics (Hons.)

SEM-IV-P-II

Thermodynamics

SUBJECT CODE	Category	SUBJECT NAME	TEACHING & EVALUATION SCHEME								
			THEORY			PRACTICAL		Th	T	P	CREDITS
			End Sem University Exam	Two Term Exam	Teachers Assessment	End Sem University Exam	Teachers Assessment				
BSPHPH403	DC	Thermodynamics	60	20	20	0	0	4	0	0	4

Course Objectives:-

- To develop the comprehensive understanding of laws of Thermodynamics and ability to apply them for laying the foundation for research and development.
- To work ethically as member as well as leader in a diverse team.

Course Outcomes:-

- Student will be able to understand and solve the problems related to Thermodynamics.
- Student will be able to determine physical parameter experimentally with optimal usage of resources and complete the assignments in time.

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BSPHPH403:Thermodynamics

UNIT 1Introduction to Thermodynamics Zeroth and First Law of Thermodynamics: Extensive and intensive Thermodynamic Variables, Thermodynamic Equilibrium, Concept of Temperature, Concept of Work & Heat, State Functions, Internal Energy, and Applications of First Law: General Relation between C_P and C_V, Work Done during Isothermal and Adiabatic Processes, Compressibility and Expansion Co-efficient.

UNIT 2Second Law of Thermodynamics: Reversible and Irreversible process with examples. Conversion of Work into Heat and Heat into Work.Heat Engines.Carnot's Cycle, Carnot engine & efficiency, Refrigerator & coefficient of performance, 2nd Law of Thermodynamics: Kelvin-Planck and Clausius Statements and their Equivalence. Carnot's Theorem. Applications of Second Law of Thermodynamics: Thermodynamic Scale of Temperature and its Equivalence to Perfect Gas Scale.

UNIT 3Etropy: Concept of Entropy, Clausius Theorem. Clausius Inequality, Second Law of Thermodynamics in terms of Entropy.Entropy of a perfect gas.Principle of Increase of Entropy, Entropy Changes in Reversible and Irreversible processes with examples, Entropy of the Universe.Entropy Changes in Reversible and Irreversible Processes.Principle of Increase of Entropy, Temperature–Entropy diagrams for Carnot's Cycle. Third Law of Thermodynamics, Unattainability of Absolute Zero

UNIT 4Thermodynamic Potentials: Thermodynamic Potentials: Internal Energy, Enthalpy, Helmholtz Free Energy, Gibb's Free Energy, Cooling due to adiabatic demagnetization, First and second order Phase Transitions with examples, ClausiusClapeyron Equation and Ehrenfest equations

UNIT 5 Maxwell's Thermodynamic Relations: Derivations and applications of Maxwell's Relations, Maxwell's Relations:(1) ClausiusClapeyron equation, (2) Values of Cp-Cv, (3) TdS Equations, (4) Joule-Kelvin coefficient for Ideal and Van der Waal Gases, (5) Energy equations, (6) Change of Temperature during Adiabatic Process. Kinetic Theory of Gases Distribution of Velocities: Maxwell-Boltzmann Law of Distribution of Velocities in an Ideal Gas and its Experimental Verification.

Reference Books:

1. Heat and Thermodynamics, M.W. Zemansky, Richard Dittman, 1981, McGraw-Hill.
2. A Treatise on Heat, MeghnadSaha, and B.N.Srivastava, 1958, Indian Press
3. Thermal Physics, S. Garg, R. Bansal and Ghosh, 2nd Edition, 1993, Tata McGraw-Hill
4. Modern Thermodynamics with Statistical Mechanics, Carl S. Helrich, 2009, Springer.