Detailed Course Scheme

Bachelor of Science (B.Sc.)

(Physics, Chemistry & Mathematics)

Semester -III

(2018-2021)

DOC201807020058

RNB GLOBAL UNIVERSITY

Educating stars for tomorrow

RNB GLOBAL UNIVERSITY

RNB Global City, Ganganagar Road,
Bikaner, Rajasthan 334601

OVERVIEW

RNB Global University follows Semester System along with Choice Based Credit System as per latest guidelines of University Grants Commission (UGC). Accordingly, each academic year is divided into two semesters, **Odd(July-December) and Even (January-June).**Also, the university follows a system of continuous evaluation along with regular updating in course curricula and teaching pedagogy.

The curriculum for B.Sc. Program for (July-December) Odd Semester, 2019 along with examination pattern is as follows.

Course Scheme

Semester – III

S. No.	Course Code	Course Name	L	T	P	Credits
1.	13001500	Thermal Physics & Statistical Mechanics	4	0	0	4
2.	13001600	Thermal Physics & Statistical Mechanics Lab	0	0	4	2
3.	13001300	Chemistry-III	4	0	0	4
4.	13001400	Chemistry-III Lab	0	0	4	2
5.	13001700	Real Analysis	5	1	0	6
6.	13002900	Ability & Skill Enhancement Module - III	2	0	0	2
7.	13006200	Basic Instrumentation Skills	2	0	0	2
8.	99002800	Workshops & Seminars	-	-	-	1
9.	99002700	Human Values & Social Service/NCC/NSS	-	-	-	1
Total			**17**	**1**	**8**	**24**

EVALUATION SCHEME -THEORY

The evaluation of the theory paper of B.Sc. program would be based on Internal and External Assessments. Internal Assessment would consist of 50% of the marks (50 marks) and external assessment (in form of End Term Exam) would consist of remaining 50% marks (50 marks). Detailed scheme of Internal and External Assessments as follows:

Internal Assessment

The distribution of Internal Assessment Marks is as follows:

Type	Details	Marks
Mid Term	Two Mid-term Sessional of 15 marks each (15+15)	30
Marks obtained in various Tests, Assignments, Presentations, Quiz, Tutorials, etc.	Average of marks obtained	15
Attendance	75%+ : 5 marks	5
TOTAL	**50**	

External Assessment

Type	Marks
Theory	50

EVALUATION SCHEME -PRACTICAL

The evaluation of the practical paper of B.Sc. program would be based on Internal and External Assessments. Internal Assessment would consist of 50% of the marks (50 marks) and external assessment (in form of End Term Exam) would consist of remaining 50% marks (50 marks). Detailed scheme of Internal and External Assessment is as follows:

Internal Assessment

Type	Details	Marks
Marks obtained in various manuals, practical file, participation, any model prepared, output of practical	Average of marks obtained	45
Attendance	75%+ : 5 marks	5
TOTAL	**50**	

External Assessment

Type	Marks
Practical	50

EVALUATION SCHEME- WORKSHOPS & SEMINARS AND HUMAN VALUES & SOCIAL SERVICE/NCC/NSS

1. The evaluation of Workshops & Seminar and Human Values & Social Service/NCC/NSS will be completed from Semester I – Semester VI. It will be evaluated internally by the various Forums & Schools Concerned. The credit for this will be given at the end of each Semester.

2. The students have to join club/clubs/Forums with the active participation in different activities of club. The students would be continuously assessed from Semester-I to Semester-IV and credits and marks would be given after the end of each Semester.

CURRICULUM

Course Name: Thermal Physics & Statistical Mechanics

Course Code: 13001500

Objectives

- Thermal Physics and Statistical Mechanics leads to the knowledge of Zeroth law, First law and Secon law of thermodynamics. This study leads of the introduction of thermodynamics potential and kinetic theory of gases. Theory of radiation leads to understanding of the Spectral distribution of energy and Black body radiation. Phase space, Macrostate and Microstate, Entropy and Thermodynamic probability, Maxwell-Boltzmann law - distribution of velocity - Quantum statistics - Fermi-Dirac distribution law - electron gas - Bose-Einstein distribution law -photon gas - comparison of three statistics are taught under statistical mechanics.
- To acquire working knowledge of the zero-th, first and second law of thermodynamics.
- To apply the laws of thermodynamics.
- To link thermodynamics to the micro description used in classical Statistical Mechanics.

Course Outline

Unit I: Thermodynamic Description of system

Zeroth Law of thermodynamics and temperature. First law and internal energy, conversion of heat into work, Various Thermodynamical Processes, Applications of First Law: General Relation between CP & CV, Work Done during Isothermal and Adiabatic Processes, Compressibility & Expansion Coefficient, Reversible & irreversible processes, Second law & Entropy, Carnot's cycle & theorem, Entropy changes in reversible & irreversible processes, Entropy-temperature diagrams, Third law of thermodynamics, Unattainability of absolute zero.

Unit II: **Thermodynamic Potentials**

Enthalpy, Gibbs, Helmholtz and Internal Energy functions, Maxwell's relations & applications - Joule-Thompson Effect, Clausius- Clapeyron Equation, Expression for (CP – CV), CP/CV, TdS equations.

Unit III: Kinetic Theory of Gases

Derivation of Maxwell's law of distribution of velocities and its experimental verification, Mean free path (Zeroth Order), Transport Phenomena: Viscosity, Conduction and Diffusion (for vertical case), Law of equipartition of energy (no derivation) and its applications to specific heat of gases; mono-atomic and diatomic gases.

Unit IV: Theory of Radiation

Blackbody radiation, Spectral distribution, Concept of Energy Density, Derivation of Planck's law, Deduction of Wien's distribution law, Rayleigh- Jeans Law, Stefan Boltzmann Law and Wien's displacement law from Planck's law.

Unit V: Statistical Mechanics

Phase space, Macrostate and Microstate, Entropy and Thermodynamic probability, Maxwell-Boltzmann law - distribution of velocity - Quantum statistics - Fermi-Dirac distribution law - electron gas - Bose-Einstein distribution law - photon gas - comparison of three statistics.

Suggested Readings:

1. Thermal Physics, S. Garg, R. Bansal and C. Ghosh, 1993, Tata McGraw-Hill.
2. A Treatise on Heat, Meghnad Saha, and B.N. Srivastava, 1969, Indian Press.
3. Thermodynamics, Enrico Fermi, 1956, Courier Dover Publications.
4. Heat and Thermodynamics, M.W.Zemasky and R. Dittman, 1981, McGraw Hill
5. Thermodynamics, Kinetic theory & Statistical thermodynamics, F.W.Sears & G.L.Salinger. 1988, Narosa
6. University Physics, Ronald Lane Reese, 2003, Thomson Brooks/Cole.
7. Thermal Physics, A. Kumar and S.P. Taneja, 2014, R. chand Publications.

Course Name: Thermal Physics & Statistical Mechanics Lab

Course Code: 13001600

Objectives

In Thermal Physics and Statistical Mechanics lab students will learn to calculate Mechanical Equivalent of Heat, J, by Callender and Barne's constant flow method, Measurement of Planck's constant using black body radiation, To determine Stefan's Constant, to determine the coefficient of thermal conductivity of copper by Searle's Apparatus, to determine the Coefficient of Thermal Conductivity of Cu by Angstrom's Method. To determine the coefficient of thermal conductivity of a bad conductor by Lee and Charlton's disc method. to determine the temperature co-efficient of resistance by Platinum resistance thermometer. to study the variation of thermo emf across two junctions of a thermocouple with temperature. to record and analyze the cooling temperature of an hot object as a function of time using a thermocouple and suitable data acquisition system and to calibrate Resistance Temperature Device (RTD) using Null Method/Off-Balance Bridge.

Course Outline

List of Experiments

1. To determine Mechanical Equivalent of Heat, J, by Calender and Barne's constant flow method.
2. Measurement of Planck's constant using black body radiation.
3. To determine Stefan's Constant.
4. To determine the coefficient of thermal conductivity of copper by Searle's Apparatus.
5. To determine the Coefficient of Thermal Conductivity of Cu by Angstrom's Method.
6. To determine the coefficient of thermal conductivity of a bad conductor by Lee and Charlton's disc method.
7. To determine the temperature co-efficient of resistance by Platinum resistance thermometer.
8. To study the variation of thermoemf across two junctions of a thermocouple with temperature.
9. To record and analyze the cooling temperature of an hot object as a function of time using a thermocouple and suitable data acquisition system.
10. To calibrate Resistance Temperature Device (RTD) using Null Method/Off-Balance Bridge.

Suggested Readings

1. Advanced Practical Physics for students, B.L.Flint & H.T.Workshop, 1971, Asia Publishing House.

2. Advanced level Physics Practicals, Michael Nelson and Jon M. Ogborn, 4th Edition, reprinted 1985, Heinemann Educational Publishers A Text Book of Practical Physics, Indu Prakash and Ramakrishna, 11th Edition, 2011, Kitab Mahal, New Delhi.
3. A Laboratory Manual of Physics for Undergraduate Classes, D.P. Khandelwal, 1985, Vani Publication.

Course Name: Chemistry III

Course Code: 13001300

Objectives

The whole curriculum has two broad parts: physical chemistry and organic chemistry, the physical chemistry has been divided into four segments whereas organic part has two segments. The syllabus coverage includes 49 hardcore lectures & clarification classes; video & practical demonstration of few important concepts; seminar, webinars, guest lectures, presentations by students and brainstorming quiz session. The main objectives of teaching include:

1. The 'SOLUTIONS' segment includes the learning of vapour pressure-composition diagrams helpful in understanding of distillation techniques, steam distillation, partial miscibility of solutes etc.
2. PHASE EQUILIBRIA' includes the understanding of Diagrams which are important to materials engineering (specially in alloys). Phase Equilibrium Diagrams are the foundation in performing basic materials research in fields such as solidification, crystal growth, joining, solid-state reaction, phase transformation
3. CONDUCTANCE' chapter has importance in the determination of ionic product of water, solubility product, degree of dissociation of electrolytes and performing the different types of titrations.
4. ELECTROCHEMISTRY' segments helps in understanding of thermodynamics of electrochemistry, the structure of the electrode/electrolyte interface and electrode processes.
5. The 'ORGANIC CHEMISTRY' section includes the principles, preparation and reactions mechanism associated with carboxylic functional groups, structures of biomolecules like carbohydrates and proteins, preparation of noble merrifield resin through peptide synthesis which has many research importance etc.

Course Outline

Unit I

Solutions: Thermodynamics of ideal solutions: Ideal solutions and Raoult's law, deviations from Raoult's law – non-ideal solutions. Vapour pressure-composition and temperature composition curves of ideal and non-ideal solutions. Distillation of solutions, Lever rule. Azeotropes Partial miscibility of liquids: Critical solution temperature; effect of impurity on

partial miscibility of liquids. Immiscibility of liquids- Principle of steam distillation, Nernst distribution law and its applications, solvent extraction.

Unit II

Phase Equilibrium: Phases, components and degrees of freedom of a system, criteria of phase equilibrium. Gibbs Phase Rule and its thermodynamic derivation, Derivation of Clausius – Clapeyron equation and its importance in phase equilibria. Phase diagrams of one-component systems (water and sulphur) and two component systems involving eutectics (lead-silver), congruent and incongruent melting points (FeCl3-H2O & Na-K only).

Unit III

Conductance**:** Conductivity, equivalent and molar conductivity and their variation with dilution for weak and strong electrolytes. Kohlrausch law of independent migration of ions. Transference number and its experimental determination using Hittorf and Moving boundary methods. Ionic mobility. Applications of conductance measurements: Conductometric titrations (only acid-base).

Unit IV

Electrochemistry: Reversible and irreversible cells. Concept of EMF of a cell. Measurement of EMF of a cell. Nernst equation and its importance. Types of electrodes. Standard electrode potential. Electrochemical series. Thermodynamics of a reversible cell, calculation of thermodynamic properties: ΔG, ΔH and ΔS from EMF data. Calculation of equilibrium constant from EMF data..pH determination using hydrogen electrode and quinhydrone electrode. Potentiometric titrations -qualitative treatment (acid-base and oxidation-reduction only).

Unit V

Organic Chemistry: Functional group approach for the following reactions (preparations & reactions) to be studied in context to their structure.

Carboxylic acids and their derivatives: Carboxylic acids (aliphatic and aromatic) *Preparation:* Acidic and Alkaline hydrolysis of esters. *Reactions:* Hell – Vohlard - Zelinsky Reaction.

Carboxylic acid derivatives (aliphatic):

Preparation: Acid chlorides, Anhydrides, Esters and Amides from acids and their inter conversion. *Reactions:* Comparative study of nucleophilicity of acyl derivatives. Reformat sky Reaction, Perkin condensation.

Amines and Diazonium Salts

Amines (Aliphatic and Aromatic):

Preparation: from alkyl halides, Gabriel's Phthalimide synthesis, Hofmann Bromamide reaction.

Reactions: Hofmann vs. Saytzeff elimination, Carbylamines test, Hinsberg test, with HNO_2, Schotten – Baumann Reaction. Electrophilic substitution (case aniline): nitration, bromination, sulphonation.

Diazonium salts: *Preparation:* from aromatic amines. *Reactions:* conversion to benzene, phenol, dyes.

Unit VI

Amino Acids, Peptides and Proteins: *Preparation of Amino Acids:* Strecker synthesis using Gabriel's phthalimide synthesis. Zwitterion, Isoelectric point and Electrophoresis. *Reactions of Amino acids*: ester of –COOH group, acetylation of -NH_2 group, complexation with Cu^{2+} ions, ninhydrin test. Overview of Primary, Secondary, Tertiary and Quaternary Structure of proteins. Determination of Primary structure of Peptides by degradation Edmann degradation (N-terminal) and C–terminal (thiohydantoin and with carboxypeptidase enzyme).Synthesis of simple peptides (upto dipeptides) by N-protection (t-butyloxycarbonyl and phthaloyl) & C-activating groups and Merrifield solid-phase synthesis.

Carbohydrates: Classification, and General Properties, Glucose and Fructose (open chain and cyclic structure), Determination of configuration of monosaccharides, absolute configuration of Glucose and Fructose, Mutarotation, ascending and descending in monosaccharides. Structure of disacharrides (sucrose, cellobiose, maltose, lactose) and polysacharrides (starch and cellulose) excluding their structure elucidation.

Suggested Readings

1. Barrow, G.M. *Physical Chemistry* Tata McGraw-Hill (2007).
2. Castellan, G.W. *Physical Chemistry* 4th Ed. Narosa (2004).
3. Kotz, J.C., Treichel, P.M. & Townsend, J.R. *General Chemistry*, Cengage Learning India Pvt. Ltd.: New Delhi (2009).
4. Mahan, B.H. *University Chemistry*, 3rd Ed. Narosa (1998).
5. Petrucci, R.H. *General Chemistry*, 5th Ed., Macmillan Publishing Co.: New York (1985).
6. Morrison, R. T. & Boyd, R. N. *Organic Chemistry*, Dorling Kindersley (India) Pvt. Ltd. (Pearson Education).
7. Finar, I. L. *Organic Chemistry* (*Volume 1 & 2*), Dorling Kindersley (India) Pvt. Ltd. (Pearson Education).
8. Nelson, D. L. & Cox, M. M. *Lehninger's Principles of Bioch*emistry *7th Ed.,* W. H. Freeman.
9. Berg, J.M., Tymoczko, J.L. & Stryer, L. *Biochemistry*, W.H. Freeman, 2002

Course Name: Chemistry III Lab

Course Code 13001400

Objectives

To provide an overview of the various business process, analyze operations, production planning.

Course Outline

List of Experiments

Section A: Physical Chemistry

Distribution

Study of the equilibrium of one of the following reactions by the distribution method:

$$I_2(aq) + I^-(aq) \rightleftharpoons I_3^-(aq)$$

$$Cu^{2+}(aq) + xNH_2(aq) \rightleftharpoons [Cu(NH_3)_x]^{2+}$$

Phase equilibria

a) Construction of the phase diagram of a binary system (simple eutectic) using cooling curves.
b) Determination of the critical solution temperature and composition of the phenol water system and study of the effect of impurities on it.
c) Study of the variation of mutual solubility temperature with concentration for the phenol water system and determination of the critical solubility temperature.

Conductance

I. Determination of cell constant
II. Determination of equivalent conductance, degree of dissociation and dissociation constant of a weak acid.
III. Perform the following conductometric titrations:
    a. Strong acid vs. strong base
    b. Weak acid vs. strong base

Potentiometry

Perform the following potentiometric titrations:
i. Strong acid vs. strong base
ii. Weak acid vs. strong base
iii. Potassium dichromate vs. Mohr's salt

Section B: Organic Chemistry

Systematic Qualitative Organic Analysis of Organic Compounds possessing mono functional groups (-COOH, phenolic, aldehydic, ketonic, amide, nitro, amines) and preparation of one derivative.
1. Separation of amino acids by paper chromatography
2. Determination of the concentration of glycine solution by formylation method.
3. Titration curve of glycine

4. Action of salivary amylase on starch
5. Effect of temperature on the action of salivary amylase on starch.
6. Differentiation between a reducing and a non-reducing sugar.

Suggested Readings:

1. Vogel, A.I., Tatchell, A.R., Furnis, B.S., Hannaford, A.J. & Smith, P.W.G.,
2. *Textbook of Practical Organic Chemistry*, Prentice-Hall, 5th edition, 1996.
3. Mann, F.G. & Saunders, B.C. *Practical Organic Chemistry* Orient-Longman, 1960.
4. Khosla, B. D.; Garg, V. C. & Gulati, A. *Senior Practical Physical Chemistry,* R. Chand & Co.: New Delhi (2011).
5. Ahluwalia, V.K. & Aggarwal, R. *Comprehensive Practical Organic Chemistry,* Universities Press.

Course Name: Real Analysis

Course Code: 13001700

Objectives

- In mathematics, real analysis is the branch of mathematical analysis that studies the behavior of real numbers, sequences and series of real numbers, and real-valued functions. Some particular properties of real-valued sequences and functions that real analysis studies include convergence, limits, continuity, smoothness, differentiability and integrability.

Course Outline:

Unit I
Finite and infinite sets, examples of countable and uncountable sets. Real line, bounded sets, suprema and infima, completeness property of R, Archimedean property of R, intervals. Concept of cluster points and statement of Bolzano- Weierstrass theorem.

Unit II
Real Sequence, Bounded sequence, Cauchy convergence criterion for sequences. Cauchy's theorem on limits, order preservation and squeeze theorem, monotone sequences and their convergence (monotone convergence theorem without proof).

Unit III
Infinite series. Cauchy convergence criterion for series, positive term series, geometric series, comparison test, convergence of p-series, Root test, Ratio test, alternating series, Leibnitz's test (Tests of Convergence without proof). Definition and examples of absolute and conditional convergence.

Unit IV
Sequences and series of functions Point wise and uniform convergence. Mn-test, Mtest, Statements of the results about uniform convergence and integrability and differentiability of functions, Power series and radius of convergence.

Suggested Readings:

1. T. M. Apostol, Calculus (Vol. I), John Wiley and Sons (Asia) P. Ltd., 2002.
2. R.G. Bartle and D. R Sherbert, Introduction to Real Analysis, J Wiley & Sons.(Asia) P. Ltd., 2000.
3. E. Fischer, Intermediate Real Analysis, Springer Verlag, 1983.
4. K.A. Ross, Elementary Analysis- The Theory of Calculus Series- Undergraduate
5. Texts in Mathematics, Springer Verlag, 2003.

Course Name: Basic Instrumentation Skills

Course Code: 13006200

Objectives

- Introduce students to the use of various electrical/electronic instruments, their construction, applications, principles of operation, standards and units of measurements and provide students with opportunities to develop basic skills in the design of instruments.
- To provide a brief knowledge of measurements and measuring instruments related to engineering
- To get exposure with various aspects of instruments and their usage through hands-on mode
- To make students learn the basics of multimeter, voltmeter, CRO and analysis instruments.

Course Outline:

Unit I: Basic of Measurement
Instruments accuracy, precision, sensitivity, resolution range etc. Errors in measurements and loading effects. **Multimeter:** Principles of measurement of dc voltage and dc current, ac voltage, ac current and resistance. Specifications of a multimeter and their significance.

Unit II: Electronic Voltmeter
Advantage over conventional multimeter for voltage measurement with respect to input impedance and sensitivity. Principles of voltage, measurement (block diagram only). Specifications of an electronic Voltmeter/ Multimeter and their significance. **AC**

millivoltmeter: Type of AC millivoltmeters: Amplifier- rectifier, and rectifier- amplifier. Block diagram ac millivoltmeter**,** specifications and their significance.

Unit III: Cathode Ray **Oscilloscope**

Block diagram of basic CRO. Construction of CRT, Electron gun, electrostatic focusing and acceleration (Explanation only– no mathematical treatment), brief discussion on screen phosphor, visual persistence & chemical composition. Time base operation, synchronization. Front panel controls. Specifications of a CRO and their significance.

Use of CRO for the measurement of voltage (dc and ac frequency, time period. Special features of dual trace, introduction to digital oscilloscope, probes. Digital storage Oscilloscope: Block diagram and principle of working.

Unit IV: Signal Generators and Analysis Instruments

Block diagram, explanation and specifications of low frequency signal generators. Pulse generator, and function generator. Brief idea for testing, specifications. Distortion factor meter, wave analysis.

Unit V: Impedance Bridges & Q-Meters

Block diagram of bridge. Working principles of basic (balancing type) RLC bridge. Specifications of RLC bridge. Block diagram & working principles of a Q- Meter. Digital LCR bridges.

Unit VI: Digital Instruments

Principle and working of digital meters. Comparison of analog & digital instruments. Characteristics of a digital meter. Working principles of digital voltmeter.

Unit VII: Digital Multimeter

Block diagram and working of a digital multimeter. Working principle of time interval, frequency and period measurement using universal counter/ frequency counter, time-base stability, accuracy and resolution.

The test of lab skills will be of the following test items:

1. Use of an oscilloscope.
2. CRO as a versatile measuring device.
3. Circuit tracing of Laboratory electronic equipment.
4. Use of Digital multimeter/VTVM for measuring voltages.
5. Circuit tracing of Laboratory electronic equipment,
6. Winding a coil / transformer.
7. Study the layout of receiver circuit.
8. Trouble shooting a circuit.
9. Balancing of bridges.

Laboratory Exercises:

1. To observe the loading effect of a multimeter while measuring voltage across a low resistance and high resistance.
2. To observe the limitations of a multimeter for measuring high frequency voltage and currents.
3. To measure Q of a coil and its dependence on frequency, using a Q- meter.
4. Measurement of voltage, frequency, time period and phase angle using CRO.
5. Measurement of time period, frequency, average period using universal counter/ frequency counter.
6. Measurement of rise, fall and delay times using a CRO.
7. Measurement of distortion of a RF signal generator using distortion factor meter.
8. Measurement of R, L and C using a LCR bridge/ universal bridge.

Open Ended Experiments:

1. Using a Dual Trace Oscilloscope
2. Converting the range of a given measuring instrument (voltmeter, ammeter)

Suggested Readings

1. A text book in Electrical Technology - B L Theraja - S Chand and Co.
2. Performance and design of AC machines - M G Say ELBS Edn.
3. Digital Circuits and systems, Venugopal, 2011, Tata McGraw Hill.
4. Logic circuit design, Shimon P. Vingron, 2012, Springer.
5. Digital Electronics, Subrata Ghoshal, 2012, Cengage Learning.
6. Electronic Devices and circuits, S. Salivahanan & N. S.Kumar, 3rd Ed., 2012, Tata Mc-Graw Hill.
7. Electronic circuits: Handbook of design and applications, U.Tietze, Ch.Schenk, 2008, Springer.
8. Electronic Devices, 7/e Thomas L. Floyd, 2008, Pearson India.

Course Name: Ability & Skill Enhancement III

Course Code: 13002900

Objectives

- Besides making English Learning an interesting activity, the curriculum aims to develop and enhance creativity of the students.

Course Outline - Final Assessment – Preparing a documentary

Unit I : Book & Movie Reviews
What is Book Review, Purpose & Importance of Book Review, Types of Book Review, Elements & Steps of Writing Book Review, What is Movie Review, Purpose & Importance of Movie Review, Types of Movie Review, Elements & Steps of Writing Movie Review.

Unit II: LSWR Skills
Reading Comprehension, Rewriting Mythology/Folklore, Debate, News Analysis, Role Plays.

Unit III: Emotional Intelligence & Handling Emotions
What is emotional intelligence, E.Q. Tests, performing under pressure, how to take right decisions under pressure keeping balance in difficult emotional situations. The science of emotional intelligence, characteristics of emotional intelligence, Emotions handling-identifying good and bad emotions, how to control emotions, how to manage negative emotions keeping balance of mental stability, stress and distress.

Unit IV: Group Discussion Skills
What is GD, Types of Group Discussions, Do's & Don'ts, Participation, Thinking, Structuring, Group Behaviour, Leadership Skills, Interpersonal Skills, Persuasive Skills, Conceptualization Skills.

Unit V: Documentary Making
What is documentary, aims & objectives, documentary for social cause, Documentary/Movie Screening & Reviews, preparing a documentary, Narration.

Note: The review of Syllabus happens on periodic basis for the benefit of the students. In case there are changes in curriculum due to review, students would be intimated in writing.

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