SURESH GYAN VIHAR UNIVERSITY

Accredited by NAAC with 'A' Grade

SYLLABUS OF

B. Sc. Mathematics (Chemistry, Physics, Mathematics) First Year (1st & 2nd Semester)

Edition-2018-21

Salient features in proposed Curriculum

1. The curriculum is restructured to have 3 years (6 semesters) with Institution and 6 months Industrial training in an Organization / Industry relevant to the field of specialization. This is mainly aimed to improve the practical skills in the students to make them ready to cater the needs of Industry with hands on experience and with a very good practical vision.

2. An effort has been made to improve the communication skills and personality development of the students, by restructuring the English Language / communication subject.
3. Primarily to develop verbal communication skills in English among students.
4. The main intention behind this is to improve their communication / presentation skills and to develop their personality to enable them to stand as a useful product in the global market.
5. Practical's on Information Technology is introduced in the I year curriculum itself. This enables the student to have good acquaintance with computers, internet, e-Mailing from First year onwards. It also enables the student to keep pace with latest trends of the present day technology.
6. Their knowledge and skills in computers are continued by introducing practical.
7. Developing reading & writing skills in students, especially among students who lack confidence in communicating in English.
8. Every effort has been made while restructuring the curriculum to mould the students to become very good — Technicians — with more practical visualization. This has been done by deleting UN necessary and extra information and regrouping the subjects to impart theoretical inputs to the students up to sufficient depth. This saving in time has been utilized in slightly improving on the practical inputs during in-house training itself.
9. Seminars also form a part of the curriculum in all the three years. This will surely improve the abilities of the students in communication / presentation skills.
10. Training to isolate important information from a written text and represent the same in note form.
11. Increase ability to write short paragraphs and to write technical reports.
12. To improve speaking skill of students through active listening & speaking practice.
13. Visualization and analytical approach towards the subject is necessary
14. To increase power of comprehending a written text.
15. Basic Mathematics knowledge to solve the problems.
16. Knowledge of basic concepts sciences such as physics, chemistry and mathematics
17. Much emphasis has been given for practical subjects by dividing the combined practical subjects in the earlier curriculum in to individual subjects by allotment of separate subject codes. Also the examination time for all practical subjects is common and is fixed as 3 hrs duration. This allows the examiners (both internal and external) to pay much attention towards the examinee during practicals.

Program Aims and Objectives:
Undergraduate Programmes
Learning Objectives

Students will be prepared with a sufficient depth of knowledge in their specific major program to assure their admission to graduate or professional school or be prepared for entry-level employment. Largely, it is studied to allow a person to enter a specific field of employment. Other aims for studying biology are intellectual, ethical and pragmatic: to increase knowledge about all aspects of organisms, to encourage greater benevolence in the relationship between humans and the natural environment and to implement biological factors into various technologies or management techniques.

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Teaching and Examination Scheme

To commence from the Academic year: 2018-2021

Department: School of Applied Sciences **Year: I**

Program : B.Sc. Mathematics Course **Semester-I**

S. No.	Course Code	Course Name	Credits	Contact Hrs/Wk.	Exam Hrs.	Weightage (in%)

				L	T/S	P		CE	ESE
		(A)University Core:							
1.	EN-103	English Language – I	2	2	-	-	3	40	60
2.	CP-105	Elementary Computers	3	3	-	-	3	40	60
3.	PC 101	Proficiency in co-curricular activities	2	0	0	0	0	100	0
4.	FD102	Foundation Course-I	1	1	0	0	3	25	75
		(B) Program Core							
5.	CY-111	Chemistry-I	4	3	1	-	-	40	60
6.	PY-111	Physics-I	4	3	1	-	3	40	60
7.	MA-111	Mathematics-I(Calculus)	4	3	1	-	3	40	60
8.	MA-113	Mathematics-II(Geometry, Vector)	4	3	1	-	3	40	60
		Practical							
9.	CY-161	Chemistry-I Lab	2	-	-	3	3	60	40
10.	PY-161	Physics-I Lab	2	-	-	3	3	60	40
		(C)Program Elective: •							
		(D)Open Elective: •							
		Total	28	18	04	06	-	-	-
		Total Teaching Load	-	28	-	-	-	-	-

L – Lecture
T – Tutorial
P – Practical

CIE – Continuous Internal Evaluation
ESE – End Semester Examination

Signature of Concerned Teacher **Signature of Convener-BoS**_____

Signature of Member Secretary

SURESH GYAN VIHAR UNIVERSITY
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Teaching and Examination Scheme

To commence from the Academic year: 2018-2021

Department: School of Applied Sciences **Year: I**

Program : B.Sc. Mathematics Course **Semester-II**

S. No.	Course Code	Course Name	Credits	Contact Hrs/Wk.			Exam Hrs.	Weightage (in%)	
				L	T/S	P		CE	ESE
		(A)University Core:							
1.	EM 102	Employability Skills	1	1	0	0	0	60	40

2.	PC 102	Proficiency in co-curricular activities	2	0	0	0	0	100	00
3.	EN-104	English Language – II	2	2	-	-	3	40	60
4.	ES 102	Environmental Studies	2	2	0	0	3	40	60
5.	FD104	Foundation Course-II	1	1	0	0	3	25	75
		(B) Program Core							
6.	CY-112	Chemistry-II	4	3	1	-	-	40	60
7.	PY-112	Physics-II	4	3	1	-	3	40	60
8.	MA-112	Mathematics-II(Algebra)	4	3	1	-	3	40	60
9.	MA-114	Mathematics-III	4	3	1	-	3	40	60
		Practical & Sessional							
10.	CY-162	Chemistry-II Lab	2	-	-	3	3	60	40
11.	PY-162	Physics-II Lab	2	-	-	3	3	60	40
		(C)Program Elective: •							
		(D)Open Elective: •							
		Total	28	18	04	06	-	-	-
		Total Teaching Load	-	28	-	-	-	-	-

L – Lecture
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Signature of Concerned Teacher **Signature of Convener-BoS**_____

Signature of Member Secretary

EN – 103	**English Language-1**	**(L,T,P) = 2(2,0,0)**
UNIT	**Course Contents**	
I	Grammar Sentences, Prepositions, Subject-verb agreement, Correct Usage- Tenses, Active & Passive, Modals, Direct and indirect Speech, Idioms, Determiners	6
II	Vocabulary Building Introduction, Synonyms, Antonyms, Homophones, Homonyms, Words Often Confused, One Word Substitution, Affixes, Select Vocabulary of about 300-500 new words	
III	Verbal Communication Definition, Working with customers, developing professional telephone skills & improving informal communication	7
IV	Professional Writing Writing Official/ Business/ Formal letters; Writing Application and CV; Writing for Official Meetings Report Writing- Size of the Report, Kinds of Reports, How to write Reports, Format for reporting Technical Proposals: Parts, Types, Writing of Proposal, Significance.	6
V	Composition Paragraph Writing- Parts of a paragraph, Writing a good paragraph, Characteristics of a good paragraph; Developing Outlines, Note- making, Review Writing	6

/ **Reference oks:**	1. Sasikumar ,V. Dutta And Rajeevan, A course In Listening And Speaking-I Foundation Books,2006. 2. Sawhney, Panja and Verma Eds. English At The Workplace Macmillan 2003. 3. Singh,R.P., Professional Communication, OUP 2004. 4. Judith Leigh. CV's and Job Applications, OUP 2004. 5. Arthur Waldhorn and Arthur Zeiger, English Made Simple, Rupa and Co. 6. Gunashekar Ed. A Foundation Enhlish Course For Undergrautes, Bookiciefi, Hyderabad. 7. Quirk and Greenbaum, A University Grammar of English Longman 1973.	
Recommended by BOS on :	19 / 05 / 2015	

CP 105	**Elementary Computers**
Version	1.0
Prerequisite	Nil
Objectives:	This course aims to give a general understanding of how a computer works, Aware about operating system, various Computer Languages and number system, Give a general understanding of Internet, information technology, e-commerce and Networks
Expected Outcome	The students will able to understand what is computer and how is it works. Understand what number system, operating system, computer language is. Understanding the Role of Information Technology.
UniT-I	**8 hours**
Introduction Types of computers and generations .Basic architecture of computers and its building blocks .Input-Output devices, Memories, **Overview, definition and function of operating system**, need of operating System,	
UNIT-**II**	**8 hours**
Classification of Computer Languages, Machine, assembly and high level languages .Brief idea of operating system, Assembler, compiler and interpreter**, Number Systems :**Binary, octal, decimal and hexadecimal representation of numbers. Integers and floating point numbers. Representation of characters	
UNIT **-III**	**6 hours**
An overview of information technology, difference between data and information, quality, of information, Information system. **Introduction to internet:** www, web browser, search engine, email, open source software's, Search Engine optimization	
UNIT-**IV**	**7 hours**

Introduction to e-commerce and its advantage, Types of E-Commerce, B2B, B2M, M2B, M2M, Electronic payment system, E-governance, Introduction to Information Security, cryptography, digital signature and smart card technology,	
UNIT-**V**	**7 hours**
Introduction to LAN, WAN, MAN: Transmission media**Data transmission type:** Introduction to OSI reference model, Analog and digital signals,, Network topologies, client-server architecture, ISDN, Broad Band	
Text Book	Computer Fundamentals: Architecture and Organization, by B Ram, New Age International Publisher
Reference Books	**Recommended Books:** Computer Fundamentals: Architecture and Organization, by B Ram, New Age International Publisher 1. Information Technology and the Networked Economy, Second Edition **By**McKeown, Patrick G. 2. Internet & Intranet Engineering, Tata McGraw Hill company. 3. Information Technology by AjitPoonia. 4. Information Technology by D.P. Sharma
Mode of Evaluation: (Percent Weightage)	Internal Evaluation: 40 Marks
Recommended by BOS on :	11/ 05/ 2015
Approved by Academic Council on:	

EN - 104 **English Language 2nd** **(L,T,P) = 2(2,0,0)**

UNIT	Course Contents	Total Contact Hours = 31
I	**Commercial Correspondence:** a) Style and Construction b) Significant Commercial terms and Phrases c) Letter of Inquiry d) Letter of Quotation e) Letter of Order f) Letter of Execution of Order g) Letter of Complaint h) Letter of Collection i) Circular Letter j) Application for Agency	**6**
II	**Official Correspondence:** Official Letter a) Semi-Official Letter b) Memorandum Journalistic Competitions on Commercial Topics: a) Editorial Note on a Commercial Topic b) Letter to the Editor on Economic and Commercial Topics c) Script Writing for the Media d) Journalistic Report Writing, Press Release e) Writing Advertisement Copy f) Writing for Internet Precise Writing	**6**
III	**Theme Writing (Report writing/Academic and Journalistic writing)**	**7**
IV	**Paragraph Writing and Essay writing**	**6**
V	**Advanced Comprehension**	**6**
Recommended by BOS on :	19 / 05 / 2015	

CY 111 **Fundamental of Chemistry-I** **C (L, T, P) = 3 (3, 0, 0)**
(Common for Mathematics and Biology Streams)

Unit	Contents of the Course	Hrs.
I	**Atomic Structure: Recapitulation**: Bohr's theory Time independent Schrodinger equation ($H\Psi = E\Psi$). Schrodinger equation for hydrogen atom. Radial and angular nodes and their significance. Radial distribution functions (1s and 2s AO).Significance of quantum numbers, orbital angular momentum and quantum numbers mr and ms. Shapes of s, p and d AO. Electronic configurations of the elements. Concept of exchange energy. Relative energies of AO, Anomalous electronic configurations.	7
II	**Chemical Bonding: Ionic Bonding**: Energy considerations in ionic bonding, stability and solubility of ionic compounds. Born-Haber cycle and its applications, Fajan's rules, bond moment, dipole moment and percentage ionic character. **Covalent bonding**: VB Approach: Concept of hybridization and VSEPR theory. Resonance and resonance energy Molecular Orbital Approach : LCAO method, bonding and antibonding MOs and their characteristics for s-s, s-p and p-p combination of atomic orbital's, non- bonding combination of orbital's ,MO treatment of homonuclear diatomic molecules of 1st and 2nd periods and heteronuclear diatomic molecules such as CO, NO and NO+	08
III	**Fundamentals of Organic Chemistry**: Cleavage of Bonds: Homolysis and Heterolysis. Structure, shape and reactivity of organic molecules Physical Effects, Electronic Displacements: Inductive Effect, Electromeric Effect, Resonance and Hyperconjugation. Nucleophiles and electrophiles. Reactive Intermediates: Carbocations, Carbanions free radicals. Strength of organic acids and bases: Comparative study with emphasis on factors affecting pK values. Aromaticity: Benzenoids and Huckel's rule	06
IV	**Stereochemistry: Conformations** ethane, butane and cyclohexane. Interconversion of Wedge Formula, Newman, Sawhorse and Fischer representations. Concept of chirality (up to two carbon atoms). Configuration: Geometrical and Optical isomerism; Enantiomerism, Diastereomerism and Meso compounds). Threo and Erythro; D and L; cis - trans nomenclature; R/ S (for up to 2 chiral carbon atoms) and E / Z Nomenclature (for up to two C=C systems).	07
V	**Aliphatic Hydrocarbons** Alkanes: Preparation: Catalytic hydrogenation, Wurtz reaction, Kolbe's synthesis, from Grignard reagent. Reactions: Free radical Substitution: Halogenations. Alkenes: Preparation, Elimination reactions: Dehydration of alkenes and dehydrohalogenation of alkyl halides (Saytzeff's rule); cis alkenes (Partial catalytic hydrogenation) and trans alkenes.	8
Total Hours		36

References and Text Books:

1 Barrow, G. M. Physical Chemistry Tata McGraw-Hill (2007).
2. Castellan, G. W. Physical Chemistry 4th Ed. Narosa (2004).
3. Mahan, B. H. University Chemistry 3rd Ed. Narosa (1998).
4. I. L. Finar: Organic Chemistry (Vol. I & II), E. L. B. S.
5. R. T. Morrison & R. N. Boyd: Organic Chemistry, Prentice Hall.
6. Arun Bahl and B. S. Bahl: Advanced Organic Chemistry, S. Chand

CY 112 **Chemistry-II** **C (L, T, P) = 3 (3, 0, 0)**
(Common for Mathematics and Biology Streams)

Unit Number	Contents of the Course	

		Hrs
I	**Chemical Thermodynamics:** (a)State of a system, state variables, intensive and extensive variables, concept of heat and work, First Law of thermodynamics. Calculation of work (w), heat (q), changes in internal energy (ΔU) and enthalpy(ΔH) for expansion or compression of ideal gases under isothermal and adiabatic conditions Calculation of w, q, ΔU and ΔH for processes involving changes in physical states. (b)Thermo chemistry. Concept of standard state and standard enthalpies of formations, integral and differential enthalpies of solution and dilution.	8
II	**Chemical Equilibrium:** (a)Free energy change in a chemical reaction. Thermodynamic derivation of the law of chemical equilibrium. (b)Distinction between ΔG and $\Delta G^{\ominus}$, Le Chatelier's principle. Relationships between Kp, Kc and Kx for reactions involving ideal gases.	7
III	**Ionic Equilibrium :** **(a)**Strong, moderate and weak electrolytes, degree of ionization, factors affecting degree of ionization, ionization constant and ionic product of water. Ionization of weak acids and bases, pH scale, common in effect, (b)Salt hydrolysis-calculation of hydrolysis constant, degree of hydrolysis and pH for different salts. Buffer solutions. Solubility and solubility product of sparingly soluble salts – applications of solubility product principle.	7
IV	**Aromatic hydrocarbons** (a)Preparation of benzene from phenol, by decarboxylation, from acetylene, from benzene sulphonic acid. Reactions of benzene): Aromatic electrophilic substitution: nitration, halogenations and sulphonation. Friedel Craft's reaction (alkylation and acylation). Side chain oxidation of alkyl benzenes (Upto 4 carbons on benzene). (b)Organic Halogen Compounds Types of Nucleophiles Substitution (SN^2, SN^1) reactions. Preparation of Alkyl Halides from alkenes and alcohols. Reactions: hydrolysis, nitrite & nitro formation, nitrile & iso-nitrile formation. Williamson's ether synthesis: Elimination and substitution.	8
V	**Aliphatic and Aromatic Hydroxy Compounds** (a)Alcohols: Preparation: Ester hydrolysis, Reduction of aldehydes, ketones, carboxylic acid and esters. Reactions: With sodium, HX, Oppeneauer oxidation Diols: oxidation of diols. Pinacol-Pinacolone rearrangement. (b)**Phenols**: Preparation and Reactions, acidic nature : Electrophilic substitution: Nitration, halogenations and sulphonationn. Reimer - Tiemann Reaction, Gattermann-Koch Reaction,	8
Total Hours		38

References and Text Books:

1 Barrow, G. M. Physical Chemistry Tata McGraw-Hill (2007).
2. Castellan, G. W. Physical Chemistry 4th Ed. Narosa (2004).
3. Mahan, B. H. University Chemistry 3rd Ed. Narosa (1998).
4. I. L. Finar: Organic Chemistry (Vol. I & II), E. L. B. S.
5. R. T. Morrison & R. N. Boyd: Organic Chemistry, Prentice Hall.
6. Arun Bahl and B. S. Bahl: Advanced Organic Chemistry, S. Chand
7. Peter Sykes: A Guide Book to Mechanism in Organic Chemistry, Orient Longman.
8.S.M.Mukherjee and S.P.Singh ,Reaction Mechanism in Organic Chemistry,Mc Millan (2004).
9.R.K.Bansal , Organic Chemistry.

CY 161 Chemistry-I Lab C (L, T, P) = 2 (0, 0, 3)

Practical Chemistry I (Atomic Structure, Bonding, General Organic Chemistry & Aliphatic Hydrocarbons)

S.No	Name of Experiment
01	1. Estimation of sodium carbonate and sodium hydrogen carbonate present in a mixture.
02	2. Estimation of oxalic acid by titrating it with KMnO4.

03	3. Estimation of water of crystallization in Mohr's salt by titrating with KMnO4.
04	4. Estimation of Fe(II) ions by titrating it with K2Cr2O7 using internal indicator.
05	5. Estimation of Cu(II) ions iodometrically using Na2S2O3.
06	1. Detection of extra elements (N,S,Cl,Br,I) in organic compounds (containing upto two extra elements)
07	2. Separation of mixtures by Chromatography: Measure the Rf value in each case (combination of two compounds to be given
08	a. Identify and separate the components of a given mixture of 2 amino acids (glycine, aspartic acid,
09	glutamic acid, tyrosine or any other amino acid) by paper chromatography. b. Identify and separate the sugars present in the given mixture by paper chromatography.

Reference Books:

1. Vogel's Qualitative Inorganic Analysis, A.I. Vogel , Prentice Hall ,7th Edition.
2. Vogel's Quantitative Chemical Analysis, A.I. Vogel , Prentice Hall ,6th Edition.
3. Textbook of Practical Organic Chemistry, A.I. Vogel , Prentice Hall, 5th edition.
4. Practical Organic Chemistry, Mann F. G. & Saunders B. C, Orient Longman, 1960.

CY 162 **Chemistry-II Lab** **C (L, T, P) = 2 (0, 0, 3)**

S.No	Name of Experiment	
01	Determination of enthalpy of ionization of acetic acid.	
02	Purification of organic compounds by crystallization (from water and alcohol) and distillation.	
03	Criteria of Purity: Determination of melting and boiling points	
04	Bromination of Phenol/Aniline	
05	Benzoylation of amines/phenols	
06	3. Preparations: Mechanism of various reactions involved to be discussed..	
07	2. Determination of enthalpy of neutralization of hydrochloric acid with sodium hydroxide	
08	Recrystallisation, determination of melting point and calculation of quantitative yields to be done.	

Reference Books:

1. Textbook of Practical Organic Chemistry, A.I. Vogel , Prentice Hall, 5th edition.
2. Practical Organic Chemistry, Mann F. G. & Saunders B. C, Orient Longman, 1960.
3. Senior Practical Physical Chemistry, B.D.Khosla, R. Chand & Co.
4. Vogel's Qualitative Inorganic Analysis, A.I. Vogel , Prentice Hall ,7th Edition.
5. Vogel's Quantitative Chemical Analysis, A.I. Vogel , Prentice Hall ,6th Edition.
6. Textbook of Practical Organic Chemistry, A.I. Vogel , Prentice Hall, 5th edition.
7. Practical Organic Chemistry, Mann F. G. & Saunders B. C, Orient Longman, 1960.

Course Code: **PY 111**	**Course Name:** **Physics-I (Mechanics and Relativity)** **C (L, T, P) = 4 (3, 1, 0)**
Version	1.0
Prerequisite	Upto XII physics
Objectives:	To help students understand the role of Physics in science and society and to see the connections between science, current events and physical phenomena. To give students the information and instincts needed to apply principles to new and unfamiliar problems.

Expected Outcome:	• Be able to apply knowledge from one or more areas of Physics to make appropriate intellectual connections or solve problems in another area of Physics • Be able to read, present and/or discuss information found in current research or scientific journals • Be familiar with important historical experiments and what they revealed about our understanding of the universe
UNIT-**I**	**Mechanics-I:**
Inertial and non-inertial frames of reference, Effect of centrifugal and Coriolis forces due to earth's rotation, Center of mass (C.M), Lab and C.M frame of reference, motion of CM of system of particles subject to external forces,	
UNIT-**II**	**Mechanics-II**
Elastic, and inelastic collisions in one and two dimensions, Scattering angle in, the laboratory frame of reference, Impact parameter, Scattering cross section, Conservation of linear and angular momenta	
UNIT **-III**	**Relativity:**
Postulates of special theory of relativity, Derivation of Lorentz transformation and physical Significance of Lorentz invariance, Length contraction and time dilation, Concept of simultaneity, Relativistic velocity transformation relations, mass energy relation, Concept of zero rest mass of Photon, Relativistic relation between energy and momentum.	
UNIT-**IV**	**Mechanical Properties of Matter-I:**
Modulus of rigidity, Poisson's ratio, relation connecting different elastic- constants, twisting couple of a cylinder(solid and hallow), Statical method (Barton's method), Dynamical method (Maxwell's needle) for determining the modulus of rigidity, Bending moment, Cantilever (neglecting mass),	
UNIT-**V**	**Mechanical Properties of Matter-II:**
Young modulus by bending of beam, Viscosity, Poiseulle's equation of liquid flow through a narrow tube, Damped harmonic oscillations, Compound pendulum, Ballistic galvanometer.	
Text Book	**1.** Physics Part –1: Resanick and Halliday. **2.** Mechanics: D.S.Mathur. **3.** Concept in Physics Vol. I: H.C.Verma. **4.** Mechanics: R.K.Shukla and Anchal Srivastava.
Reference Books	**1.** Physics Part –1: Resanick and Halliday. **2.** Mechanics: D.S.Mathur. **3.** Concept in Physics Vol. I: H.C.Verma. **4.** Mechanics: R.K.Shukla and Anchal Srivastava.
Recommended by BOS on :	
Approved by Academic Council on :	

PY 112	**Physics-II (Thermal Physics) C (L, T, P) = 4 (3, 1, 0)**
Version	1.0
Prerequisite	Upto XII physics
Objectives:	To help students understand the role of Physics in science and society and to see the connections between science, current events and physical phenomena. To give students the information and instincts needed to apply principles to new and unfamiliar problems.
Expected Outcome:	• Be able to apply knowledge from one or more areas of Physics to make appropriate intellectual connections or solve problems in another area of Physics • Be able to read, present and/or discuss information found in current research or scientific journals • Be familiar with important historical experiments and what they revealed about our understanding of the universe

UNIT-**I**	**Kinetic Theory**
Maxwell's speed distribution, Mean free path, Elementary treatment of transport phenomena, Viscous Flow and Thermal conducion in gases. Real gases, Andrew's curves, Equation of state, Virial coefficients, Van der Waals equation, Critical Constants.	
UNIT-**II**	**Thermodynamics-I:**
Reversible and irreversible processes, Examples of thermal, mechanical and chemical irreversibility, Carnot's cycle and Carnot's theorem, Second law of thermodynamics, Thermodynamic scale of Temperature, Concept of entropy, Entropy change in reversible and irreversible processes. Entropy and disorder, Principle of increase of entropy, Entropy and unavailable energy, Entropy of ideal gases, Entropy as a thermodynamic variable, S-T diagram Thermodynamic functions, Internal energy, Enthalpy, Helmholtz function and Gibb's free energy,	
UNIT **-III**	**Thermodynamics-II:**
Maxwell's thermodynamically equations and their applications, TdS equations, Energy and heat capacity equations Chaperon equations, Application to sublimation, vaporization and freezing processes, Heat capacity Of saturated vapours, Thermodynamics of liquid surfaces and paramagnetic solids. Adiabatic Demagnetization, Third law of thermodynamics, Nernst heat theorem	
UNIT-**IV**	**Thermodynamics-III**
Criterion of equilibrium of a system, Isolated system, System in contact with constant temperature reservoir. System in contact with constant temperature and pressure reservoir, Phase transition, Coexistence of phases, Triple point. Joule-Thomson effect, Thermodynamic analysis, Inversion temperature, Thermodynamic equations for a Van der Waals gas. Liquefaction of gases. Regenerative principle, Properties of liquid helium, Introduction to superfluidity and superconductivity.	
UNIT-**V**	**Radiation:**
The blackbody spectrum, Wien's displacement law, Rayleigh-Jean's law, Planck's quantum theory of radiation.	
Text Book	1. Heat and Thermodynamics: K.W. Zeemansky. 2. Thermal Physics: B.K. Agarwal. 3. Heat and Thermodynamics: Brij Lal and N. Subramanyam. 4. Heat and Thermodynamics: Dayal, Verma and Pandey. 5. A Treatise on Heat: M.N. Saha and B.N. Srivastava.
Reference Books	1. Heat and Thermodynamics: K.W. Zeemansky. 2. Thermal Physics: B.K. Agarwal. 3. Heat and Thermodynamics: Brij Lal and N. Subramanyam.
Mode of Evaluation: (Percent Weightage)	
Recommended by BOS on :	
Approved by Academic Council on	

PY 161 **Physics-I Lab** **C (L, T, P) = 2 (0, 0, 3)**

LIST OF EXPERIMENTS

1. Determination of Stefan's constant.
2. PN junction diode and Zener diode characteristics.
3. Determination of Young's modulus, modulus of rigidity and Poisson's ratio of material of a wire using Searle's method.
4. Determination of absolute capacity of a condenser.
5. Determination of Young's modulus of material of a metallic bar by bending of beam method.
6. To study series and parallel resonant L. C. R. circuit.
7. Determination of acceleration due to gravity using compound pendulum.
8. Determination of focal length of combination of lenses and nodal distance using nodal slide assembly.
9. Solar cell experiment.

PY 162 **Physics-II Lab** **C (L, T, P) = 2 (0, 0, 3)**

Group II

1. Determination of internal resistance of micro ammeter and conversion of micro ammeter into voltmeter, milli-ammeter and Ohmmeter.
2. Determination of modulus of rigidity using Bortron's apparatus.
3. Construction of two-input 'OR' and 'AND' gates using diode logic and preparation of their truth tables.
4. Determination of viscosity of liquid using Poiseuille's method.
5. To study variation of magnetic field along the axis of Helmholtz Galvanometer and to determine reduction factor.
6. Determination of resistance per unit length and an unknown resistance using C. F. Bridge.
7. Determination of dispersive power of material of a prism.
8. Determination of temperature coefficient of resistance of material of a given coil.
9. Determination of thermal conductivity of a card-board by Lee's disc method.

* In Semester-I, half of the students will do the experiments of Group-I and the other half will do the experiments of Group-II. In Semester II, the students will exchange their groups. Addition and deletion in the list of experiments may be made from time to time by the department.

MA 111	Mathematics-I(Calculus) C (L, T, P) = 4 (3, 1, 0)
Version	**1.0**
Prerequisite	Knowledge of Differential and Integral Calculus upto Senior Secondary School level is required.
Objectives:	Students will be exposed to computational techniques and applications of differentiation and integration . The objective is to develop a competent working knowledge of the main concepts and methods introduced.
Expected: outcome	Students will find applications of the topics covered, in Physical Sciences and Engineering.
UNIT-**I**	**Differential Calculus:** **7 Hours**
• Derivative of length of an arc. Pedal equations. • Curvature (various formulae), Centre of curvature and Chord of curvature .Envelopes.	
UNIT-**II**	**Differential Calculus:** **7 Hours**
• Partial differentiation, Total differential coefficient, Change of variables, Euler's theorem for homogeneous functions. • Maxima and Minima of functions of two variables. Lagrange's method of undermined multipliers.	
UNIT **-III**	**Differential Calculus:** **7 Hours**
• Asymptotes. • Multiple points. Curve tracing of standard curves (Cartesian and Polar curves)	
UNIT-**IV**	**Integral Calculus:** **8 Hours**
• Rectification, Areas. • Volumes and Surfaces of solids of revolution.	
UNIT-**V**	**Integral Calculus:** **7 Hours**
• Double integrals in Cartesian and Polar coordinates, Change of order of integration. • Triple integration. • Application of double and triple in integrals in finding areas and volumes. Dirichlet's integral.	
Text Book	1. Elements of Differential Calculus by Sharma, Gokhroo, Saini 2. Elements of Integral Calculus by Gokhroo, Saini, Agrawal
Reference Books	1. Differential Calculus by Gorakh Prasad.. 2. Integral Calculus by Gorakh Prasad. 3. Mathematical Analysis by Gabriel Klambauer. 4. Differential Calculus: RBD Publication. 5. Integral Calculus: RBD Publication.
Mode of Evaluation: (Percent Weightage)	Mid-Term I (10%) Mid-Term II (10%) Weekly test (10%) Graded assignment (10%) Written examination (60%)
Recommended by BOS on :	
Approved by Academic Council on :	

MA 113	Mathematics-II (Three Dimensional Coordinate Geometry and Vector Calculus) C (L, T, P) = 4 (3, 1, 0)
Version	**1.0**

Prerequisite	Knowledge of Three Dimensional Coordinate Geometry and Vectors upto Senior Secondary School level is required.
Objectives:	The objective is to develop a competent working knowledge of the main concepts and methods introduced.
Expected outcome:	Students will find applications of the topics covered, in Physical Sciences and Engineering.
UNIT-**I**	**Three Dimensional Coordinate Geometry: 7 Hours**
• Sphere, Plane section of a sphere, Tangent plane. • Pole and Polar plane. Orthogonal spheres. • Radical plane and Radical Centre.	
UNIT-**II**	**Three Dimensional Coordinate Geometry: 7 Hours**
• Cone, Reciprocal Cone, Right-circular cone, Enveloping cone. • Cylinder, Right circular cylinder, Enveloping cylinder.	
UNIT **-III**	**Three Dimensional Coordinate Geometry: 8 Hours**
Central Conchoids: • Ellipsoid ,Tangent plane, Condition of tangency for a plane, Director Sphere, • Polar planes, Polar lines, Section with a given centre. • Normal's, Conjugate diameters and Diametral planes and their properties.	
UNIT-**IV**	**Vector Calculus: 7 Hours**
• Scalar point function, Vector point function. Differentiation and Integration of vector point function. • Directional derivative. Gradient, Divergence and Curl. • Line, Surface and Volume integrals.	
UNIT-**V**	**Vector Calculus: 7 Hours**
• Theorem of Gauss, Green, Stokes (without proofs) and problems based on these theorems.	
Text Book	1. Analytical solid Geometry by Golas,Tandon,Bhargava. 2. A Text Book of Vector Calculus by Gaur , Mathur , Goyal
Reference Books	1. Analytical Solid Geometry by Shanti Narain. 2. Elementary Treatise on coordinate Geometry of three dimensions by R.J.T. Bell. 3. Elements of Coordinate Solid Geometry by Gupta ,Bansal. 4. Coordinator Geometry (3D) : RBD Publication 5. Vector Analysis by Chatterjee (PHI Learning)
Mode of Evaluation: (Percent Weightage)	Mid-Term I (10%) Mid-Term II (10%) Weekly test (10%) Graded assignment (10%) Written examination (60%)
Recommended by BOS on :	
Approved by Academic Council on :	

MA 112	**Mathematics-III (Abstract Algebra) C (L, T, P) = 4 (3, 1, 0)**
Version	**1.0**
Prerequisite	Knowledge of Sets , Relations and Functions is required.
Objectives:	The objective of this course is to develop the learning capabilities and problem solving skills of talented students at the mathematically deeper and more rigorous level.

Expected: outcome	Abstract Algebra is used in variety of areas such as Coding Theory and Cryptography.
UNIT-**I**	**Groups :** **7 Hours**
• Definition and simple properties of groups, Order of an element of a group. • Cyclic group, Permutation group.	
UNIT-**II**	**Subgrups :** **7 Hours**
• Subgroups, Cosets. • Lagrange's theorem on order of subgroups of a finite order group.	
• UNIT **-III**	**Homomorphism and Isomorphism :** **7 Hours**
• Homomorphism and Isomorphism, Cayley`s theorem. • Normal subgroups and Quotient groups. • Fundamental theorem on homomorphism.	
UNIT-**IV**	**Rings , Integral domains and Fields :** **7 Hours**
• Definition and simple properties of Rings, Subrings, homomorphism of rings. • Embedding rings. Integral domains and Fields. • Characteristics of an integral domain and field.	
UNIT-**V**	**Ideals and Quotient Rings :** **8 Hours**
• Ideals and Quotient Ring. • Maximal ideal and Prime ideal. Principal Ideal domain. • Field of quotient's of an integral domain. Prime fields.	
Text Book	Elements of Abstract Algebra by Sharma, Gokhroo, Saini
Reference Books	1.Topics is Algebra by N. Herstain. 2.Basic Algebra (Vol. I & II) by N.Jacobson. 3.Modern Algebra by S. Singh.
Mode of Evaluation: (Percent Weightage)	Mid-Term I (10%) Mid-Term II (10%) Weekly test (10%) Graded assignment (10%) Written examination (60%)
Recommended by BOS on :	
Approved by Academic Council on :	

MA 114	**Mathematics-IV (Differential Equations)** **C (L, T, P) = 4 (3, 1, 0)**
Version	**1.0**
Prerequisite	Deep knowledge of Integral Calculus is required to find solution of Differential Equations.
Objectives:	The objective of this course is to develop a competent working knowledge of the main concepts and methods introduced.
Expected Outcome :	It provides the fundamental concepts and mathematical methods needed for the analytical solution of many Ordinary and Partial Differential Equations which arise in the modeling of basic phenomena in Science , Engineering and Technology.

UNIT-**I**	**Differential Equations :** **7 Hours**
• Linear differential equations and equations reducible to linear form. • Exact differential equations and equations which can be made exact. • First order but higher degree differential equations solvable for x, y and p. Clairauts form and Singular solutions.	
UNIT-**II**	**Differential Equations :** **7 hours**
• Linear differential equations with constant coefficients. • Homogeneous linear differential equations. • Simultaneous differential equations.	
UNIT-**III**	**Differential Equations :** **7 Hours**
• Linear differential equations of second order with variable coefficients. • Solution by transforming the equation by changing the dependent variable and independent variable . • Method of variation of parameters.	
UNIT-**IV**	**Partial Differential Equations :** **7 Hours**
• Partial differential equations of first order. Lagrange's form. Standard forms. • Charpits method.	
UNIT-**V**	**Partial Differential Equations :**
• Homogeneous and non-homogeneous linear partial differential equations with constant coefficients. • Equations reducible to equations with constant coefficient's.	
Text Book	1. Differential Equations Vol. I by Bansal,Dhami. 2. Differential Equations Vol. II by Bansal,Dhami.
Reference Books	1. Introductory course in Differential Equations by D.A. Murray. 2 .An Introduction to Ordinary Differential Equations by E.A. Codington. 3. Elements of Differential Equations by Gokhroo, Saini, Agrawal. 4. Differential Equations (Vol. I & II) : RBD Publications 5. Introduction to Partial Differential Equations by Folland (PHI Learning)
Mode of Evaluation: (Percent Weightage)	Mid-Term I (10%) Mid-Term II (10%) Weekly test (10%) Graded assignment (10%) Written examination (60%)
Recommended by BOS on :	
Approved by Academic Council on :	

ES102	**ENVIRONMENTAL STUDIES**
Version	II
Prerequisite	Importance of the protection and conservation of our environment and control of human activities
Objectives:	The learning objective of course is: To create an understanding regarding the eco system, To gain knowledge about relation between environment and human races.
Expected Outcome	The student will be able to conceptualize about basic principal of environment, biological diversity and also able to understand various remediation process for environmental issues.
Unit-I	**Man & Environment**
Man & Environment: Definition of Environment & its various components. Ecosystem concepts. Dependence of Man on nature for its various needs. Human population growth & its impacts on environment. Environment & human health. Environmental concerns including climate change, Global warming, Acid Rain, Ozone layer Depletion etc. Environmental ethics. Traditional ways of utilizing various components of environment. Sustainable developments.	
Unit- II	**Natural Resources**

Natural Resources: Forest resources, Mining, Dams & their effects on forests & tribal people. Water resources-over utilization of water, floods, droughts and conflicts over water resources. Mineral Resources- Use of various minerals for Human welfare & environmental effects of mining. Food resources -World food problem. Impacts of changing Agriculture practices on Environment. Energy Resources-Renewable and non renewable energy Resources & exploration of alternative energy sources. Land Resources-land degradation, soil erosion, desertification and soil contamination.	
Unit-III	**Ecosystems**
Ecosystems: Structure & function, energy flow, food chains, food webs, Ecological pyramids. Basics of forest grasslands, desert & aquatic ecosystem (Ponds, Streams, Lakes, Rivers, Oceans & Estuaries)	
Unit-IV	**Biological Diversity**
Biological Diversity: Genetic, species & ecosystem diversity, Values of Biodiversity, Global, National & Local Biodiversity. Hot-spots of Biodiversity, threat to biodiversity. Endangered & endemic species of India. Conservation of biodiversity in situ & ex-situ	
Unit-V	**Environment pollution**
Environment pollution: Causes, effects & control of- Air pollution, Water pollution, Soil pollution, Noise Pollution, Thermal pollution & Nuclear Hazards. Solid wastes & their Management. Disaster Management-Flood, Drought, Earthquake, Landslides etc.	
Reference books/Text Books	1. Agarwal KC, 2001. Environmental Biology, Nidi Publishers Ltd. Bikaner. 2. Bharucha Erach, 2003. The Biodiversity of India, Mapin Publishing Pvt. Ltd, Ahmedabad – 3. Brunner RC, 1989, Hazardous Waste Incineration, McGraw Hill Inc. 480pgs. 4. Clark RS, Marine Pollution, Clanderson Press, Oxofrd (TB). 5. Cunningham WP, Cooper TH, Gorhani E & Hepworth MT, 2001. Environmental Encyclopaedia, Jaico Publishing House, Mumbai
Mode of Examination	Assignment/Quiz/Viva-Voce/student seminar/written examination/PPT
Recommended By BOS on:	
Approved by academic council on:	

SURESH GYAN VIHAR UNIVERSITY

Accredited by NAAC with 'A' Grade

Teaching and Examination Scheme

To commence from the Academic year: 2018-2021

Department: School of Applied Sciences **Year: II**

Program: B.Sc. Mathematics Course **Semester-III**

S. No.	Course Code	Course Name	Credits	Contact Hrs/Wk.	Exam Hrs.	Weightage (in%)

				L	T/S	P		CE	ESE
		(A)University Core:							
1	EM 201	• Employability Skills-II	1	1	0	0	2	60	40
2	PC 201	• Proficiency in Co-curricular Activities -III	2	0	0	0	0	100	0
		(B) Program Core:							
1.	MA-211	Mathematics –V Numerical Analysis and TP	4	3	1	0	3	40	60
2.	MA-213	Mathematics –VI Discrete Mathematics	4	3	0	0	3	40	60
3.	CY-211	Chemistry –III (Inorganic-I)	4	3	1	0	3	40	60
4.	CY-213	Chemistry –IV (Organic-I)	4	3	1	0	3	40	60
5.	PY-211	Physics III (Vector and Magnetic Force)	4	3	1	0	3	40	60
		Practical							
6.	CY-261	Chemistry- III Lab	2	0	0	2	3	60	40
7.	PY-261	Physics Lab- III	2	0	0	2	3	60	40
		(C)Program Elective: •							
8.		**(D)Open Elective:** •							
		Total	27	16	04	04	-	-	-
		Total Teaching Load		24	-	-	-	-	-

L – Lecture
T – Tutorial
P – Practical

CIE – Continuous Internal Evaluation
ESE – End Semester Examination

Signature of Concerned Teacher **Signature of Convener-BoS_____**

Signature of Member Secretary

SURESH GYAN VIHAR UNIVERSITY
Accredited by NAAC with 'A' Grade

Teaching and Examination Scheme

To commence from the Academic year: 2018-2021

Department: School of Applied Sciences **Year: II**

Program: B.Sc. Mathematics Course **Semester-IV**

S. No.	Course Code	Course Name	Credits	Contact Hrs/Wk.	Exam Hrs.	Weightage (in%)

				L	T/S	P		CE	ESE
		(A)University Core:							
1	EM 202	• Employability Skills-III	1	1	0	0	2	60	40
2	PC 202	• Proficiency in Co-curricular Activities-IV	2	0	0	0	0	100	0
		(B) Program Core:							
1.	MA-212	Mathematics -VII Real Analysis	4	3	1	0	3	40	60
2.	MA-214	Mathematics -VIII Operation Research	4	3	1	0	3	40	60
3.	CY-212	Chemistry- V (Physical-I)	4	3	1	0	3	40	60
4.	PY-212	Physics –IV (Solid State Devices)	4	3	1	0	3	40	60
5.	PY-214	Physics- V (Electronics)	4	3	1	0	3	40	60
		Practical & Sessional							
6.	PY-262	Physics Lab- IV	2	0	0	3	3	40	60
7.	CY-262	Chemistry -IV Lab	2	0	0	3	3	60	40
		(C)Program Elective:							
		(D)Open Elective:							
		Total	27	16	05	04	-	-	-
		Total Teaching Load	25		-	-	-	-	-

L – Lecture
T – Tutorial
P – Practical

CIE – Continuous Internal Evaluation
ESE – End Semester Examination

Signature of Concerned Teacher **Signature of Convener-BoS_____**

Signature of Member Secretary

MA-211	**Mathematics-V (Numerical Analysis and Theory of Probability) C(L, T, P)=4(3, 1, 0)**
Version	**1.0**
Prerequisite	Basic knowledge of Difference Calculus and Statistics is required.
Objectives:	The students will be equipped with a number of commonly used numerical algorithms , knowledge and skills in performing numerical computation using MATLAB.
Expected outcome:	The students will gain an understanding of how in practice mathematically formulated problems are solved using computers and how computational errors are analysed and tackled.
UNIT-**I**	**Finite Differences and Interpolation : 7 Hours**

• Differences. Relation between differences and derivatives. • Newton`s formulae for forward and backward interpolation. • Divided differences. Newton`s divided difference. Interpolation formulae . Lagrange`s interpolation formula.	
UNIT-**II**	**Central differences , Numerical Differentiation and Integration : 7 Hours**
• Central differences. Gauss`s Stirling`s and Bessel`s interpolation formulae. • Numerical Differentiation. Derivatives from interpolation formula. • Numerical integration. Newton-Cote`s formula. Trapazodial rule, Simpson`s one-third, Simpson`s three-eight and Gass quadrature formula	
UNIT **-III**	**Numerical solutions : 7 Hours**
• Numerical solution of algebraic and transcendental equations. Bisection Method. Regula-Falsi method. Method of iteration. Newton-Raphson method. • Gauss elimination and Iterative methods for solving system of linear algebraic simultaneous equations. • Solution of ordinary differential equations of first order with initial and boundary conditions using Picard`s and modified Euler`s method.	
UNIT-**IV**	**Theory of Probability : 7 Hours**
• Mathematical definition of probability. Addition and Multiplication theorems of Probability. Probability of atleast one event. Conditional probability. Baye`s theorem. • Random variable, Mathematical expectation, Mean, Variance and Moment Generating Functions.	
UNIT-**V**	**Discrete and Continuous Probability Distribution : 8 Hours**
• Discrete Probability Distribution : Binomial and Poisson`s distribution. Mean , Variance and M.G.F. of Binomial and Poisson`s distribution. • Continuous Probability Distribution : Rectangular and Normal distribution. Mean and Variance of Normal distribution. Area under Normal curve.	
Text Book	1. Numerical Analysis by J.L.Bansal and J.P.N.Ojha 2. Elements of Mathematical Statistics by D.C.Gokhroo, S.L.Bhargava, S.M.Agrawal
Reference Books	1. Numerical Analysis by P.C.Biswal 2. Numerical Methods for scientists and Engineers by Sankara Rao 3. Numerical Methods for scientific and Engg. Comp. by M.K.Jain, S.R.K.Iyengar ,R.K.Jain
Mode of Evaluation: (Percent Weightage)	Mid-Term I (10%) Mid-Term II (10%) Weekly test (10%), Graded assignment (10%) Written examination (60%)
Recommended by BOS on :	
Approved by Academic Council on :	

MA-213	**Mathematics-VI(Discrete Mathematics) C(L, T, P)=4(3, 1,0)**
Version	**1.0**
Prerequisite	Knowledge of Sets , Relations and Functions is required.
Objectives:	Discrete mathematics is a bridge connecting mathematics with various branches of Computer Science. Discrete mathematics is of genuine use in Computer Science and hence a study of this branch of mathematics is of great importance to the students of Computer Science.
Expected outcome	Discrete mathematics enables students to think mathematically to model computation related problems and to apply various discrete structure.
UNIT-**I**	**Sets and Propositions , Relations and Functions : 6 Hours**

• Cardinality,Principal of inclusion and exclusion. Mathematical Induction. • Binary relations, Equivalence relations and Partitions. Partial ordered relations and Lattices.	
UNIT-**II**	**Algebraic Structures , Boolean Algebra : 8 Hours**
• Groups, Rings, Integral domains. Fields (Definitions, simple examples and elementary properties only) • Lattices and Algebraic structure, Duality, Distributive and Complemented Lattices. Boolean Lattices.	
UNIT **-III**	**Computability and Formal Languages : 8 Hours**
• Ordered sets, Languages, Phrase, Structure, Grammars, Types of Grammars and Languages. • Discrete numeric functions and Generating functions . Recurrence relations and Recursive Algorithms, Linear Recurrence relation with constant coefficients. • Homogeneous solutions. Particular solution, Total solution.	
UNIT-**IV**	**Graphs : 7 Hours**
• Basic terminology, Multigraphs, Weighted graphs, Paths and Circuits, Shortest paths , Eulerian paths and circuits. • Travelling Salesman problem. • Union, Join, Product and composition of graphs.	
UNIT-**V**	**Trees , Digraphs : 7 Hours**
• Properties, Spanning tree, Binary and Rotted tree **:** • Simple digraph, Asymmetric digraphs. Symmetric digraphs and complete digraphs. Digraph and Binary relations. Matrix representation of graphs and digraphs.	
Text Book	1. Discrete Mathematics by Chauhan and Pandey 2. Graph Theory by G.N.Purohit
Reference Books	1. Discrete Mathematics by N.Chandrasekaran & M.Umaparvathi 2. Discrete Mathematics and Graph Theory by P.C.Biswal 3. Discrete Mathematics with Graph Theory by Goodaire & Parmenter 4. Graph Theory with Applications by C.Vasudev (New Age Pub.)
Mode of Evaluation: (Percent	Mid-Term I (10%) Mid-Term II (10%,) Weekly test (10%), Graded assignment (10%) Written examination (60%)
Recommended by BOS on :	
Approved by Academic Council on	

CY 211 Inorganic Chemistry I C (L, T, P) = 3 (3, 1, 0)

Prerequisites To study Inorganic Chemistry I needs Chemistry I and II and Senior Secondary Course		
Objectives **1.** To encourage Inorganic aspects of Chemistry and knowledge is added **2.** To develop knowledge by teaching **3.** Knowledge dissemination		
Outcomes Better Science undergraduate		
Unit	**Contents of the Course**	**Hrs**
I	**Chemistry of Transition Metals:** Properties of d-block elements. Binary compounds (hydrides, carbides and oxides) of the elements of the first transition series and complexes with	**7**

	respect to relative stability of their oxidation states, coordination number and geometry. Chemistry of Elements of Second and Third Transition Series: General characteristics, comparative treatment of Zr/Hf, Nb/Ta, Mo/W in respect of ionic radii, oxidation states. **Industrial application of transition metals**	
II	**Acid Base:** Acid base concepts, Role of solvent, Relative strengths of acids and bases, Ionization, Law of mass action, Common ion effect, Ionic product of water, pH, Hydrolysis of salts, Henderson Hesselbach equation, Buffer solutions, Neutralization curves, Acid base indicators, Theory of indicators, Choice of indicators, Mixed indicators, .**Use of acids and bases in Pharmacy . Business of Acids and Bases as different industrial chemicals**	**8**
III	**Oxidation Reduction:** Concepts of Oxidation and reduction, Redox reactions, Strengths and equivalent weights of oxidizing and reducing agents, Theory of Redox titrations, Redox indicators, Cell representations, Measurement of electrode potential, Oxidation-reduction curves, Iodimetry and Iodometry, Titrations involving ceric sulphate, potassium iodate, potassium bromate, potassium permanganate, **Corrosion and Industries**	**7**
IV	**Organometallic compounds; Definition** Nomenclature, Preparation properties and application and bonding of alkyl and Aryl compound. **Electronic and Ionic Conduction ,Metals, insulators and semiconductors, electronic structure of solids application in electronic and electrical industries**	**7**
V	**Solid States:** Definition of space lattice, unit cell; Laws of crystallography Symmetry elements in crystals. X-ray diffraction by crystals, Derivation of Bragg equation, Determination of crystal structure of NaCl, KCl and CsCl (Laue's method and powder method).**Structure of simple lattices and X-ray intensities, structure factor and its relation to intensity and electron density, phase problem. Structure for Semiconductor Industries**	**7**
Total Hours		**36**

References and Text Books:

1. Basic Inorganic Chemistry F.A. Cotton. G. Wilkinson and P.L. Gaus. Wiley.
2. Concise Inorganic Chemistry, J.D. Lee ELBS.
3. Concepts of Models Inorganic Chemistry B.Douglas. D.McDaniel and J.Alexander, John Wiley.
4. Inorganic Chemistry. D.E. Shriver P.W. Atkins and C.H. Langfor, Oxford.
5. Inorganic Chemistry, W.W. Porterfield Addison Wesley.
6. Inorganic Chemistry, A.G. Sharpe. ELBS.
7. Inorganic Chemistry, G.L. Miessler and D.A. Tarr, Prentice Hall.
8. Group Theory and Its Chemical Applications: P. K. Bhattacharya
9. Inorganic Chemistry: J. E. Huyee, Principles of Structure & Reactivity, 3rd Ed.
10. Selected Topics in Inorganic Chemistry: W. U. Malik, G. D. Tuli and R. Madan
11. Principles of Inorganic chemistry: D. Banerje
12. Modern Aspect of Inorganic Chemistry: H. J. Emeleus and A. G. Sharpe

CY 213 Organic Chemistry –I C (L, T, P) = 3 (3, 0, 0)

Prerequisites

To study Organic Chemistry I needs Chemistry I and II and Inorganic Chemistry I

Objectives

1. To encourage Organic Chemistry as relates with life related chemistry and knowledge is added
2. To develop knowledge by teaching and add projects
3. Knowledge to the related projects

Outcomes Better Science undergraduate

Unit	Contents of the Course	Hrs
I	**Spectroscopy** :NMR Spectroscopy :Nuclear Shielding Deshielding Organometallic Compound Nomenclature, Methods and Preparation and Applications ,Organosulphur Compounds Nomenclature, Methods and Preparation and Applications	**8**
II	**Infrared Spectroscopy : Detailed study of vibrational frequencies of carbonyl compounds**	**7**

	(ketones, aldehydes, esters, amides, acids, anhydrides, lactones,Heterocyclic Compounds: Introduction, MO Picture, Aromatic Characteristics of Pyrrole, Thiophene, and Pyridine. Chemical properties Reactions	
III	Organic Synthesis :Chemistry of Enolate ions :Acidity of alpha Hydrogen, Alkylation of diethyl Malonate .Carbohydrates : Classification and Nomenclature , Structure of Ribose and Deoxyribose **Menthol**, , **β–Carotene and squalene.Steroids and Cholesterol, Testosterone**,	**8**
IV	Amino Acids ,Peptides ,Proteins and Nucleic Acids :Structure and nomenclature of Peptides and Proteins Constituents of Nucleic Acids, Synthesis of Peptides . **dopings of semiconductors, P N junction, Band structure in organic solids.**	**8**
V	Fats Oils and Detergents, Natural Polymers Rubbers, Silk Lac. Synthetic Dyes :Classification, theories of color and structures. **Edible oil Chemistry , ground nut,Sesame,linseed oils and application for Human**	**7**
Total Hours		**38**

References and Text Books:

1. I. L. Finar: Organic Chemistry (Vol. I & II), E. L. B. S.
2. R. T. Morrison & R. N. Boyd: Organic Chemistry, Prentice Hall.
3. Arun Bahl and B. S. Bahl: Advanced Organic Chemistry, S. Chand
4. Peter Sykes: A Guide Book to Mechanism in Organic Chemistry, Orient Longman.
5. R.D.Sharma, Spectroscopy,
6. Bhupinder Mehta and Manju Mehta,Organic Chemistry, Prentice Hall

CY 261 Chemistry LabIII (L, T, P) = 1 (0, 0, 2)

Analysis of mixture containing two cations and two anions of which one will be an interfering ion.

Cations to be studied. Lead, Copper, Bismuth, Cadmium, Iron, Aluminum, Zinc, Manganese, Cobalt, Nickel, Barium, Calcium, Strontium, Magnesium and Ammonium.

Anions to be studied Carbonate, Sulphide, Sulphate, Nitrate, Chloride, Bromide, Fluoride, Borate, Oxalate and Phosphate.

Ten Experiments on Above.

Reference Books:

1. Vogel's Qualitative Inorganic Analysis, A.I. Vogel, Prentice Hall, 7th Edition.

2. Vogel's Quantitative Chemical Analysis, A.I. Vogel, Prentice Hall, 6th Edition.

PY 211	**Physics-III (Vector and Magnetic Force) C (L, T, P) = 4 (3, 1, 0)**
Version	1.0
Prerequisite	Upto B. Sc. First year
Objectives:	To help students understand the role of Physics in science and society and to see the connections between science, current events and physical phenomena. To give students the information and instincts needed to apply principles to new and unfamiliar problems.
Expected Outcome:	• Be able to apply knowledge from one or more areas of Physics to make appropriate intellectual connections or solve problems in another area of Physics • Be able to read, present and/or discuss information found in current research or scientific journals • Be familiar with important historical experiments and what they revealed about our understanding of the universe
UNIT-**I**	**Vector fields I**
Partial derivative; Gradient of a scalar function; Line integral of vector fields; Divergence of a vector field; Divergence in the cartesian coordinates; Concept of solid angle; Gauss divergence theorem, Gauss law in differential form, Gauss law from inverse square law	

UNIT-**II**	**Vector Field II**
Physical meaning of divergence of a vector; The Laplacian operator; Poission's and Laplace's equations; Curl of a vector function, curl in cartesian coordinates ;Stoke'stheorm; Physical meaning of curl.	
UNIT **-III**	**The field of stationary and moving charge :**
Potential difference and potential function; Potential energy of a system of charges; Energy required to build a uniformly charged sphere; Classical radius of an electron; Potential and field due to short dipole, torque and force on a dipole in an external field.	
UNIT-**IV**	**Magnetic forces:**
Measurement of charge in motion; Invariance of charge; Electric field measured in different frames of references; Field of a point charge moving with constant velocity; Force on a moving charge; Interaction between a moving charge and other moving charges.	
UNIT-**V**	**The magnetic field and magnetic field in matter**
The definition of magnetic field, properties of the magnetic field; Ampere's circuital law with applications, Ampere's Law in differential form; Vector potential, Poisson's equation for vector potential;	
Text Book	1. EM Field by Berkley Series 2. Saucham Series. 3. Vector analysis by Gokhroo and Saine
Reference Books	1. EM Field by Berkley Series 2. Saucham Series. 3. Vector analysis by Gokhroo and Saine 4. Griffiths, David (2012). Introduction to Electrodynamics (4th ed.). Addison-Wesley. ISBN 0-321-85656-2. 5. Stratton, Julius Adams (February 2007) [Originally published in [1941]. Electromagnetic Theory. Wiley-IEEE Press. ISBN 978-0-470-13153-4.
Mode of Evaluation: (Percent Weightage)	
Recommended by BOS on :	
Approved by Academic Council on :	

PY-261 Physics Lab III (L, T, P) = 1 (0, 0, 2)

(Do any four practicals)

1. Study of dependence of velocity of wave propagation on lineparameter using torsional wave apparatus. '
2. Study of variation of reflection coefficient of nature of termination using torsional wave apparatus.
3. Using platinum resistance thermometer find the melting point ofa given substance.
4. Using Newton's rings method find out the wave length of amonochromatic source and find the refractive index of liquid.
5. Using Micheloson's interferometer find out the Wavelength ofgiven monochromatic source (Sodium Light)
6. To determine dispersive power of prism.
7. To determine wave length of sodium light using grating.
8. To determine wave length of sodium light using Biprism

MA-21 2	**Mathematics –VII (Real Analysis)** **C(L, T, P)=4(3, 1,0)**
Version	**1.0**
Prerequisite	Knowledge of Sets , Relations and Functions, Limits, Continuity and Differentiability is required.
Objectives:	In the recent years the set theoretic concepts, the terminology and symbols associated with it are widely used in almost all branches of mathematics. So much so that one who is not familiar with these concepts, terminology and symbols cannot make any headway into the study of recently developed branches of mathematics, so called modern mathematics.
Expected outcome:	The topics covered in this course will enable students to understand the topics of modern mathematics.
UNIT-**I**	**Real Numbers :** **7 Hours**
Real numbers as complete ordered field, Limit point , Bolzano-Weierstrass theorem. Closed and Open sets. Union and intersection of such sets. Concept of compactness. Heine-Borel theorem. Real sequences, limit and convergence of a sequence. Monotonic sequences. Rea l sequences, limit and convergence of a sequence. Monotonic sequences. Real numbers as complete ordered field, Limit point , Bolzano-Weierstrass theorem. Closed and Open sets. Union and intersection of such sets. Concept of compactness. Heine-Borel theorem. Rea l sequences, limit and convergence of a sequence. Monotonic sequences.	
UNIT-**II**	**Cauchy`s sequence , Darboux`s and Rolle`s theorem.** **7 Hours**
Cauchy`s sequences. Subsequences, Cauchy`s general principle of convergence. Properties of continuous functions on closed intervals. Properties of derivable functions. Darboux`s and Rolle`s theorem.	
UNIT **-III**	**Riemann integration :** **7 Hours**
Riemann integration, Lower and Upper Riemann integrals, Riemann integrability. Mean value theorem of integral calculus. Fundamental theorem of integral calculus.	
UNIT-**IV**	**Sequence and series of functions :** **7 Hours**
Sequence and series of functions, Pointwise and Uniform convergence. Cauchy`s criterion, Weierstrass M-test, Abel`s test, Dirichlet`s test for uniform convergence of series of functions. Term by term differentiation and integration.	
UNIT-**V**	**Matric space :** **7 Hours**
Definition and examples. Subspace of a metric space, Product space, Continuous mappings, Sequence in a matric space. Cauchy`s sequence, Complete matric space, Baire`s theorem. Compact sets and Compact spaces, connected metric spaces.	
Text Book	Elementary Real Analysis by D.C.Gokhroo, S.R.Saini, J.P.N.Ojha
Reference Books	1. Real Analysis by Dipak Chatterjee 2. Real Analysis by H.L.Royden 3. Principals of Real Analysis by S.C.Malik
Mode of Evaluation: (Percent Weightage)	Mid-Term I (10%) Mid-Term II (10%) Weekly test (10%) Graded assignment (10%) Written examination (60%)
Recommended by BOS on :	
Approved by Academic Council on :	

MA-214	**Mathematics –VIII (Operation Research)** **C(L, T, P) =4(3, 1, 0)**
Version	**1.0**
Prerequisite	Knowledge of Mathematics upto Senior Secondary School level is required.
Objectives:	All the engineers in industry and business organizations are being continuously pressed for improving production and sales in reducing human efforts and to lower production costs to with stand increasing competation. This requires the use of rigorous methods of decision making, such as optimization techniques which result into more efficient and economical activities.
Expected outcome:	Students will be able to use Optimization techniques in solving problems in complex situations which are greatly aided by the advanced computer technology.
UNIT-**I**	**Linear Programming :** **8 Hours**
The Linear Programming problem. Graphical solution of Linear Programming problems. Basic solution. Some basic properties of convex sets. Theorems based on convex sets. Fundamental theorem of L.P.P. Application of Simplex Method for solution of a L.P.P. to simple problems.	
UNIT-**II**	**Duality of L.P.P. :** **7 Hours**
Duality. Fundamental theorem of duality. Properties and simple problems of duality. Transportation problems. Transportation algorithm for minimization problem.	
UNIT **-III**	**Assignment Models , Theory of Games :** **7 Hours**
Assignment Models : Mathematical formulation. Hungarian method. Variations of the assignment problem. Travelling salesman problem. Theory of Games : Basic definitions, Minimax(Maximin) criterion and optimal strategy, Saddle point, Minimax-Maximin principle for mixed strategy games. Fundamental theorem of Game theory. Two-by-two games without saddle point. Arithmetic method for 2x2 games.	
UNIT-**IV**	**Inventory Models :** **7 Hours**
• Inventory Models : Definition, types of inventory models. Classification of inventory models. • Economic ordering quantity(EOQ). EOQ models without shortage, EOQ models with shortage. EOQ models with constraints.	
UNIT-**V**	**Queueing Theory :** **7 Hours**
• Introduction, Probability distributions in queueing systems. • Models : Erlang model, general Erlang model, Model III (M/M/I) : (N/FCFS).	
Text Book	1. Elements of Linear Programming by D.C. Gokhroo, S.L. Bhargava, S.R.Saini 2.Optimization Techniques by S.K.Jain, D.M.Mehta
Reference Books	1.Operations Research:Methods and Practice by C.K.Mustafi 2.Mathematical Methods by Dr.S.Sivaiah 3. Mathematical Techniques by Jordan, Smith
Mode of Evaluation: (Percent Weightage)	Mid-Term I (10%) Mid-Term II (10%) Weekly test (10%) Graded assignment (10%) Written examination (60%)
Recommended by BOS on :	
Approved by Academic Council on :	

CY 212 Physical Chemistry-I C (L, T, P) = 3 (3, 0, 0)

(Common for Mathematics and Biology Streams)

Prerquisites: Physical Chemistry I needs Chemistry I and II and Organic and Inorganic I Papers		
Objectives: This course deals with the application of structure and theory to the study of physical aspects including reaction dynamics, isotope effects and molecular orbital theory applied. Electrochemistry for fuel systems of daily life		
Outcomes. Better Science understanding		
Unit	**Contents of the Course**	**Hrs.**
I	**Colloidal States**: Definition of colloids, classification of colloids; Solids in liquids (sols): properties – kinetic, optical and electrical; stability of colloids, protective action, Hardy-Schulze law, gold number. Liquids in liquids (emulsions): types of emulsions, preparation, Emulsifier, Liquids in solids (gels): classification, preparation and properties, inhibition, general application of colloids, colloidal electrolytes.	**07**
II	**Chemical Kinetics I** Chemical kinetics and its scope, rate of a reaction, factors influencing the rate of a reaction, concentration dependence of rates, mathematical characteristics of simple chemical reactions – zero order, first order, second order, pseudo order, half life and mean life, electro kinetics phenomena, diffusion, electric conduction, irreversible thermodynamics for biological systems,	**08**
III	**Chemical kineticsII:** Theories of chemical kinetics. Simple collision theory based on hard sphere model, transition state theory (equilibrium hypothesis), Expression for the rate constant based on equilibrium constant and thermodynamic aspects, Catalysis. Introduction to corrosion, homogeneous theory, forms of corrosion, corrosion monitoring and prevention methods in Mechanical Engineering	**06**
IV	**Electrochemistry** Electrolyte Solutions , Electrical Conductivity , Electrified Interfaces, Equilibrium Electrochemistry , Dynamic Electrochemistry , Electrolysis , Biological Electrochemistry ,photosynthesis, nerve excitation, blood coagulation, vision, smell, membrane transport Bioelectrochemistry, and applications. Electrocardiography. half wave potential and its Significance. Electrochemistry and Batteries	**07**
V	**Thermodynamics – II** Statistical thermodynamics , Thermodynamic equilibrium , Quasi-static transfers between simple systems are nearly in thermodynamic equilibrium and are reversible , Non-equilibrium thermodynamics Account in terms of states of thermodynamic equilibrium , Thermodynamic processes between states of thermodynamic equilibrium , Dependent and independent variables for a process ,Scope of thermodynamics in mechanical engineering	**08**
Total Hours		**36**

References and Text Books:

1. R.G. Compton and G.H.W. Saunders, Electrode Potentials Oxford Chemistry Primer

2. A.C. Fisher Electrode Dynamics Oxford Chemistry Primer

3. Barrow, G. M. Physical Chemistry Tata McGraw-Hill (2007).

4. Castellan, G. W. Physical Chemistry 4th Ed. Narosa (2004).

5. Mahan, B. H. University Chemistry 3rd Ed. Narosa (1998).

CY 262 Chemistry Lab –IV C (L, T, P) = 2 (0, 0, 2)

1. Estimation of borax - Standard Sodium Carbonate

2. Estimation of Sodium Hydroxide - Standard Sodium Carbonate

3. Estimation of HCl – standard oxalic acid. Iodometry

4. Estimation of Copper - Standard Copper sulphate

5. Estimation of Potassium dichromate - Standard Potassium dichromate Complexometric

6. Estimation of Magnesium using EDTA.

7. Estimation of Zinc using EDTA.

8. Estimation of ferrous ion using Diphenyl amine / N-Phenylanthranilic acid as indicator. Precipitation titration

9. Estimation of Chloride in neutral medium. (Demonstration - experiment)

10. Estimation of ferrous sulphate – Standard FAS.

Reference Books:

1. Textbook of Practical Organic Chemistry, A.I. Vogel, Prentice Hall, 5th edition.
2. Practical Organic Chemistry, Mann F. G. & Saunders B. C, Orient Longman, 1960.
3. Senior Practical Physical Chemistry, B.D.Khosla, R. Chand & Co.
4. Vogel's Qualitative Inorganic Analysis, A.I. Vogel, Prentice Hall, 7th Edition.
5. Vogel's Quantitative Chemical Analysis, A.I. Vogel, Prentice Hall, 6th Edition.

PY 212	**Physics-IV** **Solid State Devices** **C (L, T, P) = 4 (3, 1, 0)**
Version	1.0
Prerequisite	Upto B. Sc. First year
Objectives:	To help students understand the role of Physics in science and society and to see the connections between science, current events and physical phenomena. To give students the information and instincts needed to apply principles to new and unfamiliar problems. To give students the skills needed to apply Physics principles to new and unfamiliar problems.
Expected Outcome:	Be able to apply knowledge from one or more areas of Physics to make appropriate intellectual connections or solve problems in another area of Physics Be able to read, present and/or discuss information found in current research or scientific journals Be familiar with important historical experiments and what they revealed about our understanding of the universe
UNIT-**I**	**Transistor characteristics**
Characteristics for bipolar junctions transistor; Concept of load lineand operating point; Hybrid parameters.Transistor as amplifier: CB; CE, CC configurations; Analysis oftransistor amplifiers using hybrid parameters and its gain-frequencyresponse.	
UNIT-**II**	**Amplifiers**
Cascade amplifiers, basic idea of direct coupled and R-Ccoupled amplifiers; "Differential amplifiers.Need of bias and stability of Q point: stability factors, varioustypes of bias circuits for thermal bias stability: fixed bias, collector to base feedback bias and four resistor bias	
UNIT **-III**	**Feed back**
Amplifier with feedback: Concept of feed back, positive and negative feedback, voltage and current feed back circuits. Advantages of negative feed back: Stabilization of gain, effect of negative feed back on output and input resistance, reduction ofnonlinear distortion, effect on gain – frequency response.	
UNIT-**IV**	**Oscillator**
Oscillators: Criteria for self excited and self sustained oscillations, circuit requirement for build-up of oscillation; Basic transistor oscillator circuit and its analysis: Colpitfs and Hartely oscillators, R.C Oscillators, crystal oscillators and its advantages	
UNIT-**V**	**Field Effect Transistor**
Field effect transistors and logic circuits: Junction field effecttransistor (JFET) and metal oxide semiconductor field effect transistor (MOSFET): circuit symbols, biasing and volt-ampere characteristics, source follower operation of JFET, FET as variable voltage resister	
Text Book	l. John D. Ryder, Electronic Fundamentals and Applications,Prentice Hall of India Pvt. Ltd., New Delhi. 2. John D. Ryder, Engineering Electronics, McGraw Hill BookCompany, New Delhi. 3. Jacob Millman and ChristoscHailkias, Integrated Electronics.Analog and Digital Circuits and systems: McGraw-Hill Ltd.(1-972) 4. Albert Paul Malvino, Digital Computer Electronics, TataMcGraw- Hill Pub. Co.~Ltd., New Delhi (1983).
Reference Books	l. John D. Ryder, Electronic Fundamentals and Applications,Prentice Hall of India Pvt. Ltd., New Delhi. 2. John D. Ryder, Engineering Electronics, McGraw Hill BookCompany, New Delhi. 3. Jacob Millman and ChristoscHailkias, Integrated Electronics.Analog and Digital Circuits and systems: McGraw-Hill Ltd.(1-972) 4. Albert Paul Malvino, Digital Computer Electronics, TataMcGraw- Hill Pub. Co.~Ltd., New Delhi (1983).
Mode of Evaluation: (Percent Weightage)	
Recommended by BOS on :	
Approved by Academic Council on	

PY 214	**Physics-V (Electronics)** **C (L, T, P) = 4 (3, 1, 0)**
Version	1.0
Prerequisite	Upto B. Sc. First year
Objectives:	To help students understand the role of Physics in science and society and to see the connections between science, current events and physical phenomena. To give students the information and instincts needed to apply principles to new and unfamiliar problems. To give students the skills needed to apply Physics principles to new and unfamiliar problems.
Expected Outcome:	Be able to apply knowledge from one or more areas of Physics to make appropriate intellectual connections or solve problems in another area of Physics Be able to read, present and/or discuss information found in current research or scientific journals Be familiar with important historical experiments and what they revealed about our understanding of the universe
UNIT-**I**	**Circuit analysis**
Networks-some important definitions, loop and nodal equations based on DC and AC circuits (Kirchhoff Laws).	
UNIT-**II**	**Four terminal networks**
Ampere- volt conventions, open, close andhybrid parameters of any four terminal networks; Input, output andmutual impendence for an active four terminal network.	
UNIT **-III**	**Circuit theorems**:
Superposition, Thevenin, Norton, reciprocity, compensation, maximum power transfer.	
UNIT-**IV**	**Semi-conductors and rectification:**
Charge densities in N and P materials; Conduction by drift and diffusion of charge carriers, PN diode equation; capacitance effects. Rectifiers: Half-wave, full wave and bridge rectifier : calculation of ripple factor, efficiency and regulation	
UNIT-**V**	**Filters:**
Series inductor, shunt capacitor, L section and 1t section filters.Voltage regulation: Voltage regulation and voltage stabilization byZener diode, voltage multiplier.Transistor and transistor bias circuits: Notations and volt-ampere	
Text Book	l. John D. Ryder, Electronic Fundamentals and Applications,Prentice Hall of India Pvt. Ltd., New Delhi. 2. John D. Ryder, Engineering Electronics, McGraw Hill BookCompany, New Delhi. 3. Jacob Millman and ChristoscHailkias, Integrated Electronics.Analog and Digital Circuits and systems: McGraw-Hill Ltd.(1-972) 4. Albert Paul Malvino, Digital Computer Electronics, TataMcGraw- Hill Pub. Co.~Ltd., New Delhi (1983). 5. Kumar & Gupta, Hand book of Electronics.
Reference Books	1. G.K. Mithal, Hand Book of Electronics.University nfknjnstlmn 2. G.K. Mithal, Electronics Devices and Applications. 3. R.P. Jain, Digital Electronics.
Mode of Evaluation: (Percent Weightage)	
Recommended by BOS on :	
Approved by Academic Council on :	

PY-262 **Physics Lab IV** **(L, T, P) =2(0, 0, 2)**

1. Study and plot PN Diode characteristics.

2. To study characteristics of a given transistor PNP/NPN (common base & common emitter).

3. Verification of Network Theorems- Superposition, Thevenin's, Norton's and Maximum power transfer theorems.

4. To verify Kirchhoff's Current and Voltage laws- KCL and KVL.

5. Study of Half wave anf Full wave rectifiers and calculate Ripple factor.

6. To Study characteristics of a Field Effect transistor.

7. Study single stage Transistor Audio Amplifier.

8. Measurement of inductance of a coil by Anderson's bridge.

9. Determination of power factor (cos Ø) of a coil using CRO.

10. To study Operational Amplifier.

SURESH GYAN VIHAR UNIVERSITY
Accredited by NAAC with 'A' Grade

SYLLABUS

B. Sc. Mathematics 3rd YEAR

GYAN VIHAR SCHOOL OF APPLIED AND BIOSCIENCES

EDITION 2018-21

SURESH GYAN VIHAR UNIVERSITY
Accredited by NAAC with 'A' Grade

Teaching and Examination Scheme

To commence from the Academic year: 2018-2021

Department: School of Applied Sciences **Year: 3rd**

Program : B.Sc. Mathematics Course **Semester-V**

S.N.	Course Code	Course Name	Credit	Contact Hrs/Wk.			Exam Hours	Weightage (in%)	
				L	T	P		CIE	ESE
		(A)University Core:							
1	EM 301	• **Employability Skills-IV**	1	1	0	0	3	60	40
2	PC 301	• **Proficiency in Co-curricular Activities-V**	2	0	0	0	0	100	0
		(B) Program Core:							
3	MA-311	• **Mathematics –IX (Linear Algebra)**	4	3	1	0	3	40	60
4	MA313	• **Mathematics –X (Complex Analysis)**	4	3	1	0	3	40	60
5	CY311	• **Chemistry VI (Inorganic Chemistry-II)**	4	3	1	0	3	40	60
6	PY 311	• **Physics-VI (Optics and Lasers)**	4	3	1	0	3	40	60
7	PY313	• **Physics-VII Nuclear Physics**	4	3	1	0	3	40	60
		(C) Practical							
8	CY361	• **Chemistry -V Lab**	1	0	0	2	3	60	40
9	PY-361	• **Physics-V Lab**	1	0	0	2	3	60	40
		(C)Program Elective: •							
		(D)Open Elective: •							
		Total	25	16	5	4			
		Total Teaching Load		**25**					

L – Lecture
T – Tutorial
P – Practical

CIE – Continuous Internal Evaluation
ESE – End Semester Examination

Signature of Concerned Teacher **Signature of Convener-BoS_____**

Signature of Member Secretary

SURESH GYAN VIHAR UNIVERSITY
Accredited by NAAC with 'A' Grade

Teaching and Examination Scheme

To commence from the Academic year: 2018-2021

Department: School of Applied Sciences **Year: III**

Program : B.Sc. Mathematics Course **Semester-VI**

S.N.	Course Code	Course Name	Credit	Contact Hrs/Wk.			Exam Hours	Weightage (in%)	
				L	T	P		CIE	ESE
		(A)University Core:							
		(B) Program Core:							
1.	MA-312	• **Mathematics –XI (Number Theory)**	4	3	1	0	3	40	60
2.	MA314	• **Mathematics –XII (Statics and Dynamics)**	4	3	1	0	3	40	60
3.	CY312	• **Chemistry VII (Physical & Misc Chemistry-II)**	4	3	1	0	3	40	60
4.	CY314	• **Chemistry VIII (Organic Chemistry-II)**	4	3	1	0	3	40	60
5.	PY312	• **Physics-VIII (Quantum Mechanics)**	4	3	1	0	3	40	60
		(C) Practical							
6.	CY361	• **Chemistry -VI Lab**	1	0	0	2	3	60	40
7.	PY-361	• **Physics-VI Lab**	1	0	0	2	3	60	40
		(C)Program Elective: •							
		(D)Open Elective: •							
		Total	22	15	5	4			

		Total Teaching Load		**24**			

L – Lecture
T – Tutorial
P – Practical

CIE – Continuous Internal Evaluation
ESE – End Semester Examination

Signature of Concerned Teacher **Signature of Convener-BoS_____**

Signature of Member Secretary

MA-311	**Mathematics –IX (Linear Algebra)**	**C(L, T, P) =4(3, 1, 0)**
Version	**1.0**	
Prerequisite	Knowledge of basic concepts of Abstract Algebra i.e. Groups, Rings , Fields, Ideals , Vector Spaces etc. is required.	
Objectives:	The objective of this course is to develop the learning capabilities and hone the problem solving skills of talented students at a mathematically deeper and more rigorous level.	
	System of liner equations appear in numerous applications of Mathematics studying solution of sets to such system leads to the abstract notions of a vector space and a linear transformation. Matrices can be used to represent linear transformation and to do concrete calculations.	
Expected outcome:	Linear Algebra has evolved as a branch of Mathematics with wide range of applications to the natural sciences, to engineering, to computer science, to management and social sciences.	
UNIT-I	**Linear Transformations :**	**7 Hours**
• Linear Transformations, Operators, Properties of Linear Transformations. • Range space and Null space of Linear Transformations. • Properties of Linear Transformations.		
UNIT-II	**Representation of Transformations by Matrices :**	**8 Hours**
• Representation of Transformations by Matrices, Matrices of Identity and Zero Transformations. • Matrix of an Inverse Transformation, Change of Basis. • Traces of a Linear Transformations of a Finite Dimensional Vector Space.		
UNIT -III	**Characteristic Values and Vectors :**	**7 Hours**
• Characteristic Values and Characteristic Vectors of Linear Transformation. • Cayley- Hamilton Theorem, Diagonalizable Transformations.		

UNIT-IV	**Inner Product Spaces :**	**7 Hours**
• Inner Product Spaces, Cauchy-Schwarz`s inequality. • Orthogonal Vectors, Orthogonal Basis, Bessel`s inequality. • Gram-Schmidt Orthogonalization process.		
UNIT-V	**Bilinear forms :**	**7 Hours**
• Bilinear forms, Vector Space of Bilinear forms, Matrices of Bilinear forms. • Symmetric Bilinear forms, Skew-symmetric Bilinear forms.		
Text Book	1. Linear Algebra by S.D.Sharma, Kedar Nath Ram Nath & Co.	
Reference Books	1. Matrix and Linear Algebra by K.B.Datta, Prentice Hall of India Pvt. Ltd. 2. Basic Algebra Vol. I & II by N.Jacobson, Hindustan Publishing Company. 3. Linear Algebra by K.Hoffman and R.Kunze, Prentice Hall of India Pvt. Ltd.	
Mode of Evaluation: (Percent Weightage)	Mid-Term I (10%) Mid-Term II (10%) Weekly test (10%) Graded assignment (10%) Written examination (60%)	
Recommended by BOS on :		
Approved by Academic Council on		

MA-313	**Mathematics –X (Complex Analysis)**	**C(L, T, P) =4(3, 1, 0)**
Version	**1.0**	
Prerequisite	Knowledge of Advanced Calculus and elementary Modern Algebra is required.	
Objectives:	The students will learn the basic theory and techniques of complex analysis as well as some of its applications. Students will also learn computation of improper integrals.	
Expected outcome:	Study of complex analysis is remarkable in its directness and elegance and leads to many useful applications.	
UNIT-I	**Complex plane :**	**7 Hours**
• Complex plane. Curves and Regions in Complex plane, Jorden curve theorem (Statement only). Extended Complex plane. • Stereographic projection. Limits, Continuity and Differentiability of complex functions. • Analytic functions, Cauchy-Riemann equations.		
UNIT-II	**Complex Integration :**	**8 Hours**
• Complex Integration, Complex line integrals, Cauchy Integral theorem, Indefinite integral. • Fundamental theorem of Integral calculus for complex functions. Cauchy Integral Formula. • Analyticity of the derivative of an analytic function, Morera`s theorem.		

UNIT -III	**Theorems and Power Series :**	**7 Hours**
• Taylor`s theorem , Laurent`s theorem, Maximum modulus theorem. • Power series-Absolute convergence , Able`s theorem. • Cauchy-Hadamard theorem , Circle and Radius of convergence.		
UNIT-IV	**Singularities of an analytic function :**	**7 Hours**
• Singularities of an analytic function , Branch point, Meromorphic and Entire functions. • Riemann`s theorem. Residue at a singularity, Cauchy`s residue theorem. • Rouche`s theorem, Fundamental theorem of Algebra.		
UNIT-V	**Conformal mapping :**	**7 Hours**
• Conformal mapping. Bilinear transformation and its properties. • Elementary mappings : $w(z) = \frac{1}{2}\left(z + \frac{1}{z}\right), z^2, e^z, \sin z, \cos z.$ • Evaluation of a real definite integral by contour integration.		
Text Book	1. Complex Analysis by G.N. Purohit and S.P. Goyal, Jaipur Publishing House.	
Reference Books	1. Theory of Functions of a Complex Variable by S. Chand & Co. , New Delhi. 2. Complex Variables and Applications by R.V.Churchil & J.Brown, McGraw-Hill. New York. 3. Complex Variables: Intro. and Application by Marh J.,Ablowitz & A.S.Fokas, Cambridge Uni. Press	
Mode of Evaluation: (Percent Weightage)	Mid-Term I (10%) Mid-Term II (10%) Weekly test (10%) Graded assignment (10%) Written examination (60%)	
Recommended by BOS on :		
Approved by Academic Council on :		

CY 311	**Chemistry-IV (Inorganic Chemistry-II) C (L, T, P) = 3 (3, 0, 0)**	
Version	**I**	
Prerequisite	Chemistry study of earlier semester	
Objectives:	1. To train qualified, adaptable, motivated, and responsible Mathematicians who will contribute to the scientific and technological development. 2.To impact knowledge by teaching 3.To advance knowledge by research	
Expected outcome:	Better outcomes in chemistry specialization	
Unit-I	**Coordination Chemistry**	**7 Hours**

Coordination Compounds: Nomenclature Werner's coordination theory and its experimental verification, effective atomic number concept, chelates, nomenclature of coordination compounds, isomerism in coordination compounds, valence bond theory crystal field theory of transition metal complexes. **Application in Industries by Magnetic properties of transition metal complexes**	
Unit-II	**Inner Transition Elements :Actinides and Lanthanides 8 Hours**
Definition of the f elements; position in the periodic table; Properties of the atoms and ions: ionization energies, electrode potentials, metallic and ionic radii; Colour and electronic spectroscopy; Magnetism; Solid state compounds: halides and oxides; Coordination chemistry of the lanthanides and actinides; Commercial applications; **Rare earth Oxides used for Industries.**	
Unit-III	**Organometallic compounds 6 Hours**
Bonding of ligands,Reactions of organometallic ,Electron accountancy ,Oxidative addition and reductive elimination , Insertion and α/β-elimination, Industrial organometallic catalysis , Olefin catalysis **Organometallic compounds and application in electronic materials**	
Unit-IV	**Recent Advances In Inorganic 7 Hours**
Inorganic nanotechnology Zeolite ,Bio-inorganic chemistry (must emphasize the metal)Ceramics ,Inorganic thin films ,Intercalation compounds ,Super acids , High-temperature superconductors , nanowire battery , Perovskites nonvolatile memory materials	
Unit-V	**Metallurgy :ores minerals and purification of metals 8 Hours**
Solid States: Metallurgy of Minerals as Industrial Metals .Metallurgy of Iron Copper Definition of space lattice, unit cell; Laws of crystallography – (i) Law of constancy of interfacial angles, (ii) Law of rationality of indices (iii) Law of symmetry, Symmetry elements in crystals. X-ray diffraction by crystals, Derivation of Bragg equation, Determination of crystal structure of NaCl, KCl and CsCl (Laue's method and powder method).	
Reference Books	1. Basic Inorganic Chemistry F.A. Cotton. G. Wilkinson and P.L. Gaus. Wiley. 2. Concise Inorganic Chemistry, J.D. Lee ELBS. 3. Concepts of Models Inorganic Chemistry B.Douglas. D.McDaniel and J.Alexander, John Wiley. 4. Inorganic Chemistry. D.E. Shriver P.W. Atkins and C.H. Langford, Oxford. 5. Inorganic Chemistry, W.W. Porterfield Addison Wesley. 6. Inorganic Chemistry, A.G. Sharpe. ELBS. 7. Inorganic Chemistry, G.L. Miessler and D.A. Tarr, Prentice Hall. 8. Group Theory and Its Chemical Applications: P. K. Bhattacharya 9. Inorganic Chemistry: J. E. Huyee, Principles of Structure & Reactivity, 3rd Ed. 10. Selected Topics in Inorganic Chemistry: W. U. Malik, G. D. Tuli and R. Madan
Mode of Evaluation: (Percent Weightage)	As per SGVU Norms
Recommended by BOS on :	
Approved by Academic Council on :	

PY 311	**Physics-VI (Optics and Lasers) C (L, T, P) = 4 (3, 1, 0)**
Version	1.0
Prerequisite	Upto B. Sc. second year
Objectives:	To help students understand the role of Physics in science and society and to see the connections between science, current events and physical phenomena. To give students the information and instincts needed to apply principles to new and unfamiliar problems. To give students the skills needed to apply Physics principles to new and unfamiliar problems. To give students the skills needed to work with modern electronic equipment to acquire data and the ability to analyze the results obtained.
Expected Outcome:	Be able to apply knowledge from one or more areas of Physics to make appropriate intellectual connections or solve problems in another area of Physics Be able to read, present and/or discuss information found in current research or scientific journals Be familiar with important historical experiments and what they revealed about our understanding of the universe
UNIT-I	**Interference-I**
Meaning and definition of interference, conditions for interference of light- Coherent Sources. Fresnel's biprism- determination of wavelength of light.	
UNIT-II	**Interference-II**
Newton's Ring in reflected with and without contact between lens and glass plate, Newton's ring in transmitted light (Haidinger Fringes) –Determination of wavelength of monochromatic light. Michelson's interferometer: Construction and working. Determination of wavelength of light and wavelength separation of two nearby wavelengths.	
UNIT -III	**Diffraction**
Distinction between Fresnel and Fraunhoffer's diffraction. Fraunhofer's diffraction- Diffraction due to single slit and circular aperature. Fraunhofer's diffraction due to Plane Diffraction Grating.	
UNIT-IV	**Polarization**
Polarization of light: Production of light: Production of Plane, Circular and Elliptical Polarized, Phase retarding Plates.	
UNIT-V	**Lasers**
LASERS: Introduction- Spontaneous Emission, stimulated Emission, Population Inversion, LASER Principle- Einstein's coefficients, Types of LASER- He-Ne LASER, Ruby LASER. Application of lasers.	
Text Book	4. Optics by Ajoy ghatak, The Mc Graw Hill Companies 5. Optics by Subramaniyam and BrijLal, S. Chand & Co. 6. Fundamentals of Optics by Jenkin's A. Francis & White E Harvey, Mc Graw Hill Inc.
Reference Books	7. Optics by Ajoy ghatak, The Mc Graw Hill Companies 8. Optics by Subramaniyam and BrijLal, S. Chand & Co. 9. Fundamentals of Optics by Jenkin's A. Francis & White E Harvey, Mc Graw Hill Inc.
Mode of Evaluation:	
Recommended by BOS on :	
Approved by Academic Council	

PY 313	**Physics-VII Nuclear Physics C (L, T, P) = 4 (3, 1, 0)**
Version	1.0
Prerequisite	Upto B. Sc. Second year
Objectives:	To help students understand the role of Physics in science and society and to see the connections between science, current events and physical phenomena. To give students the information and instincts needed to apply principles to new and unfamiliar problems. To give students the skills needed to apply Physics principles to new and unfamiliar problems. To give students the skills needed to work with modern electronic equipment to acquire data and the ability to analyze the results obtained. To equip students with the skills and confidence to be life-long learners.
Expected Outcome:	Be able to apply knowledge from one or more areas of Physics to make appropriate intellectual connections or solve problems in another area of Physics Be able to read, present and/or discuss information found in current research or scientific journals Be familiar with important historical experiments and what they revealed about our understanding of the universe A working knowledge of fundamental concepts in the basic areas of physics An understanding of the physical principles required to analyze a physical question or topic An understanding of the importance of basic physical laws and their limitations
UNIT-I	**Nuclear Structure:**
Basic Properties of nucleus- Size, charge, spin, magnetic dipole moment and electric quadrupole moment.	
UNIT-II	**Binding Energy:**
Binding energy of nucleus, Binding Energy Curve and Stability. Radioactivity, deuteron Binding Energy, p-p and n-p scattering, Nuclear force.	
UNIT -III	**Alpha and beta decays:**
Range of α-particle, Geiger Nuttal law, Gammow's theory of alpha decay, Beta Spectrum-neutrino hypothesis.	
UNIT-IV	**Nuclear Reactions:**
Types of nuclear reactions, channels, nuclear reaction kinematics, compound nucleus, direct reactions(concepts)	
UNIT-V	**Nuclear Detectors:**
Construction, working and properties of proportional, Geiger Muller and Scintillation counter	
Text Book	1. Nuclear Physics by D. C. Tayal, Him alaya Publishing House 2. Nuclear Physics by Irving Kaplan- Narosa Publishing House

Reference Books	1. Nuclear Physics by D. C. Tayal, Him alaya Publishing House 2. Nuclear Physics by Irving Kaplan- Narosa Publishing House
Mode of Evaluation:	
Recommended by BOS on :	
Approved by Academic Council	

MA-312	**Mathematics –XI (Number Theory)**	**C(L, T, P) =4(3, 1, 0)**
Version	**1.0**	
Prerequisite	Knowledge of Elementary Algebra and Advanced Calculus is required.	
Objectives:	The security of our Phone calls, Bank transfers etc. all rely one area of Mathematics i.e. Number Theory.	
Expected outcome:	Number Theory is used in solving Diophantine equations which has got wide range of applications in engineering , social and physical sciences.	
UNIT-I	**Divisibility :**	**7 Hours**
Divisibility—Division Algorithm, g.c.d. the Euclidean Algorithm. l.c.m,.Prime, Infinitude of primes, Fundamental theorem of Arithmetic. Fibonacci sequence.		
UNIT-II	**Congruence :**	**8 Hours**
Congruence—Linear congruence, Fermat, Little and Wilson`s theorems. Chinese remainder theorem. Fermat`s last theorem. Euler`s factorization, Mersenne`s factorization.		
UNIT -III	**Functions :**	**7 Hours**
Number theoretic functions, π and σ-functions. The Mobius function, Greatest integer function. Euler Phi function and the properties of Phi function.		
UNIT-IV	**Diophantine equations :**	**7 Hours**
Diophantine equations—$ax + by = c,\ ax + by + cz = d,\ x^2 + y^2 = z^2,\ x^4 + y^4 = z^4$. General Integers solution of the equation $x^2 + y^2 + z^2 = w^2(x, y, z, w = 1)$		
UNIT-V	**Quadratics :**	**7 Hours**

Quadratic residues, Quadratic reciprocity. Quadratic congruence. Primitive roots for primes, Composite numbers having primitive roots. Theory of indices.	
Text Book	1. Elementary Number Theory by David M. Burton, Wm. C. Brown Publishers.
Reference Books	1. Elementary Number Theory by G.A.Jones and J.M.Jones, Springer—Verlag. 2. Elementary Theory of Numbers by W.Sierpinski, North-Holland,Ireland. 3. An Intro. to the Theory of Numbers by Niven, S.H.Zuckerman and L.H.Montgomery, John Wiley
Mode of Evaluation: (Percent Weightage)	Mid-Term I (10%) Mid-Term II (10%) Weekly test (10%) Graded assignment (10%) Written examination (60%)
Recommended by BOS on :	
Approved by Academic Council on :	

MA-314	**Mathematics –XII (Statics and Dynamics) C(L, T, P) =4(3, 1, 0)**
Version	**1.0**
Prerequisite	Knowledge of Elementary Statics , Dynamics, Calculus, Trigonometry, Ordinary Differential Equations is required.
Objectives:	The objective of this course is to develop the learning capabilities and hone the problem solving skills of talented students at a mathematically deeper and more rigorous level.
Expected outcome:	Study of Principles of Statics and Dynamics is remarkable which helps in solving many problems of engineering and physical sciences which appears in daily life.
UNIT-I	**Statics : 8 Hours**

General Conditions of Equilibrium when more than three forces act on a rigid body. Virtual work, Principle of virtual work for a system of coplanar forces acting on a particle. Principle of virtual work for a system of coplanar forces acting at different points of a rigid body.		
UNIT-II	**Statics :**	**7 Hours**
Centre of Gravity. C.G. of an arc, C.G. of a plane area. C.G. of a solid of revolution, C.G. of a surface of revolution, C.G. when the density varies.		
UNIT -III	**Dynamics :**	**7 Hours**
Velocity and Acceleration—along radial and transverse directions, along tangential and normal directions. S.H.M., Hooke`s Law. Motion along horizontal and vertical elastic strings.		
UNIT-IV	**Dynamics :**	**7 Hours**
Motion in resisting medium—Resistance varies as velocity and square of velocity. Motion on a smooth curve in a vertical plane. Motion on the inside and outside of a smooth vertical circle.		
UNIT-V	**Dynamics :**	**7 Hours**
Central Orbits—p-r equations, Apses. Time in an orbit, Kepler`s Law of planetary motion. Moment of Inertia—M.I. of rods, Circular rings, Circular disks, Solid and Hollow spheres, Rectangular lamina, Ellipse and Triangle.		
Text Book	1. Elements of Statics by K.C.Sharma, D.C.Gokhroo, S.R.Saini, J.P.H., Jaipur. 2. Dynamics by Y.N.Gaur, A.K.Mathur, M.C.Goyal, Ramesh Book Depot, Jaipur.	
Reference Books	1. A Text Book of Statics by R.S.Verma, Pothishala Pvt. Ltd., Allahabad 2. Principles of Mechanics by J.L.Synge & Griffith, Tata McGraw-Hill.	
Mode of Evaluation: (Percent Weightage)	Mid-Term I (10%) Mid-Term II (10%) Weekly test (10%) Graded assignment (10%) Written examination (60%)	
Recommended by BOS on :		
Approved by Academic Council on		

CY 312	**Chemistry-VII (Physical &MiscChemistry-II) C (L, T, P) = 3 (3, 0, 0)**
Version	**I**
Prerequisite	Chemistry of Sem I II, III and IV
Objectives:	This course deals with the application of structure and theory to the study of Solution colligative properties , Nuclear chemistry and heterogeneous system
Expected outcome:	Going green can save money while helping to relates with development of physical chemistry.
Unit-I	**Solution and Colligatives : 7 Hours**
Expression of Concentration of Solids in Liquids ,Solid Solutions ,Colligative Properties -Relative Lowering of Vapor Pressure ,Raoult's Law Elevation of Boiling Point ,Depression of Freezing Point ,Osmotic Pressure ,Determination of Molecular Masses using Colligative Properties 'Van't Hoff Factor and Calculations involving it ,	
Unit-II	**Nuclear Chemistry 8 Hours**
	Atomic Nucleus reactions Binding energy disintegration isotopes isobars artificial radioactivity s application radioactive waste management radioactivity. **Photo electrochemistry and application in industries. Equilibrium state at a semiconductor/liquid junction**.
Unit-III	**Phase equilibrium 6 Hours**
Heterogeneous system, Phase diagram of one and two component system. **Surface chemistry:** Interface (chemistry) Surface modification of biomaterials with proteins, Surface finishing, Surface modification, Surface phenomenon, Tribology **electrocardiography. Polarography theory, Ilkovic equation; half wave potential and its significance**	
Unit-IV	**Soil and Environmental Biogeochemistry 7 Hours**
Soil Chemistry, Chemistry of Soils: interactions between soil solids, precipitates and solution phases including: mineralogy, ion exchange, adsorption, weathering and buffering, soil colloidal .Soil Humic Substances. **Soil Testing's and salinity**	
Unit-V	**Environmental and Green Chemistry 8 Hours**
Environmental Issues :Go Green ,Consumer Health & Food Safety Concerns , Environmental Disasters **Basics of Green Chemistry.** Definition of green chemistry, How green chemistry differs from cleaning up pollution, Green chemistry's 12 principles Green chemistry's roots in the Pollution Prevention Act of 1990 **.Intellectual property Right**	
Reference Books	1 Barrow, G. M. Physical Chemistry Tata McGraw-Hill (2007). 2. Castellan, G. W. Physical Chemistry 4th Ed. Narosa (2004). 3. Mahan, B. H. University Chemistry 3rd Ed. Narosa (1998).
Mode of Evaluation: (Percent Weightage)	As per SGVU Rules and regulations
Recommended by BOS on :	

Approved by Academic Council on :	

CY 314	**Chemistry-VIII (Organic Chemistry-II) C (L, T, P) = 3 (3, 0, 0)**
Version	**II**
Prerequisite	Organic chemistry is a growing subset of chemistry. To put it simply, it is the study of all carbon-based compounds; their structure, properties, and reactions and their use in synthesis.
Objectives:	It focuses on the methods used to identify the structure of organic molecules, advanced principles of organic stereochemistry, organic reaction mechanisms, and methods used for the synthesis of organic compounds. Additional special topics include illustrating the role of organic chemistry in biology, medicine, and industry.
Expected outcome:	Organic chemistry has expanded our world of knowledge and it is an essential part of the fields of biochemistry, biology, industry, nanotechnology, rocket science, and many more!
Unit-I	**Aldehyde and Ketone** **7 Hours**
Aldehyde synthesis by deportation or hydrolysis ,Aldehyde synthesis by oxidation of alcohols and rearrangements ,?-Dike tone synthesis by oxidation , Insole synthesis Ketone synthesis by oxidation of alcohols, Nucleophilic addition reactions .Bioelectrochemistry and life constituents	
Unit-II	**Carboxylic Acids** **8 Hours**
Structure , Acidity, Synthesis , Carboxylic Acid Derivatives : Acryl Transfer Reactions : Background , Acid Chlorides/Anhydrides , Esters Amides , Chemistry of Nitriles : Formation Reactions . Natural Products , Acids, Tartaric acid Citric acid	
Unit-III	**Conjugated Systems** **6 Hours**
Conjugated Systems and Molecular Orbital Theory: Conjugated Systems and Molecular Orbital Theory Pericyclic Reactions – Introduction Electrocyclic Processes – Cycloadditions Sigmatropic Rearrangements. Cholesterol and Lipids of Human	
Unit-IV	**Polymers** **7 Hours**
Thermoplastcs and Thermosetts, polymerization classification, compounding of plastics, Elastomers natural and artificial rubber Industrial application of polymers biodegradable plastics. Industrial Process in polymers injection molding, foaming, reinforcing and fiber spinning.	
Unit-V	**Advanced Organics** **8 Hours**
Molecular design and synthesis, organic materials and nonmaterial's, - Synthesis of biologically active compounds and medicinal chemistry: bimolecular Advanced trends in organic synthesis. Photochemistry ,Carbenes ,Total synthesis. Factors governing drug design and rational approach. Drug design through method of variations ,Antibiotics ,Vitamins	

Reference Books	1. Carey, F. A., and R. J. Sundberg. Advanced Organic Chemistry, Part A: Structure and Mechanisms. 4th Ed. New York, NY: Springer, 2000. 2. Joule, J. A., and K. Mills. Heterocyclic Chemistry. 4th ed. Malden, MA: Blackwell Science, 2000. 3. L. Finar: Organic Chemistry (Vol. I & II), E. L. B. S. 4. R. T. Morrison & R. N. Boyd: Organic Chemistry, Prentice Hall. 5. ArunBahl and B. S. Bahl: Advanced Organic Chemistry, S. Chand 6. Peter Sykes: A Guide Book to Mechanism in Organic Chemistry, Orient Longman. 7. S.M.Mukherjee and S.P.Singh ,Reaction Mechanism in Organic Chemistry,Mc Millan (2004). 8. Bhupinder Mehta and Manju Mehta, Organic Chemistry, PHI Learning (2009).
Mode of Evaluation: (Percent Weightage)	As per SGVU Rules regulation s
Recommended by BOS on :	
Approved by Academic Council on :	

PY 312	**Physics-VIII (Quantum Mechanics) C (L, T, P) = 4 (3, 1, 0)**
Version	1.0
Prerequisite	Upto B. Sc. Second year
Objectives:	To help students understand the role of Physics in science and society and to see the connections between science, current events and physical phenomena.
Expected Outcome:	Be able to apply knowledge from one or more areas of Physics to make appropriate intellectual connections or solve problems in another area of Physics Be able to read, present and/or discuss information found in current research or scientific journals Be familiar with important historical experiments and what they revealed about our understanding of the universe A working knowledge of fundamental concepts in the basic areas of physics An understanding of the physical principles required to analyze a physical question or topic An understanding of the importance of basic physical laws and their limitations
UNIT-I	**Failure of Classical Physics**
Spectral radiation, Planck Law, Photo Electric Effect-Einstein's Photo Electric Equation, Compton's Effect, Stability of an atom-Bohr's Atomic theory, Limitations of old quantum theory.	
UNIT-II	**Matter Waves:**
de- Broglie hypothesis- wavelength of matter waves, Properties of matter waves, Phase and group velocities, Davisson's & Germer Experiment, Double slit Experiment, Standing de-Broglie waves of electron in bohr's orbits.	
UNIT -III	**Uncertainty Principle:**

Heisenberg Principle for position and momentum, energy and time. Gamma ray microscope, Diffraction by a single slit, Position of an electron in a Bohr's orbit, Particle in a box, Complementary principle of bohr.	
UNIT-IV	**Schrodinger Wave Equation:**
Schrodinger time independent and time dependent wave equation, Wave function, prope3rties and significance, Postulates of Quantum Mechanics, Operators, Eigen function, Eigen values and expected values	
UNIT-V	**Application of Schrodinger Equation:**
Application of Schrodinger wave equation to particle in one and three dimensional boxes, Potential step and Potential barriers.	
Text Book	1. Quantum Physics by Eyvind H. Wichman, vol 4, The Mcg raw Hill Companies. 2. Quantum Mechanics by Mahesh C Jani, Eastern Economy Edition.
Reference Books	1. Quantum Physics by Eyvind H. Wichman, vol 4, The Mcg raw Hill Companies. 2. Quantum Mechanics by Mahesh C Jani, Eastern Economy Edition.
Mode of Evaluation: (Percent Weightage)	
Recommended by BOS on :	
Approved by Academic Council on :	