RANI CHANNAMMA UNIVERSITY, BELAGAVI

WEL-COME

TO THE COURSE STRUCTRE AND SYLLABUS OF UNDERGRADUATE PROGRAMMES – B.Sc

V Semester

w.e.f.

Academic Year 2016-17 and onwards

1. PHYSICS (OPTIONAL)

B.Sc. V Semester

PHYSICS(Optional)

Paper I

Physics 5.1: CLASSICAL MECHANICS, ELECTRONICS& RELATIVITY (TOTAL HOURS: 50)

UNIT I

CLASSICAL MECHANICS

Constraints: Types with example, Degrees of Freedom,Configuration Space, Principle of Virtual Work, Generalized Co-ordinates, Virtual displacement, Velocity, Force, Kinetic and Potential Energies (derivations) . D'Alembert's Principle, Lagrange's equation of motion from D'Alembert's Principle, Applications of Lagrange's equation of Motion.

a. Motion of a Single Particle in Cartesian Co-ordinates.

b. Harmonic Oscillator.

Problems

(8+2= 10 Hrs.)

UNIT II

Reduction of two body problem to equivalent one body problem. Expression for the total energy, equation of orbit (equivalent of single body) and Classification of Orbits. Kepler's Laws of Planetary Motion and their derivation from Lagranges equation of motion.

Nano Physics: Size effect: surface volume ratio, quantization , Dangling bonds , Island formation and self assembly. Quantum computing, single electron transistor. Examples: Graphene and fullerene.

Problems

(8 +2 = 10Hrs.)

UNIT III

RELATIVITY

Michelson – Morley Experiment. Postulates of Special Theory of Relativity. Lorentz Transformations equations(Derivation). Relativity of Length and Time. Law of Addition of Velocities. Variation of Mass with Velocity. Mass Energy Relation.

Problems

(8+2=10 Hours)

UNIT IV

ANALOG ELECTRONICS

Network theorems:

Current and voltage sources , Superposition theorem, Thevinin's andNorton's Therorem Maximum power transfer Theorem (Derivation for all theorems).

Power supply

Unregulated bridge rectifier(efficiency, ripple factor,PIV ,TUF and Voltage regulation-qualitatively.) Filters: capacitor filter, LC filter, - section filter(study of wave forms qualitatively) Zener diode : characteristics parameter, Explanation of Zener Breakdown. Zener diode used as voltage regulator using unregulated DC voltage bridge rectifier.

Problems

(8 +2 = 10 Hrs.)

UNIT V

Transistor:

h-parameters of a transistor and their determination using CE configuration transistor as CE amplifier with frequency response .Types of feedback, transfer gain with feedback (derivation). Oscillators.-Transistor as an oscillator, comparison between amplifier and oscillator, Classification of oscillators-damped and undamped oscillators, the oscillatory circuit, frequency of oscillatory current, essentials of a feedback LC oscillator. Hartely and Phase shift oscillators.

FET-Types,characteristics and parameters.FET as a common source amplifier(Qualitative).
Problems

(8+2 =10 Hrs.)

PHYSICS 5.2: LAB – V

LIST OF EXPERIMENTS

1. Thevenin's & Norton's Theorem(Ladder Network).
2. h-parameters of a transistor using DC source.
3. Power supply using bridge rectifier (internal resistance and voltage regulation)
4. Power supply using bridge rectifier with Pi– section filters (internal resistance and voltage regulation)
5. Zener diode as voltage regulator using bridge rectifier power supply.
6. Transistor as CE amplifier.
7. Phase –shift oscillator using transistor.
8. Hartley oscillator using transistor.
9. FET-static characteristics and parameters.
10. FET-as common sources amplifier.

NOTE:

1. Experiments are of Four hours duration.
2. Minimum of Eight experiments to be performed.

REFERENCE BOOKS:

1. Classical Mechanics – Goldstein.
2. Classical Mechanics – Gupta, Kumar and Sharma.
3. Classical Mechanics – Takwale and Puranik.
4. Modern Physics – Murugeshan.
5. Introduction to Relativity – R. Resnick.
6. Relativistic Mechanics – Gupta, Kumar.
7. Modern Physics – Duggal and Chabra.
8. Integrated Electronics – Millman and Halkiias
9. Electronics and devices and circuits – Allan Mottershed
10. Basic Electronics –B L Theraj
11. Hand book of Electronics- Gupta and Kumar
12. Principles of Electronics-V,K,Mehta
13. Handbook on Nanophysics-John D Miler

14. Nanotechnology: principles & practices-S.K.Kulkani
15. Introduction to Nanotechonology-C.P.Poole and F.J.Ownes

B.Sc. V Semester
PHYSICS(Optional)
Paper II

Physics 5.3: QUANTUM MECHANICS AND SPECTROSCOPY (Total Hours : 50)

UNIT I

QUANTUM MECHANICS:

Compton effect-(qualitatively), Devission and Germer Experiment, de-Broglie Hypothesis. G. P. Thomson experiment ,Uncertainty principle Statement, Illustration by Gamma –Ray Microscope .

LASERS**:**

Stimulated Absorption and Emission, Einstein A and B coefficients.

Conditions for LASER action, Gas LASERs He – Ne, Diode

LASERs, Characters and applications of laser.

Problems

(4+5+1=10 Hrs.)

UNIT II

WAVE MECHANICS: Time independent Schrodinger's wave equation (derivation) Physical significance of wave function. Derivation of expression for energy of a particle in a box. Eigen function and Eigen values. Linear harmonic oscillator with energy expression (derivation). Concept of zero point energy and degeneracy.

Problems

(8+2 = 10Hrs.)

UNIT III

ATOMIC SPECTRA

Vector atom model- electron spin and quantization and quantum numbers. Stern Gerlach experiments. Coupling scheme for single valance and two valance systems.

Magnetic field effect on light- Magnetic moment of electron due to orbital motion.

Larmor precession. Normal Zeeman effect-explanation of experimental setup Quantum theory of normal Zeeman effect. Energy level diagram for sodium D lines. Anomalous Zeeman effect (qualitative). Lande's g_factor. Energy level diagram for Sodium D lines.
Problems

(8+2= 10 Hrs.)

UNIT IV

MOLECULAR SPECTRA AND LASERS

Spectra of diatomic molecules:

Nature of Molecular spectrum, Different types of energies of a molecule, Diatomic molecule as a Rigid Rotator. derivation of expression for Rotational Energy of a Diatomic molecule. Application of Molecular spectra, Energy of a Diatomic molecule as a non rigid rotator(Qualitative).

RAMAN EFFECT**:**

Raman Scattering. Experimental set up. Raman Spectrum, Explanation of Raman effect on the basis of quantum theory. Applications of Raman Effect.

Problems

(8 + 2 =10 Hrs.)

UNIT V
MATHEMATICAL PHYSICS

Legendre functions: Legendre polynomials , Rodrigue's formula , generating functions and recursion relations , Orthogonality and normalization, associated Legendre functions , spherical harmonics .
Bessel functions: Bessel functions of the first kind, recursion relations, Orthogonality. Hermite fuctions ,: Hermite polynomials , generating functions , recursion relations , orthogonality.

Problems

(8+2 = 10Hrs.)

PHYSICS 5.4: LAB – V

LIST OF EXPERIMENTS

1. Planck's constant by photo cell
2. Construction of multirange voltmeter.
3. Construction of multirange ammeter
4. Photoconductive cell
5. Astable multivibrator using transistor
6. Characteristics of G.M counter.
7. Low pass filter.
8. High pass filter.
9. Ionization potential of xenon or mercury.
10. Photovoltaic cell.

NOTE:

1. Experiments are of Four Hours duration.
2. Minimum of Eight Experiments to be performed.

REFERENCE BOOKS:

1. Modern Physics – Murugeshan.
2. Quantum Mechanics – Pauling and Wilson
3. Quantum Mechanics – B.N.Srivastava..
4. Modern Physics Vol I – B. Basavaraj.
5. Engineering physics- Basavaraj.
6. Atomic spectra – White.
7. LASERs and Non – Linear Optics – B.B.Laud.
8. Fundamentals of molecular spectra- C.NBanwell.
9. Mathematical Physics ---H. K. Dass and Dr. Rama Verma
10. Mathematical Methods for Physicists (4^{th} Edition) George Arfken and Hans J. Weber Academic Press San Diego(1995).
11. Mathematical Physics - P.K. Chatopadhyay-Wiley Eastern Limited New Delhi (1990).
12. Introduction to mathematical Physics – Charlie Harper, Prentice-Hall of India Private Limited New-Delhi (1995)

13 Mathematical Physics - M.L.Boas

2. GEOLOGY (OPTIONAL)

SYLLABI FOR B.SC.V & VI SEMESTER GEOLOGY (OPTIONAL)

(w.e.f. 2016-17 Onwards).

S. No.	Paper Code	Title of the Paper	Marks			Exam Time	Inst. Hrs/ week
			Theory/ Practical	Internal	Total		
	B.Sc Semester V						
1.	**14BSCGEOLT51** PAPER – I	STRUCTURAL GEOLOGY & MINING GEOLOGY	80	20*	100	3 hrs	4
	14BSCGEOLT52 PAPER – II	ORE PROCESSES & INDIAN ORE MINERAL DEPOSITS	80	20*	100	3 hrs	4
2.	**14BSCGEOLP51** PAPER - I	PRACTICAL : STRUCTURAL GEOLOGY & ORE MINERALS	40	10**	50	4 hrs	4
	14BSCGEOLP52 PAPER – II	PRACTICAL: GEOCHEMISTRY & SURVEYING	40	10**	50	4 hrs	4
	B.Sc Semester VI						
3.	**14BSCGEOLT61** PAPER I	HYDROGEOLOGY & GEOPHYSICS	80	20*	100	3 hrs	4
	14BSCGEOLT62 PAPER II	REMOTE SENSING & ENGINEERING GEOLOGY	80	20*	100	3 hrs	4
4.	**14BSCGEOLP61** PAPER I	I. WATER CHEMISTRY PROBLEMS II. MORPHOMETRIC ANALYSIS	40	10**	50	4 hrs	4
	14BSCGEOLP62 PAPER II	I. STUDY OF AERIAL PHOTOS & SATELLITE IMAGES II. ENGINEERING GEOLOGY PROBLEMS	40	10**	50	4 hrs	4
INTERNAL ASSESSMENT: *Theory Internal 20 marks covers: Two theory tests (20 marks reduced to 10 marks); **One Practical internal test (20 marks reduced to 10 marks).							

B.Sc (GEOLOGY OPTIONAL) SEMESTER V

Code: 14BSCGEOLT51

(STRUCTURAL GEOLOGY & MINING GEOLOGY)

Max. Marks: 80 **Total teaching hours: 50 (4 hrs/week)**

UNIT	TOPIC	Hrs
I	**Introduction:** Attitude of beds, Brunton compass and its uses. **Outcrop**: Definition, width and thickness, factors controlling the width of outcrop, Outlier and inliers. **Conformity and Unconformity**, types of unconformities- angular, disconformity, blended, non conformity, regional and local unconformity. Recognition of unconformity in the field. Significance of Unconformity	10
II	**Joints:** Definition, **Classification- Geometric:** strike, dip, oblique and bedding joints. **Genetic** – columnar, feather, extension and release, sheeting, rift and grain. Significance of joints.	10
III	**Folds:** definition, parts of fold- limb, hinge, axis, axial plane and plunge. **Types of folds-** Symmetrical, asymmetrical, anticline, syncline, over turned, isoclinals, recumbent, chevron, drag, monoclinal fold. Recognition of folds in the field. Significance of Folds.	10
IV	**Faults**: Definition. **Terminology-** fault plane, hanging wall and foot wall, dip and hade, throw and heave. **Nature of movement-** translation and rotational, relative movements- Slip, strike slip, dip slip and net slip; **Classification- Geometric** – strike fault, dip fault, oblique fault; based on apparent movement – normal and reverse fault. **Genetic-** thrust, gravity, graben, step, ridge and trough faults. Recognition of faults in the field. Significance of Faults.	10
V	**MINING GEOLOGY** Introduction- Role of geology in mining industry. Definition of mining terms- shaft, hanging wall, adit, roof, drive, cross cut, tunnel, raise, winze, slopes- types Methods of mining- open cast mining (benches, explosives, working slope) and quarrying; underground/subsurface mining (stoping- open stopes, supported stopes), - Advantages and limitations.	10

B.Sc (GEOLOGY OPTIONAL) SEMESTER V

14BSCGEOLT52

ORE PROCESSES & INDIAN ORE MINERAL DEPOSITS

Max. Marks: 80 **Total teaching hours: 50 (4 hrs/week)**

UNIT	TOPIC	Hrs
I	Introduction, Syngenetic and Epigenetic deposits. **Magmatic concentration/deposits**: Early (dissemination, segregation, injection) and late magmatic (residual liquid segregation and injection).	10
II	Contact metsomatism. Hydrothermal- Epithermal, mesothermal, hypothermal, cavity filling, crustification, fissure veins (ladder vein, stocks, box work etc), replacement deposits.	10
III	Residual deposits- lateritisation and bauxitisation.	10
	Sedimentation: Mechanical concentration – alluvial, eluvial, eolian and beach placers. Sublimation & Evaporites- salt deposits. Oxidation and supergene enrichment: Gossans/cap rocks.	
IV	INDIAN MINERAL DEPOSITS Gemstone: **Definition, Specifications, Types and uses.** **Ore Mineral:** Definition of ore mineral, ore, gangue, tenor. Introduction to metallic and non metallic ore minerals.	10
V	Introduction, Mineralogy, Uses and distribution of following ore minerals in India. **Metallic:** Iron, Manganese, Copper, Aluminum (Bauxite), Gold	10
	Non Metallic: Origin of Coal, types of coal, uses and its distribution in India. Origin of Petroleum, Migration, accumulation (Structural traps), uses and its distribution in India.	

PRACTICALS

Code: 14BSCGEOLT51

(PAPER I: STRUCTURAL GEOLOGY AND & SURVEYING)

Max. Marks: 40 **Time: 4 hrs/week** **Total 50 hrs**

1. Drawing of sections and writing the descriptions of the geological maps as given below (A minimum of 4 maps in each type).
   i) Contour maps
   ii) Horizontal strata with and without intrusions.
   iii) Inclined strata with and without intrusions.
   iv) Inclined strata with faults, with and without intrusions.
   v) Maps showing unconformities with and without intrusions
   vi) Map showing folded strata with and without intrusions.
   vii) Maps showing combined features such as folds, faults and unconformities with and without intrusions.
2. Tracing and completion of outcrops by given data (a minimum of 8 maps)

3. SURVEYING: i) Prismatic compass survey. ii) Auto Level
4. Demonstration only: Total Station

Code: 14BSCGEOLP52

PAPER II: GEOCHEMISTRY & ORE MINERALS

Max. Marks: 40 **Time: 4 hrs/week** **Total 50 hrs**

1. GEOCHEMISTY: Estimation of metal content in the given ore by volumetric method.
   i) Calcium
   ii) Hematite
   iii) Manganese

2. MEGASCOPIC STUDY OF ORE MINERALS:

   i. Iron- Hematite (Specular), Magnetite, Pyrite (Fools Gold)
   ii. Manganese- Pyrolusite, Psillomelane
   iii. Copper – Native, Chalcopyrite, Malachite, Azurite
   iv. Lead and Zinc – Galena and Sphalerite
   v. Aluminium – Bauxite
   vi. Arsenic – Realgar, Orpiment
   vii. Coal and its variety – Peat, Lignite, Bituminous, Anthracite
   viii. Magnesium- Magnesite
3. Preparation of maps showing distribution of following ore/fuel deposits in India: Iron, Copper, Gold, Lead & Zinc, Bauxite, Coal & Petroleum

TEXT BOOKS

1. Structural Geology - By M. P. Billings,
2. Fundamentals of Structural Geology - By N. W. GokhalE
3. Principles of structural Geology - C.M. Novin
4. Structural geology - De Sitter
5. Theory of Structural Geology- Gokhale, N.W.
6. Structural Geology – Fundamentals and Modern developments. – Ghosh. S.K
7. Structural and Tectonic, Principles- P.C. Bedgley
8. An Introduction to structural Geology - E.W. Spencer
9. Fundamentals of structural Geology- Park, P.G.
10. Economic Mineral Deposits- Bateman Allan .M. -
11. Mineral Deposits - Lindgren W

3. CHEMISTRY (OPTIONAL)

FIFTH SEMESTER B.Sc. COURSE

Chemistry
Paper-I
Code : 14BSCCHET51
Teaching Hours : 50 Hours

Inorganic Chemistry:

Coordination Chemistry-I **07 hours**

Review of terms- double salts, complex salts, central metal ion, ligand, types of ligands, complex ion and coordination number. IUPAC nomenclature

Valence bond theory of coordination compounds with reference to $[Fe(CN)_6]^{3-}$, $[Fe(CN)_6]^{4-}$, $[FeF_6]^{3-}$, $[Zn(NH_3)_4]^{2+}$, $[Ni(CN)_4]^{2-}$ and its limitations.

Isomerism- Ionisation, hydrate, linkage, geometrical and optical in coordination compounds with respect to coordination number 4 and 6.

Theory of gravimetric analysis **04 hours**

Principles of gravimetric analysis- super saturation, von Weimar equation, conditions of precipitation, coprecipitation and post precipitation. Separation of

precipitate from mother liquor, washing, properties of wash liquid, drying and ignition of precipitate, weighing form.

Inorganic polymers **04 hours**

Inorganic polymers, Types, comparison with organic polymers, silicones, phosphonitrilic halides- formation, structure and applications.

Green Chemistry **03 hours**

The need for green chemistry and eco-efficiency, green methods, green products, recycling of wastes, 12 principles of green chemistry.

Organic Chemistry:

Heterocyclic Compounds **05 hours**

Classification, molecular orbital picture and Aromatic character of furan, thiophene, pyrrole and pyridine, synthesis of the following compounds.

i) Furan, thiohene and pyrrole from 1,4- diketones.

ii) Pyridine by Hantzch synthesis.

Electrophilic substitution reactions of pyrrole, furan and pyndine(chlorination and nitration), comparison of basicities of pyridine, piperidine and pyrrole.

Organic Synthesis via enolates **05 hours**

Acidity of α-hydrogens, s ynthesis of ethylacetoacetate(EAA) by Claisen condensation and its mechanism, synthesis of diethyl malonate, keto-enol tautomerism of EAA

Synthesis of following compounds using EAA and diethyl malonate:

i) ketones ii) carboxylic acids iii) heterocyclic compounds iv) dicarboxylic acids.

Alkaloids **06 hours**

Definition, source, classification and general characteristics, Hofmann exhaustive methylation with pyridine as an example.

Isolation, constitution and confirmation by synthesis – Coniine, hygrine and nicotine.

Physical Chemistry:

Microwave Spectroscopy **05 hours**

Classification of molecules, rotational spectra of rigid diatomic molecules, criteria for showing the spectra, energy levels of rigid rotator, selection rules (final equations only), determination of bond length and moment of inertia of HCl molecule.

Phase rule **05 hours**

Terminology and explanation of the terms involved.Applications of phase rule-

One component system-water and sulphur systemsTwo-component systems-Bismuth-Cadmium system and KI – water system.Eutectic and freezing mixture.

Vibrational spectrum **06 hours**

Simple harmonic oscillator, Hooke's law, energy level of simple harmonic oscillator model of diatomic molecule(final equations only), selection rules, zero point energy determination of force constant and qualitative relation between force constant and bond dissociation energies. Vibrational degrees of freedom of molecules(Linear and non linear).

Reference books for inorganic chemistry

01. Advance Inorganic Chemistry Vol-I and II	Gurudeep Raj
02. Advance Inorganic Chemistry	Satya Prakash
03. Modern Inorganic Chemistry	R.D. Madan
04. Inorganic Chemistry	James Huheey
05. Concise Inorganic Chemistry	J.D. Lee
06. Inorganic Chemistry	Shreiver and Atkins

Books recommended for organic chemistry:

01. Organic Chemistry	I.L. Finar Vol-1
02. Organic Chemistry	Morrison and Boyd
03. Advanced Organic Chemistry	Jerry March

Books recommended for physical chemistry:

01. Fundamentals of Molecular Spectra	C.N. Banwell
02. Molecular Spectroscopy	S. Chandra
03. Molecular Spectroscopy	White
04. Chemical Kinetics	K.J. Laidler
05. Surface Chemistry	Gregg

Chemistry
Paper-II
Code : 14BSCCHET52
Teaching Hours : 50 Hours

Inorganic Chemistry:

Industrial Chemistry-I **08 hours**

Alloys-Significance, types of alloys (ferrous and non ferrous alloys), preparation (fusion and electro-deposition) and their applications.

Abrasives- Classification, Mohr scale of hardness, Manufacture and application of carborundum, alundum, tungsten carbide.

Glass - physical and chemical properties of glass, raw materials, manufacture using tank furnace, Annealing of glass, types, composition and uses of glasses.

Industrial Chemistry-II **09 hours**

Cement - Raw materials, composition of Portland cement, manufacture by rotary kiln method, mechanism of setting.

Pigments - Manufacture and relative merits of white lead, Lithopone, Titanium white, constituents of paints and varnishes.

Fuels - characteristic and calorific values of fuels, advantages of gaseous fuels, Manufacture of water gas and biogas.

Organic Chemistry:

Reagents and Reactions **08 hours**

Preparation, mechanism of action and applications - DCC(Amide formation), $LiAlH_4$(reduction of aldehyde, carboxylic acid and ester), DDQ(Benzylic oxidation of tetralin, aromatisation of tetralin), Lead Tetra Acetate(oxidation of 1,2-diols), NBS(allylic bromination), OsO_4(hydroxylation of alkenes), PCC(Pyridinium chlorochromate) in the oxidation of primary alcohols.

Mass Spectroscopy **03 hours**

Principle, instrumentation, definitions of parent peak and base peak, McLafferty rearrangement with respect to butyraldehyde.

Dyes **05 hours**

Classification, requirement of a dye, colour and constitution.
The synthesis of each of the followimg class of dyes-
Azo dyes–Congo red,Vat dyes–Indigo,Anthraquinone dyes–Alizarin
Triphenylemethane dyes–Malachite green, Crystal violet
Phthalein dyes-Fluoroscein,Eosin; Synthesis of each dyes

Physical Chemistry:

Surface Chemistry **08 hours**

Adsorption, derivation of Frendlich and Langmuir's adsorption isotherms. f orms of Langmuir's adsorption isotherms at high and low pressure regions, BET equation (No derivation), determination of surface area using BET equation.
Calalysis–Theories of catalysis-intermediate and adsorption theory, enzyme catalysis-Michaelis–Menten equation, industrial applications of catalysis.

Chemical equilibrium **05 hours**

Thermodynamic treatment of law of mass action, van't Hoff reaction isotherm, relationship between Kp, Kc and Kx, variation of Kp and Kc with temperature and pressure.

Kinetics of chain reactions **04 hours**

Examples of chain reactions, general aspects of chain reactions, chain length, chain transfer reactions, chain inhibition, kinetics of branching chain reactions.

Reference books for inorganic chemistry

01. Industrial chemistry B.K. Sharma
02. Engineering Chemistry Jain and Jain

Books recommended for organic chemistry:

01. Reaction Mechanism P.S. Kalsi
02. Mass Spectroscopy Y.R. Sharma
03. Synthetic Organic Chemistry Gurdeep Chatwal
04. Organic Chemistry P.L. Soni
05. Organic syntheses Jagadamba Singh and Yadav

Books recommended for physical chemistry:

01. Electrochemistry Glasstone
02. Physical Chemistry Atkins
03. Engineering Chemistry Jain

CHEMISTRY PRACTICALS

FIFTH SEMESTER B.Sc. COURSE
Chemistry Practical
Paper-I
Code : 14BSCCHEP51

Total number of hours per week: 04
Internal Assessment=10 Marks
Total No. of hours per Semester: 52
Practicals: 40 Marks

A. Organic Preparations

01. Preparation of m-dinitrobenzene from nitrobenzene.
02. Preparation of phthalimide from phthalic anhydride and urea.
03. Preparation of p-bromoacetanilide from acetanilide.
04. Preparation of p-bromoaniline from p-bromoacetanilide.
05. Preparation of p-nitroacetanilide from acetanilide.
06. Preparation of p-nitroaniline from p-nitroacetanilide.
07. Preparation of benzoic acid from benzaldehyde.
08. Preparation of methyl orange.

B. Instrumental Analysis:

01. Estimation of Fe^{+3} spectrophotometrically through phenanthroline complex.
02. Determination of pH of biological fluids like milk, orange juice, citric acid, solution and sodium carbonate solution.

Note: In case of **Part A**, not more than three students should be given the same preparation at the time of examination.

CHEMISTRY PRACTICALS

FIFTH SEMESTER B.Sc. COURSE
Chemistry Practical
Paper-II
Code : 14BSCCHEP52

Total number of hours per week: 04
Internal Assessment=10 Marks
Total No. of hours per Semester: 52
Practicals: 40 Marks

A. Inorganic volumetric experiments:

01. Preparation of aqueous iron solutions and estimation of iron using standard $K_2Cr_2O_7$(Internal indicator method).
02. Preparation of aqueous solution of copper and zinc from brass and estimation of percentage of copper using standard sodium thiosulphate solution.
03. Preparation of calcium solution from lime stone and estimation of percentage of calcium using oxalate method.
04. Estimation of zinc using standard solution of potassium ferro cyanide (Standardization of the titrant be done using standard zinc sulphate solution.

B. Physical Chemistry experiments :

01. Determination of the concentration of HCl by conductometric titration using the standard NaOH.
02. Determination of the concentration of CH_3COOH by conductometric titration using the standard NaOH.
03. Determination of equivalent conductance of strong electrolyte(NaCl) at infinite dilution.
04. Determination of dissociation constant of (weak acid) acetic acid conductometrically.
05. Determination of percentage composition of unknown mixture of A & B liquids using Abbe's refractometer by formula method.

06. Determination of percentage composition of unknown mixture of A & B liquids using Abbe's refractometer by graphical method.
07. Conductometric precipitation titration of NaCl vs $AgNO_3$.
08. Determination of specific rotation of glucose solution by polarimeter.
09. Determination of solubility of sparingly soluble salt($BaSO_4$) conductometrically

NOTE: For Examination, following combinations have to be given.

Combination-1: Organic Preparation of Practical-Va +Physical of Practical-Vb.
Combination-2: Instrumental analysis of Practical-Va + Inorganic volumetric of Practical-Vb.

4. ELECTRONICS (OPTIONAL)

B. Sc. SEMESTER – V

Electronics (optional) Paper - I

Total Teaching hours: 50. **Teaching hours per week: 4 hours**

ELE- 5.1: **COMMUNICATION, OPTICAL FIBER COMMUNICATION & TRANSDUCERS.**

UNIT –I: COMMUNICATION

Electromagnetic radiation, different layers of Ionosphere and wave propagation through them. Skip-distance, Maximum usable frequency. Virtual height, Critical frequency, Critical angle , Secant law and fading.

Modulation: Need for modulation. Types of modulation. Theory of amplitude modulation, modulation index side bands, power relations, linear modulation Square law modulation.

FM modulation: Expressions for FM wave, modulation index. Deviation ratio, FM side bands,

Phase modulation: Expressions for phase modulation

8Hrs.+2Hrs.Problems =10hrs

UNIT II : TRANSMITTERS AND RECEIVERS

Block diagram of AM transmitter. Diode modulator, Transistor modulator (collector to base), Demodulation, Diode AM detector, transistor AM detector, FM detector-balanced slope detector, Foster-Seeley discriminator and ratio detector. (Qualitative)

Receiver characteristics (sensitivity selectivity, fidelity, signal to noise ratio, noise figure and stability). Determination of receiver characteristics. Image frequency, intermediate frequency and its choice. Super heterodyne AM receiver (Explanation of each block with diagram). Block diagram of FM receiver. Comparison of FM receiver with AM receiver.

8Hrs.+2Hrs.Problems =10hrs

UNIT –III: TRANSMISSION LINES AND ANTENNA

Transmission Lines: Introduction, different types of transmission lines (parallel and co-axial lines) current and voltage relation on RF transmission lines.

Antenna : Radiation mechanism, Hertzian Dipole, Theory of dipole antenna, polar diagrams of dipole antenna, radiation resistance, efficiency, study of yagi and dish antenna. Feed mechanism, Casegrain feed antenna.

Qualitative study of Helical antenna , Loop antenna , Parabolic reflector , Horn antenna and Microstrip antenna

8Hrs.+2Hrs.Problems =10hrs

UNIT –IV OPTICAL FIBER COMMUNICATION.

OFC : Introduction, block diagram of optical fiber communication system, principle of light transmission in a fiber, expression for numerical aperture(Derivation), optical fiber modes and configurations. Fiber materials and losses in fibers.Types of Light sources and Detectors. Advantages and Disadvantages of OFC over metallic cables.

8Hrs.+2Hrs.Problems =10hrs

UNIT – V : TRANSDUCERS

Introduction - General measurement system – characteristics - definition –

static & dynamic transducers, Different types - resistive transducer - strain gauge – capacitive - inductive transducers - LVDT (variable inductive transducers) piezo electric transducer – temperature transducers, thermo couple, thermisters – ultrasonic temperature transducer. Microphones(Carbon, Condensor), Loud Speakers(Moving Coil) Types of Speakers based on frequency.(Woofer , Tweeter)

8Hrs.+2Hrs.Problems =10hrs

REFERENCE BOOKS:

1. Electronic Communication Systems - by Kennedy and Devis(TATA McGraw –HILL EDITION
2. Electronic Communication, Roddy and Coolen, 4th edition, PHI
3. Transducers and Instrumentation By DVS Murthy, PHI 1995
4. Optical Fiber Communication By Gerd Keyser
5. Instrumentation Measurements and Communication By B C Kakra and K K Choudhary , TMH 1985
6. Hand Book of Electronics By Gupta and Kumar
7. Electronics Instrumentation By Kalsi

LIST OF EXPERIMENTS

Lab-5.1:

Each experiment is of four hours duration. Minimum EIGHT experiments are to be performed.

1. Amplitude modulator and Amplitude demodulator
2. Frequency modulation and demodulation
3. Diode as a detector (Sketch input and output wave forms)
4. Straight radio receiver (Selectivity, Sensitivity)
5. Selectivity of a super heterodyne radio receiver
6. Time Division Multiplexing and de multiplexing
7. Frequency Multiplexing
8. Radiation pattern studies of different dipole Antenna

9. Studies on Antenna equivalent circuits.
10. Temperature transducers(Application of Thermister)
11. Speaker characteristics and comparison (Tweeter, Woofer)
12. Microphones characteristics and comparison (Carbon, Diaphragm)
13. Numerical aperture of OFC
14. Characteristics of OFC

Electronics (optional)

Paper - II

Total Teaching hours: 50. **Teaching hours per week: 4 hours**

ELE- 5.2: MICROPROCESSOR AND MICROCONTROLLER

UNIT- I: MICROPROCESSOR ARCHITECTURE AND INSTRUCTIONS

Microprocessor – Introduction Intel 8085, applications, basic block diagram, speed, word size, memory capacity and classification.

Microprocessor 8085 – Features and architecture. Pin diagram of 8085.

Supporting circuits; clock circuits, reset circuits, generation of control signals. Bus drivers.

Instruction set-Classification, Addressing modes, Status flags and instruction

formats, Operation code, Operand, Mnemonics

8Hrs. +2Hrs.Problems =10hrs

UNIT-II: STACK OPERATIONS AND PROGRAMMING

Program counter, Stack,Stack pointer operations, subroutine ,calls and return operations. Interrupts. Delay loops, Timing diagrams- instruction cycle, machine cycle and T-states. Timing diagrams of Opcode fetch cycle, Memory read cycle & Memory write cycle.

Programming preliminaries, Assembler concept, Programs of data transfer and memory operation (direct and indirect addressing) addition and subtraction of 8 bit and 16 bit numbers, multiplication and division of 8 bit numbers, display of largest and smallest numbers in a given array of numbers. Solve problems.
8Hrs.+2Hrs.Problems =10hrs

UNIT-III: INTERFACING OF 8085

Interfacing; Basic interfacing concepts, compatible IC of 8085, Interfacing Techniques: Memory mapped I/O, I\O mapped I\O. Memory interfacing,I/O interfacing, I/O devices, Programmable interval timer (8253): Need for 8253,features,Block diagram, pin diagram, operating modes and D to A converter using 8085 and op-amp. Programmable peripheral Interface IC 8255: features , pin diagram, functional block diagram ports and their modes.

8Hrs. +2Hrs.Problems =10hrs

UNIT-IV: MICROCONTROLLER 8051 PROCESSOR ARCHITECTURE AND INSTRUCTION SET

Introduction to Microcontroller, Features of microcontroller, Microcontroller Applications, Comparison of microprocessor and microcontroller, Microcontroller structure (Block Diagram), IC8051 pin diagram, IC8051 addressing modes, external addressing, Interrupts, , IC 8051 instruction set: Data movement instructions, Arithmetic instructions, Bit operators, Execution change operators, Assembly language programming types and some examples. 8Hrs.+2Hrs.Problems =10hrs

UNIT-V: BASICS OF VLSI

Crystal Growth: Introduction, Electronic grade silicon,Preparation of metallurgical & electron grade silicon, Czochralski Crystal growing, Silicon shaping, Processing consideration.

Epitaxy; Introduction, Vapour-Phase epitaxy, Molecular beam epitaxy,

Lithography: Introduction, Optical, Electron, X-ray and Ion Lithography (Qualitative).Etching: Introduction, plasma properties and features (Qualitative). 10hrs

REFERNCE BOOKS:-

1. Microprocessor Architecture, Programming and applications with the 8085 by- Ramesh Gaonkar
2. Microprocessor by- B.Ram
3. The 8051 Microcontroller Architecture, Programming and applications by- Kenneth Ayala
4. Programming and Customizing, The 8051 Microcontroller by-Myke Predko

5. VLSI TECHNOLOGY by - S.M.SZE (TATA McGRAW-HILL EDITION)
6. Intel Microprocessors by- BB Bray 4Edn PHI 1999
7. Software, Hardware and Applications by – Walter A Tribel and Avatar Sing PHI 1995
8. Microprocessors and Microcomputers by – Rafeeq Uzaman

LIST OF EXPERIMENTS

Lab. - 5.2:

Each experiment is of four hours duration. Minimum EIGHT experiments are to be performed.

Programming using 8085

1. Ones and twos complements
2. Addition and Subtraction.
3. Multiplication and Division.
4. Largest and smallest of an array.
5. Arranging an array of numbers in ascending and descending order.
6. D/A converter using 8255 and op-amp.
7. IC 8253 as a square wave generator.

Programming using 8051

8. Addition and Subtraction.
9. Multiplication and Division.
10. Largest and smallest of an array.
11. Arranging an array of numbers in ascending order and descending order.
12. 7 Segment Display.
13. Stepper motor.
14. Temperature measurement.

5. GEOGRAPHY (OPTIONAL)

REGULATION AND SCHEME OF INSTRUCTIONS

Regulations governing three years Semesterized, Bachelor Degree Programmes of Rani Channamma University, Belagavi (framed under Section 44(1) (c) of the K.S.U. Act 2000) and on par with CBSE with the effect from 2015-16 onwards.

I. Goals & Objectives:

The following aims have been kept in view while designing the syllabus of Bachelor's Degree Programme (B.A/B. Sc) in Geography as one of the optional subject.

1. To bring the geographical awareness among the students.
2. To provide a fundamentals of spatial information of the earth surface.
3. To train promising learners to teach geography effectively at various levels in the educational institutions.
4. To train and provide information related to spatial and regional level of planning.
5. To provide adequate geographical knowledge and skills as needed for the competitive examinations.
6. Organizing the professional tours for every year to cultivate research culture among the students.

II. Admission Criteria:

A candidate should have passed PUC/10+2 with Geography as one of the subject is eligible to choose Geography as one of the optional subjects at the under Graduate Course. The candidate should have obtained at least 40 per cent of marks in Geography as well as aggregate marks. Relaxation in respect of SC/ST etc will be followed as per the prevailing rules of the university. Other rules for admission are as per the university notification from time to time.

III. Medium of Instruction:

The medium instruction shall be English, however, the student's are allowed to write the examination in Kannada Medium.

IV. Attendance:

A minimum of 75% of attendance in each semester (both theory and practical) is compulsory.

V. Scheme of Instruction:

1. The M.A/M.Sc Master's Degree holders in Geography can only teach the subject at UG Level.
2. Geography as an optional subject at Under Graduate (UG) Level, which consists of *six* semesters, it includes eight *theory* papers and *eight practical* papers. There will be **one theory** paper and **one practical** paper in the each semester **i.e. *Ist, IInd, IIIrd, and IVth*** *semesters*. Whereas in the ***Vth and VIth*** semesters, there will be ***two theory*** *papers* and ***two practicals*** each of ***100 and 50*** *marks* respectively. The duration of teaching hours for the theory paper will be ***five*** *(05) hours per week* and the duration of teaching hours for practical *paper will be* ***four*** *(04) hours per week* in each semester. Each theory paper will have 5 modules/units (divided into chapters/units). The duration of each semester is being 16 weeks excluding examination period.
3. The Practical's are to be conducted in separate batches. Each batch consists of 15 students with one teacher, for 16-27 students with two teachers. In case, if student number is below 15 is also considered as one batch with one teacher. Each batch (depends on the number of students) must be supervised by one/two teachers for giving instructions, supervision of practical's and correction of journal/records.

VI. Scheme of Theory Examinations:

1. Theory course shall carry 100 marks of which 80 marks allotted for semester end examination and 20 marks for internal assessment (IA) that will be carried out as per the university norms.
2. Each theory course will have a question paper of 3 hours duration and the maximum of 80 marks. Minimum marks to pass in each paper of theory are 40 percent.

3. There shall be three sections in every theory question papers viz. A. B. & C. **Section A** shall have 12 questions of each 2 marks and candidate have to attempt 10 questions only (10X2=20 marks). **Section B** shall have 8 questions of each 5 marks and the candidate have to attempt 6 questions only (6X5=30 marks). **Section C** shall have 6 questions of each 10 marks and the candidate has to attempt 3 questions (3X10=30 marks).

VII. Scheme of Practical Examination:

1. Each practical course shall carry 50 marks of which **10 marks** are allotted for IA marks (out of which **07 marks** are kept for practical records (assignments)/journals and **03 marks** allotted for attendance). The **40 marks** examination will be conducted at the end of each semester, out of which **5 marks** will be kept for viva and **35 marks** for written examination as per the instruction given by the university.
2. Each practical course will have a question paper of 4 hours duration and the maximum of 40 marks.
3. The practical examination is to be conducted in batches and each batch consists of minimum of 15 candidates.
4. There will be one internal examiner and one external examiner to conduct the practical examination for each batch in each semester.
5. Minimum marks to pass in each paper of practical are 40 percent.
6. Each candidate shall complete the laboratory work of the journal/practical records, it shall be certified and signed by both the concerned course teacher and the Head of the Department of Geography of the concerned college, to the effect that the candidate has completed the prescribed course in practical satisfactory and same should be produced at the time of practical examination. No students shall be allowed for the examination without completed journal/practical records.
7. There is no provision for seeking improvement in practical paper examination and internal assessment marks.

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B. A. / B. Sc SEMESTER GEOGRAPHY (OPTIONAL)

COURSE STRUCTURE (SCHEME) UNDER CBSE SYSTEM

WITH EFFECT FROM 2017-2018ON WARDS

Theory and Practical Paper- V and VI

Semester	Title of the Paper	Teaching Hours per Week	Marks	Internal Assessment Marks (IA)	Total Marks	Duration of Examination
V	Theory Paper – V -Compulsory					
	Regional Geography of India	**05**	**80**	**20**	**100**	**3 hours**
	Practical Paper - V					
	Interpretation of IMD Weather Maps	**04**	**40**	**10***	**50**	**4 hours**
	Theory Paper – VI -Optional					
	(select any one)					
	VI- A. Development of Modern Geography	**05**	**80**	**20**	**100**	**3 Hours**
	VI- B. Settlement Geography	**05**	**80**	**20**	**100**	**3 hours**
	Practical Paper – VI					
	Basic Statistics	**04**	**40**	**10***	**50**	**4 hours**
VI	Theory Paper - VII-Compulsory					
	Human Geography	**05**	**80**	**20**	**100**	**3 hours**
	Practical Paper - VII					
	Map Projections	**04**	**40**	**10***	**50**	**4 hours**
	Theory Paper – VIII-Optional					
	(select any one)					
	VIII- A. Environmental Geography **VIII- B. Regional Planning**	**05**	**80**	**20**	**100**	**3 hours**
	Practical Paper – VIII					
	Field Work and Dissertation	**04**	**40**	**10***	**50**	**4 hours**

(* Note: Practical IA includes: 02+03+07 Marks for Assignment, Attendance & Journals only)

B. A. /B. Sc. SYLLABUS IN GEOGRAPHY

SEMESTER – V

THEORY PAPER-V (Compulsory)

REGIONAL GEOGRAPHY OF INDIA

Objectives: To understand the India in terms of various physical divisions, their important characteristics and intra-regional and inter regional linkages and to analyze natural and human resource endowments and their conservation and management. The study also synthesis the students with development issues and polices and programmes design for regional development.

Course Structure : One Theory and One Practical

Teaching Theory : 05 hours per week

Practical **:** 04 hours per week.

Examination **:** One Theory paper of 80 Marks and 20 Marks for internal assessment (IA)

One Practical of 40 Marks and 10 Marks for internal assessment (IA) (out of 10 IA marks 7 marks for practical record and journal and 3 marks for attendance).

Units	Topic	Teaching Hours
I	India : Location and Extent, Physiography, Drainage, Climate, Soil and Natural Vegetation and its importance	12
II	Water Resources and Irrigation: Multipurpose River Projects mainly- Bhakra-Nangal, DVC, Nagarjunasagar Krishna and Tungabhadra projects. Agriculture: Significance and types of Agriculture, Floriculture, Cultivation, distribution and production of Rice, Wheat, Sugarcane, Cotton, Tea and Coffee in India.	16
III	Mineral Resources: Distribution and Production of Iron ore, Manganese, Coal, Petroleum & Natural Gas. Industries: Industrial regions of India. Distribution and Production of Iron and Steel, Cotton textile, Sugar, Paper, Automobile and Shipbuilding Industry in India.	12
IV	Transport: Road and Railway, Major Ports: Mumbai, Kolkata, Chennai and Mangalore.	10
V	Population: Growth and Distribution of Population, Density of Population and Causes and Consequences of Growth and Distribution. Urbanization in India. Location of the following important elements on the given map of India-	10

	hills, rivers, soils, river projects, industries, roads, towns, tourist and urban centers, parks and wild centuries. (**Note**: Staff in charge should supply the outline map of India and train the students and it has to be treated as compulsory question in semester end examination.)	
	Total	**60 hours**

Reference:

1. .Ranjit Thirtha- Geography of India
2. Sharma & Coutinho- Economic and Commercial Geography of India
3. Tiwari.P.S- Geography of India
4. C.B.Mamoria - Economic and Commercial Geography of India
5. Ranganath - Regional and Economic Geography of India (Kannada)
6. Mallappa. P- Regional Geography of India (Kannada)
7. M.B.Goudar- Regional Geography
8. S.S.Hangaragi- Regional Geography of India (Karnataka)

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B. A. /B. Sc. SYLLABUS IN GEOGRAPHY

SEMESTER – V

PRACTICAL PAPER - V

WEATHER INSTRUMENTS & INTERPRETATION OF IMD WEATHER MAPS

Units	Topic	Teaching Hours
I	Meaning: Elements of Weather and Climate, Brief review of Indian Meteorological Department (IMD), Meteorological and Rain gauge stations and its Importance.	04
II	Meteorological Instruments: Drawing of meteorological instruments- Thermometer, Barometer, Wind-vane, Rain gauge & its importance.	04

III	Introduction to IMD Weather Maps: Drawing of Weather symbols, Season and seasonal variations, Isobars, Isobaric Pattern, Depression, Cyclone, Anticyclone, Calm Conditions, Forecasting and its Characteristics (Illustration is necessary)	12
IV	Season-wise detail Interpretation of IMD Weather Maps: a. Winter Season (at least two map from each season) b. Summer Season (at least two map from each season) c. Monsoon Season (at least two map from each season) d. Post-Monsoon Season (at least two map from each season)	20

Reference:

1. R. L. Singh: Elements of Practical Geography
2. Gopal Singh: Practical Geography
3. Dr. Ranganat: Practical Geography (Kannada Version)
4. Singh and Kanoj: Practical Geography
5. R. P. Misra and Ramesh: Fundamental of Cartography
6. M. F. Karennavar & S. S. Nanjannavar: Practical Geography
7. M .F. Karennavar & S. S. Nanjannavar: Practical Geography (Kannada Version)
8. Pijushkanti Saha & Partha Basu: Advanced Practical Geography

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B. A. /B. Sc. SYLLABUS IN GEOGRAPHY

SEMESTER – V

THEORY PAPER-VI (Select any one)

(OPTIONAL)

PAPER VI- A: DEVELOPMENT OF MODERN GEOGRAPHY

Objectives: This paper is intended to acquaint the students with distinctiveness of geography as a field of learning in social science and science as well as in natural science. The philosophy and methodology of the subject is discussed in length and to provide the students for comparative understanding of the development of the history of geographic thought.

Course structure : One Theory and One Practical

Teaching Theory : 05 hurs per week

Practical : 04 hours per week.

Examination : One Theory paper of 80 Marks and 20 Marks for internal assessment (IA)

One Practical of 40 Marks and 10 Marks (7 marks for Journal/Practical records as internal assessment (IA) and 3 marks for attendance.

Units	Topic	Teaching Hours
I	Introduction to Geographical Thought-Philosophy of Geography, Early Modern Geography, Growth of Geography as a Special Science	10
II	Founders of Modern Geography: i.) Alexander Von Humbolt, ii) Carl Ritter, iii)Friedrich Ratzel iv) Vidal de la Blache, v) William Morris Davis vi) Ellen Churchill Sample vii) Halford J Mackinder and viii) Richard Hartshorne	12
III	Development of Geography as a study of- a) Scientific Discipline, b) Man-Environment Relationship with reference to Determinism & Possibilism, c) Areal Differentiation d) Spatial Organization- Structure, Pattern & Process e) Inductive vs deductive, f) General Vs Particular and g) Quantitative vs qualitative	10
IV	Development of Scientific Method, Models, Hypothesis, Laws & Theories, Quantitative revolution	12
V	Approaches in Geography- Positivism, Humanism, Radicalism, Behaviouralism and Post Modernism Paradigms and Philosophy in Geography	16
	Total	**60 hours**

REFERENCES:

1. Adhikari Sudeepta (1972) :Fundamentals of Geographic Thought Chaitanya Publishing House, Allahabad
2. Cook and Johnson: Trends in Geography, Pergamow Press London
3. Dickinson R.E.(1969): The Makers of Modern Geography, Rout/Edge & Kegan Paul, London
4. Dixit R.D. (1999) : Development of Geographic Thought, Longmans India Limited
5. Free Man T.W.(1965): Geography As Social Science, Harper International Edition, Harper & Row Publishers, New York
6. Harvey D. (1969): Explanation in Geography London, Edward Arnold
7. Hartshorne R.(1959): Perspective on the Nature of Geography Rand McNally, Chicago
8. Majid Hussain (1999): Geographic Thought Rawat Publishing House, Jaipur
9. Holt Jensen, Arid: (1998): Geography: History and Concepts, Sage Publication, New Delhi
10. Richard Peet (1977): Radical Geography - Alternative View Points On Contemporary Social Issue, Methuen & Co. Ltd, London

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B. A. /B. Sc. SYLLABUS IN GEOGRAPHY

SEMESTER – V

THEORY PAPER-VI (Select any one)

(OPTIONAL)

PAPER VI- B: SETTLEMENT GEOGRAPHY

Objectives: The aim is to acquaint the student with spatial and structural characteristics of Human settlement under varied environmental conditions, to enable them to diagnose spatial issues related to urban and rural settlements.

Course structure : One Theory and One Practical

Teaching Theory : 05 hours per week

Practical **:** 04 hours per week.

Examination **:** One Theory paper of 80 Marks and 20 Marks for internal assessment (IA)

One Practical of 40 Marks and 10 Marks (7 marks for Journal/Practical records as internal assessment (IA) and 3 marks for attendance.

Units	Topic	Teaching Hours
I	Definition, Meaning, Nature and Scope of Settlement Geography Rural as opposed to Urban.	08
II	Settlements: types of settlements, Rural Settlement as a service and market center. Integrated Rural Development Planning (IRDP). Economic characteristics of cities and its functions.	14
III	Rural migration and its impact on agriculture and mining. Interaction between Rural-Urban settlements. Urbanization: Meaning and Trends of Urbanization in India.	14
IV	Theories of Urban landuse: Concentric zone theory and Sector theory, Multi-nucli theory. Central Business District (CBD) and its Characteristics.	14
V	Urban Fringe: characteristics and its development. Slums: Meaning, formation of slums and its measures for clearance.	10
	Total	**60 hours**

References:

1. R.B.Mandal- Introduction to Rural settlements
2. H.D.Clout- Rural Geography : An Introductory survey
3. H.Carter- The study of Urban geography
4. Jahonson- Intruduction to Urban Geography
5. Dickinson R.E. -City and Region
6. Mandal R.B. - Urban geography
7. Settlement Geography : Siddarth
8. Human Geography: Hussain. M.
9. R.Y.Singh- Geography of Settlement
10. Mallappa. -Human Geography(Kannada)
11. Ranganath- Fundamentals of Human Geography (Kannada)

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B. A. /B. Sc. SYLLABUS IN GEOGRAPHY

SEMESTER – V

PRACTICAL PAPER - VI

BASIC STATISTICS

Units No.	Topic	Teaching Hours
I	Definition and meaning, use of statistical methods in Geography Data: Defining Data, Types of Data: Nominal, Ordinal, Interval and Ratios, Collection of Data: Primary and Secondary Data and Classification and Tabulation of data	08
II	Sampling: Methods and Types of Samplings Formation of Frequency Distribution: Frequency Table, Drawing of Histogram, Frequency Curve, Polygon and Ogive Curve.	08
III	Measures of Central Tendency: a. Mean, b. Median and c. Mode	10
IV	A. Measures of Dispersion : 1. Range, 2. Quartile Deviation, 3. Mean Deviation,	14

	4. Standard Deviation and 5. Co-efficient of Variation B. Correlation: Rank order Correlation and Pearson's Product Movement correlation	
V		
	Total	**40 hours**

Reference :

1. R.L.Singh- Elements of Practical Geography
2. Gopal Singh- Practical Geography
3. Dr. Ranganath - Practical Geography : (Kannada)
4. Singh and Kanoj- Practical Geography
5. R.P.Misra and Ramesh- Practical Geography :Fundamental of Cartography
6. M.F.Karennavar & S.S.Nanjannavar.- Practical Geography : (Kannada)
7. B.S.Negi.- Statistical Geography
8. Basic Statistics : S.P.Gupta
9. Statistical Methods In Geographical Studies : Mahammad Aslam.
10. Advanced Practical Geography-Pijushkanti Saha & Partha Basu

6. BIOTECHNOLOGY(Optional)

SEMESTER-V

PAPER 5.1: PLANT AND ANIMAL CELL CULTURE

Total hours allotted: 60

PART A: PLANT CELL CULTURE

1. Introduction to *in vitro* culture methods and laboratory facilities.

2. History and development of plant tissue culture.

3. **Growth medium composition:**
Use of growth regulators and their effect on cell growth, differentiations, and Organogenesis. Study of M.S, B_5 and Nitsch media.

4. Callus, cell suspension and embryo culture:
Regeneration of shoots and roots, ovary and endosperm culture.

5. Micro propagation, clonal propagation of elite species, axillary bud, shoot tip and Meristem culture. Applications of micro propagation.

6. Organogenesis and Somatic Embryogenesis: Techniques and applications.

7. *In vitro* haploids and their applications, agronomic importance and secondary Metabolites.

8. Protoplast culture and fusion: Principles, isolation, culture protocol, action of enzymes, protoplast fusion, somatic cell hybridization and its applications in regeneration of plants**.**

9. Biotechnology and Intellectual Property Right (IPR), Patents, Trade secrets, copyright, choice of IPR and Plant Genetic resomes.

10. Applications of plant biotechnology.

PART B: ANIMAL CELL CULTURE

1. Historical perspectives, development and scope.
2. **Basic techniques of animal cell culture:** Preparation and sterilization of glass wares and apparatus, preparation and sterilization of reagents and media, preparation of animal material and applications.

3. **Animal tissue culture media:** Culture media containing naturally occurring ingredients blood plasma, serum free media, Tissues extract complex, nature media, chemically defined media.

4. **Primary culture, cell lines and cloning:** primary and established cell line somatic cell fusion, tissue cultures, whole embryo culture example chick embryo.

5. Stem cell culture and their applications.

6. Applications of animal cell culture in regenerative medicine and vaccine preparation.

7. In vitro fertilization and embryo transfer techniques and their applications, nuclear transfer techniques.

8. Applications of animal Cell Culture.

PRACTICAL- 5.2 PLANT AND ANIMAL CELL CULTURE

1) Preparation of plant tissue culture media.
   a. MS.
   b. B_5
   c. LS

2) Callus induction using plant explants (Carrot, Nicotiana, and Sugarcane).

3) Seed culture.

4) Demonstration of organ cultures, micro propagation, organogenesis, anther culture and meristem culture.

5) Protoplast isolation from mesophyll cells.

6) Suspension cultures: initiation of suspension culture from callus.

7) Preparation of synthetic seeds.

8) Cell viability test using Tryphan blue exclusion method.

9) Preparation of balanced salt solutions :(Hank and Earl)

10) Extraction of serum (chicken / mammalian).

11) Chick embryo extract (10-11 days embryos).

12) Culture of animal cells (chick embryo cells) by following techniques.
   a) Plasma clot.
   b) Single slide method / hanging drop technique.
   c) Range method.
   d) Grid method.

Reference:

Plant cell culture:

Bhan 1998.'Tissue culture', mittal publication. New Delhi.

Chatwal.G.R.1995: Text Book of Biotechnology, Anmol Publ.Pvt.Ltd.

Chawla H.S. Introduction to Plant Biotechnology , 2007, Oxford and IBM publishing Co Ltd., New Delhi.

Chadha K.L. Hand book of Horticulture, 2007, Indian Courses of Agri research, New Delhi

Crueger.W.and Crueger.A:Biotechnology – A textbook of Industrial Microbiology.2nd Ed.

Gamborg and Phillips .1996 Plant cell, tissue and Organ Culture: Fundamental methods.Narosa Publ,

Gupta P.K.1996: Elements of biotechnology; Rastogi and Company.

Harrison,Maureen,A.,Rac.Ian.F. 1997: General Technique of cell culture. Cambridge University Press.

Ignacimuthu,S,1996: Applied Plant Biotechnology.

Lyeliane Kyte and Jhon Kleyn,1996.Plants from test tubes-An Introduction To Micro Preparation 3 edition, Timber press Portland.

Narayanaswami,S. 1994: Plant Cell and tissue Culture. New Delhi. Tata McGraw Hill Publishing Company.

Prakash. M. and Arora G.K. 1998: cell and tissue culture, New Delhi. Anmol publications.

Razdan M.K 1993, An introduction to Plant Biotechnology

S.S.Purohit. Fundamental of Biotechnology, 2007 Jodhpur Students Edition.

S.S.Purohit. Laboratory manual of Plant Biotechnology , Jodhpur 2007

Shrivastava P.S.Plant tissue culture and molecular Biology: applications and prospectus, Narosa Publishing house, New Delhi.

ANIMAL CELL CULTURE:

Cartwnzht T 1994: Animal Cells as Bioreactors, Cambridge University press, New York

Freshney R.L. 1987: Cultures of animal cells: A manual of basic techniques.

Ian R.Freshney: Wiley-Liss (3rd Ed) culture of Animal cells

John.R.W: Animal cell culture-practical approach, oxford

Pulher A. 1993: Genetic Engineering of animals, VCH publishers, Weinhelm FRG.

Ravi Shankar G.A and Venkataram L.V. 1997, Recent advances in biotechnology, oxford and IBH Publishing company.

Sateesh M.K.2003 Biotechnology-5, New age international publishers

Spier R.E.and Griffith T.B.1987: Modern approaches to animal cell technology, Somerset, Butterworth and company Ltd

PAPER 5.3: GENETIC ENGINEERING

1. Introduction to Genetic Engineering.

2. **Tools of Genetic engineering:**
   Enzymes- Restriction endonucleases: Classification, Nomenclature,
   Their application in recombinant DNA technology.
   Ligages: DNA ligases and thier application, enzymes to modify
   DNA molecules.
   Vectors/Vehicle DNA:Plasmid and their features, some common
   Vectors-PBR 322, PUC9 ,vector from bacteriophage λ (lamda)
   Phage M-13.cosmids.

3. **Gene cloning:** Methods of introducing gene in prokaryotes and eukaryotes (E.coli and yeast cells as cloning host).

4. **Detection of the right clone:**
   Direct screening, direct selection, indirect screening technique, nucleic acid Probe.

5. **Cells for cloning:** *E.coli,Bacillus subtilis,Saccharomyces cerevisiae* and Mammalian fertilized egg cells.

6. **Gene libraries:** Genomic library, cDNA library and phase lamda Vs cosmid For Gene libraries.

7. **Mapping the DNA :**Restriction mapping, DNA finger printing, Chromosome walking and mapping by somatic cell hybridization.

8. **DNA sequencing:** Maxam-Gillbert's method. Sanger and Coulson's method Primer, template, the dideoxy nucleotide terminators and deoxynucleotides and polymerase. Using computers for sequencing and analyzing DNA Sequence.

9. **Molecular biology techniques:**
   Electrophoretic techniques- Proteins and nucleic acids.
   Polymerase chain reaction (PCR).
   Site directed mutagenesis (SDM).

Nucleic acid sequencing-Sanger's method
Blotting techniques-Southern, Western and Northern blot.

10. Applications of r-DNA technology in human health:
Production of recombinant vaccines- Hepatitis B.
Production of human growth hormone.

11. Human genome project and its implication**.**

12. Bio-safety:
Rules and regulations of handling genetically modified organisms.

PRACTICAL-5.4 GENETIC ENGINEERING

1. Isolation / extraction of genomic DNA from bacteria, yeast, plant and animal Tissues.
2. Study of denaturation and renaturation of DNA.
3. Quantification of extracted DNA by spectrophotometer.
4. Isolation of plasmid DNA (E.coli).
5. Agarose gel electrophoresis of DNA.
6. Isolation of RNA from plant and animal tissues.
7. Study of transformation by kits.
8. Study of conjugation by kits.
9. Isolation of phages by sewage sample.
10. Restriction digestion.
11. Production of protoplast from bacteria and plants.
12. DNA finger printing: Comparison of two plates of monomorphic and dimorphic bands (Photographs).
13. Study of gene cloning through charts.
14. Study of principles of genetic engineering equipments.
A) PCR machine
B) Laminar air flow cabinet.
C) Refrigerated centrifuge.
D) CO2 incubator.
E) ELISA reader.
F) Incubator shaker.

References :

Genetic Engineering:

Benjamin Lewin, Genes I, Wiley eastern Ltd., Delhi.

Benjamin Lewin, Genes II, Genes III, Wiley eastern Ltd., Delhi

Benjamin Lewin, Genes V and VI, Oxford University Press.

Brown T.A.1998: Genetics: A molecular approach 3rd ED., Stanley thomes publishers ltd., UK

Christopher H.1995 Gene cloning and manipulation, Cambridge university press.

Davis, R.W.Boterin, D and Roth J.R.1980: A manual for genetic engineering, cold spring harbour laboratory, New York.

Gardner, Simmons, Snustad 1991: Principles of genetics, 8th ed. John Wiley ans sons Inc.

Mitchell D.S.T. 1994: An Introduction to genetic Engineering, Cambridge University Press.

Old and Primose, Principles of gene manipulation, Black well Scientific Publications.

Peters P 1993, A guide to genetic engineering, Dubuque, Lowa, WMC Browb

Rigbu P.W.J. 1987: Genetic engineering, Academic Press inc, Florida, USA.

Genomes (2002)2nd edition Brown,T.A.
Principles of Gene Manipulation (1994), Old and Primerose
Gene Cloning: An introduction, Brown
A Passion for DNA: Genes, Genome & Society(2000),Watson
Genetic Engineering: An Introduction to Gene Analysis and Exploitation
In eukaryotes (1998), Kingsman & Kingsman
Molecular Cloning: A Laboratory Manual (2000),Sambrook & others
Molecular Genetics of Bacteria- Dale
Genes & Genomes (1991), Singer & Berg
Molecular Biotechnology (1996), Glick & Pasternak
Plant Molecular Biology (Vol.I and II 2002), Gilmartin & Bowler
Recombinant DNA (1992), Watson *et al*

7. MATHEMATICS (OPTIONAL)

SYLLABUS FOR B.Sc. MATHEMATICS (OPTIONAL)

FIFTH SEMESTER (2016-17 onwards)

Paper I

5.1 REAL ANALYSIS

TEACHING HOURS: 50 HRS **(TEACHING: 5 HRS PER WEEK)**

Unit I.

Riemann Integration-: Partition of an interval. The upper and lower Riemann sums & Riemann integrals. Necessary and sufficient conditions for integrability. Algebra of integrable functions (constant, sum, difference, product, quotient, and modulus).

(10 hrs)

Unit II.

Riemann Integration-(contd..) Integrability of continuous functions, monotonic functions. Fundamental theorem of integral calculus, Change of variables, Integration by parts. The first and second mean value theorem (Bonnet & Weirstrass form) of integral calculus. **(10 hrs)**

Unit III.

Improper integrals: Improper integrals of first and second kind. Comparison tests. Abel's test and Dirichlet's test. **(10 hrs)**

Unit IV.

Beta and Gamma functions: Properties, Relation between Beta & Gamma functions and their convergence and Duplication formula. **(10 hrs)**

Unit V.

Multiple Integrals: Differentiation under integral sign. Double and triple integrals, areas and volumes (Cartesian coordinates). **(10 hrs)**

REFERENCES:

1) Fundamental Real analysis – S. L. Gupta & Nisha Rani
2) Mathematical Analysis—Shantinarayan and P. K. Mittal
3) A Course of Mathematical Analysis—M D Raisinghania
4) Real Analysis- N.P.Bali
5) A text book of B.Sc. Mathematics- G.K.Ranganath

PAPER II

5.2 NUMERICAL ANALYSIS

TEACHING HOURS: 50 HRS **TEACHING: 5 HRS PER WEEK**

Unit I.

Solutions of Algebraic and transcendental equations: Bisection method, Iteration method, Newton-Raphson method.
Numirical Solutions of non-homogeneous systems : Gauss Siedal method. Jacobi Iteration Method**.** **(10 hrs)**

Unit II.

Finite Differences: Operators Δ (Delta), ∇ (Del) & ***E*** (Shift), Definitions and their properties, n^{th} order difference of a polynomial,

Interpolation: Newton Gregory forward and backward difference interpolation formula and examples. Lagrange's interpolation formula and examples. **(10 hrs)**

Unit III.

Numerical differentiation: Forward and backward difference formulae.
Computation of first and second ordered derivatives.
Numerical integration : General Quadrature formula, Trapezoidal rule, Simpsons rules ($1/3^{rd}$ and $3/8^{th}$). **(10hrs)**

Unit IV.

Solution of initial value problems: by ordinary linear first order differential equations by Taylor's series, Euler's, Picard and Runge- Kutta method of order two.

(10hrs)

Unit V.

Difference equations: Basic definitions**,** order and degree, solution, formation of first and second linear difference equations with constant coefficients (simple examples).
(10hrs)

REFERENCES:

1)Introductory method of numerical anaylsis- S.S.Shastri .

2)Calculus of finite differences – H.C,Saxena

3)Numerical methods for scientific and engineering computation- M.K.Jain,

S.R.K.Iyengar, & R.K.Jain (New Age International Publications)

4)Text Book of Mathematics-G.K.Raganath

5) Numerical Analysis by G. Balaguruswamy

PAPER III

5.3 DYNAMICS AND CALCULUS OF VARIATIONS

TEACHING HOURS: 50 HRS **TEACHING: 5 HRS PER WEEK**

Unit I.

1.Kinematics: Velocity and acceleration of a particle along a plane curve, Radial and Transverse components of velocity and acceleration, Tangential and normal components of velocity and acceleration. **(10 hrs)**

Unit II.

Central Orbits: Motion of a particle under a central force. Use of Polar and Pedal co-ordinates. Apse, Apsidal distance and Apsidal angle **(10 hrs)**

Unit III.

Motion of a projectile: in a non resting medium under gravity.
Elastic Impact: Direct and Oblique impact of elastic bodies. **(10 hrs)**

Unit IV.

Calculus Of Variations: Variation of a function f = f(x,y,z),and functional. Variational problems . Fundamental theorem of calculus of variation, Euler's equation. **(10 hrs)**

Unit V.
Calculus Of Variations-(contd..): Geodesic on plane , on sphere, Brachistochrome problem , minimum surface of revolution, Isoperimetric problems. **(10 hrs)**

REFERENCES:

1) Dynamics – M.Ray
2) Text book of Mathematics – G.K.Ranganath
3) Dynamics – P.N.Chatterji
4) Advanced ordinary and partial differential equations by M.D.Raisinghania
5) Higher Engineering Mathematics by B. S.Grewal

8. BOTANY (OPTIONAL)

B.Sc BOTANY (Optional Subjects) Semester System

Semester	Title of the paper	Number of hours/week/ paper	Duration of Examination	Internal Assesment Marks - 20/10				Semester end Examination Marks
				I Test	II Test	SEMI/PROJ/ASSIGN	ATTENDANCE	
I	PLANT ANATOMY & EMBRYOLOGY	04 HOURS	03 HOURS	04	10	03	03	80
	LAB	04 HOURS	04 HOURS	10				40
II	PLANT PHYSIOLOGY / BIOCHEMISTRY AND PHARAMACOGNOSY	04 HOURS	03 HOURS	04	10	03	03	80
	LAB	04 HOURS	04 HOURS	10				40
III	ALGAE FUNGI,BRYO PHYTES,PTERIODPHYTES,GYMNOSPERMS	04 HOURS	03 HOURS	04	10	03	03	80
	LAB	04 HOURS	04 HOURS	10				40
IV	DIVERSITY OF ANGIOSPERMS AND THEIR SYSTEMATIC	04 HOURS	03 HOURS	04	10	03	03	80
	LAB	04 HOURS	04 HOURS	10				40
V Paper-I	PLANT BREEDING,TISSUE CULTURE,HARVEST TECHNOLOGY AND WEED MANAGEMENT	04 HOURS	03 HOURS	04	10	03	03	80
	LAB	04 HOURS	04 HOURS	10				40
V Paper-II	ECOLOGY,ENVIRONMENTAL BIOLOGY AND PHYTOGEOPRAPHY	04 HOURS	03 HOURS	04	10	03	03	80
	LAB	04 HOURS	04 HOURS	10				40
VI Paper-I	CELL BIOLOGY,GENETICS AND EVOLUTION	04 HOURS	03 HOURS	04	10	03	03	80
	LAB	04 HOURS	04 HOURS	10				40
VI Paper-II	MOLECULAR BIOLOGY, BIOTECHNOLOGY AND IMMUNOLOGY	04 HOURS	03 HOURS	04	10	03	03	80
	LAB	04 HOURS	04 HOURS	10				40

Individual passing is required in theory and practical.

B.Sc. V Semester

(w.e.f : 2016 – 17)

Botany Paper – I

Paper-I: Plant Breeding, Tissue Culture and Horticultural Practices. 50 Hrs

Objectives: This paper includes some topics in horticulture like- Nursery, Green House Technology, Harvest and Weed Management. These will be of much help to the students residing in rural and urban areas to generate employment.

Unit 1: Plant Breeding: History and objectives. Introduction, Selection (Pure line, Mass Selection),

Hybridization- inter specific and inter generic. Mutational & Polyploidy breeding. Germ plasm and its maintenance. Pollen Bank, Quarantine method.

10 Hrs.

Unit 2: Plant Tissue Culture: Scope and Significance. Basic Aspects and Cellular totipotency (Shoot tip, Embryo and Haploid culture techniques). Differentiation and morphogenesis.

10 Hrs.

Unit 3: Introduction to Horticulture, Nursery management and importance.

Methods of propagation – vegetative – rhizome, bulb, corm and sucker (natural).

Artificial- Cutting, layering, grafting and budding. Bonsai – methods and importance.

Nursery management:

Introduction, types of nurseries and cultural practices. Seed (propagule) collection, storage and treatment. Manures, fertilizers and pesticides. Methods of irrigation – drip, sprinkler and flood

12 Hrs.

Unit 4: Green House Technology – Introduction, advantages and limitations.

Types of Green Houses- Green House structure, principle

Green house technology as applied to ornamental, vegetable and fruit plants.

08 Hrs.

Unit 5: Harvest Technology and Weed Management:

Harvest Technology**:** Flower and fruit plants management. Artificial ripening, maturity indices, methods of picking. Post-harvest technology and management of fruits: grading, processing, storage and packing.

Weed Management: Introduction and significance. Invasive weeds – concept and causes of their dominance. Weed control – physical, chemical and biological methods.

10 Hrs.

Practicals :

1. Study of methods of propagation with help of tubers, bulbs rhizomes, corms suckers, runner and offset.
2. Study of propagation by cutting, layering, grafting and budding.
3. Methods of emasculation and bagging for cross-pollination.
4. Morphology and anatomy of dry and wet stigma.
5. Morphology and anatomy of solid and hollow styles.
6. Study of pollination types.
7. Demonstration of tissue culture techniques.
8. Visit to nursery - poly house /Green house and tissue culture lab.
9. Preparation of MS media for culture.
10. Bonsai techniques.

Suggested Reading :

1. Chahal – Principles and procedures of plant breeding – L.B. Publication.
2. Sinha and Sinha – Cytogenetics, Plant Breeding and evolution- Vikas Publication.
3. Joshi P. – Genetic Engineering and its applications- Panima Book Distribution, Bangalore.
4. Purohit, S.S. -Molecular basis of cytoplasmic male sterility in crop plants.
5. Sawahel and Wagley, 1997- Plant Genetic Engineering- daya Publishing House, New Delhi.
6. Vyas S.P. and Kohi, D.V. - Methods in Biotechnology and Bioengineering – Daya Publishing House, New Delhi.
7. Vasil.IK. and Thorpe T.A. 1997- Plant cell and Tissue Culture – Kluwer Academic Publishers, The Netherlands.
8. Bhojwani S.S. 1990- Plant Tissue Culture: Applications and Limitation- Elsevier Science Publishers, New York.
9. Text Book of Horticulture – K. Manibhushan Rao – Macmillan India Ltd.
10. Introduction to Horticulture – N. Kumar (First Edition, Rajlakshmi Publication, 1996)

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Semester-V

Botany Practical I

(Plant Breeding, Tissue Culture & Horticultural Practices.)

Time: 4 Hours **Max Marks: 40**

Q.1. Estimate the percentage of pollen viability in the given specimen 'A'

08 Marks

Q.2. Carry out the Emasculation process in specimen 'B' and describe the hybridization technique (show it to the examiner)

08 Marks

Q.3. Demonstrate the vegetative propagation method C, and describe the procedure with diagram (show it to the examiner)

07 Marks

Q.4. Identify & comment D, E, F & G specimens/ slides.

12 Marks

Q.5. Journal 05. Marks

B.Sc V Semester Practical Examination

Subject: Botany Paper- I

Instructions to Examiners.

Time: 4Hours **Max Marks: 40**

Q.1. The percentage of pollen viability in the specimen A. **08 marks**

(Preparation- 6 marks, tabulation and inference – 2marks)

Q.2. Emasculation process in Specimen B **08 marks**

(Preparation-4 marks, description-2 marks, oral-2 marks). .

Q.3. Vegetative propagation method C (cutting /Grafting/Layering) **07 marks**

(Preparation-3 marks, diagram-1mark, description-2 marks ,oral-1mark)

Q.4. Specimens/slides- D, E, F and G **12 marks.**

(one each specimen/slide from pollination, tissue culture, type of stigma, type of style.

Identification-1mark, description -2 marks).

Journal **05 marks**.

B.Sc. V Semester Theory Examination

Sub: BOTANY Paper – I

Pattern of Question Paper

Time: 03 hours **Max. Marks: 80**

All questions are compulsory

Q. I Answer any ten out of twelve (01 to 12 sub questions) **10 X 2 = 20**

From Unit 1 Plant breeding: 02 sub questions.

From Unit 2 Plant tissue culture: 02 sub questions.

From Unit– 3 Introduction to Horticulture, Nursery management and importance-03 sub questions.

From Unit 4 Green House Technology-02 sub questions.

From Unit 5 Harvest Technology and Weed Management**:** 03 sub questions

Q. II Answer any six out of eight (13 to 20 sub questions) **6X 5 = 30**

From Unit 1 Plant breeding: 01 sub question.

From Unit 2 Plant tissue culture: 01 sub question.

From Unit 3 Introduction to Horticulture, Nursery management and importance-03 sub questions.

From Unit 4 Green House Technology-01 sub question.

From Unit 5 Harvest Technology and Weed Management**:** 02sub questions

Q. III Descriptive Answers.

21. From Unit 1 Plant breeding: 01 sub question. **1 X 10 = 10**

OR

From Unit 2 Plant tissue culture: 01 sub question.

22. From Unit 3 – Introduction to Horticulture, Nursery management and importance -01 sub question.

1 X 10 = 10

OR

. **From Unit 3** – Introduction to Horticulture, Nursery management and importance-01 sub question.

23. From Unit 5 Harvest Technology and Weed Management**:** 01sub question. **1 X 10 = 10**

OR

From Unit 5 Harvest Technology and Weed Management**:** 01sub question.

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Semester V

(w.e.f 2016-17)

Botany Paper – II

Paper-II: Ecology, Environmental Biology and Phytogeography **50 hrs**

Objectives:-This paper has topics on pollution, pollution control and forestry. Considering the present scenario with respect to environment these topics are most valuable.

Unit 1: Plant and environment: Atmosphere (gaseous composition), water (properties of water cycle), light (global radiation, photo synthetically active radiation), temperature, soil (development, soil profiles, physico-chemical properties), and biota.

Morphological, anatomical and physiological responses of plants to water (hydrophytes, xerophytes and epiphytes), temperature (thermoperiodicity and vernalization), light (photoperiodism, heliophytes and sciophytes) and salinity.

12 Hrs.

Unit 2: Population ecology and Ecosystems: Growth curves; ecotypes; ecads, Ecological succession-hydrach and xerarch. Structure of Ecosystems (Pond and Forest): abiotic and biotic components; food chain, food web, ecological pyramids, energy flow.

10 Hrs.

Unit 3: Phytogeography: Botanical regions of world, Vegetation types of Karnataka and India.

06 Hrs.

Unit 4: Conservation of Natural resources: Different types of natural resources and their conservation,

Forest and Forest Management: Forest and its ecological significance, deforestation, forest management and social forestry. Natural depletion of vegetation endangered and threatened economic plants of India and red data book. Wild life management in India, Indian board of wild life, national park and sanctuary.

Energy resources: conventional and non conventional sources of energy.

Biodiversity: significance, types, depletion, conservation of biodiversity. **12 Hrs.**

Unit 5: Pollution: Introduction, causes, effects and control measures of Water pollution**,** Air pollution, Soil pollution, Acid rain, Global warming, and Ozone depletion.

Sewage water and waste water types. Methods of effluent treatment of industrial waste water, sludge disposal and its care related to environment. **10 Hrs.**

Practical:

1. Study of frequency and density of herbaceous plants by quadrat method.
2. To determine moisture content and water holding capacity of different types of soils.
3. To estimate the alkalinity of water samples.
4. Ecological instruments.
5. Morphology and anatomical adaptations in three hydrophytes.
6. Morphology and anatomical adaptations in xerophytes: One succulent and one non-succulent, one epiphyte and one halophyte.
7. Waste water analysis, physical chemical parameter, pH, turbidity, TDS, BOD, COD, temperature and any other inorganic elements.
8. Visit to effluent treatment plant to study recycling of waste water near by industry and study the effect of industrial pollution nearby water bodies (Biomagnification & Eutrophication).
9. Assignment of Project related to practical number eight.

10. Study Tour of minimum two days to study forest types and ecological groups.

Books for Reference:

1. Sharma P.D. (1993)-Ecology and Environment – Rastogi Publication, New Delhi.
2. Mishra R. - Ecology Work Book- Oxford and IBH, New Delhi.
3. Agarwal K.C. (1993)- Environmental Bilogy- Agro Botanical Publishers, Jodhapur.
4. Mishra K.C. (1992)- Manual of Plant Ecology – Oxford & IBH Publication, New delhi.
5. Kochar P.L. (1980) – Plant Ecology – S. Nagin & Co., Jallandhar.
6. Kormandi E.J. (1984)- concept of Ecology- Printice Hall Ind., New Delhi.
7. Asthana R.K. (1998) – Environmental Problems and Solution- S.Chand & Co. Pvt, Ltd., New Delhi.
8. Verma P.S., V.K. Agarwal (1983) – Environmental Biology - S.Chand & Co. Pvt, Ltd., New Delhi.
9. Subramanyam N.S. A.V.S.S. Samburthy (2000)- Ecology- Narosa Publishing House, New Delhi.
10. Sharma O.P. (1993) – Ecology & Environmental Biology- Rastogi Publication, Meerut.
11. Nebel B.J. (1990) – Environmental Science – Printice Hall Indu. Pvt. Ltd. New Delhi.
12. Trivedi R.K. Etal (1987) – Practical Ecology – Anmol Publication, Jodhapur.
13. Rao K.S. (1971) - Fundamentals of Ecology – W.B. Saunders co. Philadelphia.
14. Shukla R.S. & Chandel P.S. (2000) – Plant Ecology – S.Chand & Co. Pvt. Ltd., New delhi.
15. Odum, E.P 1983. Basic Ecology, Saunders, Philadelphia.

16. Mackenzie,A et al. 1999.Instant Notes in Ecology. Viva Books Pvt.Ltd Delhi.

17. For laboratory exercises

a. Krebs, C.J. 1989. Ecological Methodology. Harper and Row, New York.

b. Ludwig, J.A. and Reynolds, J.F. 1988. Statistical Ecology. Wiley. New York.

c. Moore, P.W. and Chapman, S.B. 1986. Methods in plant Ecology. Blackwell scientific publications.

Semester-V

Botany Practical II

(Ecology, Environmental Biology and Phytogeography.)

Time: 4 Hours **Max Marks: 40**

Q.1. Give the external and internal features of ecological adaptations with neat labelled diagrams of specimen- A and mention the habitat to which it belongs. 08 Marks

Q.2. Determine the moisture content & water holding capacity of sample 'B'. 05 Marks

Q.3. Analyse sewage & waste water sample- C (pH, turbidity, TDS,). 06 Marks

Q.4. a. Identify and describe the features of ecological interest in slide D. 03 Marks

b. Describe the use and working mechanism of ecological instrument E. 03 Marks

Submission of Project (Industrial visit) 05 Marks

Submission of Study tour report (Viva voce on Ecology/vegetation types studied during tour & project) 05 Marks

Journal 05 Marks

B.Sc V Semester Practical Examination

Subject: Botany Paper- II

Instructions to Examiners.

Time: 4Hours **Max Marks: 40**

Q.1. Ecology specimen -A **08 marks**

(External and internal ecological adaptations- 5 marks, diagram-2 marks, mentioning habitat- 1mark)

Q.2. Moisture content /water holding capacity of sample -B **05 marks**

(Performing experiment and procedure-3 marks, calculation and result-2marks).

Q.3. Analysis of sewage and waste water sample -C. **06 marks**

(PH-2marks, turbidity-2marks, TDS-2marks).

Q.4. a-Ecological slide- D. **03 marks.**

(Identification -1mark, description -2 marks)

b- Ecological instrument-E **03marks**

(Identification-1mark, working mechanism and use -2marks

Submission of project **05 marks.**

Study tour report (Viva voce) **05 marks.**

Journal **05 marks.**

B.Sc.V Semester Theory Examination

Sub: BOTANY Paper – II

Pattern of Question Paper

Time: 03 hours **Max. Marks: 80**

All questions are compulsory

Q. I Answer any ten out of twelve (01 to 12 sub questions) 10 X 2 = 20

From Unit 1: Plant and environment- 03 sub questions.

From Unit 2: Population ecology and Ecosystems-04 sub questions.

From Unit 3: Phytogeography-01 sub question.

From Unit 4: Conservation of Natural resources-02 sub questions.

From Unit 5: Pollution-02 sub questions.

Q. II Answer any six out of eight (13 to 20 sub questions) 6X 5 = 30

From Unit 1: Plant and environment- 02 sub questions.

From Unit 2: Population ecology and Ecosystems-02 sub questions.

From Unit 3: Phytogeography-01 sub question.

From Unit 4: Conservation of Natural resources-02 sub questions.

From Unit 5: Pollution-01 sub question.

Q. III Descriptive Answers.

21. From Unit 1: Plant and environment- 01 question. 1 X 10 = 10

OR

From Unit 2: Population ecology and Ecosystems-01 question.

22. From Unit 3: Phytogeography-01 question.

OR

From Unit 4: Conservation of Natural resources-01 question. 1 X 10 = 10

23. From Unit 5: Pollution-01 question. 1 X 10 = 10

OR

Short notes From Unit 1: Plant and environment & From Unit 4: Conservation of Natural resources -01 question each. 2 x 5 = 10

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9. COMPUTER SCIENCE (OPTIONAL)

B.Sc. Semester – V

COMPUTER SCIENCE (Optional)

(w. e. f 2014-15 onwards)

14BSCCSCT51 : Operating Systems (Paper – I) Total : 50 Hrs

Unit 1:

Introduction: Batch Systems, Concepts of Multiprogramming and Time Sharing, Parallel, Distributed and real time Systems, Operating System Structures, Components and Services, System programs, Virtual machines. **Process Management :** Process concept, Process scheduling, Co-operating process, Threads, Inter process communication, CPU scheduling criteria, Scheduling algorithm. **12Hrs**

Unit 2:

Process synchronization and deadlocks: The critical section problem, Synchronization hardware, Semaphores, Classical problems of synchronization, Critical regions, monitors, Dead locks –System model , characterization, Dead lock prevention, avoidance and detection, Recovery from dead lock. **10 Hrs**

Unit 3:

Memory Management: Logical and Physical address space, Swapping Contiguous allocation, Paging, Segmentation, Virtual memory – Demand paging and it's performance, page replacement algorithms, Allocation of frames, thrashing**. 10 Hrs**

Unit 4:

File management (System, Secondary storage structure): File concepts, Access methods, Directory structure, Protection and consistency, semantics, File system structure, Allocation methods, Free space management. **8 Hrs**

Unit 5:

Disk Management (Structure, Disk Scheduling Methods): Disk structure and Scheduling methods, Disk management, Swap – Space management. **Protection and Security:** Goals of protection, Domain protection, Access matrix security problem, Authentication, One time password. **10 Hrs**

Text books:

1. Abraham siberschatz and peter Bear Galvin, Operating System Concepts, Fifth Edition, Addision – Wesley

2. Nutt: Operating system, 3/e person education 2004.

References:

1. Milan Milonkovic, Operating System Concepts and design, II Edition, McGraw Hill 1992.
2. Richard Peterson, Linum – The complete reference.
3. Tanenbaum, Operation System Concepts, Person Education.
4. Nutt, Operating Systems, Person Education.
5. Stallings, Operating Systems, Pearson Education.

14BSCCSCP52 : Operating Systems Lab – B.Sc. Semester - V

(Implement the following on LINUX or other Unix like platform. Use C for high level language implementation)

1. Write programs using the following system calls of UNIX operating system: fork, exec, getpid, exit, wait, close, stat, opendir, readdir
2. Write programs using the I/O system calls of UNIX operating system (open, read, write, etc)
3. Write C programs to simulate UNIX commands like ls, grep, etc.
4. Given the list of processes, their CPU burst times and arrival times, display/print the Gantt chart for FCFS and SJF. For each of the scheduling policies, compute and print the average waiting time and average turnaround time. (2 sessions)
5. Given the list of processes, their CPU burst times and arrival times, display/print the Gantt chart for Priority and Round robin. For each of the scheduling policies, compute and print the average waiting time and average turnaround time. (2 sessions)
6. Developing Application using Inter Process communication (using shared memory, pipes or message queues)
7. Implement the Producer – Consumer problem using semaphores (using UNIX system calls).
8. Implement some memory management schemes – I
9. Implement some memory management schemes – II
10. Implement any file allocation technique (Linked, Indexed or Contiguous)

Example for exercises 8 & 9 :
Free space is maintained as a linked list of nodes with each node having the starting byte address and the ending byte address of a free block. Each memory request consists of the process-id and the amount of storage space required in bytes. Allocated memory space is again maintained as a linked list of nodes with each node having the process-id, starting byte address and the ending byte address of the allocated space. When a process finishes (taken as input) the appropriate node from the allocated list should be deleted and this free disk space should be added to the free space list. [Care should be taken to merge contiguous free blocks into one single block. This results in deleting more than one node from the free space list and changing the start and end address in the appropriate node]. For allocation use first fit, worst fit and best fit

Additional Programs :

1) To write a C-Program to simulate the fork () & exit() system call.

2) To write a C-Program for displaying a command using exec() and wait() system call.

3) To write a C-Program to perform the system call to get the process id.

4) To write a C program to perform open and read a directory using UNIX Operating systems.

5) To write a C-program to perform open and read a directory using UNIX Operating systems.

6) To write a program using the I/O system calls (open, read, write) of UNIX operating system.

7) To write a C-program for simulating ls command in UNIX

8) To write a C-program in UNIX environment to implement the First Come First Serve scheduling with arrival time.

9) To write a C-program in UNIX environment to implement the Shortest Job First Scheduling.

10) To write a C-program in UNIX environment to implement the Priority Scheduling.

11) To write a C-program in UNIX environment to implement the Round Robin Scheduling.

12) To write a C-program to develop an application using Inter process Communication (IPC) using pipes.

13) To write a C-program to develop an application using Inter process Communication (IPC) using Shared Memory.

14) To write a C-program to implement producer consumer relationship using semaphore.

15) To write a C-program in UNIX to implement Dynamic Storage Allocation Strategy for First Fit.

16) To write a C-program in UNIX to implement Dynamic Storage Allocation Strategy for Best Fit.

17) To write a C-program in UNIX to implement Dynamic Storage Allocation Strategy for Worst Fit.

18) To write a C-program in UNIX to implement Contiguous Allocation.

19) To implement FIFO and LRU Pages replacement algorithms

20) To write a C-program for linked allocation of a file

21) To implement Bankers algorithm for Deadlock Detection

22) To implement the program for the Deadlock Avoidance.

23) To simulate Bankers algorithm for Deadlock Prevention.

Practical Examination (Scheme of Valuation)

Evaluation criteria for practical examinations shall be as follows:

1. Writing of Programs -15 Marks

a. One program from the journal list – 08 Marks

b. Another program given by examiner based on the concepts studied -07Marks

2. Execution of programs – 15 Marks

a. Journal Program - 08 Marks

b. Program of Examiner's Choice -07 Marks

3. Viva-Voce -05 Marks

4. Journal / Laboratory Report – 5 Marks

Total Marks -40 Marks

Syllabus for B.Sc. Semester – V

COMPUTER SCIENCE (Optional)

14BSCCSCT53 : Database Management Systems (Paper – II) Total : 50 Hrs

Unit 1:

Introduction: Database and Database Users, Characteristics of the Database Approach, Actors on the scene, Workers behind the Scene, Advantages of using DBMS, Brief History. **Database System Concepts and Architecture:** Data Models, Schemas, and Instances, Three Schema Architecture and Data Independence, Database language and interfaces, the database system Environment, Centralized and Client/Server Architectures for DBMS, Classification of Database Management Systems. **10 Hrs**

Unit 2:

Data modeling using the Entity–Relationship (ER) model: High level conceptual data models for database design with an example, Entity types, Entity sets, Attributes and Keys, Relationship types, Relationship sets, Roles and Structural Constraints, Weak Entity Types, ER Diagrams, Naming Conventions, and Design Issues, Relationship types of degree higher than two, EER Model. **10 Hrs**

Unit 3:

Relational Data Model and Relational Algebra: Relation Data Model and Relational Database Constraints, Relation Algebra, Relational Database Design by ER and EER to Relational Mapping. **10H rs**

Unit 4:

Functional dependencies and Normalization for Relational Databases: Informal Design Guidelines for Relational Schemas, Functional Dependencies, Normal Forms based on Primary Keys, General Definition of 2NF and 3NF, Boyce-Codd Normal Form(BCNF). **10Hrs**

Unit 5:

Relational Database Language: Data definition in SQL, Queries in SQL, Insert, Delete and Update Statements in SQL, Views in SQL, Specifying General Constraints as Assertions, Specifying indexes, Embedded SQL. **Transaction Processing Concepts**: Introduction, Transaction and System Concepts, Desirable properties of transaction, Schedules and Recoverability, Serializability of Schedules, Transaction Support in SQL, Locking Techniques for Concurrency Control. **10Hrs**

Text Book:

A. Ramez Elmasri & Shamkant B. Navathe, Fundamentals of Database Systems(Sixth Edition), Pearson Education, 2011).

B. Sundarraman , Oracle 9i programming A Primer, 1/e Pearson Education.

References:

1. Kahate, Introduction to Database Management System, Pearson Education 2004.

2. Abrahamsi, Silberschatag, Henry. F. Korth, S. Sudarshan, Database System Concepts, Mc. Raw hill.

3. Jefry . D. Ullman, Principles of database system.

4. Oracle Press: ORACLE – Computer reference.

5. C.J. Date, Introduction to database systems, Sixth Edition, Addisonwesley 1995.

6. Raghu Ram Krishnan, Database Management Systems, Second Edition, Mc Graw Hill, 2000.

14BSCCSCP54 : Database Management Systems Lab – B.Sc. Semester – V

Journal programs

I. Consider the Insurance database given below. The primary keys are underlined and the data types are specified.

PERSON (driver – id #: String, name: string, address: strong)
CAR (Regno : string, model: string, year: int)
ACCIDENT (report-number: int, accd-date: date, location: string)
OWNS (driver-id #:string, Regno:string)
PARTICIPATED (driver-id: string, Regno:string, report-number:int, damageamount:int)

a) Create the above tables by properly specifying the primary keys and the foreign keys.
b) Enter at least five tuples for each relation.
c) Demonstrate how you
    a. Update the damage amount for the car with a specific Regno in the accident with report number 12 to 25000.
    b. Add a new accident to the database.
d) Find the total number of people who owned cars that were involved in accidents in 2008.

e) Find the number of accidents in which cars belonging to a specific model were involved.

f) Generate suitable reports.

II. Consider the following relations for an order processing database application in a company.

CUSTOMER (cust #: int , cname: string, city: string)
ORDER (order #: int, odate: date, cust #: int, ord-Amt: int)
ORDER – ITEM (order #: int, item #: int, qty: int)
ITEM (item # : int, unit price: int)
SHIPMENT (order #: int, warehouse#: int, ship-date: date)
WAREHOUSE (warehouse #: int, city: string)

a) Create the above tables by properly specifying the primary keys and the foreign keys.

b) Enter at least five tuples for each relation.

c) Produce a listing: CUSTNAME, of orders, AVG_ORDER_AMT, where the middle column is the total numbers of orders by the customer and the last column is the average order amount for that customer.

d) List the order# for orders that were shipped from *all* the warehouses that the company has in a specific city.

e) Demonstrate the deletion of an item from the ITEM table and demonstrate a method of handling the rows in the ORDER_ITEM table that contain this particular item.

f) Generate suitable reports.

III. Consider the following database of student enrolment in courses & books adopted for each course.

STUDENT (regno: string, name: string, major: string, bdate:date)
COURSE (course #:int, cname:string, dept:string)
ENROLL (regno:string, course#:int, sem:int, marks:int)
BOOK _ ADOPTION (course# :int, sem:int, book-ISBN:int)
TEXT (book-ISBN:int, book-title:string, publisher:string, author:string)

a) Create the above tables by properly specifying the primary keys and the foreign keys.

b) Enter at least five tuples for each relation.

c) Demonstrate how you add a new text book to the database and make this book be adopted by some department.

d) Produce a list of text books (include Course #, Book-ISBN, Book-title) in the alphabetical order for courses offered by the 'CS' department that use more than two books.

e) List any department that has *all* its adopted books published by a specific publisher.

f) Generate suitable reports.

IV. The following tables are maintained by a book dealer.

AUTHOR (author-id: int, name: string, city: string, country: string)
PUBLISHER (publisher-id: int, name: string, city: string, country: string)
CATALOG (book-id: int, title: string, author-id: int, publisher-id: int, category-id: int, year: int, price: int)
CATEGORY (category-id: int, description: string)
ORDER-DETAILS (order-no: int, book-id: int, quantity: int)

a) Create the above tables by properly specifying the primary keys and the foreign keys.

b) Enter at least five tuples for each relation.

c) Give the details of the authors who have 2 or more books in the catalog and the price of the books is greater than the average price of the books in the catalog and the year of publication is after 2000.

d) Find the author of the book which has maximum sales.

e) Demonstrate how you increase the price of books published by a specific publisher by 10%.

f) Generate suitable reports.

V. Consider the following database for a banking enterprise

BRANCH (branch-name: string, branch-city: string, assets: real)
ACCOUNT (accno: int, branch-name: string, balance: real)
DEPOSITOR (customer-name: string, accno: int)
CUSTOMER (customer-name: string, customer-street: string, customer-city: string)
LOAN (loan-number: int, branch-name: string, amount: real)
BORROWER (customer-name: string, loan-number: int)

a) Create the above tables by properly specifying the primary keys and the foreign keys

b) Enter at least five tuples for each relation
c) Find all the customers who have at least two accounts at the *Main* branch.
d) Find all the customers who have an account at *all* the branches located in a specific city.
e) Demonstrate how you delete all account tuples at every branch located in a specific city.
f) Generate suitable reports.

Practical Examination
Evaluation criteria for practical examinations shall be as follows:
1. Writing of Programs -15 Marks
a. One program from the journal list – 08 Marks
b. Another program given by examiner based on the concepts studied -07Marks
2. Execution of programs – 15 Marks
a. Journal Program - 08 Marks
b. Program of Examiner's Choice -07 Marks
3. Viva-Voce -05 Marks
4. Journal / Laboratory Report – 5 Marks
Total Marks -40 Marks

10. STATISTICS (OPTIONAL)

Pattern of Question Paper from 2016-17 For B.A/B.Sc V Semesters

Part- A

Q1 with 12 sub questions numbered as **a , b, c, d, e, f, g, h, I, j, k , l**

Each question carries 2 marks. Student has to answer any 10 questions

Note:

1. There should not be any multiple choice questions.
2. At least two questions should be set on each unit.
3. Total marks - 2X10= 20 marks

Part- B

Six questions numbered as **2, 3, 4, 5, 6, 7** each of 5 marks. Student has to answer any 4 questions.

Note:

1. Of this 3 Shall be problem oriented.
2. At least one questions should be set on each unit
3. Total marks- 5X4= 20 marks.

Part- C

Five questions numbered as **8, 9, 10, 11,12, 13** each of 10 marks. Student has to answer any 4 questions

Note:

1. At least one question should be set on each unit
2. Total marks- 10 X4 = 40 marks

B.A/ B.Sc. COURSE IN STATISTICS (OPTIONAL)
FIFTH SEMESTER: THEORY PAPER-I

Total: 50 Hours.

STTH-5.1: ANOVA, DESIGN OF EXPERIMENTS AND SPRT.

Unit 1: Analysis of Variance:
Meaning and assumptions. Analysis of variance (fixed effects model) - Analysis of one-way, two-way classified data, expectation of mean sum of squares, ANOVA tables. Least significant difference. Case of multiple but equal number of observations per cell in two-way classification (with interaction). 3 – way classification

10 Hours

Unit 2: Design of Experiments:
Definitions of important terms in design of experiments and Basic principles. Completely randomized, Randomized block and Latin square designs-layout, models, least squares estimates of parameters, hypothesis, test procedures and ANOVA tables. Efficiency of design. Missing plot technique for RBD and LSD-Estimation of single missing observation.

15 Hours

Unit 3: Factorial Experiments:

2^2 and 2^3 factorials. Main effects and interactions, their best estimates and orthogonal contrasts. Yates methods of computing factorial effects . Total, partial confounding in a 2^3 experiments with RDB layout.

Unit: 4. Spilt-Plot design:

Introduction, Definition and examples of Split-Plot design. Analysis of Split-Plot design and complete ANOVA table for a split- plot design.

05 Hours

Unit 5: Sequential Testing:

Need for sequential tests. Wald's SPRT, Graphical procedure of SPRT. Determination of stopping bounds. Construction of SPRT for Binomial, Poisson, Normal distributions. Approximate expressions for OC and ASN functions for Binomial, Poisson and Normal distributions.

10 Hours

FIFTH SEMESTER: PRACTICAL PAPER-I

STPR-5.1: PRACTICALS

2. ANOVA for one way classified data.
3. ANOVA for two way classified data: Single observation per cell
4. ANOVA for two way classified data: multiple but equal number of observations per cell (assuming interaction)
5. Analysis of CRD, RBD and LSD and efficiency.
6. Missing plot technique for RBD and LSD with single observation missing.
7. Analysis of 2^2 factorial experiment
8. Analysis of 2^3 factorial experiments.
9. Exercises on SPRT (Bernoulli, Binomial, Poisson &Normal distributions)

Books for study:

1. Cochran.W.G. and G.M.Cox: Experimental Designs-John Wiley.
2. Goon A.M et.al: Fundamentals of Statistics, Vol. II- World Press, Calcutta.
3. Gupta S.C and VK Kapoor: Fundamentals of Applied Statistics- Sultan Chand & Sons.
4. Montgomery.D.C: Design and analysis of experiments: Wiley
5. A.Wald: Sequential Analysis-Wiley.
6. Parimala Mukhopadhyay-Applied Statistics.

Books for Reference:

1. Das M.N. and Giri.N: Design of Experiments: Theory and Applications.
2. Joshi.D.D.Linear estimation and Design of Experiments: New-Age International.

B.A/ B.Sc. COURSE IN STATISTICS (OPTIONAL)
FIFTH SEMESTER: THEORY PAPER-II

Total: 50 Hours.

STTH-5.2: SAMPLING AND DEMOGRAPHY.

Unit: 1. Introduction:
Concepts of population and sample. Need for sampling. Complete enumeration vs Sample surveys. Non probability and probability sampling; meaning, need and illustrations . Use of random numbers .Principal steps in a sample survey. Requisites of a good questionnaire. Pilot surveys. Sampling and non sampling errors.

10 Hours

Unit: 2.Simple Random Sampling:
Sampling with and without replacement. Unbiased estimators of population mean and total. Derivation of sampling variance .Standard errors of the estimators. Derivations of variances of the estimators and their estimation .Determination of sample size .Formulas for sample size in sampling for proportions and means.

10 Hours

Unit: 3.Stratified Random Sampling:
Need for stratification unbiased estimator of mean and total in stratified random sampling. Derivation of the SE's and their estimation. Allocation of sample size under proportional, Optimum and Neyman allocation. Comparison of V (ran), V(prop) and V (opt) ignoring f p c. Estimation of gain in precision due to stratification

10 Hours

Unit: 4.Systematic Random Sampling:
Unbiased estimator of population mean and its variance.Expression of variance with intra class correlation.Systematic sampling with linear trend. Comparison of systematic sampling with simple and stratified random sampling procedure.

10 Hours

Unit: 5. Demography and life tables:
Sources of demographic data.Measurement of Mortality: Crude, Specific and Standardized death rate, Infant mortality rate, Neonatal mortality rate and maternal mortality rates. Fecundity and fertility. Measurement of fertility: Crude, Age specific, General and Total fertility rates Reproduction rates-NRR and GRR. Life table: Definition and uses, components of life table- Explanation of the columns of life table. Abridged life table- King's method.

10 Hours.

FIFTH SEMESTER: PRACTICAL PAPER-II

STPR-5.2: PRACTICAL

1. Drawing random samples using random number tables(grouped and ungrouped cases)
2. Simple Random Sampling.
3. Stratified sampling- I: Estimation of mean, total and the standard error of the estimators.
4. Stratified sampling -II
5. Systematic sampling –Sampling mean and its relative comparisons.
6. Demography –I: Measurement of mortality, infant mortality, standardized death rates.
7. Demography- II: Measurement of fertility, ASFR, TFR and reproduction rates.
8. Demography- III: Construction of life-tables.

Books for study:

1. Cochran.W.G.Sampling Techniques (3rd Ed)-Wiley Eastern.
2. Singh and Chaudhary,F.S. (1986): Theory and Analysis of Sample survey design (Wiley Eastern).
3. Goon A.M et.al: Fundamentals of Statistics, Vol. II- World Press, Calcutta.
4. Gupta S.C and Kapoor V.K.: Fundamentals of Applied Statistics- Sultan Chand & Sons publications.
5. Srivastava .O.S (1983); A Text book of Demography-Vikas Publishing.
6. Cox.P.R(1970);Demography,Cambridge University Press.

Books for Reference:

1. Das M.N.: Sampling Theory and Methods-Statistical society,ISI,Kolkata.
2. Des Raj and Chandak; Sampling Theory-Narosa,New Delhi.
3. Sukhatme P.V.et.al: Sampling Theory of surveys with applications-Indian Society of Agricultural Statistics,New Delhi.

11. ZOOLOGY (OPTIONAL)

BSc-Zoology (Optional) Fifth Semester

Paper 5.1 and 5.2 Outline

STRUCTURE

Semester	Syllabus	Hour's
V Paper I	Ecology, Evolution, Paleontology, Zoogeography & Wild life Conservation	50
V Paper -II	Genetics, Biotechnology & Biostatistics	50

B Sc V Semester (5.1)

Paper-I

ZOOLOGY (optional)

(Ecology, Evolution, Paleontology, Zoogeography, Wild life Conservation)

Total-hours,50

Marks-80

Ecology.

Earth as Living.-Planet. Sub divisions_of ecology, Scope of ecology, Biosphere
1 hr

Abiotic factors ___
Light, Temperature (Effect on Animals and Plants)
2hr

Biotic Factor

Mutualism,Commensalism,Amensialism,Parasitism,Predation
2hrs
,Compitition,Parasitism.

Habitats
4hrs

Freshwater habitat — Lotic and Lentic systems
Zonation of Sea,Marine Biota, Esturine ecology, & Mangrooves
Terrestrial habitat — A brief account of Biomes.

Ecological Adaptations — Freshwater, Marine and Terrestrial.

Biogeochemical Cycles - Principles and concepts of Water, Nitrogen, Carbon,
2hrs
Oxygen cycles

Community Ecology-Community structure, Ecological niches, Edge effect, Stratification, Ecoton.
2hrs

Population Ecology: Density, natality, mortality.Age distribution

Population growth, types and curves.
2hrs

Evolution.

The Solar System
Origin of Earth , Origin of Life and its theories
03hrs

The geological time scale
03hrs

Fossils: Definitioni and Kinds of fossils, How fossils are formed, Methods of Preservation. Connecting links and Living fossils. The importance of fossils
02hrs

Theories of Organic Evolution :
06hrs

Lamarkism, Darwinism, Mutation Theory
And the Modern Synthesis Theory;(population gene Pool, Gene Frequencey . Variations — gene mutation, chromosomal mutation; Isolation and recombination.Genetic drift,Hardiwienberg equilibrium)

Modes of Evolution : Microevolution, Macroevolution and Mega-evolution.
02 hrs

,Evolution of Man and Horse 04 hrs

Paleontology
Mesozoic reptiles with a note on Dinosaurs.
03 hrs

Zoogeography: Zoogeographical realms of world ,
A brief account of Wallace's line
03 hrs

Wildlife Conservation : 09hrs

Wildlife in India,Causes for the depletion of wildlife.
Wild Life Conservation Techniques', methods'and measures
Brief account of ; IUCN, WWF,Bombay Natural History Society, Indian Board for Wild Life, Red Data Book.
Wild Life Act 1972 and its amendments in India,CITES.
Project Tiger and Biosphere Reserve.

Total -11 Practicals

1; Study of fossils (vertebrate(3) and invertebrate(3).
1hrs

2. Mesozoic reptiles (Ichthyosaur, tyrannosaur, brontosaur, triceratops, archaeopteryx .
1hr

3. Evolution of man (Homo-erectus. Hemo-habills. Homo-neandertalences)
1hr

4. Evolution of Horse
1hr

5 ;Connecting links and living fossils (Neopilina, Peripatus, Limulus, Latimaria; Archaeopteryx and Duckbill platypus)
1hr

6 Study of threatened Animals of India (Tiger,Lion,singal horned rhinoceros
1hr
Musk deer,gaur,Golden langur,Loin tailed monkey.Python)
1hr

7 ;Estimation of co_2 from different water samples
1hr

8; Estimation of dissolved oxygen
1hr

9; Estimation of Total hardness
1hr

10;Study of Ecological Adaptations and Morphological peculiarities,;ex-Hermit crab, 1hr
Draco,Stick insect,puffer fish,Exocoetus,Phrynosoma,chamaeleon and Bat.

11;Visit to nearby water body to study Ecosystem
1hr

REFERENCE BOOKS:-

Evolution : Odum

Organic Evolution: N.Arumugam
Evolution, Dobzhansky, Ayala,Stebbins & Valantine
Environmental Biology.Rastogi and Company,Meerut
Evolution of the Vertebrates, Colbert E.H. John Wiley and Sons, New York
Ecology;Principles and Application.chapman,Cambridge university press
Environmental Biology P.R.Trivedi and gurudeep Raj.
Recent Advances in Environmentai Biology –Diwan and D.K.Arora
Environmental Science;Eldon.D.Enger andBradly.F,Smith

Suggestions for Practical Examination

SEM — V-5.I

Q. NO I) Estimation of Carbondioxide/O xgen/Total hardness 8marks

Q.NO II) Evolution (Two spottings) 4 marks

Q NO III) Fossils (Two spottings) 4 marks

Q NO IV) Identification (Zoogeography & Wild life) 4 marks

Q NO V) Project on Local Biodiversity 10 marks

Q NO. VI Viva 5 marks

Q NO. VII Journal 5 marks

Note 1 :- Examiners can alter the Scheme of marks for practical in consultation with the staff of the host college.

Note :2	Theory	Internal	20 marks
		Final	80 marks
	Practical	Internal	10 marks
		Final	40 marks

Note 3: Question paper pattern for THEORY examination

Q No. 1	02 marks	10* 02 = 20 marks	
Q No. II	05 marks	06* 05	= 30 marks
Q No. III	10 marks	01* 10	= 10 marks
Q No. IV	10 marks	01* 10	= 10 marks

Q No. V 10 marks 01* 10 = 10 marks

Note 4 : Q Nos IIIrd IVth & Vth each should have one internal option

B Sc V Semester-5.2
Paper-II
ZOOLOGY (optional)
(Genetics, Biotechnology and Biostatistics)

Total hours-50

Marks-80

Theory 4hrs/week

Genetics

Introduction_ Mendel and his contribution, Monohybrid and Dihybrid_cross (Laws),Definition of genetical Terminologies. 4 hrs

Interaction of Gene's : 5 hrs

Supplementary Factors ; Comb, Pattern in fowls.
Dominant Epistasis;- Plumage colour in Leghorn and Wyandote
Recessive Epistasis: Coat colour in sweet peas.
Complimentary Factors – Flower colour in sweet peas
Lethal gane – Coat colour in mice.

Multiple alleles: ABO blood group and Rh factor in human 2 hrs

Linkage and Crossing Over - Linkage in Drosophila, Significance of Crossing over. 2 hrs

Sex Determination: Chromosomal mechanism of sex determination 3 hrs

Genic balance theory, Gynandomorphs., and intersexes.
Syndromes in human __ Klinefelter and Turners
Environmental and hormonal effects on determination of sex

Sex Linked Inheritance in Drosophila and Man 3 hrs

Haemomphilia and colour blindness in Man
Sex linkage in poultry.
Y - linked genes in man

Mutations – Chromosomal aberrations, Molecular basis of gene mutation & types
2 hrs

Human Genetics :
2 hrs

Human Genetic disorders __ inborn errors of metabolism, Albinism, Phenyl ketonuria, Alkaptonuria, Sickle cell aneamia, Thalassemia. Huntington's Chorea

Genetic Code and Protein Biosynthesis: Properties of genetic code and Mechanism of biosynthesis. Wooble hypothesis.
3 hrs

Biotechnology

Introduction Sub-fields of biotechnology history of biotechnology
1 hr
Biotechnology Scenario in India

Types of Biotechnology: Animal Biotechnology. Plant Biotechnology Microbial
2 hrs
Biotechnology. Environmental Biotechnology Medical Biotechnology

Molecular biotechnology Genetic engineering, isolation of DNA, Gene cloning
6 hrs
Vectors, Restrictiction enzymes- Polymerase Chain Reaction (PCR)
DNA finger printing

Applications of Biotechnology
5 hrs

Agricultural application: Improvements in crop yield

Industrial application: Ethanol production, Food processing, Food fermentors and Industrial enzymes.

Environmental Applications: Cleaning up of environmental pollutants, Bioremediation.

Medical Applications: Gene testing, Gene therapy, Drug discovery Diagnosis of inherited
Disorders, personal identification.

Biostatistics

Fundamentals of Biostatistics

10 hrs

Preliminary Concepts.
Frequency distribution
Graphical presentation of Data
Measures of Central Tendancy- Mean, Median and Mode
Measures of variation
P r o b a b l i t y
Chi-Square Test

Practicals

1. Study of human karyyotype and disorders

   03

2. Problmes based on monohybrid, dihybrid, sex linked inheritance,

   02

   Multiple allels

3. Calculation of gene frequency

   01

4. Study of blood groups

   01

5. Study of Paper Chromatography

   01

6. To form frequency distribution table & draw histograme frequency

   Polygon & frequency curve

   01

7. Measures of central tendency (range, mean, mode and median)

   01

8. Isolation of DNA / RNA

01

9. Preparation of Giant Chromosome-Drospphila Salivary gland chromosomes

01

Suggestions for Practical Examination

SEM __ V-5.2

Q No. I) Genetics : (A) One Karyotype analysis

07 marks

(B) Three problems

09 marks

No. II) Biotechnology

07 marks

Q No. III) Biostatistics

07 marks

No. IV Viva

05marks

No. V Journal

05 marks

Note 1 :- Examiner can alter the Scheme of marks for practical in consultation with

The staff of the host college.

Note 2 : Theory Internal

20 marks

Final

80 marks

Practical Internal

10 marks

Final

40 marks

Note 3 : Question paper pattern for **THEORY** examination

Q No. 1	02 marks	10* 02	=20 marks
Q No. II	05 marks	06* 05	=30 marks
Q No. III	10 marks	01* 10	=10 marks
Q No. IV	10 marks	01* 10	= 10 marks
Q No. V	10 marks	01* 10	= 10 marks

Note 4: Q Nos IIIrd, IVth & Vth each should have one internal option.