KARNATAKA STATE OPEN UNIVERSITY

PROGRAMME GUIDE

M.Sc in Biotechnology

DEPARTMENT OF POST GRADUATE STUDIES AND RESEARCH IN BIOTECHNOLOGY

Mukthagangothri, Mysore – 570 006

VICE CHANCELLOR'S MESSAGE

Dear Learner,

The family of KSOU welcomes you to pursue the academic programmes you have chosen to achieve not only academic excellence but also to fulfill the desire of your career. The University, established by the Act of State Legislature has created wonderful academic ambience. The programmes offered by the University have been recognized by University Grants Commission. Therefore, the degrees are valid for employment opportunities across the country. The 'core values' of the University are derived from its vision 'Higher Education to Everyone, Everywhere'. The ultimate touchstone of quality higher education is the motto of the University. Today, higher education stands at the crossroads of keeping pace with the emerging needs of the country.

The University has adopted a school concept in its functioning. The school of science headed by a Director offers academic programmes in basic and applied sciences. It combines an inter disciplinary and professional approach to pedagogy and research. The University believes that rigors of the contemporary world require competent quality human resources to create knowledge based society. The academic activities of B.Sc. programmes are initiated through well-established department/s led by the Chairperson/s. Well-qualified teaching faculty with equally dedicated non-academic team is an asset to the University, which is always, committed for the welfare of the students.

The University functions in a 3-tier system of student support service, namely Headquarters, Regional Centres and Learners Support Centres spread all over Karnataka. The learners can undergo teaching-learning process in the notified Regional Centres/Learner Support Centres. The University has adopted a mechanism to deliver Self Learning Material by print, limited audio visual and Counseling/Personal Contact Programme. As a learner, you will have greater opportunity to gain knowledge and skill through those mechanisms. The academic counselors will play a strategic role and supports you from the enrollment of the programme till you accomplish the goal. A proper blending of the knowledge and skill will be imparted so that you will be transformed as a good citizen to contribute to the development of society and the country.

The UGC in its Public Notice dated: 23.02.2018 stated that the Degree/Diploma/Certificate Programme awarded through distance mode are at par with corresponding Degree/ Diploma/ Certificate Programme obtained through conventional universities. The degrees acquired through distance education are recognized for the purpose of employment in State/Central Government, MNCs, Private Sector etc. and also for pursuing higher education in other educational institutes. Therefore, you have greater opportunity of pursuing Higher Education without any kind of fear about your career.

I am sure you will enjoy good experience with services rendered by the university through its Regional centres and Learner Support Centres, besides Headquarters. I wish you all the best in your academic endeavors.

Prof. Vidyashankar S

MESSAGE FROM DEAN (ACADEMIC)

Dear learner,

As you know education imparts knowledge and skills which empowers all to build civilized society. Higher education policy which was once a priority sector is no longer maintaining the same, due to General Agreements and Trade in Services (GATS). The education policy of the government provides a greater opportunity to accelerate Gross Enrolment Ratio (GER).

Higher education is imparted both by conventional system and ODL system. The former education has inbuilt rigidity where ODL enjoy flexibility. Presently the GER in higher education around is 27%, thanks to the role played by ODL system. The ODL system operates under access, flexibility and success.

The Karnataka State Open University, which came up in 1996 under the Act of state legislation 1992 play a stupendous role in imparting quality education. As one of the premier institution in ODL system of the country, the university strive hard to empower various dis-advantaged sections of the society like, house wives, economically and culturally backward, tribal, senior citizens, working groups, differently abled, professionals, technocrat, jail inmates etc., The University cater to the needs of students ranging from the age of 18 years to 80 years.

The programmes offered by KSOU are strictly in conformity with quality and standards set by regulatory bodies UGC/AICTE etc., The Karnataka State Open University was established on 1st June 1996 vide Government Notification No. EDI/ UOV/ 95 dated 12th February 1996- KSOU Act 1992, keeping in view the educational needs of our country, in general, and the state in particular. The University has a long and rich experience in the field of Distance Education as the erstwhile Institute of Correspondence Course and Continuing Education. University Grants Commission (UGC) New-Delhi vide order No: F.No 14-5/2018 (DEB-I) Dated : 14th August 2018 for the period from 2018-19 to 2022-23. The KSOU operates on dictum quality first and students foremost. Further the university is highly committed to provide need based education to the door steps of the students.

The KSOU has students' support services which work in 3 tiers - head office; regional centres and study centres within the jurisdiction of state. The admissions, counseling and the examinations are conducted in different places, hence, education at the door steps.

The dedicated staffs in various department and state of the art student support services create a conducive environment for teaching learning. The university put in places all possible efforts to keep the learners happy from the stage of enrolment till they get employed. I am confident that, as a learner in the university, you will enjoy good experience in the system.

I wish you all the best in your academic endeavors.

Truly yours,
Dean (Academic)

1. Chairman's message

Dear Learner,

It gives me great pleasure to welcome you to the Department of Biotechnology and I extend you my good wishes for successful completion of Master's Degree in Biotechnology.

Department of Biotechnology offers two years M.Sc. programme in Biotechnology in Open Distance Learning mode. The Biotechnology sector has tremendous growth potential and scope which is emerging as one of the dominant sector providing a number of employment opportunities to day. There is a huge demand for skilled biotechnologists.

The objectives of the programme include imparting quality education and produce skilled biotechnologists at affordable cost and to create an opportunity for learners interested in biotechnology. The contents of the course are delivered by Self learning material, lecture, counselling and skills imparted during the contact classes and weekends counselling along with laboratory and field work component.

Quality Assurance is taken care with the help of Students feedback on content of the SLM , lectures/practical classes delivered. Academic peers: Academic audit promotes quality and standards.

The learner will be self-equipped to find Exciting career opportunities in private/ government sector and competent enough to clear eligibility tests (NET/SLET/GATE) for Teaching/doctoral research fellowship in Universities /Research organizations.

The faculty members of the department wish you all the very best.

Chairman

Department of Biotechnology

2. ABOUT THE DEPARTMENT OF STUDIES IN BIOTECHNOLOGY

Department of Biotechnology in Karnataka State Open University was established in the year 2012 and introduced a unique Master's Degree Programme in Biotechnology in the year 2013. The main objective of this programme was to provide quality education at any age and produce skilled biotechnologists at affordable cost, especially for those working professionals who couldn't attend regular courses in conventional universities.

The Department of Biotechnology comes under the ambit of School of Sciences and offers Masters and Doctoral Degree in Biotechnology. The curriculum of Masters degree is designed to suit the current needs of the industrial sectors. The department has first rate infrastructure with high quality laboratories, well equipped classrooms, auditorium and research facilities.

In the department, learners are introduced to basic biotechnological concepts and techniques so that they learn, practice and apply this knowledge / skill for their productive careers in various fields. Comprehensive fundamentals of the program prepare the learners to advanced study in specialized microbiological and other interdisciplinary courses. Learners will be trained to be independent and creative to gain required competence for the competitive and ever changing job opportunities. The programme is offered in tune with mission of the university in terms of affordability, mass skill development and excellence.

The faculty members who have acquired the skill in respect of contemporary issues have contribute their mite to make the programme highly meaningful in the competitive arena. The teaching faculty has wide ranging experience along with professional and academic credentials to train students in Open Distance Learning mode. They have published several original research articles in high quality journals and text books. The students are encouraged to carry out in-house projects in the department and encouraged to publish their research findings.

3. Faculty

a. Department of Biotechnology

Sl. No.	Name of the Faculty	Designation	Qualification	Specialization	Expe-rience in Years	Mobile Number
1	Dr. N.G. Raju	Assistant Professor & Chairperson	M.Sc., M.Phil., Ph.D.	Cytogenetics	15	9448554051
2	Dr. Raghava	Assistant Professor (Contract Basis)				
	Dr. Suresh S	Assistant Professor (Contract Basis)				

4. PROGRAMMES OFFERED

A. MASTERS PROGRAMME IN BIOTECHNOLOGY (M.Sc)

B. DOCTORAL PROGRAMME IN BIOTECHNOLOGY (Ph.D.)

A. MASTERS PROGRAMME IN BIOTECHNOLOGY (M.Sc)

The program in Biotechnology is highly multi-disciplinary field that involves the use of living organisms, drawing upon other sciences of Chemistry, Physics, Engineering, Computers, and Information Technology to develop scientific breakthroughs and products for the welfare of human and society.

Department of Biotechnology offers two years M.Sc. programme in Biotechnology in Open Distance Learning mode.

The Biotechnology in distance learning is unique programme aimed to provide the students with requisite knowledge, sought-after skills and in-depth training in both the theoretical and practical aspects of the discipline to enable the students to effectively pursue their career.

Biotechnology attracts many students because of techniques, concepts, procedures and applications involved related to many disciplines, which in turn opens many job opportunities in different fields. The Biotechnology sector has tremendous growth potential and scope which is emerging as one of the dominant sector providing a number of employment opportunities today. This especially true of Bangalore, which has emerged as a biotechnology hub, for both research and industry, in India. Needless to say, there is a huge demand for skilled biotechnologists.

The curriculum and Self Learning study Material for both theory and practical is

designed and scrutinized by experts drawn from different industries, universities and in-house faculty for independent study.

After successfully completing the learner will be competent in the field of biotechnology and allied subjects with classical and corporate responsibility and empowered with multiple competencies and addition of quality dimension to learner's knowledge.

i. MISSION AND OBJECTIVES OF M.SC. PROGRAMME

a. Mission:

- To impart the knowledge and skill to the learners and thereby increase his/her professionalism.
- To provide education at affordable cost to the masses.
- To create effective human resources by employing the ICT.
- To enhance the capacity of the learners to realize their individual, corporate and social
- responsibility.
- To impart education such that the learners inculcate moral, civil and ethical values.
- To make the learners to embrace the philosophy of learn, earn and return.

ii. Objectives:

- To impart quality education and produce skilled biotechnologists at affordable cost

- To create an opportunity for learners interested in biotechnology, with a potential to innovate, invent and disseminate knowledge for the welfare of mankind and benefit of society and environment.
- To create awareness towards socio ethical implications of potentials of Biotechnology.
- To enable learner for careers of constructive service in academia, government, industry and health related fields.
- To train the learners with appropriate critical thinking and problem-solving skills and aptitude for taking up various Biotechnology related job opportunities.
- To provide basic grounding in research techniques and entrepreneurship skills.

B. DOCTORAL PROGRAMME IN BIOTECHNOLOGY (Ph.D.)

PhD in Biotechnology is offered in regular mode only as per University Grants Commission (Minimum Standards and Procedure for Award of M.PHIL./PH.D. Degrees) Regulations, 2016. Edibility for admission as per UGC regulation, selection through Entrance Examination, Ph.D. thesis evaluated by at least two external examiners on open Ph.D. viva voce examination.

5. DELIVERY MECHANISM

The delivery mechanism followed in this University is different from that of conventional Universities. The Open University system is more learners oriented, and is geared to cater to the needs of motivated students assuming that the student is an active participant in the teaching-learning process. Instruction to student is imparted through various modes such as print, audio and supported by face to face counseling/PCP. The University follows multi-channel approach for instruction.

It comprises proportionate combination of:

* Printed Self-Learning Material.
* Audio programs transmitted through Radio.
* Face-to-Face counseling at learners support centres by academic counsellors.

a. **Medium of Instruction:** English

b. Mode of Instruction

SLM takes the role of a teacher in distance education system. The study material provided to you along with this programme guide are called self-learning material as it facilitates learning on your own. The lessons are simple and easy to understand. The SLM have been divided into blocks and units. Each block has one credit value which means you have to devote 30 hours of study for one block, be it studying, discussing with counselors, attending classes, writing assignment and so on.

Objectives are given in the beginning of each unit which tells what is expected of you by learning that unit. Check your progress questions are given in content so that you can measure your progress while studying the material. Try to answer this questions

which make the SLM self-evaluating. References are given at the end of each unit which gives you sources for furtherance of your study.

c. **Duration of Programme:** The duration of the programme is Two years. However additional two years (N+2) would be provided to complete the programme.

LEARNING OUTCOMES

- Enrich the existing knowledge so as to produce outcomes of comparable quality with on-campus programs.
- Produce competent human resources in the field of biotechnology and allied subjects with classical and corporate responsibility.
- Empower learner′ s multiple competencies and adding quality dimension to learner′ s knowledge.
- Provide required workforce for R &D in laboratories, health, pharmaceutical and food industries

6. SYLLABUS

M.Sc. in Biotechnology
Choice Based Credit System Course Matrix

Course Code	Semester and Course	Credits	Counselling/PCP hours*	Maximum Marks			Examination duration
				Internal Assessment	Term-End Examination	Total	
	Semester - I						
HC BT 1.1	Course 1	4	12	20	80	100	3
HC BT 1.2	Course 2	4	12	20	80	100	3
HC BT 1.5	Course 3 (Practical 1&2)	4	120	20	80	100	3
SC BT 1.3	Course 1	3	06	20	80	100	3
SC BT 1.4	Course 2	3	06	20	80	100	3
EL-1	Inter Disciplinary course – I	2	06	10	40	50	$1^{1/2}$
	Semester - I Total	20	162	110	440	550	
	Semester - II						
HC BT 2.1	Course 1	4	12	20	80	100	3
HC BT 2.2	Course 2	4	12	20	80	100	3
HC BT 2.5	Course 3 (Practical 3&4)	4	120	20	80	100	3
SC BT 2.3	Course 1	3	06	20	80	100	3
SC BT 2.4	Course 2	3	06	20	80	100	3
EL-2	Inter Disciplinary course – II	2	06	10	40	50	$1^{1/2}$
	Semester - II Total	20	162	110	440	550	
	Semester - III						
HC BT 3.1	Course 1	4	12	20	80	100	3
HC BT 3.2	Course 2	4	12	20	80	100	3
HC BT 3.5	Course 3 (Practical 5&6)	4	120	20	80	100	3
SC BT 3.3	Course 1	3	06	20	80	100	3
SC BT 3.4	Course 2	3	06	20	80	100	3
SEC-T	Skill Enhancement course – T	2	06	10	40	50	$1^{1/2}$
	Semester – III Total	20	162	110	440	550	
	Semester - IV						
HC BT 4.1	Course 1	4	12	20	80	100	3
HC BT 4.2	Course 2	4	12	20	80	100	3
HC BT 4.3	Course 3	4	12	20	80	100	3
HC BT 4.4	Course 1 (Project)	6	120	50**	150***	200	3
SEC-P	Skill Enhancement course – P	2	06	10	40	50	$1^{1/2}$
	Semester – IV Total	20	152	70	480	550	
Semester I to IV Grand total		**80**	**638**	**440**	**1800**	**2200**	

Note: The Students shall study additional mandatory course, for which no assessment in I/II semester only
*10% of credits on total learning hours
#during 3rd and 4th Semester the department concerned may offer specialized soft courses with limited mobility.
HC-Hard Core, SC-Soft Core, EL-Interdisciplinary Elective, SEC-Skill Enhancement Course.

**** Viva Voce *** Dissertation**

Interdisciplinary Electives

INTERDISCIPLINARY COURSES FOR POST GRADUTE PROGRAMMES (OPEN ELECTIVES)

SL No	Department	Sub Code	I Semester	Sub Code	II Semester
1	KANNADA	ELK-01	ಆಧುನಿಕ ಕನ್ನಡ ಸಾಹಿತ್ಯದ ಇತಿಹಾಸ	ELK-02	ಪ್ರಾಚೀನ ಕನ್ನಡ ಸಾಹಿತ್ಯದ ಇತಿಹಾಸ
2	ENGLISH	ELE-01	Indian Literature -I	ELE-02	Indian Literature -II
3	HINDI	ELH-01	Vyavaharik Hindi Vyakaran	ELH-02	Hindi Cinema
4	TELUGU	ELT-01	Tilak	ELT-02	Telugu Samskruthi – Samaajam
5	HISTORY	ELHS-01	Ancient World Civilisations (Egypt, Mesopotamia, Greek, Roman, Inca, Chinese)	ELHS-02	Social Reform Movement in India
6	ECONOMICS	ELEC-01	Economic Policies of India Since 1991	ELEC-02	Institutions for International Development
7	POLITICAL SCIENCE	ELP-01	Local Government in India.	ELP-02	Indian Constitution
8	PUBLIC ADMINISTRATION	ELPA-01	Indian Polity-1	ELPA-02	Indian Polity-2
9	SOCIOLOGY	ELS-01	Invitation to Sociology	ELS-02	Study of Indian Society
10	JOURNALISM AND MASS COMMUNICATION	ELJ-01	Aspects of Journalism and Mass Communication - I	ELJ-02	Aspects of Journalism and Mass Communication - II
11	ANCIENT HISTORY AND ARCHEOLOGY	ELA-01	World heritage sites of India	ELA-02	Cultural History of Hoysalas
12	EDUCATION	ELED-01	Foundations of Education	ELED-02	Higher Education
13	COMMERCE	ELC –01	Personal Financial Planning	ELC –02	Entrepreneurship Development
14	MANAGEMENT	ELM –01	Disaster Management	ELM –02	E-Commerce
15	BIOCHEMISTRY	ELMBC –01	Basics of Bioinorganic and Biophysical chemistry for Biology graduates.	ELMBC –02	Basic Bioorganic chemistry for Biology graduates.
16	BIOTECHNOLOGY	ELMBT –01	Biotechnology Principles and applications	ELMBT –02	Fundamentals of Biotechnology
17	CHEMISTRY	ELMC –01	Open Elective I	ELMC –02	Open Elective II

18	CLINICAL NUTRITION AND DIETETICS	ELMCND –01	Healthy lifestyles and nutrition	ELMCND–02	Nutraceuticals and health foods
19	COMPUTER SCIENCE	ELMCS –01	Mobile App Development	ELMCS –02	E-Commerce
20	ENVIRONMENTAL SCIENCE	ELMES –01	Basics of Environmental Science	ELMES –02	Advances in Environmental Science
21	GEOGRAPHY	ELMG –01	Introduction to Physical Geography	ELMG –02	Geography of Karnataka
22	MATHEMATICS	ELMM –01	Fundamentals of Mathematics	ELMM –02	Combinatorics and Graph Theory
23	MICROBIOLOGY	ELMMB –01	Microbial World and Microbial Diversity	ELMMB –02	Microbes in Sustainable Agriculture and Development
24	PHYSICS	ELMP –01	Mechanics	ELMP –02	Waves and Optics
25	PSYCHOLOGY	ELMPSY –01	Introduction to Psychology	ELMPSY –02	Psychology in Everyday Life
26	INFORMATION TECHNOLOGY	ELMIT –01	Green Computing	ELMIT –02	E-Commerce
27	BOTANY (NEW)	ELMBOT –01	Plant-Microbe Interactions	ELMBOT – 02	Plant Diversity and Human Welfare
28	ZOOLOGY (NEW)	ELMZ –01	Parasites Vectors & communicable diseases	ELMZ–02	Essential of Reproductive Health
29	FOOD AND NUTRITION SCIENCES	ELMFNS –01	Food Psychology	ELMFNS –02	Nutritional Management in Disaster Conditions

Note:

A. I and II Semester Open elective (Interdisciplinary Electives) syllabus are attached in Annexure – I and Annexure - II respectively.

B. The Students may contact respective department chairperson in case of any queries regarding open elective course. The contact details available in the university website.

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SYLLABUS

HC-BT 1.1 Cell Biology & Genetics

Cell Biology

1. Study of Structure, composition and functions of Prokaryotic and Eukaryotic cells.

2. Plasma membrane structure and functions, membrane models.

3. Components of Blood & their functions (Plasma, RBC, WBC, Platelets).

4. Extracellular matrix (collagen, proteoglycans, fibronectin, lamins).

5. Cytoskeleton- Actin filaments, actin binding proteins, Intermediate filaments, Microtubules, MAPs, Structure and functions of cilia and flagella

6. Transport across membrane- passive diffusion, osmosis, active transport, Ion Channels, A B C transporters, Na+ and K+ pump, Ca2+ ATPase pump, co-transport, symport, antiport, endocytosis and exocytosis.

7. Cell to cell interactions, Cell adhesion-integrins, selectins, cadherins. Cell Junction- Tight and gap junctions, Desmosomes, plasmodesmata. General principles of cell signaling, signaling via G-protein coupled receptors, kinase receptors, role of secondary messengers

8. Molecular events of cell division and cell cycle, regulation of cell cycle events- Cyclins, Cyclin dependent kinases, inhibitors. Apoptosis, necrosis.

Genetics

9. **Introduction to Science of Inheritance:** Model genetic organisms. Life history and inheritance pattern in bacteriophage (T4), Fungi (Neurospora), Algae (Chlamydomonas), Bacteria (E. coli), Plant (Arabidopsis), Caenorhabditis, Drosophila, Zebra fish, Mouse
10. **Mendel's principles:** Mendel and his laws, Applications of laws and probability tests. Chi-square test and its application in the analysis of genetic data. Pattern of inheritance in haploid and diploid organisms. Extension of Mendelism- alleles, allelic variation and genetic factor dominant relationship, basis of dominant and recessive inheritance. Multiple alleles and allelic series, lethal alleles, penetrance and expressivity. Inheritance of genes. Pleiotropy.
11. **Chromosomal basis of inheritance:** Concepts and evidences, Sex linked inheritance in Drosophila and man. Sex chromosomes, Sex determination. Multiple sex chromosomes, Sex linked and sex- limited traits.
12. **Linkage and crossing over:** Concept, Genetic recombination and construction of genetic map. Genetic and linkage map in Drosophila, Neurospora, algae and plants. Interference and coincidence. Mitotic recombination.

13. **Non-Mendelian inheritance / Extranuclear genes:** Maternal inheritance, Extra nuclear inheritance in Neurospora, Chlamydomonas, Paramecium, Yeast, Drosophila and Man, Mitochondrial genomes, Chloroplastgenomes, Transposable genetic elements.

14. **Somatic cell genetics:** Cell-cell hybridization, cell hybrids, mapping of genes by cell hybridization methods, Mapping by in-situ hybridization.

15. **Behavioral Genetics:** Methodology, Type and examples, Genetic basis of behavioral traits in Drosophila, Mice and Humans.

16. Transposable genetic elements:

Discovery and definition of transposons, simple transposons (IS elements), composite transposons (Tn3, Tn5), Ac/Ds elements in maize, P elements in *Drosophila*, Retrotransposons, mechanisms of transposition. Transposition - Transposable genetic elements in prokaryotes and eukaryotes; Mechanisms of transposition; Role of transposons in mutation.

HC-BT 1.2 Biological Chemistry

1. Classification of Carbohydrates: Mono, di, oligo and polysaccharides. Classification of monosaccharides. Deoxy sugars, amino sugars, Muramic and Nuraminic acids.

2. Disaccharides: Sucrose, Maltose, etc. Homo-polysaccharides: Cellulose, Starch, Glycogen, etc. Hetero-polysaccharides: Hyaluronic acid, Chondroitin sulphates, Heparin, Peptidoglycan, Blood group polysaccharides.

3. Metabolism of Carbohydrates: Glycogen metabolism-synthesis and breakdown, Glycolysis and gluconeogenesis, TCA cycle and its regulation, pentose phosphate pathway.

4. Bioenergetics: organization of respiratory chain (ETC) complexes. Proton motive force, Mitchell's hypothesis, Mechanism of ATP synthesis. Photosynthesis: photo systems I and II, light harvesting antennae complex, C3 and C4 cycle.

5. Amino acids and Peptides: Chemistry and classification of amino acids. Peptide bond and its features, Ramachandran plot, Biologically important peptides

6. Secondary structures: α-helix, β-sheets. Helix supporting and disrupting amino acids. Factors stabilizing secondary structure.

7. Tertiary and Quaternary structure of proteins–Globular proteins, Fibrous proteins. Factors stabilizing tertiary and quaternary structures of proteins. Protein denaturation and renaturation.

8. Amino acid degradation – Transamination, Deamination, Decarboxylation, Basic glutamine and glutamic acid pathways, Urea cycle, In-born errors of amino acid metabolism.

9. Classification and nomenclature- Simple lipids- oils, fats, waxes, Compound lipids- Phospholipids Glyco-lipids and Sphingo lipids. Gangliosides and Cerebrosides.

10. Fatty acids, structure and their physical properties. Chemical properties. Iodine number, saponification value, acid number, rancidity. Derived lipids

11. Beta oxidation of Fatty acids-activation, transport to mitochondria, Beta
Oxidation reactions. Oxidation of unsaturated fatty acids. Alpha and omega oxidation.

12. Biosynthesis of saturated and unsaturated fatty acids and branched chain fatty acids. Cholesterol biosynthesis and its regulation. Biological functions of Eicosanoids

13. Structure and chemistry of nucleosides and nucleotides. Physicochemical properties of nucleic acids, Hypo- and Hyper-chromicity, Melting of DNA, Tm, Factors affecting Tm, Cot-curve and its applications, Chargoff's rule.

14. Secondary structure of DNA, Watson and Crick model. Comparative study of A, B and Z DNA structures and folding of DNA. Types of RNA and cloverleaf structure of t-RNA.

15. Nucleotide metabolism: Biosynthesis of purines and Pyrimidines- De novo and salvage pathways. Regulation of biosynthesis of nucleotides.

16. Degradation of Purine and Pyrimidine nuleotides. Metabolic disorders of nucleotide metabolism- Gout, Lesch-Nyhan Syndrome.

SC-BT 1.3 (A): Biochemical Techniques

1. General principle of chromatographic techniques, Paper chromatography: a) Ascending b) Descending c) circular d) Two dimensional.
2. TLC: Qualitative and quantitative. Adsorption, Ion Exchange, Gel filtration chromatography,
3. Affinity Chromatography, GLC, Chromatofocussing, HPLC and RP–HPLC
4. Microscopic techniques- Microscopy, types, simple and compound microscope.
5. Polyacrylamide gel electrophoresis, SDS-PAGE, 2D-electrophoresis and Agarose gel electrophoresis Visualizing separated macromolecules – staining, fluorescence, PAS staining, zymogram and reverse zymogram,
6. Iso-electric focusing, pulsed field electrophoresis, high voltage electrophoresis, capillary electrophoresis, isotachophoresis
7. Electrodes: Hydrogen electrode, oxygen electrode potential, oxidation and reduction red-ox potential
8. Spectroscopic **techniques**: Beer-Lambert's Law and its limitations, Extinction coefficient, Principles& Applications: Colorimeter, UV-Vis Absorption spectroscopy, Fluorescence Spectroscopy, Mass spectrometry, X-ray crystallography.

9. **Centrifugation:** Basic principles of sedimentation, types of centrifuges and rotors. Preparative Centrifugation – Differential and Density gradient, Analytical Centrifugation - application and design.
10. Optical system, Schliren optics. Raleigh scattering, Svedberg's constant, Molecular weight determination- sedimentation velocity and sedimentation equilibrium. Preparation of gradients: Continuous and Discontinuous gradients ($CsCl_2$, Sucrose, Percol.)
11. **Cell fractionation techniques**: Cell lysis, homogenization, extraction, salting in, salting out, dialysis and ultra -filtration. Isolation of cell organelles
12. Isotopes, Types of radioactive decay, Units of radioactivity, Detection and measurement of radioactivity: Methods based on gas ionization (Geiger-Muller counter), and Excitation (Scintillation counting) methods. Applications of radioisotopes in biological sciences

SC-BT 1.4 (A) -Biostatistics

1. Introduction to Bio-Statistics, basic concepts,. Need for statistical techniques in biological applications. Concept of statistical population and sample.

2. Types of data: Discrete, Continuous, Frequency and non-grouped data, nominal, ordinal, interval, ratio, time series data, Primary data (designing a questionnaire schedule), Secondary data (major sources including some government publications). Construction of frequency tables (with one or more factors),

3. **D**iagrammatic and graphical representation of grouped data, frequency and cumulative frequency distributions and their applications, Histogram, frequency curve, ogives, stem-and-leaf plots, box-plots.

4. Measures of location: Arithmetic mean, median, mode and their properties, and Quartiles

5. Measures of dispersion: Absolute and relative measures of dispersion: range, quartile deviation, mean deviation, standard deviation, coefficient of variation and their properties.

6. Correlation**:** Bi-variate data, Scatter diagram, Karl Pearson's correlation coefficient, Spearman's rank correlation coefficient.

7. Regression*:* Simple linear regression and its properties, fitting linear regression line.

8. Elements of probability**:** Random experiments, sample space, events, related results. Classical, empirical, and axiomatic approaches to probability. Properties of probability. Illustrations and applications. Addition rules of probability and some simple examples.

9. Probability distributions: Random variables-discrete and continuous. Standard probability distributions-binomial, Poisson and Normal distributions with few simple problems.
10. Statistical Inference: Estimation, standard error, confidence interval for means and proportion.
11. Testing of hypothesis: basic concepts and definitions, types of errors. Tests based on normal, student's 't', chi-square and F- distributions, interpretation of 'p' value.

SC-BT 1.3 (B) Enzymology

1. Introduction, nomenclature and Classification of enzymes,
2. Factors affecting enzyme activity-Temperature- (Free energy changes), pH, Substrate concentration and inhibiters
3. Enzyme Kinetics: Rate of a reaction, order, Michaelis-Menten equation, initial velocity and steady state approach. Vmax and Km, linear transformation of MM equation- LB plot.
4. Enzyme inhibition-Competitive, Uncompetitive, non-competitive, mixed, partial, substrate inhibition, suicide inhibition, determination of Ki
5. Molecular mechanism of enzyme action: Mechanism of action of chymotrypsin & ribonuclease.
6. Allosterism: Co-operativity-positive and negative co-operativity, Sigmoidal kinetics, MWC and KNF models, ATCase& Haemoglobin
7. Bisubstrate enzyme catalyzed reactions, Cleland notation with example for ordered, ping pong and random ordered reactions. General rate equilibrium.
8. Multienzyme complexes-PDC and fatty acid synthetase complex; Multifunctional enzymes –DNA polymerase and others.
9. Immobilization of enzymes and commercial applications of immobilized enzymes
10. Isoenzymes: Lactate dehydrogenase.
11. Application of enzymes: In medicine- as analytical agents, enzymes as markers for diagnosis. Enzymes In industry - Food and beverage, detergent, textile pharmaceutical and leather
12. Co-enzymes-NAD, NADP, Coenzyme A, FMN, FAD and cyclic nucleotides.

SC-BT 1.4 (B) Hormones and Cell Signalling

1. An overview of mammalian endocrine system: Location, structure and functions of different endocrine glands. Major endocrine disorders

2. General classes of chemical messengers: Paracrine, autocrine exocrine. Secretions – peptide, amino acid derivatives

3. Steroid hormones, growth stimulating factors,

4. Chalcones, eicosanoids, pheromones and the cell regulators

5. Mechanism of hormone action at cellular and molecular levels: Hormone receptors – surface and intracellular

6. Mechanism mediated by secondary messengers- G-protein, c-AMP, IP3, DAG, Ca2+
Mechanism mediated by receptor- tyrosine kinase; mechanism mediated through genomic transcription (steroid hormones)

7. Biomedical applications of hormones: Chemical / bio-technological, synthesis by recombinant technology- Thyroxin, catecholamine, insulin, growth hormone.

8. Biosynthesis of steroid hormones and their applications in human diseases. Anabolic steroids and their abuse

9. Hormones in contraception. Hormones in treating infertility. IVF and test tube baby

10. Commercial application of hormones and pheromones: Use of hormones in poultry, dairy and agriculture and in pest control

11. Hormones in plants and their applications: Auxins, gibberellins, Cytokinins, ABA, ethylene and jesmonats,

12. Growth promoting factors- and their role in agriculture and plant tissue culture.

M.Sc. (SECOND SEMESTER)

HC- BT-2.1 GENERAL MICROBIOLOGY

Basic concepts– Spontaneous generation, Germ theory of diseases, Cell theory. Contributions of Antonie van leuwenhoek, Joseph Lister, Robert Koch, Louis Pasteur, Edward Jenner, John Tyndall, Sergei N. Winogradsky, Selman A waksman, Alexander Flemming, Paul Erlich, Fannie Hesse, Elie Metchnikoff, Kary Mullis.

Development of pure culture methods. Cell ultra-structure: Peptidoglycan structure and synthesis. Cytoplasmic matrix and components: Inclusion bodies.

Sterilisation and disinfection- Definitions, Principles. Methods of sterilization- Physical methods (Heat, Filteration), Radiation and Chemical methods. Control of sterilization and Testing of sterility.

Microscopy – Principles, Light microscope, Phase Contrast, Dark field, Bright field, Fluorescent, Interference microscope (Stereo microscope), Confocal, Inverted microscope, and Electron microscope (TEM and SEM).

Measurement of Microorganisms- Micrometry. Staining- Simple, Gram staining, Negative staining, Capsule staining, Spore staining, Flagellar staining, Nuclear staining and Acid fast staining.

Microbiological media, composition and types: selective and differential media Growth curve and growth kinetics. Influence of environemental factors for microbial growth. Microbial nutrition, nutritional types, growth and metabolism.

Estimation of Microbes- Direct Microscopic count, Turbidometric assay, TVC- Indirect Method- CO_2 liberation- Protein estimation- Maintenance and Preservation of cultures

Microbial Taxonomy

Microbial classification:

Three domain system of classification, Phylogenetic Relationships, Code for bacterial nomenclature and taxonomy, Criteria for microbial classification-morphological, staining techniques, biochemical methods, serological techniques, phage typing, fatty acid profiles,Flow cytometry, DNA base composition, DNA fingerprinting, rRNA sequence, Nucleic acid hybridization, Numerical Taxonomy, Chemotaxonomy, Classification of bacteria according to Bergey‟s Manual of systematic Bacteriology, Dichotomous keys, Cladograms, dendrograms, universal phylogenetic tree. Archaea: Halophiles, Methanogens, Hyperthermophilic archae.

Virus and bacteriophages, general properties of viruses, viral structure, sub-viral particles – viroids and prions.

Microbial diversity

Prokaryotic Microorganism- General properties, Structure, and Reproduction: Domain Bacteria: Proteobacteria (Alpha, Beta, Gamma, Delta and Epsilon Proteobacteria), Cyanobacteria, Chlorobium, Firmicutes, Actinobacteria, Chlamydiae, Spirochaetes, Bacteroidetes, Fusobacteria. Domain Archea: Crenarchaeota, Euryarchaeota.

Eukaryotic Microorganisms- General characters, Structure and Reproduction: Fungi (Saccharomyces), Algae (Spirulina), Protozoa (Plasmodium), Slime molds (Physarum)

Microbes and environment: Nutrient cycles; microbial communication system; quorum sensing, microbial fuel cells; prebiotics and probiotics.

Beneficial and Harmful effects of Microorganism

Beneficial aspects of microbes and their metabolites in dairy and food industry,Role of microbes in Environmental safety.

Important microbial diseases of Plants caused by fungi, bacteria and viruses. Important infectious diseases of humans, caused by bacteria, protozoa and viruses - tuberculosis, malaria, AIDS, rabies. Pathogenic fungi, emerging and resurgent infectious diseases.

HC- BT-2.2 MOLECULAR BIOLOGY

History of molecular biology, DNA and RNA as genetic materials, experiments of Griffith, Avery, Macleod and McCarty. Hershey and Chase, Leaderberg and Tatum, topoisomerases;
Replication of DNA: Bidirectional and unidirectional replication, semi-conservative, semi-discontinuous replication, Mechanism of DNA replication: Enzymes and proteins involved in DNA replication –DNA polymerases, DNA ligase, primase, telomerase – for replication of linear ends.
Transcription - Definition, promoter - concept and strength of promoter. Mechanism of transcription
Translation - Genetic code, Translational machinery, Charging of tRNA, aminoacyl tRNA synthetases, Mechanisms of initiation, elongation and termination of polypeptides.
Regulation of gene Expression: Principles of transcriptional regulation, regulation at initiat ion with examples (lac and.
Mutation: Mutations and mutagenesis: Definition and types of Mutations; Physical and chemical mutagens; Uses of mutations, DNA repair mechanisms
Mechanisms of Genetic Exchange: Transformation - Discovery, mechanism of natural competence Conjugation - Discovery, mechanism, Hfr and F' strains
Transduction - Generalized transduction, specialized transduction
Prokaryotic transposable elements – Insertion Sequences, composite and non-composite transposons, Replicative and Non replicative transposition, Uses of transposons and transposition.

SC- 2.3 (A) - Immunotechnology

Immune system: Structure, functions and organization of cells and organs involved in immune systems
T cells, B-cells, macrophages, Eosinophils, Neutrophils, Mast cells; bone marrow, spleen, thymus, lymph node, peyer's patch.
Infections and immune responses – Innate immunity, acquired immunity; clonal nature of immune response. Immunohaematology – blood groups antigens, blood transfusion and Rh incompatibilities.
Antigens and antibodies- Types of antigens, haptens, adjuvants, antigenic specificity. Structure of immunoglobulins, heterogeneity, sub-types – iso-, allo- and idio- types and their properties. Antibody diversity (immunological diversity)
Block-2.3B
Complements: Structure, components, properties and functions of complement pathways; biological consequences of complement activation
Effector mechanism: Development of T and B cells, Subsets of T and B cells. T-helper cells, T-killer cells, T-suppressor cells. T and B cell receptors, antigen processing and presentation.

Cytokines and co-stimulatory molecules, Lymphokines and interleukins structure, functions of IL-1B, IL-2 and TNFα. T and B interaction. Tumor immunology-tumor associated antigens, factors favoring tumor growth, immune surveillance. Tumor necrosis factors α and β.
Immunoglobulin gene- immunoglobulin diversity, gene rearrangement and other mechanisms, clonal selection theory of Burnet

Block-2.3C
MHC-MHC gene and its polymorphism, role of MHC in immune response and transplantation Transplantation- Autograft, isograft, allograft and Xenograft. Graft rejection, the reaction b/t graft and host tissue.
Autoimmune diseases– Hashimoto's disease, Systemic lupus erythematosis, and Rheumatoid arthritis. Hyper sensitivity reactions (Type I, II, III and IV).
Immuno deficiency disorders; inborn, T and B-cells related disorders, complement deficiencies, Phagocytic cell defects and acquired-HIV.
Vaccines- adjuvants, Vaccines and their preparations. Polyclonal and monoclonal antibodies, Hybridoma technique. *In vitro* antigen-antibody reaction, precipitation, agglutination, immunodiffusion, immuno-electrophoresis, immunofluorescence, RIA, and ELISA.

SC BT 2.4 (A) FERMENTATION TECHNOLOGY

General Principles of Fermentation Bioreactors: Bioreactor types, immobilized bioreactors, types of fermentation.
Growth kinetics and Monod's Model, Substrate accelerated death, specific growth rate, stringent response,
Ntr and Pho system, growth limiting substrate, maintenance energy, growth yield and product formation.
Process optimization: factors of optimization, rheology of fermentation fluid, oxygenation, and oxygen transfer kinetics. chemostat, turbidostat.
Downstream Processing and scale up. Downstream processes: types of processing units and systems,
Storage and packaging methods. Scale up; scale down, criteria involved in scale up.
Productivity, power requirements Basic control theory.
Industrial Fermentation Products Biofuels:-Ethanol, Hydrogen, Methane Antibiotics:-β-lactum antibiotics (Synthetic penicillin), Streptomycin, Cephalosporin.
Biopreservative: Lactobacillus sakei. Biopolymers:- Xanthan, Polyhydroxyalkanotes
Thermostable enzymes:-Proteases. Biosurfectants: a comparative account. Food and Healthcare products SCP, various types and processes. Carotenoides Aminoacids:-Lysine, Glutamic acid. Vitamins:-riboflavin,Vit.B12. Fatty acids (Palmetate, oleate).

SC BT 2.3 (B) Microbial Biotechnology

Microbial biotechnology: Scope and its applications in human therapeutics, agriculture (Biofertilizers, PGPR, Mycorrhizae), environmental, and food technology.

Use of prokaryotic and eukaryotic microorganisms in biotechnological applications Genetically engineered microbes for industrial applications: Bacteria and yeast

Recombinant microbial production processes in pharmaceutical industries - Streptokinase, recombinant vaccines (Hepatitis B vaccine).

Microbial polysaccharides and polyesters, Microbial production of bio-pesticides, bioplastics Microbial biosensors

Microbial based transformation of steroids and sterols. Bio-catalytic processes and their industrial applications: Production of high fructose syrup and production of cocoa butter substitute

Microbial product purification: filtration, ion exchange & affinity chromatography techniques

Immobilization methods and their application: Whole cell immobilization. RNAi and its applications in silencing genes, drug resistance, therapeutics, and host pathogen interactions

Bio-ethanol and bio-diesel production: commercial production from lignocellulosic waste and algal biomass,

Biogas production: Methane and hydrogen production using microbial culture.

Microorganisms in bioremediation: Degradation of xenobiotics, mineral recovery, removal of heavy metals from aqueous effluents

SC BT 2.4 (B) BIOINFORMATICS

Introduction to Information technology, information types, sources of data.

Computer networking LAN, WAN, internet and resource sharing.

Biological data bases, tools for bioinformatics and molecular visualization software.

Protein databases - Alignment, multiple alignment, search for motifs, prediction methods.

Protein Structure : Introduction to protein structure - secondary

structure prediction, tertiary structure prediction, protein modelling- principles of homology and comparative modelling.

Classification of protein families based of bioinformatics. Prediction of trans-membrane regions and molecular modelling.

Nucleotide sequence analysis of nucleic acids. Tools and methods.

Single nucleotide polymorphism.

Molecular phylogenetic tree construction.

Annexure I

INTER- DISCIPLINARY COURSE
(Open Elective) for First Semester

ವಿಭಾಗ– ಕನ್ನಡ

ಪತ್ರಿಕೆ–೬: ಆಧುನಿಕ ಕನ್ನಡ ಸಾಹಿತ್ಯದ ಇತಿಹಾಸ EL 1.1 (ಕ್ರೆಡಿಟ್–೩)

ಬ್ಲಾಕ್–೧೯: ಆಧುನಿಕ ಕನ್ನಡ ಸಾಹಿತ್ಯದ ಮುಖ್ಯ ಘಟ್ಟಗಳು

ಘಟಕ–೭೩: ಆಧುನಿಕ ಕನ್ನಡ ಸಾಹಿತ್ಯದ ಹಿನ್ನೆಲೆ ಮತ್ತು ಪ್ರೇರಣೆಗಳು.

ಘಟಕ–೭೪: ನವೋದಯ ಪೂರ್ವ, ನವೋದಯ– ಬಿ.ಎಂ.ಶ್ರೀ., ಕುವೆಂಪು, ದ.ರಾ.ಬೇಂದ್ರೆ, ಶಿವರಾಮಕಾರಂತ, ಮಾಸ್ತಿವೆಂಕಟೇಶ್ ಅಯ್ಯಂಗಾರ್, ಕೆ.ಎಸ್. ನರಸಿಂಹಸ್ವಾಮಿ.

ಘಟಕ–೭೫: ಪ್ರಗತಿಶೀಲ ಮತ್ತು ನವ್ಯ: ಅನಕೃ, ಕಟ್ಟೀಮನಿ, ನಿರಂಜನ, ಚದುರಂಗ, ವಿ.ಕೃ. ಗೋಕಾಕ, ಅಡಿಗ, ಜಿ.ಎಸ್. ಶಿವರುದ್ರಪ್ಪ, ಶಾಂತಿನಾಥ ದೇಸಾಯಿ, ಅನಂತಮೂರ್ತಿ, ಯಶವಂತ ಚಿತ್ತಾಲ, ಲಂಕೇಶ್, ತೇಜಸ್ವಿ, ವೈದೇಹಿ, ವೀಣಾ ಶಾಂತೇಶ್ವರ, ವಿಜಯಾದಬ್ಬೆ.

ಘಟಕ–೭೬: ಬಂಡಾಯ ಮತ್ತು ದಲಿತ:

ಬರಗೂರು ರಾಮಚಂದ್ರಪ್ಪ, ಬಿ.ಟಿ. ಲಲಿತಾನಾಯಕ, ಸಾರಾ ಅಬೂಬಕ್ಕರ್, ದೇವನೂರು ಮಹಾದೇವ, ಸಿದ್ಧಲಿಂಗಯ್ಯ, ಅರವಿಂದ ಮಾಲಗತ್ತಿ, ಮೊಗಳ್ಳಿ ಗಣೇಶ.

ಬ್ಲಾಕ್–೨೦: ಆಧುನಿಕ ಕನ್ನಡ ಕಾವ್ಯ ಮತ್ತು ಸಾಹಿತ್ಯ ಪ್ರಕಾರಗಳು

ಘಟಕ–೭೭: ಕಾವ್ಯ ಪ್ರಕಾರಗಳು: ಭಾವಗೀತೆ, ಸುನೀತ, ಶೋಕಗೀತೆ, ಪ್ರಗಾಥ.

ಘಟಕ–೭೮: ಕಥನ ಕಾವ್ಯ, ಖಂಡ ಕಾವ್ಯ, ಮಹಾಕಾವ್ಯ.

ಘಟಕ–೭೯: ಸಾಹಿತ್ಯ ಪ್ರಕಾರಗಳು: ಕಥೆ, ಕಾದಂಬರಿ, ನಾಟಕ ಜೀವನ ಚರಿತ್ರೆ.

ಘಟಕ–೮೦: ಲಲಿತ ಪ್ರಬಂಧ, ಆತ್ಮಕತೆ, ಪ್ರವಾಸ ಸಾಹಿತ್ಯ, ಸಂಪಾದನೆ, ವಿಚಾರ ಸಾಹಿತ್ಯ, ವಿಜ್ಞಾನ ಸಾಹಿತ್ಯ

ಪರಾಮರ್ಶನ ಗ್ರಂಥಗಳು

೧. ಹೊಸಗನ್ನಡ ಸಾಹಿತ್ಯ: ಎಲ್.ಎಸ್. ಶೇಷಗಿರಿರಾವ್, ಕನ್ನಡ ಸಾಹಿತ್ಯ ಪರಿಷತ್, ಬೆಂಗಳೂರು, ೧೯೯೨

೨. ಯುಗಧರ್ಮ ಮತ್ತು ಸಾಹಿತ್ಯ ದರ್ಶನ: ಕೀರ್ತಿನಾಥ ಕುರ್ತಕೋಟಿ, ಮನೋಹರ ಗ್ರಂಥ ಮಾಲೆ, ಧಾರವಾಡ, ೧೯೯೧

೩. ಕನ್ನಡ ಸಾಹಿತ್ಯ ಇತಿಹಾಸ: ರಂ.ಶ್ರೀ. ಮಗುಳಿ, ಗೀತಾ ಬುಕ್ ಹೌಸ್, ಮೈಸೂರು, ೨೦೧೮

೪. ಕನ್ನಡ ಸಾಹಿತ್ಯ ಸಂಗಾತಿ: ಕೀರ್ತಿನಾಥ ಕುರ್ತಕೋಟಿ, ಕನ್ನಡ ವಿಶ್ವವಿದ್ಯಾನಿಲಯ, ಹಂಪಿ, ಹೊಸಪೇಟೆ, ೧೯೯೫

೫. ಕನ್ನಡ ಸಾಹಿತ್ಯ ಸಂಗಾತಿ: (ಪ್ರ.ಸಂ) ಬರಗೂರು ರಾಮಚಂದ್ರಪ್ಪ, ಕರ್ನಾಟಕ ಸಾಹಿತ್ಯ ಅಕಾಡೆಮಿ, ೨೦೧೮

೬. ಕನ್ನಡ ಸಾಹಿತ್ಯ ಚರಿತ್ರೆ: ತ.ಸು. ಶಾಮರಾಯ, ತಳುಕಿನ ವೆಂಕಣ್ಣಯ್ಯ ಸ್ಮಾರಕ ಗ್ರಂಥಮಾಲೆ, ಮೈಸೂರು, ೨೦೧೪

೭. ಹೊಸಗನ್ನಡ ಕಾವ್ಯ ಪ್ರಕಾರಗಳು: ಪ್ರಧಾನ ಸಂಪಾದಕರು, ಎ.ರಂಗಸ್ವಾಮಿ, ಲೇ. ಮ. ರಾಮಕೃಷ್ಣ, ಪ್ರಸಾರಂಗ, ಕರಾಮುವಿ,

ಮೈಸೂರು, ೨೦೧೦

೮. ಆಧುನಿಕ ಸಾಹಿತ್ಯ ಪ್ರಕಾರಗಳು: ಪ್ರಧಾನ ಸಂಪಾದಕರು, ಎ. ರಂಗಸ್ವಾಮಿ, ಲೇ. ಡಾ. ಜಿ.ಆರ್. ತಿಪ್ಪೇಸ್ವಾಮಿ, ಪ್ರಸಾರಂಗ, ಕರಾಮುವಿ, ಮೈಸೂರು, ೨೦೧೦

DEPARTMENT - ENGLISH

EL-1.1: INTER- DISCIPLINARY COURSE-I (OPEN ELECTIVE)

INDIAN LITERATURE-I

OBJECTIVES

- To help to understand the contribution of Kalidasa to Sanskrit drama as a playwright
- To create an awareness of the importance of Shakuntala and Mrichhakatika as classical Indian texts
- To evaluate Lord Macaulay and Raja Ram Mohan Roy writers of English Prose.
- To introduce the role of Autobiographies in Indian writing in English

BLOCK –I
Kalidasa: Shakuntala
Shudraka: Mrichhakatika

BLOCK -II

Jawaharlal Nehru: An Autobiography
Ram Mohan Roy: Letter to Lord Amherst
Macaulay: Minutes on Indian Education
Vivekananda: Address to the Parliament of Religions

Suggested Reading:

- **M.K.Naik:** Critical Essays on Indian Writing in English. Sahitya Akademi, 1969.
- **Narasimhaiah. C.D:** The Swan and the Eagle. Indian Institute of Advanced Study, 1987.
- **Meenakshi Mukherjee:** The Twice Born Fiction. Heinemann Educational Publishers, 1972.
- **Chirantan Kulshrestha.** Contemporary Indian English Verse: An Evaluation. Arnold-Heinemann, 1981.

DEPARTMENT - HINDI

व्यावहारिक हिंदी एवं व्याकरण

वर्ण विचार

- वर्ण

- स्वर और उसका वर्गीकरण
- व्यंजन और उसका वर्गीकरण
- वर्णों का उच्चारण स्थान
- संधि
- समास

शब्द विचार

- शब्द के भेद
- अर्थ के आधार पर शब्द भेद
- व्युत्पत्ति के आधार पर शब्द भेद
- रचना के आधार पर शब्द भेद
- प्रयोग के आधार पर शब्द भेद
- विकारी और अविकारी शब्द भेद
- अव्यय
- संज्ञा और उसके भेद
- वचन- उसके भेद, वचन परिवर्तन के नियम
- लिंग- उसके भेद, लिंग परिवर्तन के नियम
- काल और उसके भेद
- कारक और विभक्ति- उसके प्रकार,
- सर्वनाम और उसके भेद
- विशेषण और उसके भेद
- क्रिया और उसके भेद
- क्रिया विशेषण और उसके भेद
- समुच्चय बोधक और उसके भेद
- संबंधबोधक और उसके भेद
- विस्मयादिबोधक और उसके भेद
- परसर्ग और उपसर्ग
- वाच्य और उसके प्रकार

वाक्य विचार

- वाक्य का अर्थ और परिभाषा
- वाक्य के प्रकार .... **आदि**

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DEPARTMENT - TELUGU

E. L. 1.1 Thilak Prathyeka Adhyayanam

Block - 1:Thilak Kavithvam - 1

Unit - 1:Amrutham Kurisina Raathri
Unit - 2:Thilak Padhya Kavithaa Vaibhavam
Unit - 3:Thilak Abhiruchulu - Alavaatlu
Unit - 4: Thapala bantrothu

Block - 2: Thilak Kavithvam

Unit - 1:Thilak Sahithya Parichayam - 1
Unit - 2: Thilak Sahithya Parichayam - 2
Unit - 3:Thilak vachana kavithaa Vaibhavam - 1
Unit - 4: Thilak Vachana Kavithaa Vaibhavam – 2

DEPARTMENT - HISTORY

ANCIENT WORLD CIVILIZATIONS

(Egypt, Mesopotamia, Greek, Roman, Inca, Chinese)

Objective: The course is aims to understand major world civilizations. It is to provide a global historical perspective of ancient world which special reference to Egypt, china, Greek, Roman, Inca civilizations.

Pedagogy: personal contact programmes, audio video programmes, online lectures Assignments, etc

Credits: 2.

Examination Duration: 11/2 hours and Maximum Marks:40

Course outcomes:

After completing this course the students should be able to

- Discuss the Egyptian and Mesopotamian civilizations.
- Analyse the political socio economic conditions of Greek Roman civilizations.
- Evaluate the Chinese contributions to ancient world.

Block – I

Unit-1

Egyptian Civilization: Importance of the Nile, Geographical importance, Gift of Nile, Political

conditions.

Unit-2

Social, Economic and religious conditions, Literature and learning, arts and architecture.

Unit-3

Mesopotamian Civilization, Sumer and Babylonian, Hammurabi's code, Society and Culture, Economic conditions, art and literature, Assyrian Empire.

Unit - 4

Greek Civilization, Political Organizations, the city, State, Alexander the Great, Greek political theory, Religion, Philosophy, art and architecture, Characteristic of Hellenistic Civilization.

Block – II

Unit - 5

Roman Civilization, The Land and the people, the Government, Roman Republic, Roman Empire, Roman Republic, The Empire, The Patricians and Plebeians, Punic wars.

Unit – 6

Julius Caesar, his wars, fall Augustus Caesar, Social Economic Conditions, Roman art and architecture.

Unit - 7

Painting, Sculpture, Roman Law, Roman Religion, Philosophy, Roman literature, Decline of the Roman Empire.

Unit - 8

Inca Civilisation, Socio – economic Political conditions, Chinese Civilisation, Socio – economic Political conditions.

Suggested readings:

1. Breasted,J.H. : Ancient Times, A History of the early world.
2. Rostovzeff,M.S. : History of Ancient World
3. Schvider.H : The History of Civilization
4. Swain.J.E. : A History of World Civilization
5. Breasted.J.H. : History of Egypt
6. Jastorow.M : The Civilization of Babylonia and Austria
7. Bury.J.E. & OTHERS: The Hellenistic Age
8. Bailey.C : The Legacy of Rome and others
9. Abot.F.F.: Society and Politics of Ancient Rome

DEPARTMENT – ECONOMICS

EL1.1: Economic Policies of India Since 1991.

- **Objective:** To enable the Students to understand the economic policies of India in the era of new economic policy.
- **Pedagogy:** A Combination of Lectures, Group Discussion, Assignments.
- **Credits:** 2 ; Examination Duration: $1^1/_2$and Maximum Marks: 50 (Internal Assessment Marks = 10 and Semester-end Examination =40)

Course Inputs

BLOCK – I: India's Economic Policies

UNIT : 1 Economic Policies in India Since 1991

Economic reforms in India – Economic Scenario in India during 1990-91 – Domestic Financial Crisis – Balance of Payment Crisis – Extent of External debt and debt Trap Problem.

UNIT : 2 Need for Reforms

Measures Taken – Devaluation – Privatization – Liberalization – Globalization.

UNIT : 3 Monetary Policy and Fiscal Policy

Narasimhan Committee on Banking and Financial Sector Reforms Since 1998 – Fiscal Reforms: Raja Chellaiah Committee and Tax Reform Policies – Fiscal Prudence and Policies.

UNIT : 4 Structural Adjustments and External Sector in India

Foreign Trade: Trends in Exports and Imports – Balance of Payment and its Crisis – Export Import Policy – In Defence of Import Substitution – Foreign Exchange Policy.

BLOCK : II FDI and the Role of State

UNIT : 5 Foreign Direct Investment (FDI)

Trends in FDI – FDI Policy – Its Impact on the Domestic Economy – Labour Migration: causes and Consequences on Indian Economy – Information and Communication Revolution and India.

UNIT : 6 Challenges to Development in India

Poverty – Unemployment – Poverty alleviation Programmes - urban Poverty and Problems – Income Inequality – Employment Generating Schemes.

UNIT: 7 The Role of State

Parallel Economy in India – Black Money – Corruption – Slams – Redefining the Role of the State and the Markets – Balance between Economic and Socio - Political Goals.

UNIT : 8 Administrative Reforms

Rights to Information – Measures Towards Good Governance – NITI Ayoga and aftermath – Digitalized India – Demonetization – GST – Make in India.

References:

1. Acharya Shankar, (2003) India's Economy: Some Issues and Answers, Academic Foundation, New Delhi.
2. Byres J Terence (Ed.,) (1999) The Indian Economy, Major Debates since Independence, OUP,New Delhi.
3. Datt Ruddar, (2002) Economic Reforms in India - A Critique, S.Chand and Co, New Delhi.
4. Kapila Uma (Ed) (2015) Indian Economy since Independence, Academic Foundations, New Delhi.
5. Kapila Uma, (2005) Understanding the Problem of Indian Economy, Academic Foundation, New Delhi.
6. Misra S.K. & V.K. Puri, (2011) Indian Economy-Its Development Experience**,** Himalaya Pub., House, Mumbai.
7. NCAER, Economic and Policy Reforms in India, NCAER, New Delhi.
8. Rangarajan C, (1998) Indian Economy- Essays on Money and Finance, UBSPD, New Delhi.

9. Sachs D.Jeffrey, A.Varshney & N Bajpai (Ed)(1999) India in the Era of Economic Reforms,OUP, New Delhi.
10. Vaidyanathan A, India's Economic Reforms and Development, OUP, New Delhi

DEPARTMENT - POLITICAL SCIENCE

(OEL-I) Local Government in India

Block-I

Unit:1 Meaning, Nature and Scope of Local Governments.

Unit:2 Evolution of Panchayat Raj Institution in India.

a) Constitute Assembly and Village Panchayat.
b) Balavanth Roy Mehta Committee Report
c) Ashok Mehta Committee Report.
d) G.V.K. Rao Committee Report.

Unit:3 Constitutional Amendments and Panchayat Raj Institutions:

a) Basis of Constitutional Amendment.
b) 73rd and 74th Constitutional Amendment.
c) Karnataka Panchayat Raj At of 1983.
d) Karnataka Panchayat Raj Act of 1993.

Unit:4 Zilla Panchayat: Structure, Functions and Sources of Revenue.

Block-II

Unit:5 Taluk Panchayat : Structure, Functions, Executive Officer, Powers and Functions.

Unit:6 Gram Panchayat: Gram Sabha, Ward Sabha: Structure, Functions and Sources of Revenue.

Unit:7 Panchayat Development Officer and Secretary: Powers and Functions.

Unit:8 Role of Panchayat Raj Institutions in Development (with Reference to Karnataka)

a) Panchayat Raj in Rural Development.
b) Social Change: Empowerment of the Weaker Sections.

References:

1. Verma B. M, Social justice and Panchayath Raj
2. Mutarib-M.A. and Others, Theory of Local Government,
3. Dr. Arjun darshankar, Panchayath Raj aani Nagari.
4. V. B. Patil, Pancayath Raj.
5. A.N. Kulkarni, Bharatiya Sthanik Swashasan,
6. Shantaram Bhosale, Bharatiya Sthanik Shasan,
7. Kikherji. S, Essays on Rural Development.
8. Balaramu. C. H. Administration of Anty Poverty Programmes.

9. 73rd Constitutional Amendment Act, Government of India, 1993.
10. Karnataka Panchayatraj Acts, 1985, 1995.

DEPARTMENT – PUBLIC ADMINISTRATION

INDIAN POLITY – I

BLOCK – 1

UNIT – 1 Indian Constitution. .

UNIT – 2 Preamble - Meaning and Importance.

UNIT – 3 Fundamental Rights and Duties.

UNIT – 4 Directive Principles of State Policy and Relation with Fundamental Rights.

BLOCK – 2

UNIT – 5 Indian Federalism and Parliamentary system of Government.

UNIT – 6 Centre - State Relations. Legislative Administrative and Financial

UNIT – 7 Union Executive - President Elections, Powers and Positions. .

UNIT – 8 Council of Ministers and Prime Ministers - Powers and Functions

DEPARTMENT - SOCIOLOGY

Invitation to Sociology

(02 Credits)

Course Description

This course introduces learners to the basic concepts of sociology. It is particularly designed to orient the learners from interdisciplinary background about the essence of sociology and intends to inculcate sociological imagination.

Course Objectives

- To introduce the learner to the basic concepts and processes of sociology
- to comprehend the structural and organizational aspects of society
- to examine the process of social change

Learning Outcomes and Competencies

After successfully completing the course, following outcomes and competencies are possible among the learners. Learner will have/can

- Conceptual precision and clarity about the basic sociological concepts
- Develop sociological imagination and apply to analyze the contemporary events
- explain major social processes of society
- analytical view about Indian social structure
- explicate major process of social change and can conceptualize the changing aspects of Indian society

Course Contents

Block-1 Basic Concepts and Processes

Unit-1 Emergence of Sociology-Factors and Early Thinkers-Sociological Imagination
Unit-2 Society, Community- Associations and Institutions- Culture and Socialization
Unit-3 Social System, Structure and Function
Unit-4 Social Processes-Cooperation, Competition, Conflict, Accommodation and Assimilation

Block-2 Social Organization and Social Change

Unit-5 Caste and Class System-Changes in Caste
Unit-6 Social Mobility and Types
Unit-7 Factors of Social Change
Unit-8 Process of Social Change in India (Sanskritization, Westernization, Modernization and Globalization)

References

1. Berger, Peter L. 1978. An Invitation to Sociology, Allen and Unwin, London. Davis, Kingsley. Human Society, Macmilan, New Delhi.
2. Dumont, Louis, 1988, Homo Hierarchicus. Oxford University Press. Giddens, Anthony. 2009. Sociology. Politi Press, Malden.
3. Inkles, Alex. 2002. What is Sociology, Prentice Hall India, New Delhi. Jayaram, N, 1990, Introductory Sociology, Macmilan, New Delhi.
4. Johnson Harry M., 2011: Sociology: A Systematic Introduction: Allied Publishers, New Delhi.
5. MacIver, R.M and C.H. Page. Society - Introduction to Sociology, Macmilan, New Delhi
6. Samuel, Koenig. 1957. Sociology: An Introduction to Science of Society, Barnes & Nobel Books, London.
7. Singh, Yogendra. 1993: Social Change in India: Crisis and Resilience, Har-Anand, New Delhi.

DEPARTMENT – ANCIENT HISTORY AND ARCHEOLOGY

AHA
OE 1.1

World Heritage Sites of India

Block - 1	**Introduction**
Unit - 1	Nature - Scope - Criteria for incorporation of World Heritage sites
Unit - 2	Types of World Heritage sites in India
Block - 2	**Archaeological and Cave Heritage sites**
Unit - 3	Bimbetka - Sanchi- Nalanda – Champaner - Dholavira
Unit – 4	Ajanta – Ellora - Elephant
Block - 3	**North Indian World Heritage Sites**
Unit – 5	Bodh Gaya — Kajuraho–Konarak–Rani kivav– Jaipur,
Unit – 6	Agra Fort – Red Fort - FathepurSikri–Taj Mahal – Humayun's Tomb – Ahamadabad, Qutub Minar
Block - 4	**South Indian World Heritages Sites**
Unit – 7	Mahabalipuram – Pattadakallu – Chola temples
Unit - 8	Monuments of Hampi – Churches and Convents of Old Goa – Ramappa Temple

References:

1. Marco Canneo, Jasmina: The world heritage sites of UNESCO – The Treasure of Art
2. ASI: World Heritage Sites Series
3. Individual guide: Books on respective city Individual

DEPARTMENT - EDUCATION

IDC – 1 FOUNDATIONS OF EDUCATION

BLOCK-1 FOUNDATIONS OF EDUCATION – I

Unit-1 Philosophical Foundations
Unit-2 Basic Concepts of Philosophy
Unit-3 Psychology as a Science
Unit-4 Basic Concept in Psychology related to Education

BLOCK-2 FOUNDATIONS OF LEARNING – II

Unit-5 Sociological bases of Education
Unit-6 Educational Issues in Indian Society

Unit-7 Cultural and Historical Foundations
Unit-8 Political and Economic bases of Education

References:

1. Harison and Myers (1970), Education, Manpower and Economic Growth, McGrothill, Oxfords, IBH Publishing Co., New Delhi.
2. Kamala Bhatia & Baldev Bhatia, (1974) The Philosophical and Sociological Foundations of Education, Doaba House, New Delhi.
3. Bhatia B.D, (1974), 'Theory and Principles of Education, Doaba House, Delhi'.
4. Sorokim .P, (1947) 'Society, Culture and Personality', Harper and Brothers Publishers, New York.

DEPARTMENT – COMMERCE

EL1.1: Personal Financial Planning

Objective: To enable the Students to understand about the different Investment Avenues, Saving Schemes designed by various agencies particularly for the individuals.
Pedagogy: A Combination of Lectures, Group Discussion, Assignments.
Credits: 2
Examination Duration: $1\frac{1}{2}$ and Maximum Marks: 50

(**Internal Assessment Marks** = 10 and Semester-end Examination =40)

Course Inputs

Block I

- **Unit -1: Introduction to Financial Planning:** Introduction - The Process Financial Planning – Client Interactions – Time Value of Money Applications – Personal Financial Statements – Cash Flow ad Debt Management – Planning to Finance Education.
- **Unit -2: Financial Planning Process:** Introduction - Setting Goals – Informal Budget Preparation – Investment Opportunities – Financial Vs Physical Investments – Role of a Financial Planner.
- **Unit -3: Savings Plans:** Introduction - Setting Goals – Savings Instruments – Savings Plan – Tax Savings Schemes.
- **Unit -4: Investment Planning:** Introduction - Risk Return Analysis – Mutual Fund – Derivatives – Asset Allocation – Investment Strategies and Portfolio Construction and Management.

Block II

- **Unit -5: Risk Analysis and Insurance Planning:** Introduction - Risk Management and Insurance Decision in Personal Financial Planning – Various Insurance Policies and Strategies for General Insurance – Life Insurance – Motor Insurance – Medical Insurance.
- **Unit -6: Retirement Planning and Benefits:** Introduction - Retirement Need Analysis Techniques – Savings and Investment Plans for Retirement –Employee Provident Fund – Public Provident Fund – Superannuation Fund – Gratuity – Annuity Plans.
- **Unit -7: Tax Planning:** Introduction - Income-tax Computation for Individuals – Companies - Trust and other bodies – Statutory Provisions Pertaining to Capital Gains and Indexation – House Property – Deduction and Allowances.
- **Unit -8:Health Financing:** Introduction - Health Financing Models – Financing of Health in India – National Rural Health Mission – Challenges of Access to Health Care and Service Quality – Health Insurance Mechanism & Financial Protection.

Books Recommended for Reference

01. Khan M.Y, Financial Services, Tata MacGraw Hill.
02. Singhanar V.K, Students' Guide to Income Tax, Taxmann.
03. Ranganathan andMadhuamathi, Investment Analysis and Portfolio Management, Pearson Publications.
04. Gordon and Natarajan, Emerging Scenario of Financial Services, Himalaya Publishing House.
05. George Rejda, Principles of Risk Management and Insurance, Pearson.

DEPARTMENT - MANAGEMENT

COURSE: OE-1 : Disaster Management - Credit: 2

MBAS 459: DISASTER MANAGEMENT

Objectives	: The course aims at familiarizing the students with the concepts of disaster management, need for disaster management and its relevance.
Pedagogy	: Lectures, assignments, Industrial visits and practical exercises, discussions.

1. Understanding Disasters · Meaning, nature, characteristics and types of Disasters, Causes and effects, Disaster: A Global View, Disaster Profile of India, The Disaster Management cycle.
2. Geological and Mountain Area Disasters · Earthquakes · Volcanic Eruption · Landslides Snow Avalanches, Wind and Water Related Natural Disaster · Floods and Flash Floods · Droughts · Cyclones · Tsunamis, Man Made Disasters · Understanding Man-Made Disasters · Fires and Forest Fires · Nuclear, Biological and Chemical disaster · Road Accidents
3. Introduction to disaster Preparedness · Disaster Management: Prevention, Preparedness and Mitigation · Disaster Preparedness: Concept & Nature · Disaster Preparedness Plan · Disaster Preparedness for People and Infrastructure · Community based Disaster Preparedness Plan
4. Roles & Responsibilities of Different Agencies and Govt. · Roll of Information, Education, Communication & Training · Role and Responsibilities of Central, State, District and local

administration. · Role and Responsibilities of Armed Forces, Police, Para Military Forces. Role and Responsibilities of International Agencies, NGO's, Community Based Org. (CBO's)

5. Technologies for Disaster Management · Role of IT in Disaster Preparedness · Remote Sensing, GIS and GPS · Use and Application of Emerging Technologies · Application of Modern Technologies for the Emergency communication. · Application and use of ICST for different disasters.
6. Disaster Mitigation · Disaster Mitigation: meaning and concept · Disaster Mitigation Strategies · Emerging Trends in Disaster Mitigation · Mitigation management · Role of Team and Coordination
7. Disaster Management in India Disaster Profile of India – Mega Disasters of India and Lessons Learnt Disaster Management Act 2005 – Institutional and Financial Mechanism National Policy on Disaster Management, National Guidelines and Plans on Disaster Management; Role of Government (local, state and national),Non-Government and Inter-Governmental Agencies. National Disaster management Authority.

References

1. Bryant Edwards (2005): Natural Hazards, Cambridge University Press, U.K.
2. Carter, W. Nick, 1991: Disaster Management, Asian Development Bank, Manila.
3. Central Water Commission, 1987, Flood Atlas of India, CWC, New Delhi.
4. Central Water Commission, 1989, Manual of Flood Forecasting, New Delhi.
5. Government of India, 1997, Vulnerability Atlas of India, New Delhi.
6. Sahni, Pardeep et.al. (eds.) 2002, Disaster Mitigation Experiences and Reflections, Prentice Hall of India, New Delhi.

DEPARTMENT - BIO CHEMISTRY

Basics of Bioinorganic and Biophysical chemistry for Biology graduates.

Bioinorganic chemistry

Coordination Compounds: Transition metals, properties (Colour, Oxidation states, Magnetic properties) Coordinate bond, double and complex salts– differences with examples.

Postulates of Warner's theory. Types of ligands: For examples: uni, bi, polydentate ligands. Coordination number, examples.

Porphyrin nucleus and their classification. Important metallo-porphyrins occurring in nature. Structure and biological importance of Heme, cytochrome, chlorophyll,Vitamin B_{12}.

Nitrogen, Fixation of atmospheric nitrogen – Symbiotic and non-symbiotic. Nitrogen cycle.

Environmental pollution by nitrogen compounds. Phosphorous: Importance of Phosphorous compounds in biological system, phosphorous cycle

Oxygen, Formation of ozone in atmosphere. Role of ozone in maintenance of life on earth. Effect of environmental pollutants on ozone layer.

Sulphur and Selenium, Importance of compounds of Sulphur and Selenium in biological systems. Effect of sulphur compounds on environmental pollution.

Biophysical chemistry.

Units in chemistry, Avogadro's number, Mole, Mole fraction, Molarity, Equivalent weight, Normality, Molality. Colligative Properties, Osmotic pressure and its measurements. Hypo-, Hyper- and isotonic solutions. Effect of osmotic pressure on living cells.

Donnan membrane equilibrium. Relative lowering of vapour pressure, Raoult's law. Elevation of boiling point, depression in freezing point.

Adsorption: Freundlich and Langmuir's adsorption isotherm. Applications of adsorption.

Viscosity: Definition, determination of viscosity of liquids & solutions by Ostwald's viscometer (solutions of gum and protein to be taken as examples).

Distribution law, Distribution law, partition coefficient, application of distribution law.

Acids, bases and buffers- Lewis concept of acids and bases. Ionic product of water. pH scale, buffers, Henderson- Hasselbach equation, buffer capacity Choice of buffers. Theory of acid base indicators. pH titration curve and iso-electric pH of amino acids.

Selected References:

1. Basic Principles of Organic Chemistry, Roberts and Caserio, W. A. Benjamin, Inc. (1964).
2. Organic Chemistry, Morrison and Boyd, Allyn and Bacon Inc (1992).
3. Principles of Inorganic chemistry by Cotton & Wilkinson, Wiley (1999).
4. Textbook of Organic chemistry by Ahluwalia V K & Madhuri G Narosa publications (2001).
5. Physical chemistry by Castellan G W, Narosa Publications (2004).
6. Physical chemistry by Chakraborthy D K, Narosa Publications (2004).

DEPARTMENT - CHEMISTRY

ck-1	**Title: Periodic Table and chemical Periodicity**
it-1	Elements, atomic structure, atomic number, atomic mass, quantum numbers, electronic configuration,
it-2	iodic properties of elements, State of Matter, their resources. Important periodic properties of the elements, covalent radii, ionic radii, ionization potential, electron affinity and electronegativity
it-3	ncepts of Acids and Bases: Review of acid base concepts. Lux-Flood and solvent system concepts. Hard-soft acids and bases. Applications.
it-4	utions: Concentration units, solutions of liquids in liquids, Raoult's law, ideal and non-ideal solutions.

ck-2	**Title: Bonding and molecular structure**
it-5	Calcification of matter: (elements, compounds, substance and mixture), The three states of matter, physical and chemical properties of matter, fundamental particles of atoms, atomic number, atomic mass, atomic structure of atom molecular formula, empirical formula, molecular mass.
it-6	s and ionic compounds, properties of ionic compounds, formation of ionic compounds, covalent compounds, properties of covalent compounds, properties of covalent compounds
it-7	tals, properties of metals, theory of metallic bond formation, types of metals

	conductor, semiconductor and insulators, n-type semiconductors and p-type semiconductors, alloys and superconducting materials.
it-8	ds and bases, general properties of acid and bases, Acid base reactions, oxidation reduction reactions, oxidation number, types of redox reactions, balancing oxidation-reduction equation, exothermic and endothermic reactions energy change in chemical reactions.

DEPARTMENT : CLINICAL NUTRITION AND DIETETICS

OEL-1: HEALTHY LIFESTYLES AND NUTRITION 3 Credits

BLOCK 1: INTRODUCTION TO FOOD AND NUTRITION

Unit 1.- Factors affecting food habits, choices and dietary patterns – Definition of Food, Nutrition, Health, Fitness. Interrelationship between nutrition and health, concept of a desirable diet for optimum nutrition, health and fitness.

Unit 2-. A brief review of nutrients in general –

- Energy and macronutrients – Carbohydrates, Protein, Fat - functions, sources deficiency disorders and recommended intakes.
- Micronutrients: Minerals – calcium, Iron, Iodine, and other elements, Vitamins – FatSoluble & Water Soluble.

Unit 3: Nutritional assessment- Anthropometric, biochemical, clinical, dietary andBiochemical assessments

Unit 4: Basic principles of planning diet –, RDA for Indians, Food groups, Dietary guidesand balanced diets.

BLOCK 2: PLANNING OF DIET

Unit 5: Principles of planning a normal diet: characteristics of a normal diet, meeting nutrient requirements of individuals and family. Use of Dietary guidelines for Indians.

Unit 6: Objectives of diet therapy- Regular diet and rationale for modifications in energyand other nutrients, texture, fluid, soft diets etc.

Unit 7: Role of dietician in hospital- specific functions, team approach in patient care, psychological consideration, interpersonal relationship with patients. Nutrition and medicalethics. Hospital dietary- scope and importance, types of food service, quality management.

Unit 8: Nutrition counseling: definition, concept, role of clinical dietician, the recipient and counseling environment and goals of counseling. An overview of systems approach to nutritionalcare and its components (planning, implementation and evaluation).

REFERENCES

- Srilakshmi B (2004) Nutrition Science. New Age International (P) Ltd, Publishers.

- Kango M (2005) Normal Nutrition, Curing diseases through diet. First Edition CBS Publications.Paul S (2003) Text Book of Bio-Nutrition, Fundamental and Management. RBSA Publishers.
- Williams SR (2000) Nutrition and Diet Therapy. Sixth Edition C.V. Melskey Co.
- Mudambi SR and Rajagopal MV (1997) Fundamentals of Foods and Nutrition. New AgeInternational (P) Ltd, Publishers.
- Swaminathan M (1999) Essential of Food and Nutrition. Vol I and II, Bappco publications,Madras.
- Corinne, H. Robinson 2010– "Normal and Therapeutic nutrition", Oxford and IBH publishing company, Bombay.
- B. Srilakshmi – 2012"Dietetics", 4th edition, New age international publisher,Chennai

DEPARTMENT - COMPUTER SCIENCE

ELMCS-01 Mobile App Development: Credit 2

Block – I

Unit-1: Introduction to Mobile Computing: applications, a simplified reference model, Wireless Transmission:

Unit-2: Frequencies of radio transmission, signals, antennas, signal propagation, multiplexing, modulation, spread spectrum, cellular system.

Unit-3 Media Access Control: motivation for a specialized MAC, SDMA, FDMA, TDMA, CDMA ,and Comparisons.

Unit-4: GSM, DECT, Wireless LAN: Infrared vs. radio transmission, Infrastructure and ad-hoc networks,
IEEE 802.11, HPERLAN, Bluetooth.

Block – II

Unit-5: Mobile Network Layer: mobile IP, dynamic host configuration protocol,
Unit-6: ad-hoc networks. Mobile Transport Layer: Traditional TCP, classical TCP improvements,
Unit-7: TCP over 2.5/3G wireless networks. File Systems, World Wide Web,
Unit-8: Wireless Application Protocol (WAP) and WAP 2.0.

Text book:

1. Jochen H. Schiller, Mobile Communications(2e)

Reference

1. Raj Kamal, Mobile Computing
2. Asoke K. Talukder, Roopa R. Yavagal, Mobile Computing
3. Mazliza Othman,Principles of Mobile Computing and Communications
4. Prasant Kumar Pattnaik, Rajib Mall, Fundamentals of Mobile Computing
5. Ivan Stojmenovic,Handbook of Wireless Networks and Mobile Computer
6. David Taniar, Mobile Computing Concepts, Methodologies, Tools, and Applications

DEPARTMENT - ENVIRONMENTAL SCIENCE

ESOEL-1: Basics of Environmental Science

Block I: Ecology and Environment

Unit 1: Definition, Principles and Scope. Biotic and abiotic factors of environment. Ecosystems: pond, forest, river, grassland and estuary ecosystems

Unit 2: Ecosystem – trophic structure, energy flow, food chain, food web, Ecological pyramids.

Unit 3: Population dynamics: Definition, population density, Natality, Mortality, Age structure, Growth pattern, population dispersion.

Unit 4: Biogeochemical cycle – types, sedimentary and gaseous cycles, N, C, S, P, O cycles. Rock and hydrological cycles.

Block II: Biodiversity and Conservation

Unit 5: Biodiversity, Definition, Types of Biodiversity, importance and roles.

Unit 6: Needs and benefits of biodiversity, Loss of biodiversity- causes and consequences, Need for conservation of biodiversity

Unit 7: Conservation strategies, endemic and exotic species, Red Data book, National parks, wildlife sanctuaries, biosphere reserves, biodiversity hotspots, wildlife protection act, biodiversity act, wetland conservation and management, Hotspots of biodiversity.

Unit 8: Project Tiger, Project elephant, Ramsar site and other conservation projects. Experts Committee Reports on Environmental conservation

DEPARTMENT - GEOGRAPHY

ELMG –01, Introduction to Physical Geography (Credit-2)

Block-1

Origin, Shape and Size of the Earth, Movement of the Earth- Rotation and Revolution, Effects of the movement of Earth, Coordinates -Latitude, Longitude and Time; Structure of the Earth, Rocks - types, significance, Weathering –types; Agents of Denudation - River, Glacier, Wind and Under Ground water; Structure and Composition of Atmosphere, Weather and Climate

Block-2

Atmospheric Pressure, Winds and Precipitation; Distribution of Land and Sea, Submarine Relief of the Ocean, Temperature and Salinity of Sea Water; Ocean Tides and Oceanic Currents- Atlantic, Pacific and Indian Oceans; Biosphere- Elements, Ecology, Ecosystem, World's Biomes, Biodiversity – Importance, Types and Conservation

References

1. B.S. Negi (1993) Physical Geography. S.J. Publication, Meerut
2. D.S.Lal (1998) Climatology.Chaitnya publishing house, Allahabad
3. K. Siddhartha (2001) Atmosphere, Weather and Climate.Kisalaya publication, New Delhi
4. R.N.Tikka (2002) Physical Geography. KedarnathRamnath&co, Meerut
5. Willian D. Thornbury (1997) Principle of Geomorphology. New Age Internatinal (Pvt Ltd.)New

Delhi.

DEPARTMENT -MATHEMATICS

ELMM –01 - FUNDAMENTALS OF MATHEMATICS
(2 Credits)

Block-I: Number Theory: Natural numbers, integers, Real numbers, GCD, LCM, Prime numbers. Surds, Indices, Logarithms, Progressions, Arithmetic Progression, Geometric Progression, Harmonic Progression,

Block-II: Set Theory: Operations of Union, Intersection, Complementation. Relations & Functions: Types of relations One-one, onto, Many-one functions, graphs of functions.
Mathematical Logic: Propositions, logical connectives, Methods of proofs.

Books for Reference:

1. Kolman and Busby: Discrete Mathematics, PHI.
2. S. L. Loney: The Elements of Coordinate Geometry, London Macmillan & Co.
3. B. S. Grewal: Higher Engineering Mathematics, 36th Ed., Khanna Pub.
4. S. Lipschutz and M. Lipson: Theory and Problems of Discrete Mathematics. Schaum Series. 2nd Ed. Tata McGraw Hill.

DEPARTMENT - MICRO BIOLOGY

Microbial World and Microbial Diversity

i. Introduction to microbial world, Physiochemical and biological characteristics; Characteristics of Acellular microorganisms (Viruses); Baltimore classification, general structure with special reference to viroids and prions.
ii. Binomial Nomenclature, Whittaker's five kingdom and Carl Woese's three kingdom classification systems and their utility.
iii. Difference between prokaryotic and eukaryotic microorganisms
i. General characteristics of Cellular microorganisms, types - archaebacteria, eubacteria, wall-less forms - MLO (mycoplasma and spheroplasts) with emphasis on distribution and occurrence, morphology, mode of reproduction and economic importance.
ii. Structure, reproduction and economic importance of Mycoplasma.
i. General concept of Phytoplanktons and Zooplanktons. Characteristics, occurrence, thallus organization and classification of Algae.
ii. Cyanobacteria - occurrence, thallus organization, cell ultra structure, reproduction and economic importance. Applications of algae in agriculture, industry, environment and food.

i. Historical developments in the field of Mycology including significant contributions of eminent mycologists.
ii. General characteristics of fungi including habitat, distribution, nutritional requirements, fungal cell ultra- structure, thallus organization and aggregation, mode of reproduction and
iii. Economic importance of fungi with examples in agriculture, environment, Industry, medicine and food.

i. General characteristics, structure, mode of reproduction and economic importance of Actinomycetes with special reference to its application in medicine and industry.
ii. General characteristics, occurrence, classification structure, reproduction and economic importance of Protozoa.

References:

1. Singh,R.P. General Microbiology. Kalyani Publishers, New Delhi (2007).
2. Aneja, K.R. Experiments in Microbiology, Plant pathology and Biotechnology, Fourth edition, NewAge International publishers.
3. Dubey, R.C. and Maheshwary, D.K. Text book of Microbiology. S.chand and company (1999).
4. Powar, C.B. and Daginawal, H.F. General Microbiology. Vol-I and Vol- II, Himalaya Publishing House.
5. Chakraborty P. A Textbook Of Microbiology. New central book Agency (2005).
6. Prescott, M.J., Harley,J.P. and Klein, D.A. Microbiology. 5th Edition WCB Mc Graw Hill, New York, (2002).
7. Tortora, G.J., Funke, B.R. and Case, C.L. Microbiology: An Introduction. Pearson Education, Singapore, (2004).
8. Alcomo, I.E. Fundamentals of Microbiology. VI Edition, Jonesand Bartlett Publishers. Sudbury. Massachusetts, (2001).
9. Black J.G. Microbiology-Principles and Explorations. JohnWiley &Sons Inc. New York, (2002).
10. Pelczar, MJ Chan ECS and Krieg NR, Microbiology McGraw-Hill.
11. Willey, Sherwood, Woolverton. Prescott, Harley, and Klein's Microbiology McGraw-Hill publication
12. Tortora, Funke, Case. Microbiology. Pearson Benjamin Cummings.
13. JACQUELYN G. BLACK. Microbiology Principles and explorations. JOHN WILEY & SONS, INC.
14. Madigan, Martinko, Bender, Buckley, Stahl. Brock Biology of Microorganisms. Pearson
15. Tom Besty, D.C Jim Koegh. Microbiology Demystified Mc GRAW-HILL.

DEPARTMENT -PHYSICS

MP-EL1: Mechanics

BLOCK-A

Unit-1: Laws of Motion: Frames of reference, Newton's Laws of motion, Dynamics of a system of particles, Centre of Mass.

Unit-2: Momentum and Energy: Conservation of momentum, Work and energy, Conservation of energy, Motion of rockets.

Unit-3: Rotational Motion: Angular velocity and angular momentum, Torque, Conservation of angular momentum.

Unit-4: Gravitation: Kepler's Laws (statement only), Newton's Law of gravitation, motion of a particle in a central force field, satellite in circular orbit and applications, geosynchronous orbits, weightlessness, basic idea of global positioning system (GPS).

BLOCK-B:

Unit-5: Oscillations: Simple harmonic motion, differential equation of SHM and its solutions, kinetic and potential energy, total energy and their time averages, damped oscillations.

Unit-6: Elasticity-1: Hooke's law, stress-strain diagram, elastic moduli-relation between elastic constants, Poisson's ratio, expression for Poisson's ratio in terms of elastic constants, work done in stretching and work done in twisting a wire.

Unit-7: Elasticity-2: Twisting couple on a cylinder - determination of rigidity modulus by static torsion, torsional pendulum-determination of rigidity modulus and moment of inertia - q,η and □ by Searles method.

Unit-8: Special Theory of Relativity: constancy of speed of light, postulates of special theory of relativity, length contraction, time dilation.

DEPARTMENT -PSYCHOLOGY

EL-1 Introduction to Psychology 2 Credits

Block 1: Introduction to Psychology-I
Unit 1: Introducing Psychology -Definition, Scope, and goals
Unit 2: Branches of Psychology
Unit 3: Motivation
Unit 4: Emotions

Block 2: Introduction to Psychology-II
Unit 5: Sensation, Attention and Perception
Unit 6: Learning, Memory and Forgetting
Unit 7: Intelligence
Unit 8: Personality

References:

1. Charles G.Morris. Albert A. Maisto Psychology an Introduction , Prentice Hall. New Jersy.
2. Feldman, A. R.,Understanding Psychology IV th Ed, 1996, McGraw Hill, New Delhi.
3. Morgan, King, Weisz &Schopler, Introduction to Psychology-V11 Ed,1993, Tata McGraw Hill, New Delhi.
4. Ernest R Hilgard, Richard C Atkinson ,Rita L Atkinson Introduction to Psychology Oxford Publication, New Delhi.

DEPARTMENT : INFORMATION TECHNOLOGY

ELMIT –01: Green Computing (2 Credits)

Course Objective: Study the concepts related to Green IT, Green devices and hardware along with software methods, green enterprise activities, managing the green IT and various laws, standards, protocols along with outlook of green IT.

BLOCK 1: Overview of Green Computing

Unit 1:Green IT Introduction, Overview and issues, Initiatives and standards, Pathways of Green computing, Benefits of Green IT, Environmental Impacts of IT

Unit 2: Green devices and hardware Environmental issues arising from electronic devices, life cycle of electronic devices, Hazards and E-waste Ecycling, Going paperless, Hardware considerations, Greening information systems, Managing Green IT, 3Rs of Green IT, Thinking About Money-Saving Efforts

Unit 3: Green Data Centres and Associated Energy Challenges, Data Centre IT Infrastructure, Data Centre Facility Infrastructure: Implications for Energy Efficiency, IT Infrastructure Management, Green Data Storage, Storage Media Power Characteristics,

Unit 4: Green network and communications, objectives and challenges of green networking, Enterprise Green IT strategy, Approaching Green IT strategies, Business drivers and dimensions for Green IT strategies, Steps in Developing a Green IT Strategy, Metrics and Measurements in Green Strategies

BLOCK 2: Management of Green Computing

Unit 5: Sustainable Information Systems and Green Metrics, Sustainable IT Services, Sustainable IT Roadmap, Enterprise, Green IT Readiness, Readiness and Capability
Green Enterprises and the Role of IT, Organizational and Enterprise Greening, Information Systems in Greening Enterprises, Greening the Enterprise: IT Usage and Hardware,

Unit 6: Managing Green IT, Strategizing Green Initiatives, Implementation of Green IT,
Regulating Green IT: Laws, Standards and Protocols,

Unit 7: Green Cloud Computing and Environmental Sustainability, Cloud Computing and Energy Usage Model: A Typical Example, Features of Clouds Enabling Green Computing, Green Cloud Architecture

Unit 8: Green IT: An Outlook, Awareness to Implementation, Green IT Trends, Greening by IT, A Seven-Step Approach to Creating Green IT Strategy

Text Books:

1. Gangadharan, G. R., & Murugesan, S. (2012). Harnessing Green IT: Principles and practices. Wiley Publication, ISBN: 9788126539680.
2. Smith, B. E. (2013). Green Computing: Tools and Techniques for Saving Energy, Money, andResources. CRC Press.

DEPARTMENT -BOTANY

Plant-Microbe Interactions

Overview of plant microbes interactions,
Introduction, beneficial microbes, Rhizobium bacterium and nitrogen fixation, mycorrhizal fungi.
Plant pathogens, Agrobacterium tumefaciens and crown gall disease,
Mechanisms of plant disease mechanism, some bacterial plant diseases,
Plant viruses and mechanism of plant against viruses attacks.
Fungal pathogen- mechanism of plant disease,
Omycete pathogens, Fungal mediated plant.
General concept of plant immunity,
PAMP-triggered immunity (PTI) and effectors-triggered immunity (ETI).
Transcription activator like effector and their role in virulence and disease resistance.

References

1. Lautenberg, B. (2015). Principles of Plant-Microbes Interactions: Microbes for sustainable Agriculture, Springer.
2. Stacey, G. and Keen, N. T. (1997). Plant-Microbes Interactions, Vol 4, . Springer.
3. Ramasamy, K, (2015). Plant Microbes Interactions, New India Publishing Agency.
4. Martin, F. and Kamoun, S. (2014). Effectors in Plant-Microbes Interactions 1st Edition, Wiley Blackwell.

DEPARTMENT -ZOOLOGY

MZO-IE-1: Parasites, Vectors & Communicable Diseases

Introduction to parasites.

Distribution, types, origin and evolution of parasites. Parasitism.
Types: Ecto-parasites, Endo-parasites and their adaptations.

Pathogenic micro-organisms, brief outline and classification of parasitic protozoan's: Entamoeba, Balantidium, Giardia, Trichomonus, Plasmodium, Leishmania and Trypanosoma and their diseases.

Control measures, diagnosis and therapy.

Pathogenic helminthes and vectors.

Etiology, epidemiology, pathogenesis, diagnosis, prevention and control of disease due to *Trichinella spiralis, Ancylostoma duodenale, Fasciola hepatica*, Schistosoma species.
Pathogenic Cestodes: Life cycle, treatment of diseases caused by Echinococcus, Hymenolepis and Diphyllobothrium. Scope and importance of vectors. Origin and evolution of vectors. Habitat, life cycle, pathogenicity of fleas, mites, ticks, lice's and mosquitoes.

Historical perspectives and scientists involved in the discovery of vectors and communicable Diseases. Epidemiology, bio-ecology, life cycle of biological and mechanical Vectors. Vector-host-parasites interactions, Host-pathogen interaction, insects transmitting Bacteria and viruses.

Control and management of vectors and vector borne diseases

Control measures: cultural, chemical, biological, genetic and environmental Methods of vectors. Management of biological and mechanical vectors during Different seasons. Integrated Vector Control and Management.

Insecticide resistance in vectors, Drug resistance in pathogens.

Importance of education, awareness among public on communicable diseases and community participation. Covid-19 pandemics. Epidemiology of corona virus and its mutants. Vaccination against corona virus in India and other parts of the world.

DEPARTMENT –FOOD AND NUTRITION SCIENCE

ELMFNS- 01 FOOD PSYCHOLOGY

Credits: 2

BLOCK 1: FOOD: PREFERENCES AND CHOICES

Unit 1: Food: Physiological definition and significance, meaning of food, food classification, Food as statement of self-identity, Social interaction, Cultural identity

Unit 2: The Role of Food and Eating on Personality and Social Development: Psychology of eating, Food and emotion regulation, Food in daily living, Food Socialization, Food and control of others

Unit 3: Food Preferences and Fluctuations: Developmental Models, Cognitive Models & Psychophysiological Models, Physiology of food choice, Likes and Dislikes, acquired food preferences, Attitudes towards change, Food and sensory stimulus, Factors influencing eating behavior – (biological, environmental, individual, food characteristics, culture etc., Effect of eating on food selection and preferences, Understanding of the body and self – selection of the diet.

Unit 4: Food choices across lifespan and influence of society: The changing role of the senses in food choice and food intake across lifespan, Food in security and health across lifespan, Influence of media and advertisements, Digital platform and influence on food choices

BLOCK 2: EATING DISORDERS AND TREATMENTS

Unit 5: Mood, Emotions, food cravings and addictions: relation with food preferences, Connection between mood and eating, Biological and physiological aspects of food cravings, Stress and eating behavior, Food addiction - description, neurobiology of food addiction

Unit 6: Eating disorders and treatment: Anorexia nervosa, Bulimia nervosa and binge eating Disorder-Definition, Symptoms, believed causes, Classification, Risk factors, Common myths of eating disorders, Treatment & dietary management

Unit 7: Overeating, Obesity and Weight management: Definition, Prevalence, Classification of Body Mass Index, Types & patterns, Etiology, Physiological component, Fad diets, Risk factors, Treatment - Weight management (Behavior & Cognitive), Lifestyle modifications, Dietary modification - (calorie restricted diet)

Unit 8: You are what you eat- Approaches to change the dietary behavior: Multidisciplinary approach, Strategies to support healthy dietary behavior: Encouraging healthy eating, Selection of food, Meal & portion size, developing education materials, Motivation & economics, Benefits of exercise, Stage classification for change, Barriers affecting the clinical outcome

REFERENCES:

1. Smith John L. (2002), The Psychology of Food and Eating (English, Hardcover, Smith John , Publisher: Palgrave MacmillanL.), ISBN: 9780333800201, 0333800206.

Alexandra W. LogueOct 2017, The Psychology of Eating and Drinking Fourth Edition.

Annexure II

INTER- DISCIPLINARY COURSE

(Open Elective) for Second Semester

ವಿಭಾಗ– ಕನ್ನಡ

ಪತ್ರಿಕೆ–೬: ಪ್ರಾಚೀನ ಕನ್ನಡ ಸಾಹಿತ್ಯದ ಇತಿಹಾಸ EL-2.1 (ಕ್ರೆಡಿಟ್–೨)

ಬ್ಲಾಕ್–೩೮: ಸಾಹಿತ್ಯ ಚರಿತ್ರೆಯ ಉಗಮ ಮತ್ತು ವಿಕಾಸ

ಘಟಕ–೧೪೯: ಸಾಹಿತ್ಯದ ಉಗಮ, ಬೆಳವಣಿಗೆ, ಉದ್ದೇಶ.

ಘಟಕ–೧೫೦: ಪ್ರಾಚೀನ ಪೂರ್ವ ಶಾಸನಸಾಹಿತ್ಯ.

ಘಟಕ–೧೫೧: ಪಂಪ ಪೂರ್ವ ಯುಗದ ಸಾಹಿತ್ಯ.

ಘಟಕ–೧೫೨: ಕನ್ನಡ ಸಾಹಿತ್ಯ ಚರಿತ್ರೆಯ ವಿಭಾಗಕ್ರಮ.

ಬ್ಲಾಕ್–೩೯: ಪ್ರಾಚೀನ ಕನ್ನಡ ಸಾಹಿತ್ಯ

ಘಟಕ–೧೫೩: ಪ್ರಾಚೀನ ಕನ್ನಡ ಸಾಹಿತ್ಯ ರೂಪಗಳು; ಚಂಪೂ, ವಚನ, ರಗಳೆ, ಷಟ್ಪದಿ, ಸಾಂಗತ್ಯ ಇತ್ಯಾದಿ.

ಘಟಕ–೧೫೪: ಪ್ರಾಚೀನ ಕನ್ನಡ ಸಾಹಿತ್ಯದ ಪರಿಕಲ್ಪನೆಗಳು;

ಚರಿತ್ರೆ–ಪುರಾಣ, ಧರ್ಮ–ಕಾವ್ಯಧರ್ಮ, ಹಿಂಸೆ–ಅಹಿಂಸೆ, ಮಾರ್ಗ–ದೇಶಿ, ಲೌಕಿಕ–ಆಗಮಿಕ, ವಸ್ತುಕ–ವರ್ಣಕ, ಪ್ರಭುತ್ವ–ಪ್ರತಿರೋಧ.

ಘಟಕ–೧೫೫: ಪ್ರಾಚೀನ ಕನ್ನಡ ಕವಿ–ಕೃತಿ–ಕಾಲ–ದೇಶ–ಭಾಗ ೧.

ಪಂಪ, ರನ್ನ, ಪೊನ್ನ, ೧ನೆ ಚಾವುಂಡರಾಯ, ನಾಗವರ್ಮ ೨ನೆಯ ಚಾವುಂಟರಾಯ, ನಾಗಚಂದ್ರ, ನಯಸೇನ, ದುರ್ಗಸಿಂಹ, ಬ್ರಹ್ಮಶಿವ, ಕರ್ಣಪಾರ್ಯ, ಜನ್ನ.

ಘಟಕ–೧೫೬: ಪ್ರಾಚೀನ ಕನ್ನಡ ಕವಿ–ಕೃತಿ–ಕಾಲ–ದೇಶ–ಭಾಗ ೨.

ಆಂಡಯ್ಯ, ನೇಮಿಚಂದ್ರ, ರುದ್ರಭಟ್ಟ ಪ್ರಮುಖ ವಚನಕಾರರು – ಜೇಡರ ದಾಸಿಮಯ್ಯ, ಬಸವಣ್ಣ, ಅಕ್ಕ ಮಹಾದೇವಿ, ಅಲ್ಲಮಪ್ರಭು, ಚನ್ನಬಸವಣ್ಣ, ಹರಿಹರ, ರಾಘವಾಂಕ, ಕುಮಾರವ್ಯಾಸ, ಲಕ್ಷ್ಮೀಶ, ಪ್ರಮುಖ ಕೀರ್ತನಕಾರರು, ಚಾಮರಸ, ಕುಮಾರವಾಲ್ಮೀಕಿ, ಸರ್ವಜ್ಞ, ಷಡಕ್ಷರಿ, ಸಂಚಿ ಹೊನ್ನಮ್ಮ, ನಂಜುಂಡ, ರತ್ನಾಕರವರ್ಣಿ, ಮುದ್ದಣ, ಕೆಂಪುನಾರಾಯಣ.

ಪರಾಮರ್ಶನ ಗ್ರಂಥಗಳು

೧. ಗತಿಬಿಂಬ : ಜಿ.ಎಸ್. ಶಿವರುದ್ರಪ್ಪ, ಬೆಂಗಳೂರು ವಿಶ್ವವಿದ್ಯಾನಿಲಯ, ಬೆಂಗಳೂರು

೨. ಕಾವ್ಯ ವಿಹಾರ : ಕುವೆಂಪು, ಉದಯರವಿ ಪ್ರಕಾಶನ, ಮೈಸೂರು, ೧೯೬೯

೩. ಸಮಗ್ರ ಕನ್ನಡ ಸಾಹಿತ್ಯ ಚರಿತ್ರೆ : ಬೆಂಗಳೂರು, ವಿಶ್ವವಿದ್ಯಾನಿಲಯ ಬೆಂಗಳೂರು, ೨೦೦೨

೪. ಕನ್ನಡ ಸಾಹಿತ್ಯ ಚರಿತ್ರೆ : ಕೆ. ವೆಂಕಟರಾಮಪ್ಪ, ಪ್ರಸಾರಾಂಗ, ಮೈಸೂರು ವಿಶ್ವವಿದ್ಯಾನಿಲಯ, ಮೈಸೂರು

೫. ಕರ್ನಾಟಕ ಸಂಸ್ಕೃತಿ: ದೇವುಡು, ಶಾರದಾ ಪ್ರಕಾಶನ, ಮೈಸೂರು, ೧೯೩೫

೬. ಕನ್ನಡ ಸಾಹಿತ್ಯ ಸಂಗಾತಿ : ಕೀರ್ತಿನಾಥ ಕುರ್ತಕೋಟಿ, ಮನೋಹರ ಗ್ರಂಥಮಾಲೆ, ಧಾರವಾಡ

೭. ಶೈಲಿ : ಎಸ್.ವಿ.ರಂಗಣ್ಣ, ಮೈಸೂರು ವಿಶ್ವವಿದ್ಯಾನಿಲಯ, ಮೈಸೂರು, ೧೯೭೬

೮. ಶತಮಾನದ ಕನ್ನಡ ಸಾಹಿತ್ಯ : ಸಂಪಾದಕರು, ಜಿ.ಎಸ್. ನಾಯಕ, ಕನ್ನಡ ಸಾಹಿತ್ಯ ಅಕಾಡೆಮಿ, ಬೆಂಗಳೂರು

೯. ಕನ್ನಡ ಸಾಹಿತ್ಯದ ಇತಿಹಾಸ : ರಂ. ಶ್ರೀ. ಮುಗಳಿ, ಕೇಂದ್ರ ಸಾಹಿತ್ಯ ಅಕಾಡೆಮಿ, ನವದೆಹಲಿ, ೧೯೬೩

೧೦. ಕನ್ನಡ ಸಾಹಿತ್ಯ ಚರಿತ್ರೆ : ರಂ.ಶ್ರೀ. ಮುಗಳಿ, ಉಷಾ ಸಾಹಿತ್ಯ ಮಾಲೆ, ಮೈಸೂರು, ೧೯೭೧

೧೧. ಬಿಂಬ: ಚದುರಂಗ, ಸಂವಹನ ಪ್ರಕಾಶನ, ಮೈಸೂರು

೧೨. ಕನ್ನಡ ಸಾಹಿತ್ಯ ಚರಿತ್ರೆ ಸಂಪುಟಗಳು : ಕುವೆಂಪು ಕನ್ನಡ ಅಧ್ಯಯನ ಸಂಸ್ಥೆ, ಮೈಸೂರು. ವಿಶ್ವವಿದ್ಯಾನಿಲಯ, ಮೈಸೂರು, ೧೯೮೨

೧೩. ಕನ್ನಡ ಸಾಹಿತ್ಯದ ಪ್ರಾಚೀನತೆ: ಪ್ರಧಾನ ಸಂಪಾದಕರು, ಎ. ರಂಗಸ್ವಾಮಿ, ಲೇ. ಎಚ್.ಪಿ. ಗೀತಾ, ಜನಪ್ರಿಯ ಕನ್ನಡ ಮಾಲೆ, ಕನ್ನಡ ಅಧ್ಯಯನ ಮತ್ತು ಸಂಶೋಧನಾ ವಿಭಾಗ, ಕರಾಮುವಿ, ಮೈಸೂರು, ೨೦೧೧

೧೪. ಪ್ರಾಚೀನ ಕನ್ನಡ ಕಾವ್ಯ ಸ್ಥಿರತೆ ಮತ್ತು ಚಲನ ಶೀಲತೆ : ಪ್ರಧಾನ ಸಂಪಾದಕರು, ಎ. ರಂಗಸ್ವಾಮಿ, ಲೇ. ಶಿವರಾಮಯ್ಯ, ಜನಪ್ರಿಯ ಕನ್ನಡ ಮಾಲೆ, ಕನ್ನಡ ಅಧ್ಯಯನ ಮತ್ತು ಸಂಶೋಧನಾ ವಿಭಾಗ, ಕರಾಮುವಿ, ಮೈಸೂರು, ೨೦೧೨

೧೫. ಕನ್ನಡ ಕೈಪಿಡಿ: ಸಂಪುಟ ೨, ಪ್ರಸಾರಂಗ, ಮೈಸೂರು ವಿಶ್ವವಿದ್ಯಾನಿಲಯ, ಮೈಸೂರು, ೨೦೦೭

DEPARTMENT - ENGLISH

EL-2.1: INDIAN LITERATURE-II

OBJECTIVES

- To appreciate artistic values in *Hayavadana* and the use of myth
- To know the importance of Indian English historical plays
- To appreciate Sri Aurobindo as a poet and critic
- To comprehend the different theories of aesthetic experience of art

BLOCK -I

Girish Karnad: Hayavadana
Gurucharan Das: Larin Sahib

BLOCK –II

M. Hiriyanna: Art Experience
Sri Aurobindo: Selections: The Poets of the Dawn and The Poets of the Dawn 3 (The Future Poetry)

Suggested Reading:

- **K.R.Srinivas Iyengar:** Indian Writing in English .Macmillan, 1979.
- **M.K.Naik:** Critical Essays on Indian Writing in English.Sahitya Akademi, 1969.
- **Narasimhaiah C.D:** The Swan and the Eagle. Indian Institute of Advanced Study, 1987.

- **Meenakshi Mukherjee:** The Twice Born Fiction. Heinemann Educational Publishers, 1972.

DEPARTMENT - HINDI

<u>हिंदी सिनेमा</u>

- सिनेमा का उद्भव और विकास
- मूक चलचित्र और दादा साहब फाल्के युग
- दूसरा पढाव, सवाक चलचित्र अथवा आलमआरा
- रंगीन सिनेमा का युग
- सामाजिक सिनेमा एक विवेचन
- धर्म एवं सांस्कृतिक सिनेमा एक विवेचन
- राजनैतिक सिनेमा एक विवेचन
- आर्थिक सिनिमा एक विवेचन
- हास्य एवं व्यंग्य सिनेमा एक विवेचन
- बाल सिनेमा
- सिनेमा एवं संवेदना
- सिनेमा एव भाषा-शिल्प सिनेमा एवं गायन
- सिनेमा एवं पात्र संयोजना
- सिनेमा एवं नैतिक मूल्य
- अनूदित सिनेमा
- सिनेमा का तुलनात्मक अध्ययन
- फिल्म समीक्षा.....**आदि**

<u>□□□□□□ □□□□□</u>

- सिनेमा साहित्य और समाज- प्रह्लाद अग्रवाल, अनामिका प्रकाशन, नई दिल्ली
- कथाकार कमलेश्वर और हिंदी सिनेमा- उज्ज्वल अग्रवाल, राजकमल प्रकाशन, नई दिल्ली
- बॉलिवुड पाठ विमर्श के संदर्भ- ललित जोशी, वाणी प्रकाशन, नई दिल्ली
- फ्लैशबैक, प्रभुनाथ आज़मी, शिल्पायन, नई दिल्ली
- नाटक के सौ बरस, हरिश्चंद्र अग्रवाल और अजित पुष्कल, शिल्पायन, नई दिल्ली

DEPARTMENT - TELUGU

E. L. 2.1 TELUGU SAMSKRUTHI - SAMAJAM

Block - 1: ANDHRULA CHARITHRA - SAMSKRUTHI

Unit - 1:Samskruthi Vaisistyam

Unit - 2:Andhrula Charithra - Samskruthi Paraspara Prabhavam
Unit - 3:Andhrula kalalu
Unit - 4: Andhrula basha - samajam

Block - 2: ANDHRULA AACHARALU -SAMPRADHAYALU

Unit - 1:Andhrula Pandugalu
Unit - 2: Sthrela Nomulu - Vrathalu
Unit - 3: Andhrula Sangikaacharalu
Unit - 4: Andhrula Sampradhayalu

DEPARTMENT - HISTORY

OEL2.1 Social Reform Movements in Modern India

Objective: The course is aims to trace the causes for the division of society in various sections and need for reformation. Further it explains age old social evils which crippled Indian society.

Pedagogy: personal contact programmes, audio video programmes, online lectures Assignments, etc

Credits: 2. **Examination Duration:** 1 1/2 hours and Maximum Marks: 40

Course outcomes

After completing this course the students should be able to

- Understanding the contributions of the Raja ram Mohan Roy Dayananda Sarawathi towards the Indian modernity
- Analyse the Jyothibai pule Savithribai Pule Ambedkar's contributions to Indian social reform movements
- Evalute the works of Sahu Maharaj and Krishna raja wadiyar IV patronage to social Justice.

Block-I

Unit : 1

Colonial Discovery of India : Orientalism, Anglicism, Evangelism-Understanding Indian Society, Meaning of Social Reform. The Concept of Modernity : Western Impact – Indian Response.

Unit : 2

Rajaram Mohan Roy and Brahmo Samaj, Dayananda Sarawathi and Arya Samaj-Nationalism and Society – Prarthana Samaj.

Unit : 3

Jyothi Ba- Phle and Savithri Ba Pule, Social and education reforms.

Unit : 4

Communalism, Eradication of Communalism, Muslim League, Wahhabi and Pan Islamism-Syed Ahmed and Aligarh Movement.

Block-II

Unit : 5

The debate over the interpretation of Shastras – Ishwar Chandra Vidya Sagar - B.M.Malabari – Vivekananda –M.G. Ranade—Bal Gangadhar Tilak.

Unit :6

Dr. B.R.Ambedkar-, His views on Society, A caste and its annihilation, Religion and Economy, M.K.Gandhi- E.V.Ramswamy Periyar and Sri.Narayanguru, Ayyan kali.

Unit :7

The reformers – Kandukuri Veereshalingam – Pandit Shivanatha Shastry – Gopal Ganesh Agarkar-K.T.Telang-Maharma.

Unit :8

D.K.Karve, Maharaj Saiyyaji Rao Gaekwad of Baroda – Chatrapathi Shahu Maharaj of Kolhapur and Maharaja Krishnaraja Wodeyar IV of Mysore.

Suggested readings:

1. Nararajan : A Century of Social Reform in Indian.
2. Seetharam Singh : Nationalism and Social Reform in India
3. Dhananjaya Keer : Ambedkar, Life and Mission
4. Dhananjaya Keer :Mahatma Jyoti Rao Phule : Father of Social Revolution in India
5. Charless Heimsath R : Indian Nationalism and Hindu social Reform
6. A.S.Altekar : Position of Women In Hindu Civilization.
7. Gail Omvedt : Cultural Revolt in a Colonial Society – The Non – Brahmin Movements in Western India.
8. Gail Omvedt : Dalits and Democratic Revolution.
9. Ravindrakumar : Selected Documents of B.G.Tilak.
10. S. Ramkrishna : Social Reform Movements in Andhra
11. M.K.Gandhi : Women and Social Injustice.

ವಿಜಯ ಪೊಣಚ್ಚು ತಂಬಂಡ (ಸಂ), ಭಾರತ ಉಪಖಂಡದ ಆಧುನಿಕ ಪೂರ್ವ ಚರಿತ್ರೆ ವಿವಿಧ ಆಯಾಮಗಳು – ಸಂಪುಟ– 03, ಪ್ರಸಾರಾಂಗ, ಕನ್ನಡ ವಿಶ್ವವಿದ್ಯಾನಿಲಯ, ಹಂಪಿ.

DEPARTMENT - ECONOMICS

EL2.1: Institutions for International Development

- **Objective:** To enable the Students to understand the need and importance of various International Institutions.
- **Pedagogy:** A Combination of Lectures, Group Discussion, Assignments.
- **Credits:** 2 ; Examination Duration: $1^1/_2$and Maximum Marks: 50 (Internal Assessment Marks = 10 and Semester-end Examination =40)

Course Inputs

Block – I Economic Issues at Global and National Level

Unit – 1 Globalisation

Globalisation – Forces Driving Globalisation – Income Inequality – National Integrity – Impact on Labour – Multinational corporations – Global Business Environment – National Business Environment.

Unit – 2 Legal Issues of Business at Global and National Level

Political Risks – Legal System – Business Ethics – Centrally Planned Economy – Mixed Economy – Market Economy – Human Development

Unit – 3 International Trade

Importance – Volume – Direction – Composition – Trends – Theories of Trade - Mercantilism – Absolute Advantage – Comparative Advantage – International Product Life Cycle – Political, Economic and Cultural Motives behind Government Intervention.

Unit – 4 GATT and WTO

Importance – objectives – Functions - GATT and W.T.O – India and WTO.

Block – II Economic Integration and International Business Issues

Unit – 5 Regional Economic Integration

Meaning – Effects – Integration in Europe: European Union – Integration in Americans : North American Free Trade Agreement (NAFTA) – Latin American Integration Association (LAIA) – Free Trade Area of Americans (FTAA) and Transatlantic Economic Partnership.

Unit – 6 Integration in Asia

Association of Southern East Asian Nations (ASEAN) - Asia Pacific Economic Cooperation (APEC) – Integration in middle East : Gulf Cooperation Council (GCC) – BRICS – SAARC.

Unit – 7 International Financial Markets

International capital markets – Foreign Exchange markets – Currency Convertibility – International Monetary System.

Unit – 8 Issues in International Business

Trade War – Balance of Payment – Terrorism – Oil Crisis – Smuggling – Dumping – Environmental Degradation – Exhibit of Nuclear power – Covid 19 and other pandemics.

References:

01. Apte A.N. (2011) International Financial Management, Tata McGraw Hill Pub., Co. Ltd., New Delhi.
02. Bhambari C.P, (1980) The World Bank and India, Vikas Publishing House, New Delhi.
03. International Development Association, Annual Reports.
04. International Finance Corporation, Annual Reports.
05. International Monetary Fund, Annual Reports.
06. World Bank, (1995) The Evolving Role of the World Bank in the First Half Century, Washington D.C.
07. World Bank, World Bank in India, Washington, D.C. USA
08. World Bank, World Development Reports, and Annual Reports.

Palle Krishna Rao, (2005) WTO, Text and Cases, PSG Excel Series, New Delhi.

DEPARTMENT - POLITICAL SCIENCE

(OEL-I) Indian Constitution

Block-I

Unit:1 Framing of the Indian Constitution.

Unit:2 Preamble and Salient Features of the Indian Constitution.

Unit:3 Fundamental Rights and Duties.

Unit:4 Directive Principles of the State Policy.

Block-II

Unit:5 Union Legislature : Composition, Powers and Functions.

Unit:6 Union Executive : President and Vice-President - Election, Powers and Functions, Prime ministers and Council of Minister - Powers and Functions.

Unit:7 State Legislature : Composition, Powers and Functions, State Executive - Governor and Chief Minister.

Unit:8 The Judiciary : Supreme Court and High Court - Composition, Jurisdiction and Functions.

References:

1. Andre Beteille, 1965. Caste,class, and Power. Berkley: University of California Press.
2. Appadorai, A 1968. india: Studies In Social And Political Development 1947-1967. New Delhi: Aisa Publishing House.
3. Desai, A R. 2016. Social Background of Indian Nationalism. Los Angeles: Papular Prakashan.
4. Granville Austin, 2000. The Indian Constitution: Cornerstone of a Nation. Melbourne: Oxford University Press.
5. Hanson and Douglas, 1972. India`s Democracy. New York city: W W Norton & Co Inc.
6. Johari J C 1974. Indian Government and Politics. New Delhi: Vishal Publications.
7. Karunakaran, K.P 1964. Continuity and Change in Indian Politics. New Delhi: People`s Pub. House.
8. Kochanek. A. 1968. The Congress Party of India: the Dynamics of a One-Party Democracy. New Jersey: Princeton University Press.
9. Morris Jones, 1967. The Government and Politics of India. London: Hutchinson University Library.
10. Myron Weiner, 1957. Party Politics in India. New Jersey: Princeton University Press.
11. Myron Weiner, 1967. Party Building in New Nation. Chicago: University of Chicago Press.
12. Palmer, N D 1971. The Indian Political System. Boston: Houghton Mifflin.
13. Partha Chatterjee, 1998. State and Politics in India. University of Michigan: Oxford University Press.
14. Pylee, M V 1960. Constitutional government in India. Bombay: Asia Pub. House.
15. Rajni Kothari, 1970. Politics in india. The University Of Michigan: Little Brown
16. Rajni Kothari, 1995. Caste in Indian Politics. Telangana: Orient Blackswan.
17. Venkatarangaiya: M Shiviah, 1975. Indian Federalism. New Delhi: Arnold-heinemann Publishers.
18. Zoya Hasan, 2000. The State in Indian Politics. Landon: Sage publication.

DEPARTMENT - SOCIOLOGY

Study of Indian Society -02 Credits

Course Description

Every science has its own classical theories, which stand as eternal in their explanatory power and prowess to transcend the time and region. This course intends to introduce the learners to the classical period of sociology which is not just a bundle of theories but a consistent tradition and formative period, even contemporary theories cannot eschew from being inspired. After studying this course, following

learning outcomes can be expected.

Course Objectives

1. To appreciate the organizational framework of Indian society
2. To appreciate the aspects unity and diversity of Indian society
3. Examine the social issues in contemporary India

Learning Outcomes

Following outcomes are expected from the learners after successfully completing the course. Learner can/has

LOC-1: sociological insights about the social structural and organizational aspects of Indian society
LOC-2: present the changes in institutional framework of Indian society
LOC-3: recognize the causes for major social issues and present realistic remedies

Course Content

Block-1 Social Organizations

Unit-1 Unity and Diversity-Problem of Integration
Unit-2 Caste-Characteristics and Recent Changes
Unit-3 Marginalization-SC, ST, OBC and Minorities
Unit-4 Changes in Family and Concerns of the Aged

Block-2 Social Issues in Contemporary India

Unit-5 Environmental Sanitation and Ecological Degradation
Unit-6 Educated Unemployment and Employability
Unit-7 Social Unrest-Terrorism, Naxalism, Communalism and Corruption
Unit-8 Child Rights and Right to Education (RTE)

References

- Ahuja, Ram. 2002. Study of Social Problems. Jaipur & New Delhi: Rawat Publications
- Atal, Yogesh. 1979. The Changing Frontiers of Caste. National Publishing House: Delhi
- Beteille, Andre. 1971. Caste, Class and power. Berkeley: University of California.
- Betteille, Andre. 1974. Social Inequality, New Delhi: Oxford University Press.
- Betteille, Andre. 1992. Backward Classes in Contemporary India. New Delhi: Oxford University Press.
- Berreman, G.D. 1979. Caste and Other Inequalities: Essays in Inequality. Meerut: Folklore Institute.
- Dube, Leela. 1997. Women and Kinship, Comparative Perspectives on Gender
- Southern South Asia.
- Das, Veena. 2006. Oxford Handbook of Indian Sociology. New Delhi: Sage
- Dube, S C. 1990. Study of Indian Society. New Delhi: National Book Trust
- Jha, Hetukar. 2015. Sanitation in India. Delhi: Gyan Books.
- Karve, Iravathi. 1990. Kinship Organization in India.
- Pais, Richard. 2015. Sociology of Sanitation. Delhi: Kalpaz Publications.
- Pathak, Bindeshwar. 2015. Sociology of Sanitation. Delhi: Kalpaz Publications.
- Singer, Milton & Cohen, Bernards. 1996. Structure and change in Indian Society. Jaipur: Rawat
- Singh, Yogendra, Modernization of Indian Tradition. Jaipur & New Delhi: Rawat
- Srinivas, M N. 1995. Social Change in Modern India: Orient Blackswan
- Srinivas, M. N. 1962. Caste in Modern India and Other Essays. Asia Publishing House: Delhi

DEPARTMENT – ANCIENT HISTORY AND ARCHEOLOGY

AHA
OE 2.1

Cultural History of Hoysalas (OE)

Block - 1	**Early Kings**
Unit - 1	Archeological and Literary Sources
Unit - 2	Theories of Origin of Hoysalas – Sala – Nripakama – Ereyanga
Block - 2	**Important Rulers**
Unit - 3	Vishnuvardhana - VeeraNarasimha – I
Unit - 4	Ballala – II - Narasimha – II - Narasimha III and Ballala – III
Block - 3	**Cultural Contributions**
Unit - 5	Hoysala polity - Economy
Unit –6	Hoysala Society – Religion – Education - literature
Block - 4	**Art and Architecture**
Unit - 7	Hoysala Architecture
Unit – 8	Hoysala Art

References:

1. Epigraphia Carnatica: Relevant Volumes
2. Derrett Duncan, M.J: The Hoysalas, 1957
3. Dhakey M.A: Encyclopedia of Indian Temple Architecture
4. Desai P.B: History of Karnataka
5. Foekema Gerard: A Complete Guide to Hoysala Temples
6. Gopinatha Rao T.A: Elements of Hindu Iconography,Vols
7. Kelleson Collyer: The Hoysala Artists – Their Identity Style
8. Krishna Murthy M.S: The Hoysala Art, Kuppam, 2007
9. Padmnabha K: Hoysala Sculptures : A cultural Study
10. Sheik Ali B (Ed): The Hoysala Dynasty , 1972 11.William Cohelo: The HoysalaVamsha, 1950
12. Annual Reports of the Department of Archaeology, Mysore 1939 – 4613.Settar S: Hoysala Temples
14. Marg: In Praise of Hoysala Art
15. Narasimhachar R; Lakshmidevi Temple at Doddagaddhavalli

16. Shastri KAN: The Cholas, 17.Shastri KAN: History of South India

DEPARTMENT - EDUCATION

IDC - 2 HIGHER EDUCATION

BLOCK - 1 HIGHER EDUCATION – ORGANIZATION AND TEACHING – LEARNING

Unit-1 Higher Education
Unit-2 Teaching Learning in Higher Education – I
Unit-3 Teaching-Learning in Higher Education – II
Unit-4 Problems and Innovations in Higher Education

BLOCK - 2 HIGHER EDUCATION – SOCIO-PSYCHOLOGICAL AND MANAGEMENT DIMENSIONS

Unit-5 Socio-Psychological Background of College Students
Unit-6 Problems of College Students
Unit-7 Higher Education – Management Dimensions
Unit-8 Higher Education Teacher

References:

1. Shills Edward (1989) 'The modern university Liberal Democracy'.
2. Abraham, Abu (1988) The Penguin, Book of Indian cartoons, New Delhi.
3. Chandra, Bipan (1984) Communalism Modern India, New Delhi.
4. Chauhan S.S (1989) Innovations in Teaching Learning Process, New Delhi, Vikas.
5. Srivastva A.B and Sharma K.K (1985) Elementary Statistics in Psychology and Education, New Delhi, Sterling Publishers Pvt. Ltd.,

DEPARTMENT - COMMERCE

Elective Course – EL2.1: Entrepreneurship Development

- **Objective:** To enable the Students to understand about the different aspects of Entrepreneurship Development.
- **Pedagogy:** A Combination of Lectures, Group Discussion, Assignments.
- **Credits:** 2 ; Examination Duration: $1^1/_2$and Maximum Marks: 50 (Internal Assessment Marks = 10 and Semester-end Examination =40)

Course Inputs

Block I

- **Unit -1: Entrepreneur and Entrepreneurship:** Introduction - Evolution – Characteristics – Distinction between Entrepreneur and Manager – Functions – Types – Entrepreneur - Concept of Entrepreneurship – Growth of Entrepreneurship in India – Role of Entrepreneurship in Economic Development
- **Unit – 2: Women Entrepreneurship:** Introduction - Concept – Statistical Evidence – New Age Women – Functions – Growth - Problems – Recent trends in Development of Women Entrepreneurship.

- **Unit -3: Rural Entrepreneurship:** Introduction - Meaning – Need – Rural Industrialisation in Retrospect – Problems – Development of Rural Entrepreneurship – NGOs and Rural Entrepreneurship.
- **Unit -4: Conceptual Models of Entrepreneurship:** Introduction - Models of John Kao – Udai Pareek and Nadakarni– NISIET.

Block II

- **Unit – 5: Factors Affecting Entrepreneurial Growth And Competencies:** Introduction - Economic Factors – Non-Economic Factor – Government Actions - Entrepreneurial Competencies: Meaning – Major Entrepreneurial Competencies – Developing Competencies.
- **Unit -6: Entrepreneurial Motivation and Mobility:** Introduction - Motivation – Motivation Theories – Motivating Factors – Achievement Motivation – Factors Influencing Mobility – Occupational Mobility – Locational Mobility.
- **Unit – 7: Entrepreneurship Development Programes:** Introduction - Need for EDPs - Objectives of EDPs – Course Contents and Curriculum of EDPs – Phases of EDPs – Evaluation of EDPs.
- **Unit -8: Institutional Support System for Entrepreneurship:** Introduction - DICs – SISIs – SIDCOs – NISIET – EDIT – NIESBU – TCOs- A Broad Overview of Central and State Level Financing Institutions.

Books Recommended for Reference

a. Vasanth Desai, The Dynamics of Entrepreneurial Development and Management, Himalaya Publishing House.
b. **A.** N Desai, Entrepreneurship Management, Ashish Publishing House.
c. Chandra Prasanna, Project Preparation, Appraisal and Implementation, Tata McGraw Hill.
d. Khanka, S.S, Entrepreneurial Development, S. Chand Publications.
e. Prasanna Chandra, Projects: Planning, Analysis, Selection, Implementation and Review, Tata McGraw Hill.

DEPARTMENT - MANAGEMENT

E-COMMERCE

Credits: 2

Module 1: E-commerce and its Technological Aspects:
Overview of developments in Information Technology and Defining E-Commerce: The scope of E commerce, Electronic Market, Electronic Data Interchange, Internet Commerce, Benefits and limitations of E-Commerce, Produce a generic framework for E-Commerce, Architectural framework of Electronic Commerce, Web based E Commerce Architecture.
Module 2: Electronic Data Interchange: Benefits of EDI, EDI technology, EDI standards, EDI communications, EDI Implementation, EDI Agreements, EDI Security. Electronic Payment Systems, Need of Electronic Payment System: Study and examine the use of Electronic Payment system and the protocols used, Study Electronic Fund Transfer and secure electronic transaction protocol for credit card payment. Digital economy: Identify the methods of payments on the net – Electronic Cash, cheques and credit cards on the Internet.

References:

1. Elias. M. Awad, " Electronic Commerce", Prentice-Hall of India Pvt Ltd.

2. Ravi Kalakota, Andrew B. Whinston, "Electronic Commerce-A Manager's guide", Addison-Wesley.
3. Efraim Turban, Jae Lee, David King, H.Michael Chung, "Electronic Commerce–A Managerial Perspective", Addison-Wesley.
4. Elias M Award, "Electronic Commerce from Vision to Fulfilment", 3rd Edition, PHI, Judy Strauss, Adel El-Ansary, Raymond Frost, "E-Marketing", 3RDEdition, Pearson Education

DEPARTMENT - BIO CHEMISTRY

Basics of Bioorganic chemistry for Biology graduates.

Introduction to Organic chemistry: Classification of organic compounds, unique characteristics, IUPAC nomenclature of organic compounds (including bifunctional).

Reaction mechanisms: Classification of organic reactions: substitution, addition, elimination and rearrangement with one example for each. Concepts of the following – carbon anions, carbon cations, free radicals, carbenes, nucleophiles and electrophiles.

Cycloalkanes**:** Reactivities and relative stability, Bayer's strain theory. Sachse-Mohr theory. Boat and chair form of cycloalkanes. Axial and equatorial bonds.

Arenes: Structue of Benzene–resonance and molecular orbital theories. Aromaticity. Mechanism of Nitration and Friedel-Craft's reaction. Electronic interpretation of the orienting influence of substituents in the electrophilic substitution of Toluene, Chlorobenzene, Nitrobenzene and Phenol. Polynuclear hydrocarbons–Resonance structures of Naphthalene, Anthracene and phenanthrene.

S_N1 and S_N2 reactions, mechanism with an example for each. Concept of elimination reactions. Example –n-butyl chloride.

Alcohols: Classification, monohydric, alcohols-distinguishing reactions for primary, secondary and tertiary alcohols.

Trihydric alcohols: Glycerol, Properties, ($KHSO_4$, HNO_3, Oxalic acid and HI)

Phenols: Acidity of phenols, Effect of substitution on acidity

Stereochemistry: Stereoisomerism, types, Fischer-projection formulae, asymmetric carbon atom, molecular dissymmetry, chirality, optical isomerism: ex. Glyceraldehyde, Lactic acid, Tartaric acid. Nomenclature of enantiomers. D- and L- system, Recemisation and resolution.

Heterogeneous and Homogenous hydrogenation of oils.

Selected References:

1. Basic Principles of Organic Chemistry, Roberts and Caserio, W. A. Benjamin, Inc. (1964).
2. Organic Chemistry, Morrison and Boyd, Allyn and Bacon Inc (1992).
3. Principles of Inorganic chemistry by Cotton & Wilkinson, Wiley (1999).
4. Textbook of Organic chemistry by Ahluwalia V K & Madhuri G Narosa publications (2001).
5. Physical chemistry by Castellan G W, Narosa Publications (2004).
6. Physical chemistry by Chakraborthy D K, Narosa Publications (2004).

DEPARTMENT - CHEMISTRY

ck-1	**Title: Physical parameters of molecules**

it-1	Thermodynamics: First and second laws of thermodynamics. Concept of entropy and free energy, entropy as a measure of unavailable energy. Entropy and free energy changes and spontaneity of process.
it-2	emical kinetics: Rate and order of reaction. Factor affecting the rate of reaction. And determination Order of reaction. Energy of activation and its determination. Brief account of collision and activated complex theories.
it-3	ic equilibria: pH scale, buffer solutions, calculation of pH of buffer solutions, buffer capacity and buffer index, buffer mixtures.
it-4	ctrochemistry: Electrolytic conductance, specific, equivalent and molar nductance, ionic mobility and transference number, factors affecting the electrolytic conductance, Arrhenius theory of strong and weak electrolytes, assumptions of DebyeHuckel theory of strong electrolytes.

ck-2	**Title: Organic molecules**
it-5	Introduction to organic chemistry, atomic orbitals, sigma and pi bond formation-molecular orbital (MO) method, sp, sp2 and sp3 hybridization, bond length, bond dissociation energies and bond angles
it-6	ctronegativity and polarity of the bonds. Classifications and ctions of organic compounds (with examples).
it-7	logical importance of natural products: Amino acids, proteins, carbohydrates (cellulose, starch, glycogen), lipids (fats and oils, phospholipids), nucleic acids, steroids, alkaloids, vitamins, flavonoids.
it-8	plications of synthetic products: Dyes, drugs, polymers (plastics), soaps and ergents, pesticides and pheromones.

DEPARTMENT – CLINICAL NUTRITION AND DIETETICS

OEL - 2: NUTRACEUTICALS AND HEALTH FOODS **2 Credits**

BLOCK 1. NUTRACEUTICALS:

Unit - 1: Introduction to Nutraceutical

Unit - 2: Use of Nutraceuticals in Traditional Health Sciences

Unit – 3: Functional Foods

Unit – 4: Development of Nutraceutical and Functional Foods

BLOCK 2: FUNCTIONAL FOODS AND NUTRACEUTICALS OF PLANT, ANIMAL AND MIRCIBIAL ORIGIN

Unit - 5: Prebiotics and Probiotics

Unit - 6: Bio Active Peptides and Phyto- Chemicals

Unit - 7: Fats and Oils- Omega 3 Fatty Acids:

Unit - 8: Sugar Substitutes / Sweeteners

REFERENCES:

- Tai Hu Guan, (2018), text book of Nutraceuticals and Health, Scitus Academics Publisher, Wilmington DE 19804, United States of America.
- Wildman REC, (2016), Handbook of Nutraceuticals and Functional Foods, 2nd edition, CRC Press publishers, Boca Raton, Florida (USA).
- Athapol Noomhorm, Imran Ahmad, Anil Kumar Anal (2014), Functional Foods and Dietary Supplements Processing, Effects and Health Benefits, first edition, published by John Wiley & Sons, Ltd. UK 111 River Street, Hoboken, NJ 07030-5774, USA
- Wildman REC, (2001) Handbook of Nutraceutical and Functional Foods, CRC Press, USA.Ghosh D et al, (2012) Innovations in Healthy and Functional Foods, CRC Press, USA. Pathak YV (2011) Handbook of nutraceuticals Volume 2, CRC Press, USA.

DEPARTMENT - COMPUTER SCIENCE

ELMCS- 02: E -Commerce

BLOCK-1

UNIT-1: Overview of developments in Information Technology and Defining E-Commerce: The scope of E commerce, Electronic Market, Electronic Data Interchange, Internet Commerce, Benefits and limitations of E-Commerce, Produce a generic framework for E-Commerce,

UNIT-2: Architectural framework of Electronic Commerce, Web based E Commerce Architecture. Consumer Oriented E Commerce E-Retailing: Traditional retailing and e retailing, Benefits of e retailing,

UNIT-3: Key success factors, Models of e retailing, Features of e retailing. E services: Categories of e-services, Web-enabled services, matchmaking services,

UNIT-4: Information-selling on the web, e entertainment, Auctions and other specialized services. Business to Business Electronic Commerce

BLOCK-2

UNIT-5: Electronic Data Interchange: Benefits of EDI, EDI technology, EDI standards, EDI communications, EDI Implementation, EDI Agreements, EDI Security. Electronic Payment Systems, Need of Electronic Payment System:

UNIT-6: Study and examine the use of Electronic Payment system and the protocols used, Study Electronic Fund Transfer and secure electronic transaction protocol for credit card payment. Digital economy: Identify the methods of payments on the net – Electronic Cash, cheques and credit cards on the Internet.

UNIT-7: Security in E Commerce Threats in Computer Systems: Virus, Cyber Crime Network Security: Encryption, Protecting Web server with a Firewall, Firewall and the Security Policy, Network Firewalls and Application Firewalls, Proxy Server. Issues in E Commerce Understanding Ethical,

UNIT-8: Social and Political **issues in E-Commerce**: A model for Organizing the issues, Basic Ethical Concepts, Analyzing Ethical Dilemmas, Candidate Ethical Principles Privacy and Information Rights: Information collected at E-Commerce Websites, The Concept of Privacy, Legal protections Intellectual Property Rights: Types of Intellectual Property protection, Governance.

References:

1. Elias. M. Awad, " Electronic Commerce", Prentice-Hall of India Pvt Ltd.
2. RaviKalakota, Andrew B. Whinston, "Electronic Commerce-A Manager's guide", Addison-Wesley.
3. Efraim Turban, Jae Lee, David King, H.Michael Chung, “Electronic Commerce–A

ManagerialPerspective", Addison-Wesley.
4. Elias M Award, “Electronic Commerce from Vision to Fulfilment”, 3rd Edition, PHI, Judy Strauss, Adel
5. El-Ansary, Raymond Frost, “E-Marketing”, 3RDEdition, Pearson Education.

DEPARTMENT - GEOGRAPHY

ELMG –02 Regional Geography of Karnataka (Credits – 2)

Block-1

Physical setting - Location, Administrative divisions, Geology, Physiographic divisions of the Karnataka; Climate and Rivers; Soils and Vegetation; Irrigation in Karnataka, Major Multipurpose River Valley Projects, Major water problems and Issues - Yetthinahole, Linganamakki, Mekedatu, Krishna-Cauvery valley-linking Rivers.

Block-2

Agriculture - Major of Crops: Rice, Jowar, Ragi, Wheat, Oil seeds, Sugarcane, Cotton, Tobacco and Coffee; Minerals Resources - Iron ore, Manganese, Bauxite, Copper, Gold; Major Power Projects - Hydel, Thermal and Atomic Energy power plants; Industries - Cotton Textile, Silk Textile, Sugar, Iron and Steel, Cement and Paper industries, Industrial Regions of Karnataka; Transportation - Roads, Railway, Water way, Ports/Harbors and Airways; Population - growth, distribution and density

References:

1. Directorate of Information and Tourism, Government of KarnatakaKarnataka State Gazetteer
2. Mallappa, P., (2014) Geography of Karnataka, Chethana book publishers, Mysuru
3. N.B.K Reddy & G.S. Murthy, (1967) Regional Geography of Mysore State
4. R.P. Misra, (1973) Geography of Mysore
5. Ranganath, (2018) Geography of Karnataka, Mysore Book House, Mysuru

DEPARTMENT - MATHEMATICES

Combinatorics and Graph Theory (ELMM –02) **2 Credits**

Block-I: Permutations and Combinations, Pigeon-hole principle, Principle of inclusion and exclusion.

Block-II: Graphs, Vertices of graphs, Walks and connectedness, Degrees, Operations on graphs, Blocks – Cutpoints, bridges, Block graphs and Cutpoint graphs. Trees - Elementary properties of trees,

Books for Reference:

1. C. L. Liu – Elements of Discrete Mathematics, McGraw-Hill, 1986.
2. Kenneth H. Rosen – Discrete Mathematics and its Applications, McGraw-Hill, 2002.
3. F. Harary – Graph Theory, Addition Wesley Reading Mass, 1969.

4. N. Deo – Graph Theory With Applications to Engineering and Computer Science, Prentice Hall of India, 1987.
5. K. R. Parthasarathy – Basic Graph Theory, Tata McGraw-Hill, New Delhi, 1994.
6. G. Chartand and L. Lesniak – Graphs and Diagraphs, wadsworth and Brooks, 2nd Ed.,
7. Clark and D. A. Holton – A First Look at Graph Theory, Allied publishers.
8. D. B. West – Introduction to Graph Theory, Pearson Education Inc.,2001, 2nd Ed.,
9. J. A. Bondy and U. S. R. Murthy – Graph Theory with applications, Elsevier, 1976.

DEPARTMENT - MICROBIOLOGY

Microbes in Sustainable Agriculture and Development

i. Soil Microbiology: Soil as Microbial Habitat, Soil profile and properties,
ii. Soil formation, Diversity and distribution of microorganisms in soil.
iii. Microbial Activity in Soil and Green House Gases- Carbon dioxide, methane, nitrous oxide, nitric oxide – production and control
i. Mineralization of Organic & Inorganic Matter in Soil: Mineralization of cellulose, hemicelluloses, lignocelluloses, lignin and humus, phosphate, nitrate, silica, potassium .
ii. Microbial Control of Soil Borne Plant Pathogens: Biocontrol mechanisms and ways, Microorganisms used as biocontrol agents against Microbial plant pathogens, Insects, Weeds.
iii. Biofertilization, Phytostimulation,
iv. Bioinsecticides: Plant growth promoting bateria, biofertilizers – symbiotic (Bradyrhizobium, Rhizobium, Frankia),
v. Non Symbiotic (Azospirillum, Azotobacter, Mycorrhizae, MHBs, Phosphatesolubilizers,algae),
vi. Novel combination of microbes as biofertilizers, PGPRs
i. Secondary Agriculture Biotechnology: Biotech feed, Silage, Biomanure, biogas, biofuels – advantages and processing parameters.
ii. GM crops: Advantages, social and environmental aspects, Bt crops, golden rice, transgenic animals.

References:

1. EldorA.Paul. SoilMicrobiology. EcologyandBiochemistry.VIEdition:Academic Press, (2007).
2. EugeneL. Madsen. Environmental Microbiology:FromGenomestoBiogeochemistry. IEdition,Wiley-BlackwellPublishing. (2008).
3. Agrios, G.N. Plant pathology. Harcourt Asia Pvt. Ltd. (2000).
4. Buchanan. B.B., Gruissem, W. and Jones, R.L Biochemistry and Molecular Biology of Plants. I.K. International Pvt. Ltd. (2000).
5. Mehrotra R S and Ashok Agrawal. Plant Pathology. Tata Mc Graw Hill ,6th reprint (2006).
6. K. S. Bilgrami, H. C. Dube. A textbook of modern pathology. 6th Edition, Vani Educational Books, a division of Vikas, (1984).
7. K.R. Aneja .Experiments in Microbiology, Plant Pathology and Biotechnology . New Age

Publications.2017

DEPARTMENT - PHYSICS

MP-EL2: Waves and Optics

BLOCK-A:

Unit-1: Superposition of Two Collinear Harmonic oscillations: linearity & superposition principle. (i) Oscillations having equal frequencies and (ii) oscillations having different frequencies (Beats).

Unit-2: Waves Motion- General: Transverse waves on a string, travelling and standing waves on a string, normal modes of a string, group velocity, phase velocity, plane waves,Spherical waves, wave intensity.

Unit-3: Fluids: Surface tension: synclastic and anticlastic surface - excess of pressure - application to spherical and cylindrical drops and bubbles. viscosity - rate flow of liquid in a capillary tube - Poiseuille's formula - determination of coefficient of viscosity of a liquid.

Unit-4: Sound: Simple harmonic motion - forced vibrations and resonance intensity and loudness of sound, intensity levels, musical notes, musical scale, acoustics of buildings: reverberation and time of reverberation, absorption coefficient, Sabine's formula - measurement of reverberation time.

BLOCK-B:

Unit-5: Wave Optics: electromagnetic nature of light, definition and properties of wave front, Huygen's Principle.

Unit-6: Interference: Interference: division of amplitude and division of wavefront. Young's double slit experiment, interference in thin films: parallel and wedge-shaped films,Newton's Rings: measurement of wavelength and refractive index.

Unit-7: Diffraction: Fraunhofer diffraction- single slit and double Slit, multiple slits and diffraction grating, Fresnel diffraction: half-period zones, zone plate, Fresnel diffraction pattern of a straight edge, a slit and a wire using half-period zone analysis.

Unit-8: Polarization: Transverse nature of light waves, plane polarized light – production and analysis, circular and elliptical polarization.

DEPARTMENT -PSYCHOLOGY

EL-2 Psychology in Everyday Life 2 Credits

Block 1: Applications of Psychology-I
Unit 1: Psychology as a Profession
Unit 2: Memory Improving Techinques
Unit 3: Stress and Emotional Management
Unit 4: Personality Development

Block 2: Applications of Psychology-II
Unit 5: Psychology in Educational Settings
Unit 6: Psychology in Health Setting
Unit 7: Psychology in Organizational Setting
Unit 8: Adjustment to Family and Work Place

References:

1. Charles G.Morris. Albert A. Maisto Psychology an Introduction , Prentice Hall. New Jersy.
2. Feldman, A. R.,Understanding Psychology IV th Ed, 1996, McGraw Hill, New Delhi.

3. Morgan, King, Weisz &Schopler, Introduction to Psychology-V11 Ed,1993, Tata McGraw Hill, New Delhi.
4. Ernest R Hilgard, Richard C Atkinson ,Rita L Atkinson Introduction to Psychology Oxford Publication, New Delhi.

DEPARTMENT -INFORMATION TECHNOLOGY

ELMIT –02 E-Commerce (2 Credits)

Block 1:Fundamentals of E-commerce

Unit 1 : Introduction to E-commerce

What Is E-commerce? The Difference Between E-commerce and E-business, Technological Building Blocks Underlying E-commerce: the Internet, Web, and Mobile Platform, Major Trends in E-commerce, Unique Features of E-commerce Technology

Unit 2 : Types of E-commerce:

Business-to-Consumer (B2C) E-commerce, Business-to-Business (B2B) E-commerce. Consumer-to-Consumer (C2C) E-commerce, Mobile E-commerce (M-commerce), Social E-commerce, Local E-commerce E-commerce: A Brief History, Understanding E-commerce: Organizing Themes, Academic Disciplines Concerned with E-commerce

Unit 3 : E-Commerce Infrastructure

The Internet, Technology Background , Internet – Key Technology concepts, TCP/IP, IP addresses, Domain names, DNS and URLs, Client Server Computing, Cloud computing model, Mobile platform

Unit 4 : Internet and Web

Hypertext, HTML, XML, Web servers and clients, Web browsers, Communication tools – E mail, messaging apps, online message boards, Internet Telephony

Block 2: Construction of E-commerce presence

Unit 5: E-commerce presence – Building an e-commerce idea, Systematic approach, Choosing software and hardware, E-commerce site tools

Unit 6: E-commerce security E-commerce System environment, Security threats, Technology solutions

Unit 7: **E-commerce payment systems** : Management policies, E-commerce payment systems, Electronic billing presentment and payment

Unit 8: **E-commerce Business Strategies** : E-commerce business models, Major B2C Business models, B2B Business models,

References:

1. Laudon, Kenneth C., and Carol Guercio Traver. *E-Commerce 2020-2021*. Pearson, 2020.
2. Laudon, Kenneth C., and Carol Guercio Traver. *E-commerce Essentials*. Pearson, 2014

DEPARTMENT - BOTANY

Plant Diversity and Human Welfare

Plant Diversity and its Scope Levels of biodiversity: Genetic, Species and Ecosystem; Agrobiodiversity and cultivated plant taxa and related wild taxa.

Values and uses of Biodiversity, Methodologies for valuation, Ethical and aesthetic values, Uses of plants; Ecosystem services.

Loss of Biodiversity Loss of biodiversity- causes and implications, Hot spots of biodiversity, extinction of species, projected scenario for biodiversity loss.
Management of Plant Biodiversity Organizations associated with biodiversity management, IUCN, UNEP, WWF, UNESCO, NBPGR; Methodology for execution;
Biodiversity legislation; Information management and communication.
Conservation of Biodiversity, Role of Plants in Relation to Human Welfare Conservation of genetic, species and ecosystem diversity,
In situ and ex situ conservation strategies, India's biodiversity and its conservation Social approaches to conservation,
Biodiversity awareness programmes, Sustainable development.
Importance of forestry their utilization and commercial aspects; Avenue trees; Ornamental plants of India; Alcoholic beverages; Fruits and nuts; Wood and its uses; their commercial importance.

References

1. Krishnamurthy, K.V. (2004). An Advanced Text Book of Biodiversity - Principles and Practices.Oxford and IBH Publications Co. Pvt. Ltd. New Delhi
2. Singh, J.S., Singh, S.P. and Gupta, S. (2006). Ecology Environment and Resource Conservation. Anamaya Publications, New Delhi, India.
3. Reddy, K.V. and Veeraiah, S. (2010). Biodiversity and Plant Resources. Aavishkar publication, New Delhi.
4. Heywood, V. H. and Watson, R. T. (1995). Global biodiversity and Assessment. Cambridge University Press.

DEPARTMENT –FOOD AND NUTRITION SCIENCE

OEL-2: NUTRITIONAL MANAGEMENT IN DISASTER CONDITIONS

BLOCK- I: NATURAL / MANMADE DISASTERS

Unit-1: Emergency Situations-Famine, Drought, Flood, Earthquake, Cyclone, War, Civil and Political Emergencies.
Unit-2: Nutrition in Emergencies, Nutritional Problems and Communicable Diseases.
Unit-3: Feeding Programs during Emergencies.

Unit-4: Assessment and monitoring of Nutritional Status and relief measures during emergencies.

BLOCK- I: NUTRITIONAL RELIEF AND REHABILITATION

Unit-5: Assessment of Food needs in emergency situations, Food Distribution Strategy, Local food rehabilitation.
Unit-6: Special Foods/ Rations for Nutritional Relief, Organizations for Mass Feeding/ Food Distribution, and Supplementary Feeding.
Unit-7: Transportation, Storage, Feeding Centres, Sanitation, Hygiene and Identifying Reaching the Vulnerable Group.
Unit-8: Public Nutrition Approach to Tackle Nutritional and Health Problems in Emergencies, food security.

REFERENCES:

Jaspars, S. & Young, H. (1996), General Food Distribution in Emergencies: from Nutritional Needs to Political Priorities. Good Practice Review 3. 1996. Relief and Rehabilitation Network, Overseas Development Institute. London.
Young H., Jaspars S., Brown R., Frize J. & Khogali H (2001), Food Security and Assessments in Emergencies: A Livelihoods Approach. Humanitarian Practice Network, Overseas Development

Institute. London

ANNEXURE-III

Question Paper Pattern

I Semester, M.Sc. in Biotechnology Examination May 2014
Biomolecules

Time: 3 Hours **Max. Marks: 80**

Instruction: *Answer all the sections.*

Section A

Answer any **FOUR** questions from the following **4 × 5 = 20**

1.

2.

3.

4.

5.

6.

Section B

Answer any **THREE** questions from the following **3 × 10 = 30**

7.

8.

9.

10.

11.

Section C

Answer any **TWO** questions from the following **2 × 15 = 30**

12.

13.13.

14.14.

15.15.

A. Model Question Paper

BT 1.1

I Semester, M.Sc. in Biotechnology Examination
Biomolecules

Time: 3 Hours **Max. Marks: 80**

Instruction: *Answer all the sections.*

Section A

Answer any **FOUR** questions from the following **4 × 5 = 20**

1. Starch
2. Haemoglobin
3. Saponification number
4. Sphingolipids
5. Functions of cholesterol
6. Chargaff's rule

Section B

Answer any **THREE** questions from the following **3 × 10 = 30**

7. Classify carbohydrates with suitable examples
8. Classify amino acids based on nature of R groups
9. Describe the steps involved in determination of primary structure of proteins
10. Enumerate and explain physic-chemical properties of RNA
11. Explain Watson and Cricks's model of DNA

Section C

Answer any **TWO** questions from the following **2 × 15 = 30**

12. Explain the reactions of amino acids.
13. Explain the structure and functions of biologically active peptides.
14. Give detailed classification of lipids.
15. Explain the structure and chemistry of nucleotides.

Note: The question papers of all courses are available in the University website.