



MES College of Arts, Commerce and Science

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Course Outcome of Under Graduate Subjects

Subject: Biotechnology

COURSE CODE	COURSE NAME	COURSE OUTCOME
BTT 101	Cell biology and genetics	<ul style="list-style-type: none"> • Structure of eukaryotic cells – plants and animals • Cell organelles structure and functions – ER, Golgi complex, mitochondria, chromosome, chloroplast. Ribosome, peroxisome, nucleus, vacuole, cytosol and cytoskeleton structures • Cell cycle, mitosis, meiosis • Cell senescence • Structure of RNA, DNA • Mendel's laws of inheritance • Gene interaction • Sex determination in animals and plants • Linkage and crossing over with respect to recombination frequency • Cytoplasmic inheritance • Mutations • Karyotypes of human beings and abnormality
BTP 102	Cell biology and genetics	<p>Students Learn Cytological Techniques:</p> <ul style="list-style-type: none"> • Micrometry – measurement of size of cells • Counting of cells by hemocytometer • Locating Barr bodies in buccal cells by preparing buccal smear and staining • Isolation and visualization of mitochondria • Mitosis using onion root tip • Meiosis using grasshopper testis and onion shoot bulb

BTT 201	Microbiology and Biostatistics	<p>Students Learn</p> <ul style="list-style-type: none"> • How the cell was discovered and role of various scientists • Microscopic techniques • Sterilization techniques • Staining techniques for various microbes • Classification of microorganism in microbial taxonomy • Structure and properties of Viruses, Bacteria, Fungus and algae • Pathogenic organisms causing tetanus, tuberculosis, typhoid, cholera, AIDS • Metabolism in microorganisms –EMP, HMP &ED pathway, TCA cycle • Bacterial photosynthesis- light and dark reaction, oxidative and non-oxidative photophosphorylation <p>For future research and project work they learnt various statistical techniques:</p> <ul style="list-style-type: none"> • Frequency distribution, sampling, graphical data representation • Measure of central values – mean, median and mode • Dispersion of data measurement – mean deviation, standard deviation, coefficient of variance • Hypothesis testing like Chi square test and student t-test • Probability and distribution methods – binomial, poisson and normal and where they are used
BTP 202	Microbiology and Biostatistics	<p>Students learn industrially applicable techniques:</p> <ul style="list-style-type: none"> • Sterilization of lab, glassware by autoclave, fumigation, hot air oven, wrapping of glassware • Use of instruments like pH meter, laminar air flow, autoclave, centrifuge • Staining techniques to stain various organisms like fungus and bacteria – safranin, crystal violet, malachite green, nigrosine, lactophenol cotton blue (gram's staining, simple staining, differential staining and fungal staining) • Microbial culture techniques using bacterial and fungal media - nutrient agar, MRBA and nutrient broth • Isolation of fungus and bacteria from air, water and soil samples – they practice analyzing sample at their home and surrounding as well • Biochemical test of microorganisms – gelatin liquefaction, antibiotic sensitivity test, starch hydrolysis, catalase test to test to find the properties of microorganisms based on test • Rhizobium study from root nodule of legume plant
BTT 301	Biochemistry and Biophysics	<ul style="list-style-type: none"> • Students learn about biomolecules and their function • About steroid hormone, structure and mechanism • Spectroscopic techniques, radioisotopes, uses and its measurement • Biological buffer concepts

BTP 302	Biochemistry and Biophysics	Industrially important techniques <ul style="list-style-type: none"> • Buffer preparation – citrate and phosphate • Estimation of concentration of sugar by DNS and Somoji's method • Estimation of protein by Lowry's and biuret method • Enzyme activity assay of amylase • Chromatographic technique for sugar, amino acid – TLC and ninhydrin method • Estimation of concentration of phosphate by Subba row method
BTT 401	Molecular Biology	Students gain knowledge in the field of molecular biology like: <ul style="list-style-type: none"> • Nucleic acid and structure of DNA and RNA • Replication of DNA during cell division • Making of RNA copies for cellular activities • Formation of proteins for normal functioning of cell and organisms • Jumping genes and its applications
BTP 402	Molecular Biology	Research institute important techniques: <ul style="list-style-type: none"> • Estimation of concentration of DNA and RNA by DPA and orcinol method • Chromatographic techniques for precious sample- gel filtration • Extraction and purification of proteins by ammonium sulfate precipitation method • Protein separation technique –SDS PAGE
BTT 501	Genetic Engineering and EBT	<ul style="list-style-type: none"> • Students learn about genetic engineering and its application in the field of agriculture and medicine • They learn to obtain gene from the source and ligating it to the vector and transforming to a host cell to get the desired product • DNA finger printing • Biogas production, renewable and non-renewable resources • Microbial production of H₂, ethyl alcohol • GM organisms and its application in bioremediation • Importance of N₂ fixing organisms and its production in large scale as biofertilizers, which helps in increasing the percentage of crop.
BTP 502	Genetic engineering and EBT	Research institute important basic techniques: <ul style="list-style-type: none"> • DNA AND RNA isolation from plant and animal source • Plasmid DNA isolation from E. coli • Gel electrophoresis technique to separate DNA • Protein separation technique by SDS PAGE • Examination of bacteria in water

BTT 601	Immunology and ABT	<p>Students learnt about:</p> <ul style="list-style-type: none"> • Different types of immunity- innate, adaptive, cell mediated, humoral, active and passive • Antigens and its properties • Antibodies, different types, properties and functions • Production of antibodies • Blood typing • Complement system • Hypersensitivity reactions in humans • Animal tissue culture • Types of media used for ATC • Growth hormones – EGF, FGF, PDGF, IL-1 &2, NGF, Erythropoietin • Techniques of disaggregation of animal tissue, primary and secondary culture • Cell lines, examples and transformation of animal cell lines • HAT selection, selectable markers, expression vectors, over production o and downstream processing of expressed proteins • Transgenic animals and applications • Monoclonal antibodies and applications • Production of vaccines
BTP 602	Immunology and ABT	<p>Pathologically important techniques:</p> <ul style="list-style-type: none"> • Blood grouping and WBC counting • Diagnosis of typhoid and syphilis by WIDAL and VDRL METHOD • ELISA techniques applicable to diagnose various virus and bacteria like dengue: DOT ELISA and Sandwich ELISA • Finding concentration of antigen in serum by rocket immune electrophoresis technique • Finding identity of two antigens by ouchterlony double diffusion technique • Serum separation from blood and serum precipitation technique
BTT 701	Plant Biotechnology	<p>Students learn about plant hormones</p> <ul style="list-style-type: none"> • Sterilization techniques • Plant growth media • Micro propagation techniques • Primary and secondary metabolites • Organ culture – ovary, ovule, anther, embryo and endosperm • Somatic embryogenesis and somatic hybridization

		<ul style="list-style-type: none"> • Transgenic plants and techniques of transformation • Role of tissue culture in agriculture, horticulture and forestry • Intellectual property rights
BTP 702	Plant Biotechnology	<p>Students learnt the technique of:</p> <ul style="list-style-type: none"> • Plant tissue culture media • Plants organ culture – callus, shoot tip, anther, nodal, , suspension culture • Preparation of industrially important synthetic seeds • Isolation of protoplast for creating cybrids
BTT 801	Industrial Biotechnology	<p>Students learn about:</p> <ul style="list-style-type: none"> • Fermenters • Techniques of fermentation • Downstream processing of fermented products • Methods of strain improvement • Upstream processing before fermentation • Production of microbial products – alcohol, organic compounds, antibiotic, amino acids, Vitamin b12 • Enzyme technology and its application • Fermented food products – SCP and SCO • Mass culture of spirulina, production of xanthum gum, safranin, capascin, PHA and PHB
BTP 802	Industrial Biotechnology	<p>Students learnt industrially important basic techniques:</p> <ul style="list-style-type: none"> • Algal and fungal culture for mushroom, vitamins, antibiotic and acid production • Estimation of acid and sugar • Cell immobilization techniques • Alcohol estimation by specific gravity method • Industrial visits to various industries

Subject: Botany

COURSE CODE	COURSE NAME	COURSE OUTCOME
I Semester Paper 1	Introduction to Microbiology, Viruses, Bacteria, Cyanobacteria and Phycology	<p>Syllabus</p> <ul style="list-style-type: none"> • Introduction to Microbiology, scope of and significance of microbiology. • Isolation of Microbes from soil • A brief account of culture media, serial dilution, pour plate method and colony characteristics of bacteria • A brief account of Biofertilizers, Biopesticides. • Immunology • Study of Cyanobacteria and Phycology
		<p>Students Learn</p> <ul style="list-style-type: none"> • Students learn some basic microbiology technique like preparation of culture media, serial dilution, pour plate method and identification of some bacteria based on their colony characters. • Identification of some plant diseases caused by viruses, bacteria and mycoplasma. • Gram staining technique • Measurement of cell concentration using Hemocytometer. • Mounting, staining and identifications of different algal members studied in the syllabus. • Economic importance to cyanobacteria and Algae in Agriculture, industry and Medicine. • Application of immune techniques in Agriculture, Industry and Medicine.
II Semester Paper 2	Diversity of Non-Vascular Plants part II- Mycology, plant Pathology, Bryophytes and Plant Anatomy	<p>Syllabus</p> <ul style="list-style-type: none"> • Introduction to Mycology and study of some forms • Economic importance of Fungi in Medicine, Agriculture. • Mycorrhiza and Saccharomyces • Plant Pathology • Bryophytes • Plant Anatomy
		<p>Students Learn</p> <ul style="list-style-type: none"> • Identification of different fungi and the diseases caused by them in plant. • Economic importance of fungi and Mycorrhiza with reference to Industry, Agriculture and Medicine. • Management of some common fungal diseases. • How to use biopesticides • Preparation of Biofertilizers and its usage

		<ul style="list-style-type: none"> • General characterization and identification of different Bryophytic forms. • Mushroom cultivation • Sectioning techniques - stem, roots and identification of different tissues
III Semester PAPER 3	Pteridophytes, Paleobotany, environmental Biology, Ecosystem Management and Phytogeography	<p>Syllabus</p> <ul style="list-style-type: none"> • Introduction and General Characters in different representative forms of Pteridophytes • Process of Fossilization and study of Different fossil forms. • Study of types of Ecosystem, soil conservation and soil reclamation • Ecosystem Management • Study of Vegetation in India and Karnataka
		<p>Students Learn</p> <ul style="list-style-type: none"> • Identification of pteridophytes pertaining to the syllabus • Identification of fossils and types of fossilization • Estimation of Salinity and Chlorinity in Water using Harvey's Method • Estimation of Oxygen content in Water using Wrinkler's Method • Permanent slide preparation of Pteridophytes, Hydrophytes, Xerophytes and Parasites. • Characterization of soil samples and their uses in Agriculture • Use and application of Quadrat method • Identification of vegetation type in Karnataka. • Watershed management • Conservation of plant diversity by seed bank and gene bank
IV Semester Paper 4	Gymnosperms, Embryology of Angiosperms	<p>Syllabus</p> <ul style="list-style-type: none"> • Introduction and General Characters in different representative forms of Gymnosperms • Study of structure and development of male and female reproductive structure in Angiosperms • Palynology • Embryogenesis • Experimental Embryology
		<p>Students Learnt</p> <ul style="list-style-type: none"> • Identification of Gymnosperms pertaining to the syllabus • Mounting of Embryo and Endosperm • Project on Pollen Morphology and Pollen germination of different flowers from different localities • Tissue Culture Techniques • Practical applications of Anther, Embryo and Protoplast Culture

V Semester Paper 5	Taxonomy and Economic Botany	<p>Syllabus</p> <ul style="list-style-type: none"> • Classical Taxonomy • Biosystematics • Detail study of prescribed Monocot and Dicot family members • Economic importance of Edible oil, Sugar starch, Fibers, Spices, Timber, Medicinal and Aromatic plants. <p>Students Learn</p> <ul style="list-style-type: none"> • Structure and modification of root, stem and leaf • Morphological features of inflorescence, flower and fruit. • Identification and characterization of plants based on the taxonomic characters and assign them to the respective families • Use of technical terms for describing plants. • Use of ICBN rules. • Herbarium techniques • How to study local flora • Economic importance of different parts of plants and their significance
V Semester Paper 6	Molecular Biology, Genetic Engineering, Biotechnology and plant Physiology	<p>Syllabus</p> <ul style="list-style-type: none"> • Molecular Biology • Recombinant DNA technology • Bioinformatics • Plant Physiology • Stress Physiology in plants <p>Students Learn</p> <ul style="list-style-type: none"> • Quantitative analysis of starch, proteins, Reducing sugars and Lipids • Determination of osmotic potential of cell sap by plasmolytic method • Determination of Stomatal Index • Streaming of protoplasm to show cyclosis • Study of Osmosis and transpiration experiments • Study of phloem transport by ringing Experiments

VI Semester Paper 7	Cytology, Genetics, Evolution and Plant Breeding	<p>Syllabus</p> <ul style="list-style-type: none"> • Cell and chromosome Biology • Mendelian Genetics • Evolution • Plant Breeding. <p>Students Learn</p> <ul style="list-style-type: none"> • Preparation of cytological stains • Preparation of permanent slides of mitosis and meiosis using plant material Allium root tips and flowers • Karyotype and Idiogram: Camera Lucida Drawing • Plant Breeding Techniques • Solve plant Genetic Problems
VI Semester Paper 8	PLANT PHYSIOLOGY III	<p>Syllabus</p> <ul style="list-style-type: none"> • Enzymes • Nitrogen metabolism • Photosynthesis • Photorespiration • Plant Growth Regulators • Defense mechanisms in plants Students learn • Separation of photosynthetic pigments by paper chromatography and measure of Rf values • Determination of rate of photosynthesis at different wavelength of light • Determination of rate of photosynthesis at different concentration of CO₂ • Estimation of Ascorbic Acid content in plant sample • Determination of RQ of carbohydrates, fats and proteins • Determination of rate of growth in plants using ArC Auxanometer • Study of manufacture of Alcohol/ Antibiotics/Enzymes at Industrial level by visit to any one of the Industry

Subject: Chemistry

COURSE CODE	COURSE NAME	COURSE OUTCOME
I Semester	Mathematical concepts	Strengthens their understanding of mathematical aspects like logarithms, calculus and curve sketching underlying the chemical concepts.
	Gaseous State	They will be able to differentiate between ideal and real gasses. They will develop a thorough understanding of different parameters that define a real gas. They gain the knowledge on how to liquefy air and hydrogen based on the principles of J/T effect by Linde's Process.
	Photochemistry	They will be able to apply the laws of photochemistry to all colorimetric estimations.
	Liquids and solutions	They understand the behavior of binary liquid mixtures, CST, Azeotropes and colligative properties and their applications in determination of molar mass and estimation of percentage composition of impurities in liquid mixtures in industries.
	Periodic table and Periodic properties.	They are well versed with the periodicity in properties of elements. They will be able to assign the elements to their respective groups based on the properties. They are efficient in predicting and explaining chemical behavior – reactivity and reducing power of elements.
	Analytical chemistry	They will understand the significance of precision, accuracy and errors in lab measurements and analytical techniques.
	Basic concepts in organic chemistry	They will acquire basic understanding about the classification and nomenclature of organic compounds, fundamentals of organic reaction mechanism, aromaticity and stereochemistry.
Aliphatic Hydrocarbons	Understand the mechanism, preparation and chemical basis behind the behavior of hydrocarbons like alkanes, cyclo-alkanes, alkenes, dienes, and alkynes.	
III Semester	Chemical Kinetics	They gain the elementary idea <ol style="list-style-type: none">about order and molecularity of chemical reactions.rate equations for 0, 1st and 2nd order reactions.Half-life and its significance in radioactivity.Theories of reaction rates and their applications.Experimental determination of commonly observed chemical reactions like inversion of cane sugar.

Thermodynamics I and II	They will be able to State and apply the laws of thermodynamics, entropy, enthalpy and free energy. Derive expressions like Gibbs-Helmholtz, Clausius Clapeyron equations. To predict chemical equilibrium and spontaneity of reactions. Design practical engines by using thermodynamics cycles.
Surface chemistry	They get an elementary idea of catalysis and adsorption, theories of adsorption, mechanism including enzyme catalysis and its applications in industry and daily life.
Organic and Inorganic Polymers	They will comprehend the chemical composition of different polymers and will gain the knowledge of their manufacture and applications to industry and daily life.
Compounds of some Nonmetals	They develop a comprehensive understanding of structures [banana bond structure of diborane], preparation, properties and applications of significant non-metal compounds of boron and chlorine like bleaching powder.
Metallurgy	They understand the basic metallurgical operations required to extract essential metals like thorium, nickel, plutonium and uranium from respective ores. Knowledge about the principle and salient features about the Ellingham Diagram and its significance in extraction of metals.
Alcohols and Thiols	Will develop an insight about the properties, manufacture and reactions of alcohols, thiols, phenols, Grignard reagents, ethers and epoxides; and their applications in industries and in their daily lives.
Phenols	
Ethers and Epoxides	
Epoxides	
Organometallic compounds	
Fertilizers	They have complete knowledge on fertilizers, functions of essential plant nutrients [Nitrogen, Phosphorous, Potassium], classification with suitable examples and manufacture of fertilizers. an idea about all the fertilizer industries in India.

Subject: Computer Science

COURSE CODE	COURSE NAME	COURSE OUTCOME
CS 1T	Programming Concepts using C	<ul style="list-style-type: none"> To understand the basics of Computer system, classification of software, algorithms and flowcharts, programming techniques To understand the concepts of problem solving using a language To understand the syntax and semantic rules of C Programming Language To execute the practice as well as syllabus programs to put the theory concepts into practical knowledge
CS 1P	C Programming Lab	<ul style="list-style-type: none"> To know the concepts in problem solving with algorithms and flowcharts. Understanding of tools and software for coding and execution of programs Basic understanding of approaching structured programming language paradigm. To write simple C programs with variables and arithmetic operators and use appropriate statements to control flow of execution. Design C programs that are modular. To test and debug C Program To understand the syntax and semantic rules of C programming language.
CS 2T	Data Structures	<ul style="list-style-type: none"> Understand the concept of derived and user defined data structures Analyze the problem and decide which data structure to be used.
CS 2P	Data Structures Lab	<ul style="list-style-type: none"> Understand the concept of derived and user defined data structures To understand the operations on data structures through programs To understand the applications of data structures through programs
CS 3T	Database Management System and Software Engineering	<ul style="list-style-type: none"> Understand software development life cycle and the role of modelling. To understand concepts in software development such as risk and quality. Understand the basics of an object-oriented approach to software development Ability to analyze, design, verifies, validate, implement, apply and maintain a software system. Ability to apply software engineering principles and techniques to develop large-scale software systems. Ability to plan and work effectively in a team Knowledge about how to do Transition from traditional software models to agile models. Understand database concepts and structures and query language. To be able to model an application's data requirements using conceptual modeling tools like ER diagrams and design database schemas based on the conceptual model. To design and build a simple database system and demonstrate competence with the fundamental tasks involved with modeling, designing, and implementing a DBMS.

		<ul style="list-style-type: none"> • Design schema for the given database by creating appropriate tables and write SQL queries using DDL and DML statements, to retrieve information out of it. • Understand Functional Dependency and Functional Decomposition. • Apply various Normalization techniques.
CS 3P	DBMS Lab	<ul style="list-style-type: none"> • Understand database concepts and structures and query language. • To be able to model an application's data requirements using conceptual modeling tools like ER diagrams and design database schemas based on the conceptual model. • To design and build a simple database system and demonstrate competence with the fundamental tasks involved with modeling, designing, and implementing a DBMS. • Design schema for the given database by creating appropriate tables and write SQL queries using DDL and DML statements, to retrieve information out of it. • To declare and enforce proper Integrity constraints on Database. • Create views and triggers that automatically indicate the updating of data in the tables • Understand Functional Dependency and Functional Decomposition. • Apply various Normalization techniques. • Perform PL/SQL programming using concept of Cursor Management, Error Handling, Stored Procedure, Package and Triggers.
CS 4T	Operating System and Unix	<ul style="list-style-type: none"> • Understand the structure of an Operating System. • Understand the function of an Operating System. • Understand the various process management concepts including scheduling, synchronization, deadlocks of an Operating System • Be familiar with multithreading. • Be familiar with memory management including virtual memory. • Be familiar with system resources sharing among the users. • Be familiar with protection and security mechanisms. • Study of UNIX Operating System with reference to the theory.
CS 4P	UNIX Programming Lab	<ul style="list-style-type: none"> • To know the UNIX working environment. • To get familiar with the common commands used in UNIX. • To learn script writing using features of UNIX script writing. • To be able to write small scripts in UNIX and execute them.
CS 5T1	Object Oriented Programming JAVA	<ul style="list-style-type: none"> • Understand the OOPS concept • Understand the packages and threads concept. • To understand the exception handling in detail.

		<ul style="list-style-type: none"> • Understand the concept of Applet, Files.
CS 5P1	JAVA Programming Lab	<ul style="list-style-type: none"> • Understanding of tools and software for coding and execution of programs in JAVA • Understand and apply the Object-Oriented Features and JAVA Concepts • To apply the concept of multithreading and implement exception handling • To develop applications using Console I/O, File I/O and GUI Applications • To be able to write programs for applets
CS 5T2	Visual Programming	<ul style="list-style-type: none"> • To understand the concepts of Visual Programming • To get familiar with the syntax and semantics of VB6.0 • To understand the working of VB6.0 controls in detail • To understand implement Data Base connectivity concepts using DAO, ADO mechanisms • To be able to design an application in VB6.0 using the required features of VB6.0
CS 5P2	Visual Programming Lab	<ul style="list-style-type: none"> • To understand the concept of Visual Programming • To be able to use the Visual Studio for developing simple applications in VB as well as VC++ • To apply the MDI Concepts • To understand the usage of different controls, their properties and events and methods, of VB6.0 through application • To design applications with back end(database) and thus manipulate the database • To design a VC++ application with resources
CS 6T1	Web Programming	<ul style="list-style-type: none"> • To understand the syntax and semantics of XHTML, JAVA SCRIPT, CSS • To design web pages using the above said facilities.
CS 6P1	Web Programming Lab	<ul style="list-style-type: none"> • To apply a structured approach to identifying needs, interests, and functionality of a website. • To write well-structured, easily maintained, standards-compliant, accessible HTML code. • To write well-structured, easily maintained, standards-compliant CSS code to present HTML pages in different ways. • To use JavaScript to add dynamic content to pages. • To enhance the experience of site visitors, using animation
CS 6T2	Computer Networks	<ul style="list-style-type: none"> • To understand the concept of computer networks • To understand the transmission media, types of networks, communication fundamentals. • To understand the various protocols and topologies, collision handling • To study different routing algorithms, TCP/IP protocols.
CS 6P2	Project Lab	<ul style="list-style-type: none"> • To design an application to solve a real time problem. The application needs to create database, manipulate it and generate report using the front end. • To work in a team

Subject: Economics

COURSE CODE	COURSE NAME	COURSE OUTCOME
I Semester	Micro Economics	<ul style="list-style-type: none"> • Explains what economic theory is and the significance of its study. • Explains the use of application of economic theory to build models. • Explains the concepts and helps in making major decisions.
II Semester	Macro Economics	<ul style="list-style-type: none"> • Explains the methods of National income calculation. • Provides the knowledge of causes and effects of inflation and unemployment. • Helps in measurement and determination of aggregate demand and supply.
III Semester	Monetary Economics	<ul style="list-style-type: none"> • Helps in understanding the role of money. • Helps in understanding the role of Central bank and Commercial banks. • Helps in understanding the process of credit creation. • Helps in understanding the impact of inflation.
III Semester	Economics of Infrastructure	<ul style="list-style-type: none"> • Helps in understanding Benefit and Cost analysis and its application to transport. • Explains the concept of energy crisis and methods of overcoming it. • Explains the various methods and role of communication.
IV Semester	Public Economics	<ul style="list-style-type: none"> • Provides the broad understanding of public expenditure and its utility. • Provides the broad understanding of public revenue and methods of tax collection. • Describes the methods of financial management by the government.
IV Semester	International Business Environment	<ul style="list-style-type: none"> • Helps in understanding global business management. • Explains how international factors affect domestic concerns. • Provides the knowledge of international finance, marketing and legal environment.

Subject: Electronics

COURSE CODE	COURSE NAME	COURSE OUTCOME
EL 101T	BASIC ELECTRONICS -I	<p>After successful completion of the course student will be able to</p> <ul style="list-style-type: none"> • Understand the working and response of passive components using DC /AC source. Ideal and practical current and voltage sources and their inter conversion. Basic principles of transformers, switches and circuit breakers. • Understand basic concepts and laws of DC electrical networks and solve them using Network theorems. • Understand the basic concepts of Semiconductor diode and apply the concepts to describe the working of rectifiers. Types of filters and regulators. • Develop the Ability to understand the working of BJT/ FET and design a good biasing circuit. • Learn different number systems and types of binary codes. Solve examples on conversion one form to another form. Perform basic binary arithmetic.
EL 101P	BASIC ELECTRONICS LAB	<p>After successful completion of the course student will be able to</p> <ul style="list-style-type: none"> • Identify the different value of resistors, capacitors and study different meters and instruments for measurement of electronic quantities. • Demonstrate and verify Thevenin's, Superposition and Maximum power transfer theorem in electrical circuit. • Apply the working principles of Semiconductor diode to build and test rectifiers. • Design voltage regulator using zener diode. • Measure voltage and frequency of any waveform using CRO.
EL 201T	ELECTRONIC CIRCUITS AND SPECIAL PURPOSE DEVICES	<p>After successful completion of the course student will be able to</p> <ul style="list-style-type: none"> • Tell what is an amplifier. Classify and differentiate small signal amplifiers on different criteria. Basic concepts of CE amplifier and JFET amplifier. • Understand difference between voltage and power amplifiers. Classification of power amplifiers. Single tuned and double tuned amplifier. • Understand the working the differential amplifier and perform ac and dc analysis. • Know basic concepts of feedback and oscillators. Study different sinusoidal oscillators. • Draw the circuit symbol and explain the working of MOSFET, UJT, SCR, Triac, Diac, LED, LCD and special purpose diodes.

EL 201P	ELECTRONIC CIRCUITS AND SPECIAL PURPOSE DEVICES LAB	<p>After successful completion of the course student will be able to</p> <ul style="list-style-type: none"> • Design and implement single-stage BJT amplifiers and observe amplitude and frequency response. • Design various amplifiers like CE, CC, common source amplifiers and implement them using hardware and also observe their frequency responses.
EL301T	LINEAR INTEGRATED CIRCUITS AND C-PROGRAMMING	<p>After successful completion of the course student will be able to</p> <ul style="list-style-type: none"> • Understand the fundamentals and applications for the integrated circuits. • Understand different blocks of OpAmp, its characteristics and parameters. • Use Op-Amp for various applications and Understanding and designing of multi-vibrator using IC555. • Understand the basics of Computer system, classification of software, algorithms and flowcharts, programming techniques. • Understand the concepts of problem solving using a language and understand the syntax and semantic rules of C Programming Language. • Execute the practice as well as syllabus programs to put the theory concepts into practical knowledge.
EL301P	LINEAR INTEGRATED CIRCUITS AND C-PROGRAMMING LAB	<p>After successful completion of the course student will be able to</p> <ul style="list-style-type: none"> • Built two most popular configurations op-amp circuits (inverting and non-inverting amplifiers), predict the results, and observe the gain and frequency response • Understand the various applications of linear IC's like 741 and 555 timer. • To study and design the application of 555 timer like Astable Multivibrator. • Ability to use OP Amp as Summation, Subtractor and to generate sine waveform. • Understanding of tools and software for coding and execution of programs. • To write simple C programs with variables and arithmetic operators and use appropriate statements to control flow of execution. • To test and debug C Program. • To understand the syntax and semantic rules of C programming language.
EL401T	DIGITAL ELECTRONICS & VERILOG	<p>After successful completion of the course student will be able to</p> <ul style="list-style-type: none"> • Have a thorough understanding of the fundamental concepts and techniques used in digital electronics and compare different types of logic families. • Analyze different types of digital electronic circuit using various mapping and logical tools and know the techniques to prepare the most simplified circuit. • The ability to understand, analyze and design various combinational and sequential circuits and to develop skill to build, and troubleshoot digital circuits.

		<ul style="list-style-type: none"> • Describe digital circuits utilizing various constructs of Verilog and analyze the steps involved in synthesis of HDL code. • Model the digital system using gate level, behavioral and dataflow description.
EL 402P	DIGITAL ELECTRONICS & VERILOG PROGRAMMING LAB	<p>After successful completion of the course student will be able to</p> <ul style="list-style-type: none"> • Familiarization with Digital Integrated Circuits. • To Verify the Behavior of combinational and sequential circuits using Truth Table. • Realize the combinational and sequential circuits using Universal gates. • Demonstrate different styles of writing HDL code. • Use Xilinx tools in digital circuit modeling, simulation, functional verification in Verilog.
EL501T	COMMUNICATION-I	<p>After successful completion of the course student will be able to</p> <ul style="list-style-type: none"> • Gain thorough knowledge on different types noises, noise figure. Mechanism of Transmission lines & its constants. Concepts on wave propagations, and Ionosphere's effects. • Understand need for modulation, different modulation and demodulation techniques used in analog communication. Compare and contrast advantages, disadvantages and limitations of various analog communication systems. • Compute modulation index, bandwidth, power requirements for various modulation techniques. • Analyze generation and detection of FM signal and comparison between amplitude and Frequency modulation. Identify different radio receiver circuits and role of AGC. • Analyze the radiation mechanisms of antennas. Demonstrate knowledge of antennas in communication systems. Ability to differentiate various antennas on the basis of their electrical performance. • Understand the fundamentals of analysis and synthesis of TV pictures, Composite video signal, Picture tubes and Television Camera tube. • Understand the principles of Monochrome Television Transmitter and Receiver systems. To familiarize the various definitions and color television principles and the functionality of color television picture tube.
EL502T	MICROPROCESSOR AND INSTRUMENTATION	<p>After successful completion of the course student will be able to</p> <ul style="list-style-type: none"> • Understand the applications of Microprocessors and need of Microprocessors in computer system. And understand architecture and features of typical Microprocessors. • Understand and classify the instruction set of 8085 microprocessor and distinguish the use of different instructions and apply it in assembly language programming. • Understand and realize the Interfacing of memory & various I/O devices with 8085 microprocessor.

		<ul style="list-style-type: none"> • Understand the architecture and operation of Programmable Interface Devices and realize the programming & interfacing of it with 8085 microprocessor. • Learn the measurement systems, errors of measurement, classification of transducers and understand principle of working of various transducers. • Describe the origin of biopotentials and explain the role of biopotential electrodes. • Know the block diagram and electrodes used for various biomedical instruments like ECG, EEG, EMG.
EL 501P	COMMUNICATION – I LAB	<p>After successful completion of the course student will be able to</p> <ul style="list-style-type: none"> • Analyze Amplitude modulation and demodulation techniques. • Analyze and verify the applications of timer circuits. • Design and test the behavior of Pre-emphasis and De-emphasis circuits.
EL 502P	MICROPROCESSOR LAB	<p>After successful completion of the course student will be able to</p> <ul style="list-style-type: none"> • To provide practical exposure to the students on microprocessors, design and coding knowledge on 8085. • Develop structured programs in assembly language with an ability to test and debug them in the laboratory. • Inspect hands-on experience in doing experiments on microprocessors by using hardware kit in the laboratory. • To give the knowledge and practical exposure on connectivity and execute of interfacing devices with 8086 kit like LED displays, DAC and generate waveforms.
EL601T	COMMUNICATION – II	<p>After successful completion of the course student will be able to</p> <ul style="list-style-type: none"> • Analyze various pulse modulation and demodulation techniques. • Apply the concepts of sampling, quantization, encoding & reconstruction in processing digital signals. Determine quantization noise, SNR, probability of errors and explore the concepts of OSI and Nyquist criteria. • Understand the essential principles of operation of radar systems and analyze the various blocks of CW radar, FM-CW radar and MTI radar along with their limitations and applications. • Understand the fundamentals of satellite communication and various blocks of satellite subsystems. • Understand and compare various Multiple access techniques. • Understand basic elements of optical fiber communication link and know different kind of losses in optical fiber. • To study various types of light sources, photo detectors, amplifiers in optical communication.

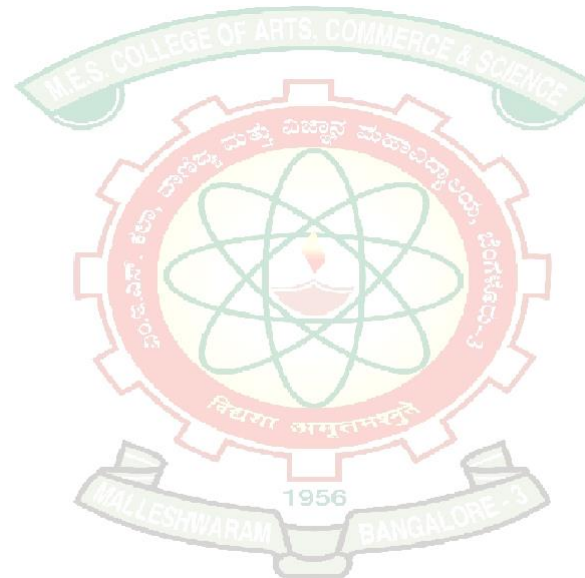
		<ul style="list-style-type: none"> • Make use of various standards, technologies and architecture of wireless networks to describe wireless communication networks. • Compare and contrast various network protocols and multiple access techniques used in mobile communication and optimize network capacity of GSM systems using cellular capacity expansion techniques.
EL602T	MICROCONTROLLERS	<p>After successful completion of the course student will be able to</p> <ul style="list-style-type: none"> • Understand the difference between Microprocessors and microcontrollers and understand architecture and features of 8051 microcontroller. • Understand and classify the instruction set of 8051 microcontrollers apply it in assembly language programming. • Develop programs using C-programming using suitable tools. • Analyze the working of timers/counters and interrupts in 8051 microcontrollers to develop timing critical applications. • Interface various peripheral devices such as LCD, DAC, Stepper Motor, 7-segment Display.
EL 601P	COMMUNICATION AND MICROCONTROLLER LAB	<p>After successful completion of the course student will be able to</p> <ul style="list-style-type: none"> • Design various pulse modulation techniques – PAM, PWM, PPM • Apply the concepts of modulation and demodulation to perform ASK • Apply the knowledge of mnemonics of 8051 to develop Assembly Language Code to perform different data transfer, arithmetic, logical operations & Code conversion.
EL 602P	PROJECT WORK	<p>After successful completion of the course student will be able to</p> <ul style="list-style-type: none"> • Apply some of the techniques/principles which have been taught. • Carry out budget and time planning for the project. • To inculcate electronic hardware implementation skills by learning PCB artwork design using an appropriate EDA tool. • Follow correct grounding and shielding practices and do effective trouble-shooting of the mini project. • To develop effective communication skill by delivering a seminar based on mini project and demonstrate a thorough and systematic understanding of project contents. • Understand methodologies and professional way of documentation and communication. • Able to interact effectively with the members associated with project and work as a part of team with professionalism. • Evaluate the challenges and risks involved in the execution of the project and handle them effectively. • Extend or use the idea in mini project for major project.

Subject: Optional English- BA

COURSE CODE	COURSE NAME	COURSE OUTCOME
I Semester		<ul style="list-style-type: none"> • Trace the origin of English literature from the period of Chaucer to the Meta physicals. • To appreciate the growth and evolution of the English language over the different Ages. • To understand the cultural contexts in which the writers of the different periods wrote. • The section FACETS of Language enable students to study the technicalities of language like Phonetics and Morphology. • The study of Phonetics empowers students with pronunciation skills and improves their ability to decipher the phonetic alphabet. • They develop their skills in learning the characteristics and definitions of language. • The study of language improves their communication skills and also close reading skills.
II Semester		<ul style="list-style-type: none"> • There is knowledge upgradation as students move forward in the study of the different Ages of literature in a chronological order. • They are able to appreciate the changes and varieties in the themes of the texts they study: texts that cover the different genres of prose, poetry and drama. • In this semester they study the poets and writers up to the Romantic Age. • In the Facets of Language section, they move on to an understanding of clause structure and analysis. This study enhances their language abilities and they learn to use language in a structured and grammatical manner. • They are introduced to a basic approach to the study of poetry through an introduction to poetic and literary devices and figures of speech. • Students learn to identify figures of speech in unseen poems: simple poems which help them to see the poetic process at work with the help of literary devices. • This exposure to the nuances of language provides students the competence to appreciate literature and also for writing independently.
III Semester		<ul style="list-style-type: none"> • The syllabus in this semester takes the students sequentially up to the Modern Age. • By now they have a working knowledge of literary traditions in English literature and are able to develop strategies to critique them. • They are introduced to issues related to gender and class. 4. In the section Facets of Language they move on to Discourse and Discourse Analysis they understand the importance of the social context in the use of language and the relevance of Coherence and Cohesion . • They learn the different functions of language and are able to differentiate between the various functions as per their contexts.

		<ul style="list-style-type: none"> • The gain an understanding of the Tenor, Domain and Mode of different discourses. • They are able to analyse the Mode, Tenor and Domain , as also the functions of language of unseen samples of discourse including conversations.
IV Semester		<ul style="list-style-type: none"> • In this semester students are introduced to American literature ,a sampling of Prose , Poetry and Drama. • This study widens the horizons of the students to the differences and complexities of American literature. • A close reading of the texts enables critical thinking and in some students the ability to make comparisons between British and American literature. • Through the prescribed texts, students gain insights into the different strands that make American literature what it is , its complexities and literary traditions. • The section Facets of Language which has been taught in the last 3 semesters helps students to independently analyse a variety of discourses both prose and poetry. • By the end of this semester, at this level, students are able to read independently and learn to interpret texts paying attention to complexities and ambiguity in them.
V Semester		<ul style="list-style-type: none"> • In this semester students study two papers: Indian literature and European and non-European literature; this takes them to a different realm of sensitivity and awareness. • The developed the ability to analyse, interpret and understand the complex relationship between culture, texts and contexts (social, political and historical) • An understanding of Indian and European literatures enables students to think critically about issues related to gender class and sexuality across continents. • This study of the different nuances of literature helps students to develop aesthetic values and sensitivity to literary theories. • A study of literary theories develops critical approaches in the students' understanding and analysis of the texts. • These two papers expose students to a range of disparate, though invigorating texts which develops their abilities to critique them.
		<ul style="list-style-type: none"> • This semester takes students yet again through a continued study of Indian literature and European and non-European literature in a chronological order. • This detailed study provides students with the necessary skills for thinking and writing independently. • Their introduction to critical approaches to texts encourages them to embark on research; some texts really sensitize students to look at them critically. • The twin faculties of Reading and Writing get encouraged because of the intense study of the texts.

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| | | <ul style="list-style-type: none">• The communication skills, knowledge upgradation and critical yet sensitive approaches to literature ensures that students become lifelong learners of literature and this goes a long way in creating sensitive and human citizens of the world. |
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Subject: Hindi

COURSE CODE	COURSE NAME	COURSE OUTCOME
I Semester B.A,B.Sc.,B.Com		<ul style="list-style-type: none">• Get familiar with various Disciplines that exist in Hindi Literature• Communication Skill is enhanced.• Get Expertise in Business related Letters.• They become Creative.
II Semester B.A,B.Sc.,B.Com		<ul style="list-style-type: none">• They know different Dialects of Hindi Literature.• Knowledge about Indian Mythology & rich heritage of India is enhanced.• Get Expertise in Official Letters.
III Semester B.A		<ul style="list-style-type: none">• They get in-depth Knowledge about the Significance of Ancient History.
III Semester B.Sc.		<ul style="list-style-type: none">• They know the value of family in one's life.• They start to respect their elders.
III Semester B.Com.		<ul style="list-style-type: none">• They know about Indian History & its Struggle to get Independence.• Creates Patriotism in them.• General Knowledge is increased.
IV Semester B.A		<ul style="list-style-type: none">• They become good Decision Makers.• They become responsible Citizens.
IV Semester B.Sc.		<ul style="list-style-type: none">• They learn how to overcome unhealthy Practices that prevail in society.• They become a better Person.
IV Semester B.Com.		<ul style="list-style-type: none">• Sensitized about Gender Equality & women Empowerment

Subject: History

COURSE CODE	COURSE NAME	COURSE OUTCOME
I Semester	History of Ancient India	<p>Students will be able to</p> <ul style="list-style-type: none"> • Perceive various sources to study of Ancient India • Know about the development and achievements of man in the Stone Age • Understand the Glory of Indian History in the age of Harappan Civilization • Comprehend the History of Vedic Period • Understand the philosophy of Jainism and Buddhism • Perceive influence of political support on religion • Know about the Mouryan Empire • Perceive Socio-Economic, religious situation under the Mouryas • Understand the History of Shatavahanas, Shungas and the Kushans • Know about the Sangam Age
II Semester	History of Early Medieval India 300-1200 C.E.	<p>Students will be able to</p> <ul style="list-style-type: none"> • Understand the Glory and Golden Era/legacy of the Gupta Period • Know the rise of Vardhanas and achievements of Harshavardhana • Perceive the rise of chalukyas and the Pallavas in the South and Military achievements of Pulakeshi II • Know about the Art and Literature of the Rastrakutas • Understand the Cholas contribution in the field of Administration and Art • Know about the advent of Islam to India • Understand the early difficulties of Sultans in India • Know about the beginning of the medieval period is marked by the rise of the Rajput Clan
III Semester	Medieval India 1206-1707 C.E.	<p>Students will be able to</p> <ul style="list-style-type: none"> • Understand the territorial expansion of Sultanate period in the reign of Iltumish, Razia Sultan and Balban. • Know about the Military and Economic reforms of Alla-ud-din-Khilji • Understand the aspects of fiscal policy and monetary system under Sultanate – Mohammad- bin- Tuglaq • Know about the philosophical aspects of the various saints in the Bhakti Movement.

		<ul style="list-style-type: none"> • Understand the political situation of India on the eve of Babar's Invasion • Understand the emergence and consolidation of Sher Shah • Grasp the Mughal concept of Divine Theory of Kingship and state • Understand the administrative setup of Mughals • Comprehend the basic features of Mansabdari and changes in it during the 17th C. • Know the military tactics and the administrative vision of the Marathas • Know about the revival of the Hindu culture and tradition in the period of Vijayanagara Empire
IV Semester	Modern Indian History	<p>Students will be able to</p> <ul style="list-style-type: none"> • Know about the trade and the expansion of the European power in India • Understand the administrative system of the English • Understand the massive struggle in 1857 Revolt – administrative changes under the crown. • Know about the notions of the nation among the Indians in the matter of modern education and in the 19th c Socio-Religious Reform Movement • Know about the various Constitutional developments in India during the reign of the British • Know about the different stages and struggle of the Indian National Movement under the leadership of Gandhiji
V Semester Paper 5.1	History Modern Europe to 1945 C.E.	<p>Students will be able to</p> <ul style="list-style-type: none"> • Know about the beginning of the Modern era through the voyages • Understand the Colonial tactics and power by the Europeans in the time of Industrial Revolution • Know the significance of Watch words of the French Revolution and its impact • Know about the rise of Renaissance and its impact in the states of Italy and Germany in the 19th C • Understand the disastrous in the human being at the time of I & II World War.
V Semester Paper 5.2	History of Karnataka upto 1956.	<p>Students will be able to</p> <ul style="list-style-type: none"> • Understand the state formation in Karnataka from the period of Maurys to Adil Shahis. • Know about the education system in Ancient Karnataka and its economic activities • Know about revival of Kannada literature in Vachanas and the Dasa Liture – Sufism

		<ul style="list-style-type: none"> • Understand the relation between English and the native rulers of Mysore and their economic reforms • Know about the various stages of the National Movement and the Unification Movement in Karnataka. Realize on the various contemporary issues such as Border, Water, Caste and Environment.
V Semester Paper 5.3	Women in Indian History	<p>Students will be able to</p> <ul style="list-style-type: none"> • Understand the position of women in Vedic period and their customs • Know about the position of women both in Hindus and Muslims in Medieval period • Know about the women problem in Colonial India and their developments • Understand the constitutional rights of women – Ambedkar’s Ideological thoughts and contemporary issues regarding the Rights of Muslim Women • Understand the neo-debates on development discourse on women • Understand the problems of the women through their organizations
VI Semester Paper 6.1	Bangalore in Time and Space	<p>Students will be able to</p> <ul style="list-style-type: none"> • Know about the Geographical features of Bangalore • Know about the ethnic and the social status of the various people of Bangalore • Know about the history of Bangalore from Hoysals to Yalhanka Nadaprabhus • Understand the developments of Bangalore city in the initial stages by the early Wodeyars of Mysore • Understand the religion and cultural diversity in Bangalore, Bangalore in Modern era
VI Semester Paper 6.2	Select Debates in Indian History	<p>Students will be able to</p> <ul style="list-style-type: none"> • Understand the real concept of the origin of Aryans through the various debates • Know about the rise of new religions in 6th C BCE against Brahmanical tradition • Understand the realism of the Golden Age of the Guptas through the various debates • Know about the factual awareness on modern education, nationalism, women empowerment through the debates (Ambedkar and Gandhiji) • Know about the real factual through the debates on Secularism and Communalism

VI Semester Paper 6.3	Book Review	<p>Students will be able to</p> <ul style="list-style-type: none"> • Understand the various aspects of Gandhiji such as Swaraj, mechanization and Civilization – (“Hind Swaraj” – Gandhiji) • Know about the Socio, religious and economic aspects in the Vedic and Later Vedic Period – (“Myth and Reality” – D.D. Kosambi) • Understand the various styles of art and its origin – (“ Introduction to Indian Art” – Ananda Kentish Coomara Swamy) • Know about the cast system, gender sensation and the problem of Untouchability in the society – (“Annihilation of Cast” – Dr. B. R. Ambedkar)
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Subject: Indian Constitution

COURSE CODE	COURSE NAME	COURSE OUTCOME
	Indian Constitution and Human Rights	<ul style="list-style-type: none"> • The Students are introduced into the governance and policy of the state. It gives them an in-depth understanding of the democratic system of the functioning of all the organs of the state, to become responsible and duty abiding lawful citizens. It helps students taking up KAS/IAS which gives a foundation for their growth.

Subject: Journalism

COURSE CODE	COURSE NAME	COURSE OUTCOME
I Semester	Introduction to Communication & Media	<ul style="list-style-type: none"> The students will be exposed to important concepts & communicate thoughts, emotions, ideas, & attitudes which are critical factor in social environment. They also learn how to take positions in important debate and explore emerging issues in the contemporary media landscape.
II Semester	Print Media	<ul style="list-style-type: none"> The Paper exposes the students towards how different forms of media evolved in India. How people were involved in developing journalism for passing information. It also focuses on how media is different today.
III Semester	Audio – Visual Media	<ul style="list-style-type: none"> The course exposes the students to a brief theoretical background in order to facilitate radio & television production and film appreciation. It also introduces towards the techniques and stages of programme production.
IV Semester	Media Laws	<ul style="list-style-type: none"> The aim of the course is to introduce the students on essential framework of their rights and responsibilities as journalists. Further it explains current legal issues impacting journalists.
V Semester	Reporting	<ul style="list-style-type: none"> The Students upon completing this course will demonstrate the ability to report in depth, using a wide variety of sources to provide context, accuracy, and balance.
V Semester	Editing	<ul style="list-style-type: none"> The course will introduce the students to the basics of editing design. They learn how to edit the stories & designing a newspaper.
VI Semester	Media Management	<ul style="list-style-type: none"> The Students will get to know how an organization works both print & electronic media. It also throws light on what different problems media houses face in running it.
VI Semester	Advertising & Public Relations	<ul style="list-style-type: none"> The course provides the students with fundamental understanding of advertising, creating ads, its place in business, branding and society. Explain public relation as an ethical practice, planned process, a managerial concept and a behavioral science.

Subject: Kannada BA

Course Code	Course Name	Course Outcome
I Semester	Poetry, storytelling, folklore, article variety.	<p>Syllabus</p> <ul style="list-style-type: none"> Nelakkarulam Poontamunte- Pampa Vanchanas - Basavanna, aydekki Marayya, Amugeraiyamma, devaru ruju madidanu - Kuvempu, Poetry birth Time - KS Narasimhaswamy. Thirukannanam Voting - Niranjan, Panjroli Ghoul's Challenge - KP Poornachandra Tejaswi Asphalt came - Devanoor Mahadeva. The Prince Who Married Himself - Ed. AK Ramanujan, Kempegowda's Lavani - ed. HL Nagegaur, Adivasi Folk - G.S. Paramashivayya. Crisis facing humanism - GS Sivaradrappa, Bevarina manunya Dr Rajakumar - Baraguru Ramachandrappa, Kannada is my religion - Jayadevi's mother Ligade.
		<p>Students Learn</p> <ul style="list-style-type: none"> Introducing old poetry, reading poetry, and reading poetry in Hoshangada. In addition, they are taught to read and understand the text. The language differences found in these three language structures are addressed in this case. Stories of modern times are introduced in the context of Kannada storytelling traditions such as time, country, language, storytellers and movements. Kannada folk literature is limited to classic literature, where articles such as poetry, poetry and criticism are introduced. In this section, various thought-provoking articles are read for knowledge.
II Semester	Poetry, drama, folklore, essay literature, article variety.	<p>Syllabus</p> <ul style="list-style-type: none"> Dheerairavara Noiseenu - Kumaravasya, Rakthagamale - NK Hanumanthaya, Devadasi- Saraju Katkar, Fallodutal Surupalaki. (Janapada Ramayana) - Collection: Rag, P.K. Rajasekhara, S. Basavya. Tingara buddanna - Chandrasekhar Patil. Sumane jeevisida ondudina - P.Lankesh, Kannada Moulvi - Goruru Ramaswamy Iyengar, gonaguva chata – A N Murthirayaru. Bottle culture and water politics - Muzaffar Aswadi, Balve swekarakede nirakaranegala- Dr K. Shivarama karanth , ella nana hanebaraha- Dr. H. Narasimhaiah.

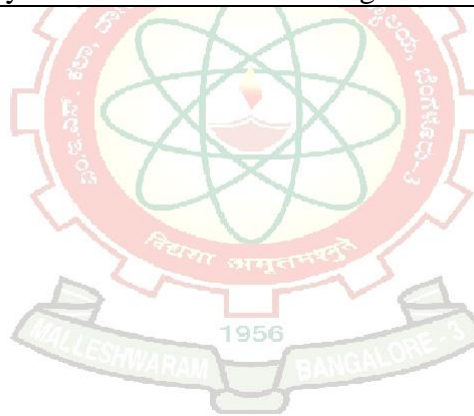
		<p><u>Students Learn</u></p> <ul style="list-style-type: none"> • Students will understand nadukannada poetry, hosakannada and folklore. from ramayana they get to understand the various behaviors and emotions of women. • They learn about today's corruption and problems everyone are facing from this drama • They get to understand about the rest you need for the soul and mind, humanity should be given more importance in a man's life. • Students understand about water problems, life is very precious, smartly how to lead your life
III Semester	Old poetry, biography excerpt, travel literature excerpt, complex articles	<p><u>Syllabus</u></p> <ul style="list-style-type: none"> • Rajachakrama pudhialkadithu: Pampa, Vachanas : Devadasimayya, Allamaprabhu, Basavanna, Akkamahadevi, Ambigara Chowdhaya. • Thavaudu enutha etidanu Mastavka: Kumaravasya, Manujane marulendu neneda: Ratnakaravarni. • Thakurara manethana : Ha Ma Naika , Constant War: H.J. Lakkappa Gowda, Dr. Vishweshwaraiah - Person and Legend: A.N. Moorthirao, dam damar: B.S. Keshavrao. • Albert University: Goruru Ramaswamy Iyengar, Gange yalli deepamale- G.S. Shivdradappa, kadala bandanadalli matina bele: Rahmat Tarikere. • Bharathada rasthriyathe arunodaya: Swami Dharma Theertha Lord, Ashoka: B.G.L. Swami • What's the price of Chilipili gana? : Nagesh Hegde.
		<p><u>Students Learn</u></p> <ul style="list-style-type: none"> • Students learn halegannada poems , 2 scenes of mahabaratha of pampa, specialities of vachanas, kumaravyasa baratha , to understand man is not great. • They learn life histories of great personalities like rabindranath tagore, Dr. B R Ambetkar , Dr. Visveswarya and musician P Kalingaraya . • They learn about the travel literature first of America's Albert University then about pilgrimage place Kashi and andaman's life history • They get to understand importance of history ,Environmental consciousness.
IV Semester	Poetry, Personality - Thinking, Language Skills (Regional-Race etc.), Complex	<p><u>Syllabus</u></p> <ul style="list-style-type: none"> • The story of Shivbhuti: Durgasimha, Podavigeadipatiyagi balu- harihara, keerthane: Sripadaraja, Purandaradasa, Kanakadasa, Jagannatha Dasa, chamundienisiye kondala devi – Chidanana avadutha. • Ondu Yakshaprashne : Joshi, life policy: Dr. Dr. Shimraiah Karantha, Mekaalaya Makalu- Dr. D R Nagaraja, Dictatorship and Sensibility: Baraguru Ramachandrappa. • Female Parva: AR Krishnasastri, Karnataka yesterday and today: Patila Puttappa, Nauru Island tragedy: Poornachandra Tejaswi. • Humanity is not the same - about it: Devanoor Mahadeva, Format of Gender: Dr. H.S. Mrs, Citizen in the City: Chanakya.

		<p><u>Students Learn</u></p> <ul style="list-style-type: none"> • Students learn one story of old poetry, specialties of keerthans and learn ragale poem • By now they learn the grammar and good knowledge in writing skills of the language. • They learn what each great scholars opinions in different medium. • They get to understand the different problems about humanity, gender discrimination etc .,
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Subject: Kannada – B. Sc

Course Code	Course Name	Course Outcome
I Semester	Paper 1	<ul style="list-style-type: none"> • Introduction to read and understand ancient Kannada • Introduction of poets • Way of reading and understanding the poetry • Understand the relation between Literature and Life • Analyze the social and human values • To understand the way of narration of the stories • To appreciate the articles by different writers about the society • To understand the human values through literature
		<ul style="list-style-type: none"> • Read and understand ancient Kannada • Way of Reading the poetry • Understand the relation between Literature and Life • Analyze the social and human values • To understand the way of narration of the stories • To appreciate the articles by different writers about society and modern thinking • To understand the human values through Literature
II Semester	Paper 2	<ul style="list-style-type: none"> • Growth of poetry through ages is taught. • To teach humor and scientific approach through prose, poetry, and few articles. • Think rationally about the society and secular thinking • To think about the cordial relationship between people in the society. • To adopt critical and scientific thinking in daily life

III Semester	Paper 3	<ul style="list-style-type: none"> • To identify the different metre adopted in kannada literature and to teach about the environment and its conservation. • Equality in society through Vachanas. • Learn to live cordially without differences in the society by reading stories. • Accept critical, scientific thinking and social awareness. • To understand the life through literature.
IV Semester	Paper 4	<ul style="list-style-type: none"> • To appreciate the beauty of ancient Kannada. To live lust less life through vachanas. • To understand ancient kannada easily. • To come out of the worldly attachments • To understand the Social, Economic & Cultural environment of other countries through 'Pravasa Kathana' • Study of women empowerment • Totally understand the life through Literature



Subject: Kannada – B. Com.

Course Code	Course Name	Course Outcome
I Semester	Paper I	<ul style="list-style-type: none">• Poetry from ancient times to modern days is introduced.• Enable students to think critically about the social evils through stories.• The importance and the beauty of the folklore is emphasized.• Get exposed to the difficulties of modern day business.
II Semester	Paper 2	<ul style="list-style-type: none">• To appreciate the growth of poetry from ancient times to modern days.• Play which throws light on modern day politics is learnt.• The difference between modern days and ancient times are known.• Introduction to a basic approach of MNC' s and the study of environment and its conservation.
III Semester	Paper 3	<ul style="list-style-type: none">• Trace the origin of poetry and its developments through ages.• Exposure to communicative skills in Kannada.• Enabling students think seriously about the society• Think seriously about social evils and try to overcome them.
IV Semester	Paper 4	<ul style="list-style-type: none">• Poems of different metre are introduced.• Communicative skills in kannada are enhanced.• These write-ups make students enjoy as well as think about life and society.• Critical thinking about the social evils and to lead a harmonious life.



Subject: Mathematics

COURSE CODE	COURSE NAME	COURSE OUTCOME
A0230	Mathematics-I	<ul style="list-style-type: none"> • Demonstrate basic manipulative skills in Algebra, Geometry and Calculus. • Finding rank of a matrix, solving system of equations using Matrix theory, Cayley-Hamilton theorem and its applications. • Leibnitz theorem for n^{th} derivatives and its applications, Partial differentiation, Euler's theorem and Jacobians. • Reduction Formulae, Differentiation under integral sign. • Concepts of Three-Dimensional Geometry. • Introduction to FOSS –Scilab, Maxima.
B0230	Mathematics-II	<ul style="list-style-type: none"> • Introduced to the concept of Abstract algebra – Algebraic structure and operations. • New system of co-ordinates for Plane curves, Curve tracing. • Application on Integral Calculus – Rectification, Area, Solids of Revolution. • Solving Ordinary Differential Equations. • Techniques of solving the problems using Scilab and Maxima.
C0230	Mathematics-III	<ul style="list-style-type: none"> • Understanding the basic rules of logic including the role of Axioms or Assumptions. • Lagrange's theorem and its consequences. • Differentiate between the Sequence and the Series, Nature of the Sequence and Series, Summation of Series. • Mean Value Theorems and its applications, Evaluation of limits using L 'Hospital's rule. • Techniques of solving the problems using Scilab and Maxima.
PAPER-4	Mathematics-IV	<ul style="list-style-type: none"> • Transformation of Algebraic structure using mappings. • Expanding Periodic functions as Fourier series. • Differential Calculus of functions in two variables. • Introduction to Laplace operators, properties and its applications. • Solving Higher order differential equations. • Techniques of solving the problems using Scilab and Maxima.

SM1C51	Mathematics – V	<ul style="list-style-type: none"> • Introduction to Algebraic structures with two binary operations, consequences of two binary operations on a non-empty set. • Introduction to Scalar and Vector fields, Vector differential operator and its effect on a scalar field and a vector field. • A tool to interpolate the variable y using the method of finite differences. • Introduction to Numerical difference operators $\Delta, \nabla, E, \delta$, Integration using numerical methods. • Techniques of solving the problems using Scilab and Maxima.
SM1C52	Mathematics-VI	<ul style="list-style-type: none"> • Finding the Extremum of Functionals, Application problems. • Introduction to Line and Multiple Integrals and Integral Theorems. • Techniques of solving the problems using Scilab and Maxima.
SM1C61	Mathematics-VII	<ul style="list-style-type: none"> • Introduction to Vector spaces and Linear Transformations. • Solving Partial Differential Equations and its applications. • Techniques of solving the problems using Scilab and Maxima.
SM1C62	Mathematics-VIII	<ul style="list-style-type: none"> • Introduction to Complex Variable Functions, Analytical functions, Complex Integration, Bilinear Transformations. • Solving Algebraic and Transcendental equations, Numerical Differentiation. • Techniques of solving the problems using Scilab and Maxima.



Subject Physics

COURSE CODE	COURSE NAME	COURSE OUTCOME
PhyT101	Mechanics I Heat and Thermodynamics	<ul style="list-style-type: none"> • To Apply Newton's second law of motion to motion in a resistive medium • To Understand concept of friction • To Draw free body diagrams for a system of mass and pulley • To understand Kepler's laws of planetary motion, derive equations of gravitational field & potential due to a solid sphere, orbital and escape velocity • To know distinction between Geostationary and Geosynchronous orbits • Understand Concept of work done by a constant and variable force with suitable examples • To write Newton's law for a system using the concept of system of particles and center of mass • Understand the concept of black body and radiation laws • To Energy distribution of a black body • To differentiate most probable, mean and root mean square velocity , Maxwell's velocity distribution curve • To understand the concept of equipartition of energy and specific heat capacities of an ideal gas • To understand concept of viscosity and thermal conductivity of a gas • To understand the inferences of Andrew's experiments on carbon-di-oxide • To understand concept of temperature, Zeroth, first ,second laws of thermodynamics • To use work done concept in a Carnot's cycle, infer about efficiency of a Carnot's engine • To understand concept of entropy • To be able to use the relevant math-skills in derivations • To interpret graphical representations in content learning • To be able to solve problems in all the units and be able to relate/apply the concepts learnt to new contexts.
PhyP102	Physics Practicals	<p>Apparatus/ Procedure</p> <ul style="list-style-type: none"> • Setting up of the apparatus • To understand Least count of instruments • Skill of performing the experiment with consistent / correct readings • Able to connect physics concepts from class to lab <p>Mathematical calculations (Formula)</p> <ul style="list-style-type: none"> • Adept at doing precise calculations with knowledge of the physical quantity and unit related to each symbol in the formula/formulae.

		<p>Graphical representation</p> <ul style="list-style-type: none"> • Able to choose convenient scale to plot a graph • Understand the distinct relation between two physical quantities • Interpret the graph through conceptual understanding. <p>Mathematical calculation (graph)</p> <ul style="list-style-type: none"> • Calculate slope/ intercept • Make appropriate inference
PhyT201	Mechanics-2 Heat and Thermodynamics	<ul style="list-style-type: none"> • Apply Newton's second law of motion to a system executing SHM and set up the second order differential equation • Understand the three elastic moduli and the relation between the moduli • To derive equations relevant to a stretched wire, single cantilever, & torsional oscillations • Understand Concept of thermodynamic potentials • To derive Tds relations, energy and heat capacity equations • To apply Gibb's equilibrium condition in derivation of Clausius Clayperon equation • To describe methods of producing low temperature • To understand the concept of frames of reference and their relative motion • To understand concepts of length contraction, time dilation , mass-energy equivalence • To understand the theorems- parallel and perpendicular axes • To understand concept of waves ,group and phase velocity • To be able to use the relevant math-skills in derivations • To interpret graphical representations in content learning • To be able to solve problems in all the units and be able to relate/apply the concepts learnt to new contexts.
PhyP201	Physics Practicals	<p>Apparatus/ Procedure</p> <ul style="list-style-type: none"> • Setting up of the apparatus • To understand Least count of instruments • Skill of performing the experiment with consistent / correct readings • Able to connect physics concepts from class to lab <p>Mathematical calculations (Formula)</p> <ul style="list-style-type: none"> • Adept at doing precise calculations with knowledge of the physical quantity and unit related to each symbol in the formula/formulae.

		<p>Graphical representation</p> <ul style="list-style-type: none"> • Able to choose convenient scale to plot a graph • Understand the distinct relation between two physical quantities • Interpret the graph through conceptual understanding. <p>Mathematical calculation (graph)</p> <ul style="list-style-type: none"> • Calculate slope/ intercept • Make appropriate inference
PhyT301	Electricity and Magnetism	<ul style="list-style-type: none"> • To understand the network theorems for a DC circuit and prove the theorems • To derive equations relevant to transient currents and interpret the equations • To Understand Concept of magnetic field and force, Lorentz force • To be able to describe the theory and experiment method related to moving coil galvanometer • To understand mathematical concepts of scalar and vector fields • To be able to apply the mathematical concepts to EM waves • To derive Poynting vector and understand the significance • To understand j operator method and use it in AC circuits • To understand concept of electrical resonance • To describe the experiment method to illustrate Seebeck effect • To understand the method of determining Seebeck coefficients from thermoelectric diagrams • To be able to use the relevant math-skills in derivations • To interpret graphical representations in content learning • To be able to solve problems in all the units and be able to relate/apply the concepts learnt to new contexts.
PhyP302	Physics Practicals	<p>Circuits / Procedure</p> <ul style="list-style-type: none"> • Identify the sources, meters and components in circuit • Making circuit connections in accordance with the circuit diagram presented • Perform the experiment with entry of readings • Able to connect physics concepts from class to lab <p>Mathematical calculations (Formula)</p> <ul style="list-style-type: none"> • Adept at doing precise calculations with knowledge of the physical quantity and unit related to each symbol in the formula/formulae.

		<p>Graphical representation</p> <ul style="list-style-type: none"> • Able to choose convenient scale to plot a graph • Understand the distinct relation between two physical quantities • Interpret the graph through conceptual understanding <p>Mathematical calculation (graph)</p> <ul style="list-style-type: none"> • Calculate slope/ intercept • Make appropriate inference.
PhyT401	Optics and Fourier Series	<ul style="list-style-type: none"> • To understand Huygen's wave theory of light and be able to explain the phenomena of reflection and refraction • To understand coherent source of light and the methods of producing coherent sources by division of wave front and division of amplitude • To derive the related mathematical equations • To Understand Concept of Fresnel's half period zones • To understand theory of diffraction at a straight edge • To understand the production and detection of linearly, elliptically and circularly polarised light • To understand the lasing action • To distinguish between spatial and temporal coherence • To understand the orthogonality condition of sine and cosine functions • To write the Fourier series as in Fourier theorem • To write the Fourier theorem for specified periodic functions, both mathematical functions and functions that describe voltage signals • To Understand principle of an optic fibre, and concepts of attenuation and dispersion • To be able to use the relevant math-skills in derivations • To interpret graphical representations in content learning • To be able to solve problems in all the units and be able to relate/apply the concepts learnt to new contexts.
PhyP402	Physics Practicals	<p>Apparatus/ Procedure</p> <ul style="list-style-type: none"> • Able to understand the working of instruments such as spectrometer, polarimeter • Able to calculate least count of instruments • Perform the experiment with entry of readings • Able to connect physics concepts from class to lab <p>Mathematical calculations (Formula)</p> <ul style="list-style-type: none"> • Adept at doing precise calculations with knowledge of the physical quantity and unit related to each symbol in the formula/formulae

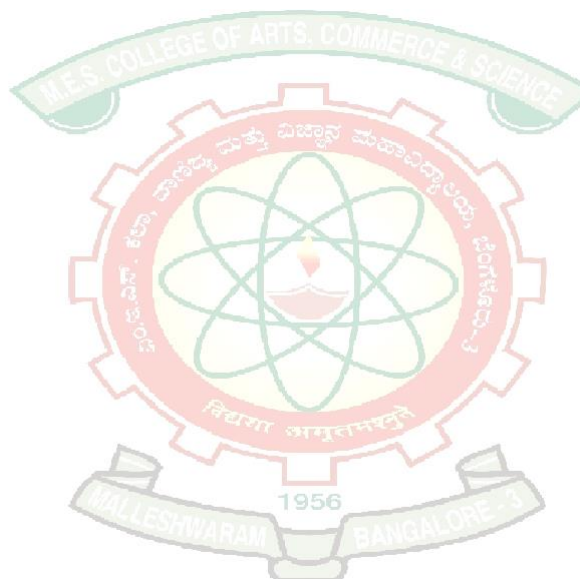
		<p>Graphical representation</p> <ul style="list-style-type: none"> • Able to choose convenient scale to plot a graph • Understand the distinct relation between two physical quantities • Interpret the graph through conceptual understanding <p>Mathematical calculation (graph)</p> <ul style="list-style-type: none"> • Calculate slope/ intercept • Make appropriate inference
PhyT501	Statistical Physics, Quantum Mechanics-1, Atmospheric Physics and Nanomaterials	<ul style="list-style-type: none"> • To understand the concept of thermodynamic probability • To understand the basis of Maxwell's-Boltzmann statistics, Bose-Einstein statistics and Fermi-Dirac statistics • To be able to arrive at the distribution functions • To explain MB velocity distribution, BE condensation, specific heat capacity of metals • To Understand limitations of classical theory to explain black body radiation , photoelectric effect , Compton effect and specific heat of solids • To understand experiment methods and inferences about matter waves, uncertainty principle • To understand the temperature structure of atmosphere • To understand Greenhouse effect • To know about properties of nano materials • To be able to use the relevant math-skills in derivations • To interpret graphical representations in content learning • To be able to solve problems in all the units and be able to relate/apply the concepts learnt to new contexts.
PhyP502	Physics Practicals	<p>Circuits / Procedure</p> <ul style="list-style-type: none"> • Identify the sources, meters and components in circuit • Adept at using Cathode Ray Oscilloscope (CRO) • Making circuit connections in accordance with the circuit diagram presented • Perform the experiment with entry of readings • Able to connect physics concepts from class to lab <p>Mathematical calculations (Formula)</p> <ul style="list-style-type: none"> • Adept at doing precise calculations with knowledge of the physical quantity and unit related to each symbol in the formula/formulae. <p>Graphical representation</p> <ul style="list-style-type: none"> • Able to choose convenient scale to plot a graph • Understand the distinct relation between two physical quantities

		<ul style="list-style-type: none"> • Interpret the graph through conceptual understanding <p>Mathematical calculation (graph)</p> <ul style="list-style-type: none"> • Calculate slope/ intercept • Make appropriate inference
PhyT503	Astrophysics, Solid State Physics and Semiconductor Physics Phy-503	<ul style="list-style-type: none"> • To understand the terminology • To understand stellar classification and evolution of stars • To derive expressions for average and core temperature, core pressure, life-time of a star • To understand Miller indices, • To understand Mosley's law • To understand free electron theory of metals • To understand Meisner effect and BCS theory • To understand classification based on band theory • To derive carrier concentration for holes and electrons • To understand fabrication of and behaviour of biased P-N junction • To understand the function of zener diode as a voltage regulator • To understand transistor characteristics in CE mode and transistor amplifying action in CE mode • To be able to use the relevant math-skills in derivations • To interpret graphical representations in content learning • To be able to solve problems in all the units and be able to relate/apply the concepts learnt to new contexts.
PhyP504	Physics Practicals	<p>Circuits / Procedure</p> <ul style="list-style-type: none"> • Identify the sources, meters and components in circuit • Adept at using Cathode Ray Oscilloscope (CRO) • Making circuit connections in accordance with the circuit diagram presented • Perform the experiment with entry of readings • Able to connect physics concepts from class to lab • Able to analyse the given sun- spot photographs , X- ray photograph, stellar spectra as per the given procedure • Make observations in tabular columns <p>Mathematical calculations (Formula)</p> <ul style="list-style-type: none"> • Adept at doing precise calculations with knowledge of the physical quantity and unit related to each symbol in the formula/formulae. <p>Graphical representation</p> <ul style="list-style-type: none"> • Able to choose convenient scale to plot a graph

		<ul style="list-style-type: none"> • Understand the distinct relation between two physical quantities • Interpret the graph through conceptual understanding <p>Mathematical calculation (graph)</p> <ul style="list-style-type: none"> • Calculate slope/ intercept • Make appropriate inference
PhyT601	Atomic, Molecular and Nuclear Physics	<ul style="list-style-type: none"> ➤ To understand the selection rules and coupling schemes ➤ To understand Normal and Anomalous Zeeman effect ➤ To understand rotation –vibration spectrum, Tyndall, Rayleigh and Raman scattering ➤ To understand alpha scattering using Rutherford's theory ➤ To comprehend radioactive decay and alpha decay, beta decay ➤ To understand the working of counters and particle accelerators ➤ To understand the types of nuclear reactions and the terminology ➤ To understand the classification of elementary particles ➤ To understand symmetries and conservation laws. ➤ To be able to use the relevant math-skills in derivations ➤ To interpret graphical representations in content learning ➤ To be able to solve problems in all the units and be able to relate/apply the concepts learnt to new contexts.
PhyP602	Physics Practicals	<p>Circuits / Procedure</p> <ul style="list-style-type: none"> • To understand the use of GM counter • Perform the experiment with entry of readings • Able to connect physics concepts from class to lab Mathematical calculations (Formula) • Adept at doing precise calculations with knowledge of the physical quantity and unit related to each symbol in the formula/formulae. • Able to analyse the given Spectra as per the given procedure • To construct simple logic gates and verify the truth tables • To construct half adder and full adder • To understand the equivalence of the binary system in digital circuits. <p>Mathematical calculations (Formula)</p> <ul style="list-style-type: none"> • Adept at doing precise calculations with knowledge of the physical quantity and unit related to each symbol in the formula/formulae. <p>Graphical representation</p> <ul style="list-style-type: none"> • Able to choose convenient scale to plot a graph • Understand the distinct relation between two physical quantities • Interpret the graph through conceptual understanding

		<p>Mathematical calculation (graph)</p> <ul style="list-style-type: none"> • Calculate slope/ intercept • Make appropriate inference
PhyT603	Electronics, Magnetic materials, Dielectrics and Quantum Mechanics -II	<ul style="list-style-type: none"> • To understand pin configuration and characteristics of OPAMP • To differentiate between ideal and practical OPAMP • To comprehend working of inverting and non-inverting amplifier and derive expressions for voltage gain • To understand the working of low ,high and band pass filters • To know the concept of feedback required for oscillator circuits and working • To be adept at conversions of number in one system to another • To simplify Boolean expressions using Boolean laws and theorems • To understand the construction and truth tables Half adder and full adder • To understand Langevin theory,theory of ferromagnetism and Ferromagnetic domains • To derive Clausius Mosetti equation • To understand Piezo electric effect • To understand concept and significance of wave function • To develop Schrodinger's time dependent and time-independent equations • To be able to write the quantum mechanical operators for physical quantities in mechanics • To comprehend concept of Eigen values and eigen functions • To write Schrodinger equation for linear harmonic oscillator, rigid rotator and hydrogen atom • To infer about the eigen values of the physical systems • To be able to use the relevant math-skills in derivations • To interpret graphical representations in content learning • To be able to solve problems in all the units and be able to relate/apply the concepts learnt to new contexts.
PhyP604	Physics Practicals	<p>Circuits / Procedure</p> <ul style="list-style-type: none"> • To be adept with the pin configuration of OP AMP 741 • Construct the circuit as in the circuit diagram presented • Perform the experiment with entry of readings • Able to connect physics concepts from class to lab. <p>Mathematical calculations (Formula)</p> <ul style="list-style-type: none"> • Adept at doing precise calculations with knowledge of the physical quantity and unit related to each symbol in the formula/formulae. <p>Graphical representation</p> <ul style="list-style-type: none"> • Able to choose convenient scale to plot a graph

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| | | <ul style="list-style-type: none"> • Understand the distinct relation between two physical quantities • Interpret the graph through conceptual understanding <p>Mathematical calculation (graph)</p> <ul style="list-style-type: none"> • Calculate slope/ intercept • Make appropriate inference |
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Subject: Psychology (B.A & B.Sc.)

COURSE CODE	COURSE NAME	COURSE OUTCOME
I semester	General Psychology	<p>A student completing a paper in General Psychology must be able to:</p> <ul style="list-style-type: none"> • Understand the goals and fields of Psychology and the types of research methods adopted. • Comprehend cognitive aspects of Intelligence, Learning and memory and apply these concepts in day-to-day life. • Gain an insight into theories of Motivation and its application. <p><u>Psychology Practicals - Semester I</u></p> <p>A student who has undergone training in Psychology practicals paper - I will be able to:</p> <ul style="list-style-type: none"> • Get an overview of different aspects of 'learning' such as habit formation and how it can interfere in new learning and how transfer of training occurs. • Experimentally test and use memory techniques such as cueing and chunking to enhance performance on memory tasks. • Understand the scientific basis of distorted recall under the influence of suggestions. • Statistically analyze measures of central tendencies- Mean, Median and Mode for Ungrouped data. • Carry out data collection part of the Project on various Psychology topics.
II semester	General Psychology	<p>A student completing a paper in General Psychology must be able to:</p> <ul style="list-style-type: none"> • Understand the structure of brain, spinal cord; various aspects associated with sensation and perception; and the applications of Gestalt laws. • Understand higher order cognitive processes such as Thinking, reasoning, decision making and creativity. • Get an insight into the different components of emotions and various theories pertaining to it. • Understand various approaches to Personality and its measurement using questionnaires, projective techniques. <p><u>Psychology Practical - Semester II</u></p> <p>A student who has undergone training in Psychology practical paper - II will be able to:</p> <ul style="list-style-type: none"> • Understand the science underlying insight learning and trial-and-error learning processes. • Get an overview of psychophysical phenomena underlying signal detection, retinal color zones and Muller-Lyer illusion. • Comprehend the process of interference produced by certain irrelevant information on an individual's performance. • Statistically analyze measures of central tendencies- Mean, Median and Mode for Grouped data.

		<ul style="list-style-type: none"> Analyze and write a report on the data collected as part of the Project.
III semester	Child Psychology	<p>A student completing a paper in Child Psychology must be able to:</p> <ul style="list-style-type: none"> Gain an insight into the discipline of Child psychology and the role of child psychologists in different settings. Understand the biological processes of conception, with an insight into teratology that could act as a deterrent to normal growth and development. Understand the various theories of motor, sensory, cognitive and emotional development that pave way in knowing the child's behavior, thought processes and reasoning abilities.
	Developmental Psychology	<p>A student completing a paper in Developmental Psychology must be able to:</p> <ul style="list-style-type: none"> Understand theoretical approaches to human development and developmental research designs. Get an overview of the processes of conception; with a focus on sex-linked, gene-linked and chromosomal abnormalities; and the methods of delivery. Understand physical, cognitive, emotional and social development in Infancy and childhood.
III semester	Practicals (Common for both child psychology and Developmental Psychology)	<p>A student who has undergone training in Psychology practicals paper - III will be able to:</p> <ul style="list-style-type: none"> Assist counsellors in assessing adolescents' problems by using a checklist. Gain insight into the different styles of learning. Comprehend the basis of free association and paired associate learning. <p>Assess individuals' level of creativity using a specific test of creativity that consists of verbal and non-verbal items.</p>
IV semester	Child Psychology	<p>A student completing a paper in Child Psychology must be able to:</p> <ul style="list-style-type: none"> Understand the theories of moral development; self-esteem and its influences on overall development of the child. Comprehend the importance and influence of peer sociability on psychosocial development. Understand the childhood disorders of varying severities, their clinical picture and treatment patterns.
	Developmental Psychology	<p>A student completing a paper in Developmental Psychology must be able to:</p> <ul style="list-style-type: none"> Understand Physical and mental health in Adolescence, their moral development and risk-taking behaviors-such as drug abuse and sexual promiscuity. Physical, cognitive and psychosocial development in Early, Middle and Late adulthood. Understand the finality of Life- Death, the patterns of grieving and bereavement and finding purpose in Life and Death.

IV semester	Practicals	<p>A student who has undergone training in Psychology practicals paper - IV will be able to:</p> <ul style="list-style-type: none"> • Get an overview of psychophysical phenomena underlying size-weight illusion. • Experimentally determine the absolute threshold of human subjects' 2-point sensation. • Use paper pencil tests to assess an individual's self-concept and emotional intelligence. • Understand the cognitive process underlying the formation of specific concepts. • Statistically analyze Pearson's Product Moment correlation, Spearman's rank correlation. • Analyze and write a report on the data collected as part of the Project.
V semester (Paper V)	Abnormal Psychology	<ul style="list-style-type: none"> • Understands the meaning of abnormality, is able to understand the difference between normal and abnormal behavior, identify deviant behaviors among people, also is able to attribute the behavior to various psychological underpinnings. • An insight about myths and misconceptions of abnormal behavior will make the student equipped to fight the stigma prevailing in the society about mental illness. • An overview of the classification system aims to provide them with knowledge about different types of mental disorders and also lays a foundation to the prospective clinical psychologists. • Psychological models of Abnormality imparts knowledge about the causes behind the abnormal behavior through various theories. An understanding of the process behind the development of deviant behavior occurs. • Meaning of stress, different stressors, effective techniques in managing stress is understood, this facilitates the students to also manage mild amount of stress. • Meaning and types of Anxiety disorders, Somatoform Disorders and Dissociative Disorders is comprehended. Students are able to identify the symptoms of these among people and distinguish if it is indeed a disorder or not. • On a personal level, a student is able to help himself/herself by noticing changes in their pattern of behavior, the reason behind the behavior, the ways in which they can work on it and seek help when required. They also gain the capability of observing the same in others and directing them to professionals.
	Counseling Psychology	<p>A student by the end of the semester must be able to:</p> <ul style="list-style-type: none"> • Understand goals and scope of counseling psychology in broader perspective. • Differentiate between Counselling, Psychotherapy and Guidance. • Know the various theoretical approaches in the field of Counselling Psychology. • Understand the process or various stages involved in Counseling. • Be familiar with the various skills required to be an effective Counsellor.

	Practicals- Paper V	<p>A student after having completed this practical paper is able to</p> <ul style="list-style-type: none"> • Administer Personality test, score and interpret the test results. • Gain insight into one's own personality traits. • Assist testing processes in a clinical setting. • Statistically analyze the difference in means between two different groups. • Carry out research projects (also write project report) in various topics of Psychology.
	Social Psychology	<p>A student who has studied Social Psychology will be able to:</p> <ul style="list-style-type: none"> • View behavior of individuals in social situations from a scientific perspective. • Analyze and interpret different types of communication in a social setting. • Understand the process of causal attribution of social behavior of individuals. • Gain insight into mechanisms underlying self-concept, self-esteem, efficacy and get a comprehensive picture of gender stereotypes and gender identity. • Get an overview of formation and change in attitudes and prejudice.
V Semester (Paper VI)	Industrial Psychology	<p>A student by the end of the semester must be able to:</p> <ul style="list-style-type: none"> • Understand the roots of Industrial Psychology, structure of an organization, and prospects in the field. • Get to know various methods of Job Analysis such as Critical incident method and different techniques used under the process of Selection like Interviews. • Understand the Employee attitude at workplace in various situations and study their effects on the organization. • Evaluating the reward system, which consists of both financial and non-financial benefits to the employees. • Know the various theories of motivation which will enable them to motivate employees to perform their best under various circumstances.
	Practicals- Paper VI	<p>A student after having completed this practical paper is able to</p> <ul style="list-style-type: none"> • Understand the meaning of aptitude test, types of aptitude tests and its applications. • Administer aptitude tests, score and analyze the test results. • Assist testing process in a career counseling setting or industrial setting. • Understand one's aptitude, thereby helping the student to make future choices. • Administer, score and interpret interest inventory, also understands one's interest towards various occupations.

		<ul style="list-style-type: none"> • Statistically analyze the difference in means between the test results of a single group tested under two different conditions. • Carry out research projects (also write project report) on various topics in Psychology.
VI Semester	Abnormal Psychology	<ul style="list-style-type: none"> • Unit on Personality Disorders provides students with an understanding of its meaning, types, symptoms and causes. The student has an understanding of how personality disorder is different from other mental disorders, is able to identify symptoms in people. • Unit on Schizophrenia and Paranoia gives an insight about the symptoms, types and causes of Schizophrenia and the student is also able to identify the symptoms in individuals around him/her. An overview of delusional disorder is gained, thereby allowing a student to identify and distinguish between the types of delusions. • Unit on Mood Disorders- meaning and types- Unipolar and Bipolar Disorders' symptoms and its causes is understood. Students know how to distinguish between normal depression and clinical depression. Suicide, its signs and symptoms can be identified by the students so as to act as gatekeepers in preventing suicide. • Unit on Brain Disorders and other cognitive impairments- students are able to understand and identify the symptoms of various brain disorders and cognitive deficits. They are able identify symptoms of Autism and Dyslexia. • Students by the end of this semester have a good foundation on the symptoms of different mental disorders and are ready to participate as active observers in clinical settings.
	Counseling Psychology	<p>A student by the end of the semester must be able to:</p> <ul style="list-style-type: none"> • Understand various testing and assessment tools that can be used in diagnosing clients. <p>Understand various special areas under counseling with reference to family cycle, interpersonal relationship, career aspects etc.,</p> <p>Know the importance of Group counselling and the process involved in conducting Group sessions.</p> <p>Understand the ethics in counseling.</p>
	Practicals Paper VII	<p>A student after having completed this practical paper is able to</p> <ul style="list-style-type: none"> • Administer various paper-pencil tests that measure Personality, Guidance needs and general health, score and analyze the test results. • Assist the testing process in clinical setting. • Statistically analyze the difference between median of two independent groups. <p>Carry out research project (also write project report) on various topics in psychology.</p>

VI Semester	Social Psychology	<p>A student who has studied Social Psychology will be able to:</p> <ul style="list-style-type: none"> • Understand the psychological underpinnings of interpersonal attraction and group dynamics. • Have a firm hold on techniques and processes that people use to influence each other, by understanding the scientific basis of social influence. • Get an insight into factors that enhance and hinder prosocial behavior. <p>Understand the factors associated with aggression and are able to apply the concepts of Social Psychology to deal with the social problem - aggression.</p>
	Industrial Psychology	<p>A student by the end of the semester must be able to:</p> <ul style="list-style-type: none"> • Understand various methods of performance appraisals in an organization and hence use the best appraisal technique for the benefit of both employer and employees. • Understand the types of communication in an organization and its importance, thereby facilitating effective communication. • Understand various ways to train the employees based on the specific need of the employees and requirements of the management. • Ability to distinguish an effective leader in a team and also know the importance of team building. • Understand the reasons behind employee stress and be equipped to initiate counselling session.
	Practicals-Paper VIII	<p>A student after having completed this practical paper is able to</p> <ul style="list-style-type: none"> • Understand the meaning of intelligence tests, it's types, Attitude scale and its applications. • Distinguish between different intelligence tests and choose the appropriate one for testing based on needs and age of the test taker. • Administer intelligence test (verbal, non-verbal and performance), score and analyze the test result. • Assist intelligence testing process in an educational setting or clinical setting. • Understand one's level of intelligence on a particular intelligence test. • Statistically analyze if there is significant difference between observed and expected frequencies. • Carry out research projects (also write project report) on various topics in Psychology.

Subject: Sociology

COURSE CODE	COURSE NAME	COURSE OUTCOME
I Semester	Fundamentals of Sociology	<ul style="list-style-type: none"> • Understand the Basic concepts in Sociology. • Study the relationship between Sociology and other Social Sciences. • To know about the different branches of Sociology. • Understand the process of Socialization and its importance.
II Semester	Social Institutions and Social change	<ul style="list-style-type: none"> • Understand the Basic Social Institutions. • Study the relevance of Social Institutions. • To know the concept of Social change and its dynamics. • Understand the process of Social change and its factors.
III Semester	Study of Indian Society	<ul style="list-style-type: none"> • Understanding the Rural and Urban Society in India. • Know the basic concepts in rural and urban studies. • Analyse rural and urban problems in India. • Acquire skills to reconstruct rural Institution and evaluate rural development. • Understanding the linkages between Urban and rural reality.
IV Semester	Crime and Society	<ul style="list-style-type: none"> • Acquaint the students with changing profile of crime and criminals. • Know the emerging perspectives of crime causation. • Sensitise the students to the emerging idea of correction, its types and measures. • To know the recent advances in correctional measures and programmes. • Demonstrate the knowledge about theoretical perspectives on crime. • To sensitise the students about causes and consequences of crime.
V Semester (Compulsory Paper)	Sociological Thought	<ul style="list-style-type: none"> • To familiarise with Social, political and intellectual context of emergence of Sociology. • To gain an understanding of some of the classical contributions in Sociology. • To know the theoretical foundations of Sociology. • To develop critical thinking, analytical ability to interpret the social scenario.
V Semester (Optional Paper)	Sociology of media and mass communication	<ul style="list-style-type: none"> • To learn role of media in society. • To prepare youth for journalism and career in media. • To learn the prospects and consequences of media projections. • To understand media as a catalyst of Social change.
	Industrial sociology	<ul style="list-style-type: none"> • To understand sociology of industry, labour and human relations. • To get familiarised with actual problem situations in industrial organisations. • To get a knowledge of management and organisation of work in industry .

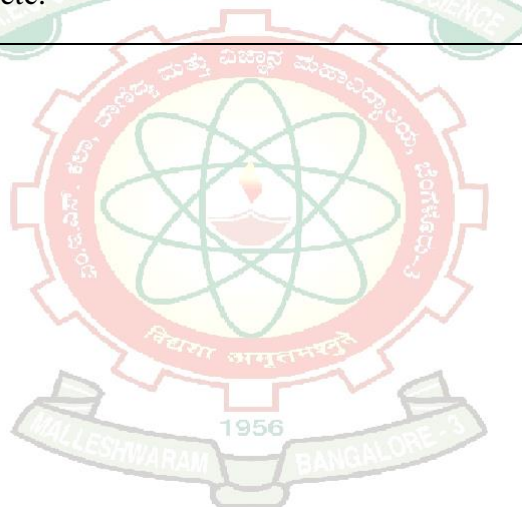
		<ul style="list-style-type: none"> • To study industrialisation process and work transformation. • To understand the bearing of society and industry on each other.
VI Semester (Compulsory Paper)	Elements of Social Research	<ul style="list-style-type: none"> • Understand the nature of Social phenomena and issues involved in Social research. • Study of research methods as a means of understanding social reality. • Exposure to the fundamentals of various research techniques and methods. • To learn the method of data collection, analysis and report writing. • To get acquainted with qualitative and quantitative strategies of research.
VI Semester (Optional Paper)	Sociology of tourism	<ul style="list-style-type: none"> • To gain basic knowledge and social aspects of tourism. • Understanding tourism as a socio-economic force in social development. • Understanding cultural differences and respect for other cultures. • Motivation to choose career in tourism management. • The impact of tourism on Society.
	Sociology of Marketing	<ul style="list-style-type: none"> • To gain an insight on Marketing, Social relations and Social behaviour. • Knowledge on the role of marketing in Social welfare. • Functions of marketing systems and their effects. • Career opportunities in Social marketing. • Knowledge of unfair marketing strategies and their effects.



Subject: Statistics

COURSE CODE	COURSE NAME	COURSE OUTCOME
I semester		<ul style="list-style-type: none"> • Able to collect data, presenting data in graphs and diagrams. • Able to calculate basic statistical tools such as mean, variance, moments, measures of skewness and kurtosis etc. • Understands the need and importance of bivariate data and able to establish relationship between two and three variables • Understands the basic concepts in probability theory and its applications
II Semester		<ul style="list-style-type: none"> • Understands the use of random variable and its applications in discrete and continuous probability distributions. • Able to solve typical day to day life problems using probability distributions. • Able to understand the concepts and applications of normal distribution.
III Semester		<ul style="list-style-type: none"> • Understands the importance of sampling in drawing inferences about the population constants. • Knowledge about characteristics of a good estimator. • Can construct confidence interval for the unknown parameters. • Able to simulate the data based on certain probability distributions.
IV Semester		<ul style="list-style-type: none"> • Able to analyze small sample and large sample on the basis of characteristics • Knows the importance and use of test of significance and non-parametric test in real life circumstances.
V Semester (Paper 5)		<ul style="list-style-type: none"> • Understands the methods of selecting the sample values by different methods. • Importance of Simple random sampling, Stratified random sampling and Systematic sampling and their comparisons. • Understands the importance of SQC in industry to maintain the quality of manufacturing and manufactured products.
V Semester (Paper 6)		<ul style="list-style-type: none"> • Able to study the effect of different factors by using ANOVA (analysis of variance) • Able to analyze the homogeneity of several means in field experiments.

VI Semester (Paper 7)		<ul style="list-style-type: none"> • Knowledge about the concepts of time series and its importance in forecasting. • Able to construct index numbers and • Understand the importance and construction of Index number in day to day life especially consumer price index. • Understands various demographical concepts and its measure. • Application of statistical concepts in medical fields.
VI Semester (Paper 8)		<ul style="list-style-type: none"> • Understands various concepts of Operation Research where they learn to solve problems involving operations of a system – LPP, game theory, Transportation problem, Assignment problems, Replacement theory etc.



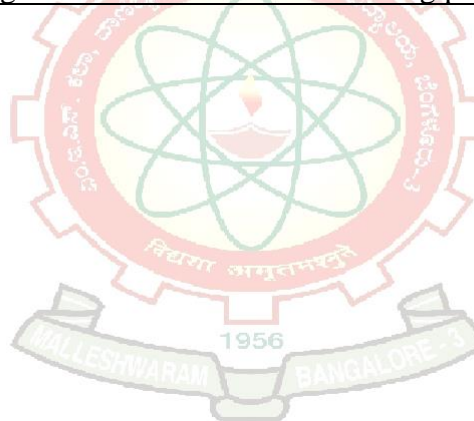
Subject: Zoology

COURSE CODE	COURSE NAME	COURSE OUTCOME
A0330 – Semester I	Paper 1 – Non Chordata - I	<ul style="list-style-type: none"> • Grades of body organization (cellular, tissue/organ, organ/system)? • Bilateral/radial symmetry with suitable examples. • Acoelomate, pseudocoelomate and eucoelomate conditions. • General characters of phyla like protozoa, porifera, coelenterata, platyhelminthes, aschelminthes, and annelida. • Classification of the various phyla up to class level. • Detailed study of prescribed examples like Sycon, Aurelia, Planaria and Earthworm. • Life cycle, occurrence, mode of infection and disease caused of common parasites like Leishmania, Entamoeba, Fasciola, Taenia, Ascaris and Wuchereria. • Importance of annelids like leech and earthworm. • Develop the ability to focus and observe microscopic slides, identify and classify specimens based on external features and also relate to the comparative study of organs and systems in invertebrates.
A0330- Semester II	Paper 2 – Non Chordata - II	<ul style="list-style-type: none"> • Students gain an understanding about general characters of higher invertebrates and also are able to classify the organisms into different classes of the phylum. • By understanding the affinities of Peripatus with annelids and arthropods, students can easily give its importance as connecting link. • By studying concept of serial homology, students will understand the basic structure and arrangement of appendages in prawn. • Students are able to define and differentiate between different patterns of metamorphosis by citing suitable examples. • By understanding the structure of tornaria larva, students can relate to its affinities with echinoderms and chordates. • Students are expected to gain knowledge into areas of economic zoology like sericulture, apiculture, prawn fisheries and pearl culture. After graduation, they can pursue any of these as their occupation. • Develop the skill to focus and observe microscopic slides, identify and classify specimens based on external features. • Students understand the layout and functioning of important systems like digestive and nervous systems in higher invertebrates like cockroach and Unio. • Students acquire a first-level training to write project reports, following a scientific format.

A0330 – Semester III	Paper 3 - Chordata	<ul style="list-style-type: none"> • The students will be able to differentiate between the invertebrates and vertebrates, as well as intermediate animals between these two categories. • How aquatic vertebrates are adapted to land by modifications in their characters? What are flight adaptations in aerial vertebrates? • Understanding of basic skeletal structures of terrestrial vertebrates, also the morphology and anatomy of highest vertebrates. • After gaining knowledge into the nuances of economic zoology, students will be introduced and motivated to pursue entrepreneurship programs related to pisciculture, poultry, dairy, etc. • Students are able to appreciate the distinctive features that set apart the vertebrate classes, with special emphasis on unique adaptive features of higher vertebrates. • At this level, students are also required to understand anatomical details, especially pertaining to osteology. • Students get an experiential learning, related to temporary whole mount slide preparations.
A0330 – Semester IV	Paper 4 - Comparative anatomy, Human anatomy, Cell Biology and Histology	<ul style="list-style-type: none"> • Student gains an insight into the ultrastructure of an animal cell with detailed information about the various cell organelles, cell division, cell regulation and cell senescence. • Students are expected to comprehend the structures of different tissues, organs and organ systems, and endoskeleton of humans. Apart from the humans, they can also relate the structures and basic function of various organs of a vertebrate animal and variation among the different classes of vertebrates. At the end they can appreciate the evolutionary significance among the different classes of vertebrates. • Not only structures of human organs, even they will have a good understanding of how an individual fight its diseases by different mechanisms.
A0330 – Semester V	Paper 5 – Environmental Biology and Ethology	<ul style="list-style-type: none"> • To understand the concept of ecology and conservation of environment and wildlife. • To know the different types of toxicants/pollutants and their effects on environment and organisms. • To have the knowledge of utilization of renewable energy. • To understand the ways of managing solid waste disposal. • To have basic knowledge of remote sensing and geographical information system. • Learning the different types of animal behavior like social behavior, migratory behavior, biological rhythms and parental care. • To have the knowledge of ecological adaptations of different types of animals. • Limnological studies: To understand the titrimetric method of estimating the dissolved oxygen, salinity, organic matter and total hardness of the water samples. • Students should acquire the skill of writing academic projects.

A0330 – Semester V	Paper 6 – Genetics and Biotechnology	<ul style="list-style-type: none"> • Understanding of basic concepts of heredity and environment. • The students should be able to understand Mendelian principles of genetics and deviations from it like multiple allelism, gene interaction, sex-linked inheritance, etc. • Understanding of chromosomal aberrations, concept of gene, gene mutations, eugenics and biochemical genetics. • The student should have an understanding of general process of DNA recombinant technology. • The student should be able to differentiate between molecular tools, host cells and vectors used in biotechnology. • The student should be able to understand various structures of bioreactors and their significance. • The student should have a preliminary knowledge of different methods of gene transfer. • The student should be aware of some important applications of biotechnology like gene targeting, artificial insemination, gene therapy, hybridoma technology, DNA fingerprinting, etc. • Practicals: The student should acquire skills of solving genetic problems based on data given. • The student should be able to perform Gram staining of bacteria, amino acid separation by paper chromatography, identify catalase activity by bacteria and translocation in Rhoeo.
A0330 – Semester VI	Paper 7 – Developmental Biology and Organic Evolution	<ul style="list-style-type: none"> • To enable the students to understand the basics of reproduction and development in higher animals. • Understanding the process of gametogenesis, fertilization, cleavage, blastulation, gastrulation and neurulation in different animals. • To make students to understand what regeneration is? and how it occurs in various animals. • Gaining knowledge about the placenta and different types of placenta in mammals. • Understanding how the evolutionary forces help in speciation. • Acquiring the knowledge of palaeontological, morphological and embryological evidences supporting organic evolution of man. • Obtaining the thorough knowledge of fossils stages in evolution of man. • Practicals: Acquire the skill of observation of microscopic slides and understand the developmental stages in frog and chick. • Obtaining a thorough knowledge of morphological and anatomical evidences that support organic evolution.
A0330 – Semester VI	Paper 8 – Animal Physiology and Techniques in Biology	<ul style="list-style-type: none"> • Understand the physiology and internal milieu (homeostasis) of animal/human body. • Understand how digestion, respiration, muscle conduction, nerve conduction, circulation and excretion occur in animal. • Students understand the process of digestion in ruminants with the help of microorganisms.

- With the knowledge of endocrine glands, students understand the role of glands and their secretions causing disorders.
- Why fishes migrate and what are the changes occurring in fishes during migration which helps students to understand osmoregulation.
- Students understand the hormonal control of metamorphosis in insects and amphioxus.
- By understanding the principle behind basic biological techniques such as microscopy, autoradiography, chromatography, microtechniques, endoscopy, centrifugation, etc., students can learn the working and their applications.
- Practically students can estimate the amount of oxygen consumed and salt loss or gain by aquatic animals.
- Practically students can also do qualitative analysis of carbohydrates present in the samples.
- By theoretical knowledge of nitrogenous waste formation in different organisms, students do a qualitative analysis to draw the conclusion about the type of nitrogenous waste that different animals produce.
- Students get to know the method of writing project on human diseases.



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M.E.S. COLLEGE OF ARTS, COMMERCE AND SCIENCE
POST GRADUATE DEPARTMENT OF MATHEMATICS

COURSE OUTCOMES

Course Code	Course Name	Course Description (Syllabus)	Course Outcome
FIRST SEMESTER			
M101T	Algebra-I Credits: 4 Lecture hours: 4 per week	Group theory (Permutation groups, Group action of a set, Sylow's groups, Simple and Solvable groups), Ring theory (Homomorphism, Ideals, Euclidean and Polynomial rings).	<ul style="list-style-type: none"> ▪ Students learn about different types of groups. They also learn the applications of isomorphism, automorphism and inner automorphism to groups. ▪ Students understand the concept of group action, orbits, stabilizers and their properties. ▪ Students are introduced to Sylow's groups, simple groups, solvable groups and their applications. ▪ Students learn different types of rings, ideals and their properties. ▪ Students are introduced to Euclidean rings, polynomial rings, their properties and applications.
M102T	Real Analysis Credits: 4 Lecture hours: 4 per week	Riemann-Stieltjes integration, Sequences and series of functions, Topology of real spaces, Functions of several variables.	<ul style="list-style-type: none"> ▪ Students learn the definition and properties of Riemann-Stieltjes integral, uniform convergence of sequences and series of functions, and functions of several variables. ▪ Students also learn to approximate continuous functions using polynomials. ▪ Students will understand the concept of compactness, continuity and uniform continuity on the n-dimensional real space.
M103T	Topology-I Credits: 4 Lecture hours: 4 per week	Finite and Infinite sets, Metric spaces, Topological spaces, Connected spaces.	<p>Intended outcome</p> <ul style="list-style-type: none"> ▪ To study and understand the nature of the convergence of the series and sequences, metric spaces and application of these spaces in embedding. To learn the concept of continuity and homeomorphism of the functions. <p>Outcome Assessment</p> <ul style="list-style-type: none"> ▪ Exposure to the finite and infinite sets. ▪ Introduction to number system and nature of infinite and finite sets, limit points and bounds.

			<ul style="list-style-type: none"> ▪ To understand the criteria for point-wise convergence, uniform convergence of metric spaces. ▪ The criteria for continuity and homeomorphism of the functions to understand local connectedness and path-connectedness of topological spaces. ▪ To understand continuity and homeomorphism of the functions defined on topological spaces.
M104T	Ordinary Differential Equations Credits: 4 Lecture hours: 4 per week	Linear differential equations of n^{th} order, Existence and uniqueness of solutions, Power series solutions, Stability and phase plane analysis.	Intended outcome: Recognize real world circumstances to identify when ordinary differential equations are appropriate, formulation of problems and solving the problems using multiple approaches. Outcome Assessment <ul style="list-style-type: none"> ▪ Students will learn what an ordinary differential equation is, distinguish between linear and nonlinear ODEs and classify ODEs, what are initial and boundary value problems, what constitutes a solution. Students will learn to visualize and manipulate ODEs in graphical and symbolic form. ▪ Students will understand the concept of existence and uniqueness of solutions. Learn to find the power series solution of linear differential equations. ▪ Students will be introduced to system of ODEs and discuss graphical and analytical solution methods.
M105T	Discrete Mathematics Credits: 4 Lecture hours: 4 per week	Logic, Counting techniques, Modeling with recurrence relations, Generating functions, Relations, Types of Graphs, Paths, Cycles, Euler and Hamiltonian paths, Planarity in graphs, Trees.	<ul style="list-style-type: none"> ▪ Students are introduced to logic, rules of inference, methods of proof and counting techniques. ▪ Students learn modeling with recurrence relations, generating functions and difference equations with various examples. ▪ Students also learn to represent relations using matrices and digraphs. ▪ Students understand the concept of graph theory, types of graphs, their properties and applications. ▪ Students study trees, their properties and algorithms for minimum spanning trees.
M106P	Maxima Practicals based on paper M105T Credits: 2 Lecture hours: 4 per week	Some methods and concepts of discrete mathematics and graph theory.	<ul style="list-style-type: none"> ▪ Students are introduced to Maxima programming, its usage and advantages. ▪ Students verify different various concepts, principles and properties of discrete mathematics and graph theory using Maxima programming.
M107SC	Mathematical Analysis Credits: 2 Lecture hours: 3 per week	Limits, Continuity, Differentiability, Mean value theorems, Sequences and series of numbers, Tests of convergence.	<ul style="list-style-type: none"> ▪ Students revisit the concepts of limit, continuity and differentiability of functions. ▪ Students learn about the different mean value theorems with examples. ▪ Students study the numerical sequences and series of real numbers, their types and properties. ▪ Students understand the various tests of convergence for sequences and series of

			numbers with examples.
SECOND SEMESTER			
M201T	Algebra-II Credits: 4 Lecture hours: 4 per week	Local ring, Nil and Jacobson radicals, Modules, Artinian and Noetherian modules, Extension fields, Splitting fields, Simple and separable extensions, Galois theory.	<ul style="list-style-type: none"> ▪ Students are introduced to Nil and Jacobson radicals, operations on ideals and prime spectrum of a ring. ▪ Students study about modules, their different types, properties and applications. ▪ Students learnt about finite, algebraic, simple and separable extensions, and splitting fields. ▪ Students are introduced to construction with straight edge and compass. ▪ Students understand the concept of Galois theory.
M202T	Complex Analysis Credits: 4 Lecture hours: 4 per week	Analytic functions, Power series, Radius of convergence, Singularities, Entire and meromorphic functions, Residues and applications.	<p>Intended outcome</p> <ul style="list-style-type: none"> ▪ To study and understand the importance of entire and meromorphic functions, convex functions and their application in mathematical analysis of solutions obtained by the mathematical modeling of the problems existing in atmospheric, engineering, aerodynamics etc. <p>Outcome Assessment</p> <ul style="list-style-type: none"> ▪ To learn the conformal mapping of the elementary functions. ▪ Finding the radius of convergence of the power series solutions and plotting. ▪ Evaluation of functions involving singularities and boundaries of different types and branch points. ▪ Applications of complex valued functions in circles and concentric circles, understanding of conformal mapping using Reimann mapping theorem.
M203T	Topology-II Credits: 4 Lecture hours: 4 per week	Compact spaces, Axioms of countability, Projections, Separation axioms, Local finiteness, Para-compactness, Metrizable.	<ul style="list-style-type: none"> ▪ Students learn about compactness, its types and properties. ▪ Students study the first and second axioms of countability. ▪ Students are introduced to different separation axioms, their comparison, properties and characteristics. ▪ Students understand the concept of para-compactness and metrizable.
M204T	Partial Differential Equations Credits: 4 Lecture hours: 4 per week	First and second order partial differential equations, Wave, Laplace and Diffusion equations, Green's function method.	<p>Intended outcome:</p> <p>Recognize real world circumstances to identify when partial differential equations are appropriate, formulation of problems and solving the problems using multiple approaches.</p> <p>Outcome assessment</p> <ul style="list-style-type: none"> ▪ Students will learn what partial differential equation is, distinguish between linear and nonlinear PDEs, classify PDEs, geometrical interpretation of PDEs, what are initial and boundary value problems, what constitutes a solution. Students will learn to visualize and manipulate PDEs in graphical and symbolic form. Application of PDEs to analytical dynamics, discontinuous solution and shock waves.

			<ul style="list-style-type: none"> Students will learn to classify second order linear PDEs as hyperbolic, parabolic and elliptic PDEs and find their solution by different methods. Students will acquire knowledge on solving boundary value problems of hyperbolic, parabolic and elliptic PDEs.
M205T	Numerical Analysis-I Credits: 4 Lecture hours: 4 per week	Solution of nonlinear equation in one variable, and system of linear and nonlinear equations, Interpolation, Numerical integration.	Intended outcome: Basic concepts and techniques of numerical solution of algebraic equations, system of algebraic equations, system of non linear equations. Demonstrate understanding of common numerical methods and apply numerical methods to obtain approximate solutions to mathematical problems. Outcome Assessment <ul style="list-style-type: none"> Students learn about different types of errors. Students study different iteration methods to obtain the solution of nonlinear equations in one variable. Students also learn to obtain the solutions of system of linear and nonlinear equations using direct and iteration methods. Students study different techniques of interpolation and approximation. Students understand the numerical methods used for determining the value of single and multiple integrals. Students also study the convergence of all the methods.
M206P	Scilab Practicals based on paper M205T Credits: 2 Lecture hours: 4 per week	Some methods and techniques of numerical analysis.	<ul style="list-style-type: none"> Students are introduced to different aspects of Scilab programming. Students use Scilab to determine better approximations of solutions of some numerical methods.
M207SC	Elementary Number Theory Credits: 2 Lecture hours: 3 per week	Divisibility and primes, Congruences, Quadratic residues, Sum of squares.	<ul style="list-style-type: none"> Students learn about divisibility, distribution of primes and introduced to linear Diophantine equations. Students understand the concept of linear and polynomial congruences with applications. Students are introduced to quadratic residues, Legendre symbol, Jacobi symbol and their properties. Students learn about sum of two squares, four squares and Pythagorean triples.
THIRD SEMESTER			
M301T	Differential Geometry Credits: 4 Lecture hours: 4 per week	Calculus on Euclidean spaces, Frame fields, Calculus on surfaces, Shape operators.	<ul style="list-style-type: none"> Students are introduced to coordinate and differentiable functions, tangent spaces, directional derivative, differential forms and mappings of Euclidean spaces. Students study about frame fields, their properties and characteristics. Students understand different concepts about surfaces with examples. Students learn the shape operators of sphere, plane, cylinder and saddle surfaces.

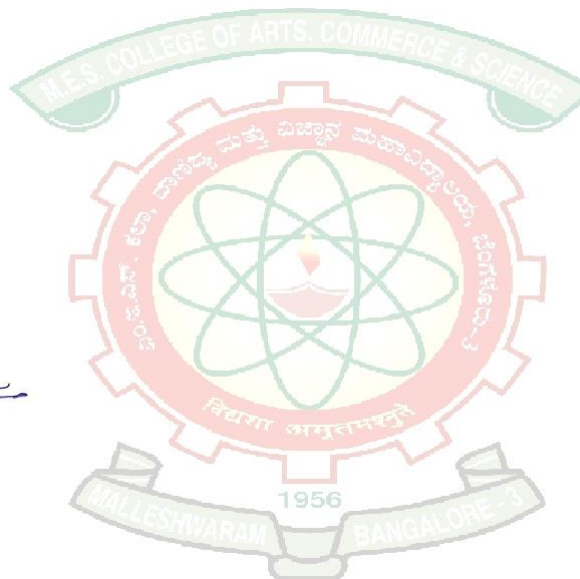
M302T	Fluid Mechanics Credits: 4 Lecture hours: 4 per week	Cartesian tensors, Continuum hypothesis, Motion, Stress, Fundamental laws, Motion of non-viscous and viscous fluids, Two dimensional flows of inviscid flows.	<p>Intended outcome</p> <ul style="list-style-type: none"> To study and understand the real world applications of fluid mechanics and solving the resultant mathematical equations using relevant methods to realize the complexity of the solution of the physical, engineering, bio-medical, atmospheric and mechanical based problems. To understand the importance of software usage. <p>Outcome assessment</p> <ul style="list-style-type: none"> Mathematical modeling of the fluid flow systems. Solving resultant ordinary and partial differential equations using relevant methods. Representation of the solution using plotting the graphs. Dimensional analysis of the system for understanding rescaling the actual physical configuration to the conventional forms Analysis of the solution using stream functions. Students are introduced to the concept of Cartesian tensors, their types and properties. They also learn about suffix, comma and semicolon notation. Students study about the configuration of a continuum, description of motion, stress, fundamental basic physical laws and related concepts. Students study the complex potential and singularities of two dimensional flow.
M303T	Functional Analysis Credits: 4 Lecture hours: 4 per week	Normed linear spaces, Banach spaces, Inner product spaces, Hilbert spaces.	<ul style="list-style-type: none"> Students are introduced to normed linear spaces and Banach spaces, their properties, characteristics and examples. Students learn about continuous linear transformations, linear functionals and projections on Banach spaces. Students study the definition, examples and properties of inner product spaces and Hilbert spaces. Students understand the concepts of orthogonality and orthonormality in Hilbert spaces. They also learn operators and projections on Hilbert spaces.
M304T	Linear Algebra Credits: 4 Lecture hours: 4 per week	Linear transformations, Minimal and Characteristic polynomials, Canonical forms, Inner product spaces, Quadratic forms, Bilinear forms.	<ul style="list-style-type: none"> Students study linear transformations, their properties, characteristics, matrix representation and diagonalizability. Students learn about different canonical forms. Students are introduced to Gram-Schmidt orthonormalization process. Students understand the concept of singular value decomposition, its applications and examples. Students also learn about bilinear and quadratic forms.
M305T	Numerical Analysis-II Credits: 4 Lecture hours: 4 per week	Numerical solution of ODEs (single and multistep methods) and PDEs (explicit and implicit methods).	<ul style="list-style-type: none"> Students study single and multistep methods for solving initial value problems of first and second order ODEs. Students learn methods for solving boundary value problems of second order ODEs. Students are introduced to explicit and implicit methods to solve elliptic, parabolic

			and hyperbolic PDEs. <ul style="list-style-type: none"> Students also study the convergence and stability of all the methods.
M306P	Scilab Practicals based on paper M305T Credits: 2 Lecture hours: 4 per week	Some numerical methods and techniques applied to ODEs and PDEs.	<ul style="list-style-type: none"> Students learn to write Scilab code for several methods used for solving initial and boundary value problems of first and second order ODEs. Students understand the nature of the solutions by plotting the solutions of PDEs. Students also learn how to debug the code.
3.5	Academic English (Open Elective) Credits: 4 Lecture hours: 4 per week	Process writing, Essays, CVs, Reports, Short research paper.	<ul style="list-style-type: none"> Students study process writing. Students write essays related to various topics. Students learn how to write their Curriculum Vitae (CV). Students also learn how to write a short research paper.
FOURTH SEMESTER			
M401T	Measure and Integration Credits: 4 Lecture hours: 4 per week	Lebesgue measure, Measurable functions, Lebesgue integral, Convergence theorems.	<ul style="list-style-type: none"> Students study about Lebesgue outer measure, Lebesgue measure, Lebesgue measurable sets and their properties. Students understand the definition and properties of measurable functions. Students learn about Lebesgue integral and its characteristics. Students also study the convergence theorems of Lebesgue integral.
M402T	Mathematical Methods Credits: 4 Lecture hours: 4 per week	Integral transforms, Integral equations, Asymptotic expansions, Perturbation methods.	<p>Intended outcome</p> <ul style="list-style-type: none"> To study and understand the importance of Integral transforms like Laplace transform, Fourier transform, Hankel transform, Discrete Fourier transform and Wavelet transforms of functions and applications existing in atmospheric, engineering, aerodynamics etc. Finding Eigen values and Eigen functions of different types of integral equations existing in IVP and BVP problems. Understanding the closed form solution of the integral equations using asymptotic expansions. <p>Outcome Assessment</p> <ul style="list-style-type: none"> Learn to apply Integral transforms to Differential and integro-differential equations. Solving differential equations with initial and boundary conditions using Integral transforms. Asymptotic expansion of the functions for in the valid interval of convergence. Solving the linear and non-linear differential equations with constant and variable coefficients using Perturbation techniques like regular perturbation, Poincare-Lindstedt method and WKB approximation. Studying applicative problem like Duffings equation, Vanderpol oscillator,

			<p>small Reynolds number flow and singular perturbation problems.</p> <ul style="list-style-type: none"> Students study the Laplace, Fourier, discrete Fourier, Hankel and wavelet transforms, and their applications to solve ODEs and PDEs.
M403T(C)	<p>Theory of Numbers</p> <p>Credits: 4 Lecture hours: 4 per week</p>	<p>Arithmetical functions, Congruences, Quadratic residues, Primitive roots, Partitions.</p>	<ul style="list-style-type: none"> Students study different arithmetical functions, their properties and examples. Students understand the concept of linear and polynomial congruences with applications. Students are introduced to quadratic residues, Legendre symbol, Jacobi symbol and their properties. Students are introduced to the concept of partitions. They learn the Euler's theorem, Jacobi's triple product identity and Rogers-Ramanujan identities.
M403T(E)	<p>Magnetohydrodynamics</p> <p>Credits: 4 Lecture hours: 4 per week</p>	<p>Electrodynamics, Classical MHD, Magnetostatics, Alfven wave equations.</p>	<p>Intended outcome</p> <ul style="list-style-type: none"> To study and understand the real world applications of Magnetohydrodynamics, Nano Fluids and solving the resultant mathematical equations using relevant methods to realize the complexity of the solution of the physical, engineering, bio-medical, atmospheric and mechanical based problems. To understand the importance of software usage. <p>Outcome Assessment</p> <ul style="list-style-type: none"> Mathematical modeling of the electrically conducting fluid flow systems. Solving resultant ordinary and partial differential equations using relevant methods. Representation of the solution using plotting the graphs. Dimensional analysis of the system for understanding rescaling the actual physical configuration to the conventional forms Finding the velocity and temperature distribution for the MHD Flows and Plotting and analyzing using non-dimensional numbers
M403T(H)	<p>Finite Element Method with Applications</p> <p>Credits: 4 Lecture hours: 4 per week</p>	<p>Weighted residual approximations, Finite elements, Finite element procedures, Finite element solution of ODE and PDE.</p>	<p>Intended outcome</p> <p>Recognize real world circumstances to apply Finite element method, formulation of problems and solving the problems using multiple approaches.</p> <p>Outcome Assessment</p> <ul style="list-style-type: none"> To obtain an understanding of the fundamental theory of the Finite element method. To develop the ability to generate the governing Finite element equations for systems governed by ordinary and partial differential equations. To understand the use of the basic finite elements for structural applications using Torsion of shaft of a square, elliptic, triangular cross sections. To understand the application and use of the Finite element method for Laplace and Poisson equations over rectangular and non rectangular and curved domains.

M404P	Latex and Latex Beamer Credits: 2 Lecture hours: 4 per week	Some environments of Latex and Latex Beamer.	<ul style="list-style-type: none"> ▪ Students learn how to use Latex for creating documents and presentations. ▪ Students use different Latex packages to style their documents and presentations. ▪ Students get hands-on experience in typesetting documents. ▪ Students also learn how to debug to Latex programs.
	Project Work Credits: 4 Lecture hours: 8 per week	Project on a research problem of current interest or on an advanced topic not covered in the syllabus.	<ul style="list-style-type: none"> ▪ Students do a self study of a topic (fairly advanced, not covered in their course work) under the guidance of a faculty member. ▪ Students gain deep knowledge about the project topic. ▪ Students create a project report leading to a possible publication at the end of the project work.

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