UNIVERSITY OF MYSORE
YUVARAJA'S COLLEGE, MYSORE
(A Constituent Autonomous College with Potential for Excellence)
(Accredited "A" Grade with CGPA 3.34 by NAAC)
JLB Road, Mysuru 570 005, Karnataka , INDIA

Under graduate (Bachelor) Programs offered in Yuvaraja's College (Autonomous): 2018-19

1. Bachelor of Science (B.Sc.) : Program outcome (PO): Page no. 2
2. Bachelor of Computer Applications (BCA): Program outcome (PO): Page no. 3
3. Bachelor of Business Administration (B.B.A.): Program outcome (PO): Page no. 4

The objectives and outcomes of the above Programs have been set since the CBCS syllabus is during introduced the year of introduction.

Sl. No	Program	Program Code	No of Program specific disciplines	Program Specific code	Page No. PSO & CO
			1. Program (B.Sc.)		
	B.Sc.	BSCYCM	**Core Disciplines:** Any three opted **(Fourteen)**:		
	B.Sc.	BSCYCM	1.Biochemistry	BSCBICYCM	06-10
	B.Sc.	BSCYCM	2. Biotechnology	BSCBITYCM	11-17
	B.Sc.	BSCYCM	3.Botany	BSCBOTYCM	18-20
	B.Sc.	BSCYCM	4.Chemistry	BSCCHEYCM	21-28
	B.Sc.	BSCYCM	5. Computer Science	BSCCOMYCM	29-35
	B.Sc.	BSCYCM	6.Electronics	BSCELEYCM	35-40
	B.Sc.	BSCYCM	7.Environmental Science	BSCENSYCM	41-47
1.	B.Sc.	BSCYCM	8.Food and Nutrition	BSCFSNYCM	47-49
	B.Sc.	BSCYCM	9.Geology	BSCGEOYCM	49-53
	B.Sc.	BSCYCM	10.Mathematics	BSCMATYCM	54-56
	B.Sc.	BSCYCM	11. Microbiology	BSCMICYCM	57-61
	B.Sc.	BSCYCM	12. Physics	BSCPHYYCM	61-65
	B.Sc.	BSCYCM	13. Sericulture	BSCSERYCM	66-71
	B.Sc.	BSCYCM	14. Statistics	BSCSTAYCM	71-81
	B.Sc.	BSCYCM	15. Zoology	BSCZOOYCM	81-87

			Compulsory additional Three courses (Environmental Studies, Indian Constitution and Computer Application have to be completed: Language disciplines: Compulsory (Two); One is English and the other can be chosen from the list of languages given from the college.		
	B.Sc.	BSCYCM	English	BSCENGYCM	87-89
			Language options given to B.Sc/BBA/BCA Students are as follows (any one out of eight)		
	B.Sc.	BSCYCM	Kannada	BSCKANYCM	90-91
	B.Sc.	BSCYCM	Hindi	BSCHINYCM	91-93
	B.Sc.	BSCYCM	Sanskrit	BSCSANYCM	93-95
	B.Sc.	BSCYCM	Malayalam	BSCMALYCM	96
	B.Sc.	BSCYCM	Persian	BSCPERYCM	96
	B.Sc.	BSCYCM	Tamil	BSCTAMYCM	96
	B.Sc.	BSCYCM	French,	BSCFREYCM	96
	B.Sc.	BSCYCM	Arabic	BSCARAYCM	96
			Compulsory Courses		
	B.Sc.	BSCYCM	Environmental Studies	BSCICNYCM	96
	B.Sc.	BSCYCM	Indian Constitution	BSCESTYCM	97
	B.Sc.	BSCYCM	Computer Application	BSCDIMYCM	97
			2 and 3: Programs : B.C.A. and B.B.A.		
2.	B.C.A	BCAYCM	Bachelor of Computer Applications	BCACOAYCM	98-107
3.	B.B.A	BBAYCM	Bachelor of Business Administration	BBAMANYCM	107-118

1. Program: Bachelor of Science (B.Sc.)
Program Code: BSCCBCSYCM

Program objectives: (PO):

Objective all Bachelor of Science degree program is

1. To train critical thinking.
2. To develop effective communication
3. To train good social interaction.
4. To become effective citizenship.
5. To have environmental concerns.
6. To motivate them for self-directedand lifelong learning process.
7. To develop belongingness to our locality and nation.

Program outcome: (PO):
Students of all B.Sc. degree Program at the time of graduation will be able to develop.

1. Critical Thinking: Take informed actions after identifyingthe assumptions that frame our thinking and actions, checking out the degree to which these assumptions areaccurate and valid, and looking at our ideas and decisions, (intellectual, organizational, and personal) from different perspectives.

2. Effective Communication: Speak, read, write and listen clearly in person and through electronic media in Englishand in one Indian language, and make meaning of theworld by connecting people, ideas, books, media and technology.

3. Social Interaction: Elicit views of others, mediate, disagreements and help reach conclusions in group settings.

4. Effective Citizenship: Demonstrate empathetic social concern and equity centered national development, and theability to act with an informed awareness of issues andparticipate in civic life through volunteering.

5. Ethics: Recognize different value systems including your own, understand the moral dimensions of your decisions, and accept responsibility for them.

6. Self Directed learning: The ability to engage in independent and life-long learning in the context of socio-technological changes which gives them self-directed and lifelong learning capabilities.

7. Belongingness: The importance of locally available resources and knowledge with pride and this helps them to think locally and act globally and have belongingness to our nation.

1. Program: Bachelor of Computer Applications (BCA)

Program Code: BCACBCSYCM

Program Objectives (PO):

1. To provide a foundation of computing principles and business practices for effectively using/managing information systems and enterprise software.
2. To provide the students with options to specialize in legacy application software, system software or mobile applications.

Program Outcome (PO): Students will able to:

1) Recognize and appreciate the role of computing in a wide variety of activities such as applications of Modern society, including commerce, education and communication.
2) Analyse a given problem and develop an algorithm to solve the problem.
3) Demonstrate the basic technicalities of creating word document, creating power point presentation, design spreadsheet for office use.
4) Develop the software projects by understanding the client requirement.
5) Define fundamental account concept, conventions & terminologies.
6) Implement the software models in various programming languages like C, C++, VB. Net, Java Construct in the right way.
7) Master the basic concept and understand the database management system.
8) Acquire options to pursue MCA/ M.Sc.-CS/IT/ MBA/ MS (IT).
9) Become a responsible citizen with sensitivity towards environmental concerns.

3. Program: Bachelor of Business Administration (BBA)

Program Code: BBACBCSYCM

Program Objectives:

1. To Understand of Business Functions

2. To Provide Global Perspectives

3. To Develop Critical and Analytical Thinking Abilities

4. To Develop Interpersonal Skill

5. To Create Social Sensitivity in understanding CSR

6. Demonstrate sensitivity to social, ethical and sustainability issues

7. To Develop Entrepreneurship Insight

8. To prepare students for managerial positions in business and industry.

9. To develop entrepreneurial skills

10. To develop critical thinking and analysing skills

11. To inculcate ethical values, corporate social responsibilities and sustainable business practices.

12. To provide an environment that facilitates all-round development of the student's personality

13. To foster thinking minds that are sensitive to societal needs and issues thus making them good human beings and responsible members of the society.

14. To understand the problems faced by the business sector in the Current scenario.

Program Outcomes:

1. Acquiring Conceptual Clarity on Various Functional Areas

2. Demonstrating ability to evolve strategies for organizational benefits

3. Develop analytical ability for Decision Making

4. Demonstrate the ability to develop models / frameworks to reflect critically on specific

business contexts

5. Demonstrate capability in Oral and Written Communication
6. Demonstrate Ability to work in Groups
7. Demonstrate capability in understanding social cues for decision making
8. Develop ethical practices and values for Better Corporate Governance.

Sl No.	Program	Program Code	No of Program specific disciplines with code
1	B.Sc.	BSCCBCSYCM	1. Biochemistry , BSCCBCSBICYCM

Program Specific Objectives:

- Adopt strong foundation with skills, relevant training and education towards understanding Biochemistry.
- Apply appropriate tools and techniques for conducting scientific investigations to solve the problems in life science domain.
- Acquire higher degree of work in academics and research.
- Adapt lifelong learning with continuous improvement.

Program Specific outcomes:

- Ability to analyze the various biological components through analytical tools in living cells and molecular machinery.
- Development of practical laboratory skills and strong speculative foundation in the discipline of Biochemistry.
- Understanding of the applications of Biochemistry in various fields such as Clinical Biochemistry, Genetic Engineering, Molecular biology & Biotechnology.
- Acquire practical skills that will prepare for a future career in the interdisciplinary subjects.
- Comprehending fundamental concepts in modern biology to meet the emerging trends, Handling microbial and biochemical systems, Procuring hands on real time experience in the industries.

- Comprehending fundamental concepts in modern biology to meet the emerging trends, Handling microbial and biochemical systems, Procuring hands on real time experience in the industries.

B.Sc., Biochemistry

Sl No	Sem	Course	Title of the Paper	Hrs/Week L:T:P	Credits
1	I	DSC-I	**B**io-organic, Bio inorganic & Bio Physical Chemistry	4:0:2	6
2	II	DSC-II	Biomolecules	4:0:2	6
3	III	DSC-III	Biochemical Techniques & Enzymology	4:0:2	6
4	IV	DSC-IV	Metabolism I & Human Physiology	4:0:2	6
5	V	**DSE-IA**	Metabolism–II and Human Physiology Practical: Enzyme Assays	---	---
		DSE-IB	Molecular Biology Practical: Biochemical and Biophysical Experiments	---	---
6	V	SEC-2	---	---	---

7	VI	**DSE-2A**	Nutrition Practical: Nutrition	---	---
		DSE-2B	Clinical Biochemistry and Immunology Practical: Clinical Biochemistry and Immunology	---	---
8	**VI**	SEC-4	---	---	---

DSC: Discipline Specific Core Course
DSE: Discipline Specific Elective
SEC: SkillEnhancement Course

DSC-I: Title of the Course: Bio-organic, Bio inorganic & Bio physical Chemistry

Course Objectives:

- To study the fundamentals of the chemistry, since basic chemistry knowledge is essential for biochemistry subject.
- To study the basics of bioorganic, bioinorganic and biophysical chemistry aspects.

Course Outcome:

- To understand the bioorganic components such as reaction intermediates, attacking reagents and stereochemical aspects. They can describe chemistry of vitamins, heterocyclic compounds, terpenes, alkaloids, steroids, flavanoids, hydroxy acids, dicarboxylic acids and keto acids.
- To understand radiochemistry, porphyrins, coordination compounds, transition metals and elements such as nitrogen, phosphorus, oxygen, sulphur, selenium and their biological/environmental effects:
- To understand the concepts of stoichiometry, viscosity, distribution law, properties of water, acid, bases and buffers. They are able to discuss the concepts in photochemistry and electrochemistry.

II SEMISTER
DSC-II: Title of the Course: Biomolecules
Course Objectives:

- To study the biomolecules, which are the pillars of the biochemistry.

- To study the chemistry, occurrence, types and biological role of carbohydrates, proteins,lipids, nucleic acids.

Course Outcome:

- To understand the definitions, classification, chemical reactions, occurrence and functions of carbohydrates that includes monosaccharides, disaccharides, polysaccharides and other carbohydrate derivatives.

- To understand the definitions, classification, chemical reactions, occurrence and functions of lipids and their derivatives.

- To understand the methods involved in the isolation of proteins, their types and functions. Structure of amino acids and color reactions and the role of biologically important peptides,
- To understand the isolation methods of nucleic acids, their structure, types and functions.

III SEMISTER
DSC-III: Title of the Course: Biochemical Techniques and Enzymology

Course Objectives:
- To study the structure, classification, nature, types, biological role and applications of enzymes.
- To study the biophysical techniques which allow to learn different methods of isolation and purifications of molecules

Course Outcome:
- To understand the biophysical techniques which allow to learn different methods of isolation and purifications of molecules
- To understand the definitions, classification, nature , types, biological role and applications of enzymes.

IV SEMISTER
DSC-IV: Title of the Course: Metabolism-I and Human Physiology

Course Objectives:

- To understand the basic aspects of metabolic pathways and regulation of biomolecules.
- To study and understand the structural and functional aspects of mitochondrial electron transport chain in detail.
- To gain deeper insights on photosynthesis and its associated process.

Course Outcome:

- Students will acquire the concept of anabolism, catabolism, anapleurotic reactions, redox balance etc. and the role of high energy compounds in the cell.
- They will acquire knowledge related to regulation of various pathways.
- The role of lipids as storage molecules and structural component of bio membranes will be understood in detail.
- Students will learn about importance of high energy compounds, electron transport chain, synthesis of ATP under aerobic and anaerobic conditions will be understood.
- Students will gain knowledge about the fundament aspects of photosynthesis and its associated processes in depth.
- To emphasizes on metabolic disorders at molecular level.
- To learn the regulatory aspects of metabolism for better understanding of physiology and therapeutic applications.

V Semester
Metabolism–II and Human Physiology

Course Objectives:
- To study about the importance of, nitrogen containing compounds, porphyrins, and steroid hormones.
- To study and appreciate the integrated approach of interrelated pathways of catabolism and anabolism.
- To emphasizes on metabolic disorders at molecular level.
- To learn the regulatory aspects of metabolism for better understanding of physiology and therapeutic applications.

Course Outcome:
- Students will learn about the importance of nitrogen and nitrogen containing compounds in biological system.
- Students will learn to explain/describe the synthesis, degradation and functional aspects of amino acids, nucleic acids, steroid hormones and vitamins in detail.
- Students will learn about the regulatory aspects of metabolic pathways at various phases like transcriptional, translational, and post-translational levels.

Molecular biology

Course Objectives:
- To give deeper knowledge on cellular processes that drive biological systems.
- To build the fundamental concepts of cellular structural organization and functional understanding of sub-cellular components.

Course Outcome:
- Students will obtain understanding of the molecular aspects of biology.
- It also helps in understanding the concepts of cellular function.
- Students obtain fundamental knowledge required for understanding the cancer/apoptosis at molecular level.
- The course addresses molecular mechanisms underlying several central themes in cellular biology like cell division and replication, the transport of proteins and other macromolecules within cells.
- Students of this course will obtain an elementary introduction to the study of molecular biology

VI Semester
Nutrition

Course Objectives:
- To understand the role of nutrition in health.
- To understand about the physiological and biochemical aspects of the nutrition.
- To plan the therapeutic diet and monitor the evaluation of nutrition therapy according to the disease conditions.

Course Outcome:
- Students will learn about the fundamentals of nutrition from the angle of clinical perspective.
- They will understand the concepts like glycemic index, balanced diet, micronutrient deficiencies and their remedies, nutraceuticals and their importance, junk foods and their hazards in the holistic manner.
- The course will assist the students to gain employability in diagnostic and research institutes.

Clinical Biochemistry and Immunology

Course Objectives:

- To understand the concept of health & diseases, communicable, non-communicable diseases. Metabolic diseases & deficiency.
- To give knowledge on various bio-molecules and their use in diagnosis and treatment of diseases.
- To create awareness of different lifestyle diseases including its management.
- To give insights to the recent developments in clinical diagnosis.
- To gain knowledge of the development of the various cells and tissues of the human immune system.
- To model the physiological and pathological functions of the immune system at a molecular level.
- To demonstrate some of the major modern techniques influenced by immunology and to understand types of immune responses seen in the body in normal and pathological conditions.
- To acquire knowledge about research and development of novel vaccines and immune therapeutics.

Course Outcome:

- It illustrates the mechanism of metabolic disorders at molecular level.
- Students will learn about the normal constituents of urine, blood and their significance in maintaining good health.
- Students will get the knowledge of marker enzymes useful in diagnosis of various diseases.
- It is directed towards the employability in diagnostic centers.
- Students will have knowledge of different types of immunity, protection barriers, different cells which are participating in the immune responses. Applications of monoclonal antibodies. Immunology of cancer and other disorder.
- Students will understand the importance of ongoing research like production of vaccines for emerging pathogens, also in immunotherapy, autoimmune diseases.
- This will helps the students in advancing understanding of basic immunology which is essential for clinical and commercial application and will facilitate the discovery of new diagnostics and treatments to manage a wide array of diseases.

- Students will understand the role of immune responses in numerous disciplines of medicine, particularly in the field of organ transplantation, oncology etc.

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Sl No.	Program	Program Code	No of Program specific disciplines with code
1	B.Sc.	BSCCBCSYCM	2. Biotechnology , BSCCBCSBITYCM

PROGRAM SPECIFIC OBJECTIVES:

➢ Biotechnology is an undergraduate course aims to impart knowledge to the students on application of biotechnology in various fields such as medical, environmental, industrial, agricultural and many more.

➢ The main motto is to create biotechnological awareness.

➢ To encourage students a critical appreciation of the integrated nature of biotechnological problems.

➢ To make them realise that the biotechnological problems are global.

➢ To induce the spirit of competitiveness.

➢ To impart specialised knowledge and skills to students in particular areas of the national or regional biotechnological issues.

PROGRAMME SPECIFIC OUTCOMES:

After successful completion of B.Sc. Biotechnology Course:

➢ Graduates in biotechnology will be eligible for pursuing higher education, M.Sc. program in Biotechnology and also in the different field of life science.

➢ Graduates will exhibit contemporary knowledge in Biotechnology and students will be eligible for doing jobs in pharmaceutical and biotechnological Industry.

➢ Graduates will be able to understand the potentials, and impact of biotechnological innovations on environment and their implementation for finding sustainable solution to issues pertaining to environment, health sector, agriculture, etc.

➢ Graduates will be able to design, conduct experiments, analyze and interpret data for investigating problems in BT and allied fields.

➢ Graduates will be able to work individually as well as in team to survive in multidisciplinary environment.

➢ Graduates will possess oral and written communication skills

B.Sc., BIOTECHNOLOGY

Sl No	Sem	Course	Title of the Paper	Hrs/Week L:T:P	Credits
1	I	DSC-I	Biomolecules & Microbiology	4:0:2	6
2	II	DSC-II	Enzymology & Cellular Metabolism	4:0:2	6
3	III	DSC-III	Cell biology, Genetics & Immunology	4:0:2	6
4	IV	DSC-IV	Plant & Animal Biotechnology	4:0:2	6
5	V	DSE-IA	Molecular Biology & Genetic Engineering	4:0:2	6
		DSE-IB	Genomics & Proteomics	4:0:2	6
6	V	SEC-2	Biotechnology & Human Welfare	2:0:0	2
7	VI	DSE-2A	Microbial, Environmental Biotechnology & Bioinformatics	4:0:2	6
		DSE-2B	Bioprocess Technology	4:0:2	6
8	VI	SEC-4	Entrepreneurship Development	2:0:0	2

DSC: Discipline Specific Core Course
DSE: Discipline Specific Elective
SEC: SkillEnhancement Course

I-SEMESTER

DSC-I: Title of the Course: Biomolecules and Microbiology
Course Objectives:
➢ To understand the basics of biotechnology through biomolecules and microbiology.

➢ Highlights the structure and importance of various biomolecules in living organisms.

➢ Study on different microorganisms, their identification techniques and diseases caused by them

On completion of the courses students will be able:

➢ To gain knowledge about structure and function of biomolecules in living organisms.

➢ To gain knowledge on principle and application of various types of Microscopy.

➢ To classify and explain the structure and general characteristics of Microorganisms.

DSC-II: Title of the Course: Enzymology and Cellular MetabolismCourse

Course Objectives:
➢ Basic understanding of enzymes, their classification and functional aspects.

➢ Basic understanding of metabolism, different metabolic processes at cellular level, metabolism of biomolecules and metabolic disorders, and Bioenergetics,

➢ It explores the knowledge of interconnections among all the biomolecules and their metabolism at cellular level.

- To understand the structure and functions of enzymes, their role in metabolism and metabolic disorders.

Course Outcome:

- Students will acquire new knowledge of the interdependence between enzymes, bioenergetics and metabolism that is vital for normal metabolic activities, in maintaining normal health and in metabolic disorders and diseased conditions

- They understand the role of enzymes to maintain normal functions in the body, that ensures the survival of human being, and also different living organisms.

- They will learn how enzymes play vital role in normal metabolic activities, diseased conditions/metabolic disorders. Generation of energy via ETC and their utilization for synthesis of ATP which have important role to play in various metabolic processes of the body.

DSC-III: Title of the Course: Cell Biology, Genetics & Immunology

Course Objectives:

- The focus is on interactions between the cell biology, genetic constitution of an organism and various immunological aspects of living organisms.
- To understand the basic unit of the organism.
- To differentiate the organisms by its cell structure.
- To know Components of the Cell and their division.
- To explain the arrangement of Genes and their interaction.
- To describe the influence of environment on gene expression.
- To understand extra nuclear inheritance, linkage & crossing over.
- It deals with the interactive cellular processes, genetic makeup, and role of various immunologically active organs and cells in the immune system.
- Immune system is a very important part in the protection of body against deleterious effects caused by various harmful microorganisms.

Course Outcome:

- Cell is an important and integral part of living organisms. Genetic constitution of of an organism plays a key role in normal development of an organism. Immune system plays a vital role in protection of organism.
- Students gain knowledge about how these relationships are important in maintaining normal life, and also in various metabolic disorders and diseases.
- They also strive to understand the functions of cell, variations in gene, chromosome and abnormal functions due to variations in chromosomes.
- Exploring more about functions of cell, importance of genetic constitution of an organism and functions of immune system.

DSC-IV: Title of the Course: Plant & Animal Biotechnology

Course Objectives:

- The paper aims to build a conceptual understanding of students by exposing them to the basic principles behind various processes of plant tissue culture and animal cell culture.

- Plant & Animal biotechnology is the study of the history and development of plant tissue

culture various biotechnological processes such as applications of plant tissue culture, Transgenic plants and Animal biotechnology discusses the historical background, a brief account of importance and development of animal cell culture, cloning techniques, and transgenic animals.

➤ It gives a clear knowledge on the plant tissue culture, animal cell culture, gene cloning, production of transgenic plants and animals, and their advantages.

Course Outcome:

➤ This paper enables students to learn various methods and procedures of plant tissue culture and animal cell culture.

➤ Students gain knowledge about gene cloning techniques

➤ Students will be able to gain the knowledge on the production of transgenic plants and animals.

➤ Advantages of transgenic plants and animals.

DSE-IA- Title of the Course: Molecular Biology & Genetic Engineering

Course Objectives:

➤ To understand from cells to organelles to molecules, the understanding of various biological processes.
➤ To explain genome organization in higher organisms.
➤ To describe kinetic classes of DNA and Gene families.
➤ To understand the steps involved in recombinant DNA technology.
➤ To explain the construction of DNA & c DNA library and their applications
➤ Mutations, proto-oncogenes, oncogenes and tumour suppressor genes, physical, chemical and biological mutagens; types of mutations; intra-genic and inter-genic suppression.

Course Outcome:

➤ Student should be equipped to understand three fundamental aspects in
   biological phenomenon: a) what to seek; b) how to seek; c) why to seek?

➤ Students gain basic knowledge about Molecular biology, genetic engineering.
➤ Students get a valuable knowledge about the theoretical knowledge of various technologies relating to molecular biology and genetic engineering.
➤ In conjunction with the practicals the students will be able to take up minor biological research as well as placement in the relevant biotech industries.

DSE-IB: Title of the Course: Genomics & Proteomics
Course Objective:

➤ To understand from cells to organelles to molecules, and genome organization in higher organisms.
➤ To describe kinetic classes of DNA and Gene families.
➤ To explain the construction of DNA & c DNA library and their applications
➤ To learn about basics of gene and genomics, and proteins and proteomics
➤ Overview of genomics – definition, complexity and classification; need for genomics level analysis; methods of analyzing genome at various levels – DNA, RNA, protein, metabolites and phenotype.

Course Outcome:

- ➢ Students get knowledge to explain principles of basic methods of genomic and proteomic analysis.
- ➢ Students learn to propose appropriate methods for analysis of given sample type with respect to purpose of analysis.
- ➢ Students get a valuable knowledge about the theoretical knowledge of various technologies relating to genomics and proteomics.
- ➢ In conjunction with the practicals, the students will be able to take up minor biological research as well as placement in the relevant biotech industries.
- ➢ They get opportunities for investment relating to areas of genomics and proteomics small scale industries and laboratories which boost the economy which means that there will be more jobs and new sources of income.

SEC-2- Title of the Course: Biotechnology & Human Welfare

Course Objectives:

- ➢ To understand contemporary knowledge in Biotechnology and students will be eligible for doing jobs in pharmaceutical and biotechnological Industry.
- ➢ To gain knowledge in the potentials, and impact of biotechnological
- ➢ To understand innovations on environment and their implementation for finding sustainable solution to issues pertaining to environment, health sector, agriculture, etc.
- ➢ To design, conduct experiments, analyze and interpret data for investigating problems in BT and allied fields.
- ➢ To work individually as well as in team to survive in multidisciplinary environment.
- ➢ To possess oral and written communication skills.

Course Outcome:
- ➢ Students will be flexible path of personal and professional development that is suited for entry into a wide range of biotechnology industries and research enterprises.
- ➢ Students get a valuable knowledge in the area which includes both medical areas such as vaccine and drug development, industrial activities such as hormone manufacturing using large scale cell culture or drug synthesis using enzyme catalysis.
- ➢ Students will also gain knowledge in non-medical applications such as waste treatment and biofuel production.

VI- SEMESTER

DSE-2A: Title of the Course: Microbial and Environmental Biotechnology and Bioinformatics

Course Objectives:

- ➢ These papers throw light upon the biotechnological approaches relating to application of microorganisms and its application for betterment of environment in various aspects.
- ➢ Appreciate their relevance for investigating specific contemporary biological questions;
- ➢ Critically analyse and interpret results of their study.

➢ These papers will also educate students about the fundamental concepts of bioprocess technology and its related applications, thus preparing them to meet the challenges of the new and emerging areas of biotechnology industry.

➢ To develop an understanding of basic theory of computational tools.

➢ To acquire working knowledge on computational tools and methods.

➢ This paper gives an overview of microbial and environmental biotechnology, and bioinformatics which play an important role in the protection of human health as well as the environment.

Course Outcome:

➢ Students learn about biotechnological application of microorganisms for protection of environment which play a key role for betterment of human health as well as the environment.

➢ Appreciate their relevance for investigating specific contemporary biological questions;

➢ Critically analyse and interpret results of their study.

➢ Appreciate relevance of microorganisms from industrial context.

➢ Carry out stoichiometric calculations and specify models of their growth

➢ Give an account of design and operations of various fermenters

➢ Present unit operations together with the fundamental principles for basic methods in production technique for bio-based products.

➢ Calculate yield and production rates in a biological production process, and also interpret data;

➢ Give an account of important microbial/enzymatic industrial processes in food and fuel industryDevelop an understanding of basic theory of these computational tools.

➢ Gain working knowledge of computational tools and methods.

➢ Students gain entrepreneurial skills, understand the various operations involved in venture creation

Students identify scope for entrepreneurship in biosciences and utilize the schemes promoted through knowledge centres and various agencies.

➢ The students will also gain knowledge pertaining to management which will also help them to build up a strong network within the industry.

SEC-4: Title of the Course: Entrepreneurship Development

Course Objectives:

- To gain basic knowledge aboutthe selection of a product, line, design and development processes, economics on material and energy requirement
- To gain knowledge on basic regulations of excise such as demand for a given product, feasibility of its production under given constraints of raw material, energy input, financial situations export potential etc.
- To understand the business opportunitieswhich may be available in various fields of biotechnology such as medical biotechnology, industrial biotechnology, environmental biotechnology etc.
- To gain invaluable knowledge about bio-ethics, business strategy, business plan preparation and so on.

Course Outcome:

Upon completion of this program, graduates will be able to:

- Demonstrate a fundamental comprehension of business opportunity evaluation.
- Form the perspective of a prospective investor.

  Identify the most recognized sources of potential funding and financing for business start upsand/or expansion.

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Sl. No	Program	Program Code	No of Program specific disciplines with code
1	B.Sc.	BSCCBCSYCM	3. Botany , BSCCBCSBOTYCM

Program specific Objectives:

- To bring awareness of plant wealth around us which has to be protected with utmost care
- To make them understand the diversity of plant kingdom
- To make them understand morphology, anatomy, cell biology, microbiology related to plants, physiology, molecular biology genetics, plant propagation, plant breeding evolution of plants
- To train them to enter into higher studies, teaching, research, and industry related profession in botanical science.
- To prepare them to competitive examinations like KPSC, UPSC and IFS etc

Program specific outcome:

- Student will become the torch bearers of conservation of plant wealth
- They will become competent in naming the common plants around them which the general public usually will be interested.
- In-depth study of plant science sub disciplines help them to enter into the institutes which require specific skill sets
- Many students enter into B.Ed programs which generates many good teachers
- Students after completion of the course get opportunities for higher studies in plant science in india and abroad or job opportunities related to plant science as well as in general service fields.

B.Sc., Botany

Sl No	Sem	Course	Title of the Paper	Hrs/Week L:T:P	Credits
1	I	DSC-I	Diversity of Microbes, Phycology, Mycology, Lichens, Plant Pathology and Bryophytes	4:0:2	6
2	II	DSC-II	Pteridophytes, Gymnosperms, Paleobotany, Morphology of Angiosperms and Anatomy	4:0:2	6
3	III	DSC-III	Reproductive Biology, Plant Ecology and Plant Physiology	4:0:2	6
4	IV	DSC-IV	Genetics, Molecular Biology, Cell Biology and Plant Breeding	4:0:2	6
5	V	**DSE-IA**	Taxonomy, Economic Botany and Ethnobotany	4:0:2	6
		DSE-IB	Cell biology, plant breeding and plant propagation	4:0:2	6
6	V	SEC-2	------	2:0:0	2
7	VI	**DSE-2A**	Genetics, Genetic engineering and evolution	4:0:2	6
		DSE-2B	Plant biotechnology, biodiversity and conservation	4:0:2	6
8	VI	SEC-4	----	2:0:0	2

DSC: Discipline Specific Core Course
DSE: Discipline Specific Elective
SEC: SkillEnhancement Course

<div align="center">

I Semester

DSC-I: Title of the Course: Diversity of Microbes, Psychology, Mycology, Lichens, PlantPathology and Bryophytes

</div>

Course Outcome:
1. To understand the General characters, Classification and Economic importance of Mollicutes, Viruses, Bacteria, Cyanobacteria, Algae, Fungi, Lichens and Bryophytes
2. To Learn the Structure and Reproduction of various forms included in the syllabus
3. To acquire the basic knowledge of various plant diseases mentioned in the syllabus and their management

<div align="center">

II Semester

DSC-II: Title of the Course: Pteridophytes, Gymnosperms, Paleobotany, Morphology of Angiosperms and Anatomy

</div>

Course Outcome:
1. To understand the Salient features, Classification and Economic importance of Pteridophytes and Gymnosperms
2. To study the Morphology, Anatomy and Reproduction of Pteridophytes and Gymnosperms included in the syllabus
3. To acquire the knowledge of Geological time scale, Fossils and Fossilization
4. To study various types of tissues and their functions
5. To understand the Anatomical structures of root, stem and leaf of Dicots and Monocots
6. To study the Morphological structure of Angiosperms

<div align="center">

III Semester

DSC- III: Title of the Course: Reproductive Biology, Plant Ecology and Plant Physiology

</div>

Course Outcome:
1. To study Plant Developmental Biology and and Experimental Embryology
2. To acquire the basic knowledge of Plant Community and their Adaptations
3. To study the Environmental factors and their impact on Plant Community
4. To acquire the knowledge of various Ecosystem and Energy flow
5. To understand the underlying Principles of various Physiological processes and Metabolism
6. To study the roles of Minerals in Plant Metabolism
7. To study Plant Growth and Development

<div align="center">

IV Semester

DSC-IV: Title of the Course: Genetics, Molecular Biology, Cell Biology and Plant Breeding

</div>

Course Outcome:
1. To study the ultra structure of cell organelles
2. To acquire the knowledge of underlying Principles of different Microscopes
3. To learn Chromosomal aberrations and their significance
4. To understand Mendel's Principles, Deviations from Mendelism, Mutation and its significance
5. To learn the principles, techniques and applications of Plant Breeding

<div align="center">

V Semester

DSE-IA- Title of the Course: Taxonomy, Economic botany, & Ethnobotany

DSE-IB Title of the Course: Cell Biology, Plant Breeding &Plant Propagation

</div>

Course Outcome:
1. To study the types of classification- Artificial, Natural, Phylogenetic and Recent trends in Taxonomy
2. To acquire the knowledge about Botanical Survey of India (BSI), Herbarium,
3. Brief study of the Economic products of Angiosperms and Ethnobotany
4. To study the ultra structure of cell organelles
5. To acquire the knowledge of underlying principles of different microscopes
6. To learn the principles, techniques and applications of Plant Breeding
7. To learn the principles, techniques and applications of Plant propagation

<div align="center">

VI SEM COURSE STRUCTURE

DSE-2A: **Title of the Course: Genetics, Genetic engineering & Evolution**

DSE-2B: **Title of the Course: Plant Biotechnology, Biodiversity & conservation**

</div>

Course Outcome:
1. To acquire the knowledge on chemistry, structure, types of genetic material and protein synthesis
2. To learn the concepts of gene and mechanism of gene regulation
3. To acquire the knowledge on principles, techniques and applications of Plant Biotechnology
4. To understand methods of gene transfer in Recombinant DNA technology
5. Applications of Biotechnology in Human welfare, IPR, Biosafety and Bioethics
6. To understand the principles, tools and techniques of Genetic Engineering
7. To learn the principles, techniques and applications of Plant Breeding
8. To acquire the knowledge of Biodiversity, conservation and biolegislations
9. To study the geographical distribution of plants
10. To acquire the knowledge and techniques of Plant Propagation and Horticulture
11. To understand the concept of Evolution, theories and evidences

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Sl. No	Program	Program Code	No of Program specific disciplines with code
1	B.Sc.	BSCYCM	4. Chemistry , BSCCHEYCM

B.Sc., Chemistry

Sl. No	Sem	Title of the Paper
1	I	Chemistry paper-1
2	II	Chemistry paper-II
3	III	Chemistry paper-III
4	IV	Chemistry paper-1V
5	V	Chemistry paper-V
6		Chemistry paper-VI
7		Chemistry paper-VII
8	VI	Chemistry paper-VIII
9		Chemistry paper-IX
10		Chemistry paper-X

Program Specific Course Outcome:

1. Students will get a good background of Chemistry knowledge in all sphere of life.
2. Students will get good knowledge of General chemistry, Inorganic chemistry, Organic Chemistry, Physical chemistry and Analytical chemistry.
3. The above knowledge enables the students to enter to Post graduate courses in Chemistry, Organic Chemistry, Industrial Chemistry & interdisciplinary areas etc.
4. Helps the students to enter research institutes to do their Integrated Ph.D programs.
5. They get knowledge of chemicals and medicinal composition and this helps them to get placements in Industry and research institutes also.
6. They will get a range of practical skills so that they can understand and assess risks and work safely measures to be followed in the laboratory.
7. Students will gain the ability to apply standard methodology to the solution of problems in chemistry.
8. Students will get the ability to plan and carryout experiments independently and assess the significance of outcomes and to cater to the demands of chemical Industries of well-trained graduates.
9. Students will get the ability to adapt and apply methodology to the solution of unfamiliar types of problems.
10. To develop an independent and responsible work ethics.

I SEMESTER

CHEMISTRY– PAPER – I

Course Objectives:
- To understand the atomic theory of matter, composition of atom.
- Learning scientific theory of atoms, concept of wave function.
- To learn Periodic Properties of elements
- To learn basic reactive intermediates and reactions in organic compounds
- To know about the Maxwell distribution, mean-free path, kinetic energies.
- To know about the surface phenomenon like adsorption and catalysis.

Course Outcome:
- Students will understand the electronic configuration of various elements in periodic table
- Students will get the idea of de Broglie matter of radiation
- Students will understand the physical and chemical characteristics of elements in various groups and periods according to ionic size, charge, etc. and position in periodic table.
- Students will understand the basic of organic molecules, structure, bonding, reactivity and reaction mechanisms.
- Students will acquire the knowledge of behaviour of real gases, deviation from ideal behaviour, equation of state, isotherm, and law of corresponding states
- Students will know about the mechanism of catalysis, Michaelis-Menten equation, various adsorption process and adsorption isotherms.

I SEMESTER

CHEMISTRY– PRACTICAL PAPER – I

Course Objectives:
- To learn about concept of Normality, Molarity, Molality etc.,

- To understand the concept of good lab practices, understanding the chemical nature and awareness of MSDS

- To carry out the preparation of standard solutions, dilution of solutions, calibrations, standardization and estimations.

Course Outcome:
- Students will learn about titrimetric analysis, redox reactions and Acid-Base Titrations

- Students will be able to get idea about Calibration and use of apparatus.

II SEMESTER

CHEMISTRY– PAPER – II

Course Objectives:
- To study and understand about bonding between ions, molecules and polarity of molecules.
- To understand the basic idea of alcohols, phenols and their reactions.
- To understand the synthetic applications of organometallic compounds.
- To study the concept of Colligative properties and electrolytes.

Course Outcome:
- At the end Students will get idea about bonding in molecules and ions.
- Students will learn the concept of Colligative properties and their applications.
- Students will able to learn the types of alcohols, properties of Phenols, amines.

II SEMESTER

CHEMISTRY– PRACTICAL PAPER – II

Course Objectives:
- Students will be able to get the evidence based comparative chemistry to explain the chemical synthesis and identification of organic compounds by qualitative approach.

Course Outcome:
- Students will come to know about special elements, functional groups and structure of organic compound.

CHEMISTRY PAPER – III

Course Objectives:
- To know the important properties, bonding and structure of compounds of P-block elements.
- To study the types of inorganic solvents and their properties.
- To understand the basic concept, reactions and mechanisms of Carbonyl compounds and Carboxylic acids
- To know the concepts of oils, fats, waxes, soaps, detergents and dyes
- To learn about basic concepts of thermodynamics and their laws
- To study the types of emulsions, gels, their importance

Course Outcome:
- Student will able to understand the structure, chemical properties and applications of p-block elements.
- Students learn the general characteristics of non-aqueous solvents and chemical properties of acid and bases.
- Students will familiarize with the Carbonyl compounds and Carboxylic acids
- Students will able to understand the importance and applications of thermodynamics, emulsions and gels

III SEMESTER

CHEMISTRY– PRACTICAL PAPER – III

Course Objectives:
- To develop the experimental skill by the practice of qualitative analysis of inorganic salts.
- The lab work will have a somewhat inorganic salts focus. E.g. the related to ions and the use of ions in assays.

Course Outcome:
- Students will able to understand the distinction between qualitative and quantitative chemical analysis.
- Students will able to understand the assessment method of analysis related to chemical analysis goals such as detection limits.

IV SEMESTER

CHEMISTRY PAPER – IV

Course Objectives:
- To understand the concept of indicators and use of organic reagents in inorganic analysis.
- To understand the general characteristics of transition and inner-transition elements in the periodic table.
- To understand basics of nuclear chemistry like nuclear reactions and nuclear reactors
- To learn about basic concept of stability and conformation of alicyclic compounds and reactions in Aromatic compounds.
- To understand the third law of thermodynamics, Nernst heat theorem, Vant-hoff's reaction isotherm.
- To acquire basic knowledge about the laws of spectrophotometry, photochemistry and crystallography.

Course Outcome:
- At the end students will able to know how to choose indicators and organic reagents for various types of titrations and inorganic analysis respectively.
- Students will learn the fundamental concepts in coordination chemistry of transition metals.
- Students will understand the working of nuclear reactors, binding energy and fission energy, stability of nuclei.
- Students will learn the concept of electrophiles, nucleophiles, free radicals, and intermediates along with the reaction pathways.
- Students will learn and understand the importance and applications of Nernst heat law, Vant-hoff's reaction isotherm and the third law of thermodynamics
- Students will get the knowledge about theoretical uses of spectrophotometer and photochemistry.

IV SEMESTER

CHEMISTRY– PRACTICAL PAPER – IV

Course Objectives:
- To determine the physical properties of different organic liquids, molecular weight of nonvolatile solute.
- To determine first, second and zero order rate constant.
- To know the thermometric properties of acid and base by titrimetric method.

Course Outcomes:
- Students familiar about density, viscosity and surface tension of various liquids.
- The students get idea about to determine molecular mass of a non-volatile solute by non-instrumental method.
- The investigation of first, second and zero order reaction will be demonstrated by students.
- The difference between transition temperature and miscibility temperature can be understood by the students

V SEMESTER

CHEMISTRY PAPER – V

INORGANIC CHEMISTRY

Course Objectives:

- To understand the key features of coordination compounds, including: - the naming, types of ligands and physical methods to determine the complex ions.
- To study about the shapes and structures of coordination complexes and types of isomers and metal-ligand bonding in coordination compounds.
- To understand the general characteristics of inner-transition elements in the periodic table.
- To learn about concept and principle of gravimetric analysis.
- To Study and understand and General characteristics Bio-Inorganic Chemistry and essential and traces of elements in biological process.

Course Outcome:

- Students will able to use Valence Band Theory and Crystal Field Theory to understand the magnetic properties of coordination compounds Students will learn the applications and properties of lanthanides and actinides
- Students will learn the different techniques of gravimetric analysis and electro gravimetry
- Able to explain the fundamentals concepts Bio-Inorganic Chemistry

CHEMISTRY PAPER – VI

Course Objectives:

- To know about the various types of drugs and their application in the field of medicinde
- To study about classification of carbohydrates and preparation methods

Course Outcome:

- Understanding of uses of antibacterial, antimalarial, anticancer drugs and know the synthesis of common drugs like aspirin, paracetamol and sulpha drug
- Students will be able to classify the carbohydrates, learn the inter conversion reactions of carbohydrates, and also will be able to understand the application of different carbohydrates

CHEMISTRY PAPER – VII

Course Objectives:

- To understand the concepts of kinetics and theories of reaction.
- Study of basic concepts and applications of molecular spectroscopy related with rotational, vibrational, Raman and electronic spectra

Course Outcome:

- Students will able to learn the physical properties of chemical reaction, Nernst distribution law, theories of strong electrolytes
- Students are able to understand basic principle, selection rule for rotational vibrational and Raman spectra.

CHEMISTRY– PRACTICAL PAPER – V

Course Objectives:
- To understand the basic principles and advantages of gravimetric analysis and how it is better than any other methods learnt previously
- To develop the skill in handling the delicate apparatus like crucible and accuracy of weighing
- To learn about filtration and ignition technique in better way
- To study about the ore estimation and alloy estimations.

Course Outcomes:
- Student will understand why gravimetric estimation is superior to other previously learnt volumetric estimation
- Students learn the technique of filtration and ignition
- Student develops skill to handle and weighing small compounds accurately
- Student learn about metal ion concentration in micro quantity which is helpful for industrial process and metallurgical process
- Students understand and know about source, estimation and application of ores.

V SEMESTER

CHEMISTRY– PRACTICAL PAPER – VI

Course Objectives:
- To separate ortho and para-nitro aniline in a mixture by thin layer and column chromatography.
- To estimate vitamin-C, amino acid, amino group and carboxylic acid by various suitable methods

Course Outcomes:
- Students will able to demonstrate about separation of ortho and para-nitro aniline in a mixture by thin layer and column chromatography.
- Vitamin-C, Amino and carboxylic acid group can be estimated by student by various suitable methods.

VI SEMESTER

CHEMISTRY PAPER – VIII

Course Objectives:

- To extract metals through metallurgical operations and their uses.
- To learn about the properties and uses of abrasives, propellants, refractories and explosives
- To get to know about the basic concepts of nanotechnology

Course Outcome:
- Students will able to understand the different metallurgical processes involved in the extraction process.
- The students will understand the types of abrasives, refractories, ceramics, paints
- Able to understand the composition of various fuels, their production and calorific value
- Students will be able to understand the new branch of modern science and application of nanotechnology in modern days

CHEMISTRY PAPER – IX

Course Objectives:

- To understand the basic introduction about the amino acids and nucleic-acids
- To learn about organic polymers,
- To study some important organic reagents and their applications in synthetic organic chemistry.
- To know about the enantiomers, optical isomerism, racemization, geometrical isomerism in various organic molecules.

Course Outcome:
- After completion of the course, the learner can be able to understand the properties, synthesis and applications of amino acids.
- The learner can be able to understand the mechanism of organic polymer material formation and application of polymers in the field of industries
- Student able to apply the usage to synthetic reagents to synthesis organic compounds in research fields
- Students will be able to understand the stereochemical aspects involved in organic molecules, optical activity, and understand the absolute configurations of organic molecules.

CHEMISTRY PAPER – X

Course Objectives:

- To learn about the concepts of electrochemistry
- To understand pH titration, potentiometric titration and concept of corrosion
- To know about the Gibbs phase rule and its application to one and two component system
- To understand different crystal systema and crystal defects

Course Outcomes:
- After completion of the course, the learner can be able to understand the basic principle of laws of electrochemistry, chemical cells and their function.
- Students will able to understand the properties of electrodes, EMF measurement, and potentiometric titrations.
- The students will able to determine the cell constant, Equivalent conductance, degree of dissociation and dissociation constant of a weak acid.
- Conductometric titrations of acids and bases can be understood by the students.
- Able to understand the application of Gibbs rule in different component system
- Students will be able to classify the crystal system and solve numerical problems and also able to understand the defects in crystal system

VI SEMESTER

CHEMISTRY– PRACTICAL PAPER – VII

Course Objectives:
- To understand how instrumental methods are better than conventional methods learnt in previous years.
- To develop the accuracy in plotting graph and learn idea about unit conversion.
- To understand some important terms like equivalent conductance, dissociation constant practically.
- To understand how conductometry linked to rate of reaction.
- To understand how different electrodes works, and how they are.
- To understand how Beer's -Lamberts law practically applied for the concentration of metal ion determine in ppm level.

Course Outcomes:
- Students will understand why instrumental estimation is superior to other previously learnt conventional methods.
- Students learn about how conductance depends on size of ion and learn about how redox reaction is occurring by change in potential.
- Students verify Beer's – Lamberts law and helpful in determine estimation of metal ions.
- Students develop the skills of handling the different electrodes.
- Students able to differentiate different type of electrodes.

VI SEMESTER
CHEMISTRY– PRACTICAL PAPER – VIII

Course Objectives:
- To study about the ore estimation and alloy estimations
- To understand the solubility and preparation of different ore and alloy solution
- To understand the standardization of solutions
- To know employment of different indicators in the titration process
- To know about alloy estimation by complexometric, iodometric and acid base titration process
- To understand the steps involved in the preparation of inorganic complexes

Course Outcomes:
- Students learn the technique titration and ore solution preparation
- Student develops skill to handle and weighing small compounds accurately
- Student learn about metal ion concentration in micro quantity which is helpful for industrial process and metallurgical process
- Students understand and know about source, estimation and application of ores.
- The learners will learn the steps involved in the preparation of the different inorganic complexes and get to know about the filtration, precipitation , drying and other techniques

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Sl No.	Program	Program Code	No of Program specific disciplines with code
1	B.Sc.	BSCCBCSYCM	5. Computer Science , BSCCBCSCOMYCM

CBCS Syllabus – B.SC (Computer Science) for 2019-20 onwards

Program specific objectives:
- To impart basic knowledge in computer science
- To give the skills required related to computer science
- To make the students aware of the various facets of computer science
- To make the students ready for placements in various software and other companies which need computer science skill sets

Program specific outcome:
   After completing this program specific discipline the students
- Get basic knowledge of computer science and this helps them to go for higher studies and do better in their profession
- Trained with skills required for their higher studies and jobs
- Students are placed in various software companies and regularly enter to higher studies also.

B.Sc., Computer Science

Course details-Computer Science (UG)-2019-2020 onwards (Revised CBCS)

Sl No	Sem	Course	Title of the Paper	Hrs/Week L:T:P	Credits
1	I	DSC-I	Computer Concepts and C Programming	4:0:2	6
2	II	DSC-II	Data Structures and File Processing	4:0:2	6
3	III	DSC-III	Object Oriented Programming with Java	4:0:2	6
4	IV	DSC-IV	Database Management Systems	4:0:2	6
5	V, VI any one in each sem	DSE-1A/ DSE-1B/ DSE-1C/ DSE-2A/ DSE-2B/ DSE-2C Without repetition	Numerical and Statistical Analysis	4:0:2	6
			Computer Graphics and Animation	4:0:2	6
			Data Communication and Computer Networks	4:0:2	6
			Web Programming	4:0:2	6
			NET Programming	4:2:0	6
			Software Engineering	4:0:2	6
			System Software and Operating Systems	4:0:2	6
6	V or	SEC-1/SEC3	Computer Applications	2:0:0	2
7	V and VI One each among these	SEC 2 and SEC4 Without repetition	DTP (Page Maker and Corel Draw)	1:0:1	2
			Cyber Security	1:0:1	2
			Accounting Software (Tally)	1:0:1	2
			Android Programming	1:0:1	2

<div align="center">

I Semester

DSC-I: Title of the Course: Computer Concepts and C Programming

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Course Objectives: Students will try to learn:
- To learn problem solving techniques.
- To make the student learn a programming language.
- To develop logics, this will help them to create programs, applications in C.
- Also learn the basic programming constructs they can easily switch over to any other language in future.

Course Outcome: Students will be able to:
- Analyze a given problem and develop an algorithm to solve the problem
- Improve upon a solution to a problem
- Use the 'C' language constructs in the right way
- Design, develop and test programs written in 'C'
- Use different data types in a computer program.
- Design programs involving decision structures, loops and functions.
- Understand the dynamics of memory by the use of pointers and Structures.

<div align="center">

II Semester

DSC- II: Title of the Course: Data Structures and File Processing

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Course Objectives: Students will try to learn:

- Understand and remember algorithms and its analysis procedure.
- Introduce the concept of data structures through advanced data structures including List, Stack, and Queues.
- To design and implement various data structure algorithms.
- To introduce various techniques for representation of the data in the real world.
- To develop application using data structure algorithms.
- Compute the complexity of various algorithms.

Course Outcome: Students will able to:

- Select appropriate data structures as applied to specified problem definition.
- Implement operations like searching, insertion, and deletion, traversing mechanism etc. on various data structures.
- Students will be able to implement Linear and Non-Linear data structures.
- Implement appropriate sorting/searching technique for given problem.
- Design advance data structure using Non-Linear data structure.

II Semester
DSC-III: Title of the Course: Object Oriented Programming with Java

Course Objectives: Students will try to learn:
- To understand how to design, implement, test, debug, and document programs that use basic data types and computation, simple I/O, conditional and control structures, string handling and functions.
- To understand the importance of Classes & objects along with constructors, Arrays and Vectors.
- Discuss the principles of inheritance, interface and packages and demonstrate though problem analysis assignments how they relate to the design of methods, abstract classes and interfaces and packages.
- To understand importance of multi-threading & different exception handling mechanisms.
- To learn experience of designing, implementing, testing, and debugging graphical user interfaces in Java using applet and AWT that respond to different user events.

Course Outcome: Students will be able to:
- Implement Object Oriented programming concept using basic syntaxes of control
- Structures, strings and function for developing skills of logic building activity.
- Identify classes, objects, members of a class and the relationships among them needed for a finding the solution to specific problem
- Demonstrates how to achieve reusability using inheritance, interfaces and packages and describes faster application development can be achieved.
- Demonstrate understanding and use of different exception handling mechanisms and concept of multithreading for robust faster and efficient application development.
- Identify and describe common abstract user interface components to design GUI in Java using Applet & AWT along with response to events.

II Semester
DSC-IV: Title of the Course: Database Management Systems

Course Objectives: Students will try to learn:
- Formal foundation in database concepts, technology and practice to the participants to groom them into well-informed database application developers
- To give a good formal foundation on the relational model of data
- To present SQL and procedural interfaces to SQL comprehensively
- To give an introduction to systematic database design approaches covering conceptual design, logical design and an overview of physical design
- To motivate the participants to relate all these to one or more commercial product environments as they relate to the developer tasks
- To present the concepts and techniques relating to query processing

Course Outcome: On successful completion of the course students will be able to:
- Understand, appreciate and effectively explain the underlying concepts of database technologies
- Design and implement a database schema for a given problem-domain
- Normalize a database
- Populate and query a database using SQL DML/DDL commands.
- Declare and enforce integrity constraints on a database using a state-of-the-art RDBMS
- Programming PL/SQL including stored procedures, stored functions, cursors, packages.
- Design and build a GUI application using a 4GL

Course outcomes Electives for both Vth and VIthsemesters (DSE-1A/ DSE-1B/ DSE-1C and DSE-2A/ DSE -2B/ DSE-2C)

(One among DSE-1A/ DSE-1B/ DSE-1C and DSE-2A/ DSE -2B/ DSE-2C in V/VI Semester)

DSE: Title of the Course: Numerical and statistical analysis

Course Objectives: Students will try to learn:
- To develop the mathematical skills of the students in the areas of numerical methods.
- To teach theory and applications of numerical methods in a large number of engineering subjects which require solutions of linear systems, interpolation
- To lay foundation of computational mathematics for post-graduate courses specialized studies and research.

Course Outcome: On successful completion of the course students will be able to:
- Apply numerical methods to find our solution of algebraic equations using different methods under different conditions, and numerical solution of system of algebraic equations.
- Apply various interpolation methods and finite difference concepts
- Work out numerical differentiation and integration whenever and wherever routine methods are not applicable.
- Work numerically on the ordinary differential equations using different methods through the theory of finite differences.

(One among DSE-1A/ DSE-1B/ DSE-1C and DSE-2A/ DSE -2B/ DSE-2C in V/VI Semester)

DSE: Title of the Course: Computer graphics and animation

Course Objectives: Students will try to learn:
- To introduce the use of the components of a graphics system and become familiar with building approach of graphics system components and algorithms related with them.
- To learn the basic principles of 3- dimensional computer graphics.
- Provide an understanding of how to scan convert the basic geometrical primitives, how to transform the shapes to fit them as per the picture definition.
- Provide an understanding of mapping from a world coordinates to device coordinates, clipping, and projections.
- To be able to discuss the application of computer graphics concepts in the development of computer games, information visualization, and business applications.
- To comprehend and analyze the fundamentals of animation, virtual reality, underlying technologies, principles, and applications.

Course Outcome: Students will able to:
- To list the basic concepts used in computer graphics.
- To implement various algorithms to scan, convert the basic geometrical primitives, transformations, Area filling, clipping.
- To describe the importance of viewing and projections.
- To define the fundamentals of animation, virtual reality and its related technologies.
- To understand a typical graphics pipeline.
- To design an application with the principles of virtual reality

(One among DSE-1A/ DSE-1B/ DSE-1C and DSE-2A/ DSE -2B/ DSE-2C in V/VI Semester)
DSE: Title of the Course: Data communication and computer networks

Course Objectives: Students will try to learn:
- Study the basic taxonomy and terminology of the computer networking and enumerate the layers of OSI model and TCP/IP model.
- Acquire knowledge of Application layer and Presentation layer paradigms and protocols.
- Study Session layer design issues, Transport layer services, and protocols.
- Gain core knowledge of Network layer routing protocols and IP addressing.
- Study data link layer concepts, design issues, and protocols.
- Read the fundamentals and basics of Physical layer, and will apply them in real time applications.

Course Outcome: Students will able to:
- Describe the functions of each layer in OSI and TCP/IP model.
- Explain the functions of Application layer and Presentation layer paradigms and Protocols.
- Describe the Session layer design issues and Transport layer services.
- Classify the routing protocols and analyze how to assign the IP addresses for the given network.
- Describe the functions of data link layer and explain the protocols.
- Explain the types of transmission media with real time applications

(One among DSE-1A/ DSE-1B/ DSE-1C and DSE-2A/ DSE -2B/ DSE-2C in V/VI Semester)
DSE: Title of the Course: Web programming

Course Objectives: **Students will try to learn:**
- Understand the principles of creating an effective web page
- Develop skills in analyzing the usability of a web site.
- Learn the language of the web: HTML and CSS.

Course Outcome: Students will able to:
- To Create Web-Pages Effectively.

DSE: Title of the Course: Net programming

Course Objectives: Students will try to learn:
- OOPs using C#.NET
- Learn data access mechanism provided .net
- Create a web application using .net
- Developing the website & application
- Dot Net IDE Component Framework.
- Programming concepts in .Net Framework.

Course Outcome: Students will able to:
- Create user interactive web pages using ASP.Net.
- Create simple data binding applications using ADO.Net connectivity.
- Performing Database operations for Windows Form and web applications.

DSE: Title of the Course: Software engineering

Course Objectives: Students will try to learn:
- Knowledge of basic SW engineering methods and practices, and their appropriate application.
- Describe software engineering layered technology and Process frame work.
- A general understanding of software process models such as the waterfall and evolutionary models.
- Understanding of software requirements and the SRS documents.
- Understanding of the role of project management including planning, scheduling, risk management, etc.
- Describe data models, object models, context models and behavioural models.
- Understanding of different software architectural styles.
- Understanding of software testing approaches such as unit testing and integration testing.
- Describe software measurement and software risks.
- Understanding on quality control and how to ensure good quality software.

Course Outcome: Students will able to:
- Select and implement different software development process models.
- Extract and analyze software requirements specifications for different projects.
- Develop some basic level of software architecture/design.
- Apply standard coding practices.

DSE: Title of the Course: System software and operating systems

Course Objectives: Students will try to learn:
- To understand the main components of an OS & their functions.
- To study the process management and scheduling.

- To understand the concepts and implementation Memory management policies and virtual memory.
- To understand the working of an OS as a resource manager, file system manager, process manager, memory manager and I/O manager and methods used to implement the different parts of OS
- To study the need for special purpose operating system with the advent of new emerging Technologies

Course Outcome: Students will able to:
- Describe the important computer system resources and the role of operating system in their management policies and algorithms.
- Understand the process management policies and scheduling of processes by CPU
- Evaluate the requirement for process synchronization and coordination handled by operating system
- Describe and analyze the memory management and its allocation policies.
- Identify use and evaluate the storage management policies with respect to different storage management technologies. 6. Identify the need to create the special purpose operating system.

Sl. No	Program	Program Code	No of Program specific disciplines with code
1	B.Sc.	BSCCBCSYCM	6. Electronics, BSCCBCSELEYCM

Department of Electronics

Program Specific Objectives (PSO)

1. To pass on advanced and comprehensive knowledge in the area of Electronic Science
2. To train the students to be inquisitive and think in an innovative way
3. To impart basic and translational research skills with technical excellence and make them research and industry ready

Program Specific Outcome (PSO)

1. In depth knowledge gained during the course of three years helps the students to join the higher courses or industries as beginners.
2. Helps the students to answer the questions with confidence in competitive examination
3. Develop practical skills along with their theory components,
4. They develop entrepreneurial skills with the help of skill-based courses and alumni interaction
5. Overall goal is reached towards Professional Competence

B.Sc., Electronics

Sl. No	Sem	Course	Title of the Paper	Hrs/Week L:T:P	Credits
1	I	DSC-I	Network Analysis and Analog Electronics	4:0:2	6
2	II	DSC-II	Linear and Digital Integrated Circuits	4:0:2	6

3	III	DSC-III	Communication Electronics	4:0:2	6
4	IV	DSC-IV	Micro Processor and Microcontroller	4:0:2	6
5	V	**DSE-IA**	Molecular Biology & Genetic Engineering	4:0:2	6
		DSE-IB	Electronics Instrumentation	4:0:2	6
6	V	SEC-1	VHDL	2:0:0	2
7	VI	**DSE-2A**	Photonic devices and power Electronics	4:0:2	6
		DSE-2B	Digital Signal Processing	4:0:2	6
8	VI	SEC-2	Entrepreneurship Development	2:0:0	2

DSC: Discipline Specific Core Course
DSE: Discipline Specific Elective
SEC: SkillEnhancement Course

I -SEMESTER

DSC-I: Title of the Course: Network Analysis and Analog Electronics

Course Objectives: This course will enable students:

1. To explain the basic concepts and laws of DC and AC electrical networks and solve them using mesh and nodal analysis techniques.
2. To introduce students with the fundamental concepts of network theorems and analysis.
3. To introduce open circuit, short circuit, transmission, hybrid parameters and their interrelationship.
4. To design and demonstrate diode circuits.
5. To explain various BJT, FET and UJT connections and configurations.
6. To analyze the different RC and LC oscillator circuits to determine the frequency of oscillation.

Course Outcomes: After successful completion of the course student will be able to

1. Apply concepts of electric network topology, nodes, branches, loops to solve circuit problems including the use of computer simulation.
2. Understand various functions of network and also the stability of network.
3. Synthesize the network using passive elements.
4. Design the different oscillator circuits for various frequencies
5. Know about the multistage amplifier using BJT and FET in various configuration to determine frequency response and concept of voltage gain.

II SEMESTER
DSC-II: Title of the Course: Linear and Digital Integrated Circuits

Course Objectives: Students will try to learn:

1. To understand the concepts, working principles and key applications of linear integrated circuits.
2. To perform analysis of circuits based on linear integrated circuits.
3. To design circuits and systems for particular applications using linear integrated circuits.
4. To understand number representation and conversion between different representation in digital electronic circuits.
5. To analyze logic processes and implement logical operations using combinational logic circuits.
6. To understand characteristics of memory and their classification.
7. To understand concepts of sequential circuits and to analyze sequential systems in terms of state machines

Course Outcome: After successful completion of the course student will be able to

1. Understand the fundamentals and areas of applications for the integrated circuits.
2. Analyze important types of integrated circuits.
3. Demonstrate the ability to design practical circuits that perform the desired operations.
4. Understand the differences between theoretical, practical & simulated results in integrated circuits.
5. Select the appropriate integrated circuit modules to build a given application.
6. Develop a digital logic and apply it to solve real life problems.
7. Analyze, design and implement combinational logic circuits.
8. Classify different semiconductor memories.
9. Analyze, design and implement sequential logic circuits.

II SEMESTER
DSC-III: Title of the Course: Communication Electronics

Course Objectives: This course will enable students:

1. To introduce the concepts of analog and digital communication systems.
2. To equip students with various issues related to analog and digital communication such as modulation, demodulation, transmitters and receivers and noise performance.
3. To make the students understand the concepts AM, FM, PM.
4. Explain the basics of sampling and quantization, ASK, FSK, PSK.
5. To study the concept of satellite communication and various frequency bands, orbits etc.
6. To understand the concepts of mobile communications.

Course Outcomes: After study through lectures and assignments, students will be able to

1. Gain the knowledge of components of analog communication and digital communication systems.
2. Analyze various methods of baseband/band pass Analogue transmission and detection.
3. Analyze and allocate performance of components of an analogue communication system and to design analogue communication systems.
4. Generation and detection of pulse modulation techniques and multiplexing.

II SEMESTER
DSC-IV: Title of the Course: Micro Processor and Microcontroller

Course Objectives: This course will enable students:

1. To develop background knowledge and core expertise of microprocessor and microcontroller.
2. To know the importance of different peripheral devices and their interfacing to microcontrollers.
3. To know the design aspects of microprocessor and microcontrollers.
4. To write assembly language programs of microprocessor and microcontrollers for various applications.
5. To introduce the concept of embedded systems.

Course Outcomes:

1. At the end of course, a student will be able to:
2. Draw and describe architecture of 8085 microprocessor and 8051 microcontroller.
3. Interface various peripheral devices to the microcontrollers.
4. Write assembly language program for microprocessor and microcontrollers.
5. Analyze architecture of embedded systems.

II SEMESTER

DSE-IA- Title of the Course: Electronics Instrumentation

Course Objectives: This course will enable students to:

1. Define and describe accuracy and precision, types of errors, statistical and probability analysis.
2. Describe the operation of Ammeters, Voltmeters, and Multi meters also to develop circuitsfor multi range Ammeters and Voltmeters. ·
3. Describe functional concepts and operation of various Analog and Digital measuring instruments.
4. Describe and discuss functioning and types of Oscilloscopes, Signal generators, AC and DC bridges.
5. Recognize and describe significance and working of different types of transducers.

Course Outcomes: After studying this course, students will be able to:

1. Describe instrument measurement errors and calculate them.
2. Describe the operation of Ammeters, Voltmeters, Multi meters and develop circuits for multi range Ammeters and Voltmeters.
3. Describe functional concepts and operation of Digital voltmeters and instruments to measure voltage, frequency, time period,
4. Describe and discuss functioning and types of Oscilloscopes, Signal generators and Transducers.
5. Utilize AC and DC bridges for passive component and frequency measurements.

SEC-2: Title of the Course: VHDL

Course Objective: This course will enable students to:

1. Learn different VHDL constructs.
2. Familiarize the different levels of abstraction in VHDL.
3. Understand timing and delay Simulation.
4. Learn VHDL at design levels of data flow, behavioral and structural for effective modeling of digital circuits.
5. Study the concepts of generics, configuration and sub-programs.
6. Get an introduction to Verilog

Course Outcome:

1. At the end of this course, students should be able to
2. Write VHDL programs in gate, dataflow, behavioural and structural modelling levels of abstraction.
3. Write simple programs in VHDL in different styles.
4. Design and verify the functionality of digital circuit/system using test benches.
5. Identify the suitable Abstraction level for a particular digital design. ·
6. Perform timing and delay Simulation

II SEMESTER

DSE-2A: Title of the Course: Photonic devices and power Electronics

Course Objectives: This course will enable students:

1. To understand the classification of photonic devices like LEDs, LCDs, Photo detectors, Photoconductors and Solar Cells.
2. Understand the working of various power devices like SCR, DIAC, TRIAC POWER MOSFET and IGBT.
3. Study and analysis of thyristor circuits with different triggering techniques.
4. Learn the applications of power devices in controlled rectifiers.
5. Study of power electronics circuits under different load conditions.

Course Outcome: **After studying this course, students will be able to:**

1. Determine the wavelength of different light.
2. Understand the application of various photonic devices.
3. Describe the characteristics of different power devices and identify the applications.
4. Determine the output response of a thyristor circuit with various triggering options.
5. Determine the response of controlled rectifier with resistive and inductive loads.

DSE-2B: Title of the Course: Digital Signal Processing

Course Objectives: This course will enable students to:

1. Understand the mathematical description of continuous and discrete time signals and systems.
2. Analyze the signals in time domain using convolution difference/differential equations
3. Classify signals into different categories based on their properties. ·
4. Analyze Linear Time Invariant (LTI) systems in time and transform domains.
5. To study the bilenear transformation, digital filters and DSP processor.

Course Outcomes: At the end of the course, students will be able to:

1. Classify the signals as continuous/discrete, periodic/aperiodic, even/odd, energy/power and deterministic/random signals. ·
2. Determine the linearity, causality, time-invariance and stability properties of continuous and discrete time systems.
3. Compute the response of a Continuous and Discrete LTI system using convolution integral and convolution sum.
4. Determine the spectral characteristics of continuous and discrete time signal using Fourier analysis.
5. Compute Z-transforms, inverse Z- transforms and transfer functions of complex LTI systems.
6. Compute the DFT for the given sequence formula method, and Using FFT.
7. Design of simple IIR digital Butterworth filters.
8. Brief idea about FIR filter.

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Sl No.	Program	Program Code	No of Program specific disciplines with code
1	B.Sc.	BSCCBCSYCM	7. Environmental Science, BSCCBCSENVYCM

Program Specific Objectives:
- To impart basic knowledge in Environmental science
- To give the skills required related to Environmental science
- To make the students aware of the various facets of Environmental Science
- To make the students ready for placements in Environmental related organisations

Program Specific Outcome: After completing this program specific discipline the students
- Get basic knowledge of Environmental science and this helps them to go for higher studies and do better in their profession
- Trained with skills required for their higher studies and jobs
- Students are placed in various organizations and companies and they regularly enter to higher studies also.

B.Sc., Environmental Science

Sl No	Sem	Course	Title of the Paper	Hrs/Week L:T:P	Credits
1	I	DSC-I	Atmosphere and climate change	4:0:2	6
2	II	DSC-II	Ecology and environment	4:0:2	6
3	III	DSC-III	Earth and environmental science	4:0:2	6
4	IV	DSC-IV	Environmental chemistry	4:0:2	6
5	V	**DSE-IA**	Environmental microbial technology	4:0:2	6
		DSE-IB	Natural resource management and sustainability	4:0:2	6
6	V	SEC-1	Industrial safety, health and environment	2:0:0	2
7	VI	**DSE-2A**	Environmental pollution analysis, control& management	4:0:2	6
		DSE-2B	Environmental legislation and policy	4:0:2	6
8	VI	SEC-2	Watershed Management	2:0:0	2
		AECC 3A	Environmental Studies	3:0:0	3

I Semester

Atmosphere and Climate Change

Course Objectives:
- To understand the dynamics of atmospheric processes.
- Highlights the anthropogenic intervention which has led to global climate change.
- The paper explores the effects of global changes on human communities and initiatives taken at global and regional levels to combat them.

Course Outcome:

- Students will understand the Earth's atmosphere, meteorology, pollution, gas emissions, and airborne contaminants, thereby the dynamics of atmosphere.
- Studying climate and a changing climate is important, which will affect people around the world.
- Analysis of atmospheric circulation and/or temperature alone can be used for modelling or prediction purposes.
- Climatic Change is important since it helps to determine future climate expectations.
- Preparing for climate change — also known as climate change adaptation — is about reducing the risk of climate change impacts to people, places and resources.

II Semester

Ecology and Environment

Course Objectives:

- Basic understanding of ecosystem and its structural and functional aspects.
- It explores the knowledge of interconnections among all the biotic and abiotic components of environment.
- To understand the dynamic nature of the ecological processes in maintaining the equilibrium.

Course Outcome:

- Students will acquire new knowledge of the interdependence between people and nature that is vital for food production, maintaining clean air and water, sustaining biodiversity.
- They understand to maintain a mosaic of habitats that ensures the survival of a rich variety of species.
- They will learn how Biodiversity boosts ecosystem productivity where each species, no matter how small, all have an important role to play.
- Students will have an insight like larger number of plant species means a greater variety of crops. Greater species diversity ensures natural sustainability for all life forms.
- Inculcates conservation aspects which help in preventing soil erosion, desertification, deforestation, natural disasters etc.

III Semester

Earth and Environmental Science

Course Objectives:

- The focus is on interactions between the solid Earth, its water, its air and its living organisms, and on dynamic, interdependent relationships between these four components.
- A good exposure to basic structure and composition of the Earth.
- It deals with the interactive processes in the inner as well as outer Earth's surface.
- Natural disasters education is a very important part in the prevention of natural disasters.

Course Outcome:

- Earth Science is important because most human activities are related to interaction with the planet Earth.
- Students gain knowledge about how these relationships produce environmental change at different timescales.

- They also strive to understand past and present environmental processes so that reliable and scientifically based predictions can be made about the future.
- It is a good platform to learn the physical and chemical properties of soil which enables them to understand how they affect the plant growth and thereby fertilizing management practices.
- Students acquire sufficient knowledge about rainwater harvesting which enhances stored water capacity, revitalize the groundwater level and reduce surface runoff and soil erosion.
- Exploring more about natural disasters yield positive results by reducing the risks and consequences.

IV Semester

Environmental Chemistry

Course Objectives:
- The paper aims to build a conceptual understanding of students by exposing them to the basic principles behind various processes.
- Environmental Chemistry is the study of the changes chemicals make in the environment, such as contamination of the soil, pollution of the water, degradation of chemicals, and the transport of chemicals upon the plants and animals of the immediate environment.
- It gives a clear knowledge on the chemically induced soil, its effects and its relationship with the plants and animals of the environment.

Course Outcome:
- This paper enables students to develop methods and procedures to reduce the contaminants or the chemicals in the air, water or soil.
- Students gain knowledge about the health impacts of various types of pollution.
- Students understand the processes occurring in the environment which are impacted by humankind's activities.
- They get to know about the different chemical reactions, sampling and analytical techniques.
- Students are exposed to the effects of chemical fertilizers and pesticides on the environment and also encourage the use of bio-fertilizers and bio-pesticides.

IV Semester

Environmental Microbial Technology

Course Objectives:

- The course focuses on the variety of microbes, their habitats and interactions and their significance.
- It gives a wide vision on the spread of various diseases through microbes and a proper treatment for the disease.
- The paper presents an objective view of the application of biotechnological aspects in tackling the environmental problems.
- The course also provides knowledge on how to avoid the use of hazardous pollutants and wastes that affect the natural resources and the environment.

Course Outcome:

- Students get a valuable knowledge about the role of microbes in the environment.
- They are also exposed to the various effects of microbes on the environment and how it can be reduced.
- Students will get to know how the contaminated soil might be corrected or remedied on-site or loaded into containers and transported for treatment.
- It is a good platform for them to learn and transform plants into biofuels.

- Develop procedures to convert waste into biogas or other cleaner sources of energy.
- This study explains the contributions of bioenergy and how it can offer to reduce the use of fossil fuels in cities.
- They get opportunities for investment in biofuels which boosts the growth of economy which means that there will be more jobs and new sources of income.

V SEMESTER

DSE/T- Paper -2: Natural Resource Management and Sustainability

Course Objectives: This paper enable the students to gain/understand/obtain/Learn the knowledgeabout

- Natural resources and their reserves
- Various types of natural resources, their conservation and management strategies
- Mineral resources and environmental effects of mineral extraction
- Approaches towards resource management

Course Outcome:

Students get an extensive knowledge on natural resources, their types and conservation and management are

- Appreciate attributes of natural resource use and management
- Understand the complexity of natural resource and issues, and sustainability
- Apply theories and methods with interdisciplinary approach towards natural resource management
- Critically examine the gap in the resource availability, use, and conservation
- Appreciate ideas of sustainable development
- Critically examine the interlink between development and the environment

V SEMESTER

SEC/T- Paper -1, INDUSTRIAL SAFETY, HEALTH AND ENVIRONMENT

Course Objectives: This paper enable the students to gain/understand/obtain/Learn the knowledgeabout

- Define, categorize and explain hazards
- Health hazards associated with occupational health hazards and ergonomics
- Origin of fire, their detection and extinguishing methods
- First aid techniques for various casualties
- Selection and maintenance of personal protective equipment

- Management associated with occupational health and safety
- Various legislative measures associated with industrial safety

Course Outcome:
- Students are able to apply the knowledge of occupational health and safety in industrial sector
- Ability to provide industry with inputs on health and safety.
- Able to learn about Fire and other Hazards and its implications.
- Able to learn the first aid use and application.
- Learn and disseminate issues related to occupational health and hazards. CO4 Protocol development for an industry on disaster prevention, health issues, safety measures and environment management.

V SEMESTER

DSE/T- Paper –1,
Environmental Pollution Analysis, Control & Management

Course Objectives; This paper enable the students to gain/ understand/obtain the knowledge about
- Air pollutants, their sampling techniques, control and management
- Water pollutants, their sampling techniques, control and management
- Noise pollution, thier control and management
- Solid waste, it's collection and management
- Environmental impact assessment which is the project of policies, plans, and programs, which are related to the proposed program associated with the organ of the state.
- An overview of Environmental laws which plays an important role in the protection of human health as well as the environment.

Course outcome: After studying this Course, the students are able to

- Students get broad knowledge on various types of pollution, their control and management.

- Students learn that pollution prevention can reduce environmental damages with suitable action.
- They can analyse the pollutants qualitatively and quantitatively and based on the results action can be taken.
- EIA study will ensures that the potential problems are foreseen and addressed at an early stage in project planning and design, to achieve sustainable development.

- Students understand the role of the Environmental Law, to make sure that the practices used in the environment do not cause harm to the environment, human or animal health.

VI SEMESTER

DSE/T- Paper - 2, Environmental Legislation and Policy

Course Objectives: This paper enable the students to gain/ understand/obtain the knowledge about
- Achieve knowledge about the history of environmental legislation in the ancient time;
- Legal terminologies associated with environmental legislation;
- Various legislative instruments/acts;
- Role of government bodies in management of various types of pollution;
- Various case studies related to environmental laws;

Course Outcome:

- Students are able to apply the knowledge of environmental legislation to control and monitor environmental pollution
- This paper introduces students to the legal structure of India and fundamentals of Environmental legislation and policy making.
- Each unit will help the students to develop basic concepts of environmental legislation and policy making in India and around the world.
- They get the knowledge about the judicial response to environmental issues in India and world.

VI SEMESTER

SEC/T paper 2: Watershed Management

Course Objectives: This paper enable the students to gain/understand/obtain/Learn the knowledgeabout

- Basic concept of watershed;
- Approaches and practices of sustainable watershed management;
- Integrated watershed management;
- Use modern techniques in watershed management;
- Techniques of flood and drought management and water conservation

Course Outcome: Students are able to apply the knowledge about:

- watershed management in curbing the floods and droughts
- To control damaging runoff and degradation and thereby conservation of soil and water.
- To protect, conserve and improve the land of a watershed for more efficient and sustained production.
- To protect and enhance the water resources originating in the watershed.
- To check soil erosion and reduce the effect of sediment yield on the watershed.
- To moderate infiltration of rainwater.
- To improve and increase the production of timbers, fodder and wildlife resources.
- To enhance the groundwater recharge, wherever applicable.

I/II Semester

Ability Enhancement Compulsory Course (AECC): AECC 3A: Environmental Studies:

Course Objectives: This paper enable the students to gain/understand/obtain/Learn the knowledgeabout

- Interdisciplinary nature of the course.
- To address the sensitive environmental issues
- To develop the critical thinking for solving the problems related to environmental issues
- To communicate environmental issues to both technical and non-technical audiences.

Course Outcome:

- Students will understand interdisciplinary nature of the course.
- They will be able to address the sensitive environmental issues with a focus on sustainability.
- They can adopt critical thinking for solving the problems related to environmental issues and will be able integrate with systematic approach the natural sciences and humanities.
- They will be able to communicate the information related to environmental issues to both technical and non-technical audiences.

- They will be able to understand that environmental problems have to be considered as global problems.
- Students will come to know of their roles and responsibilities as citizens, consumers and in this interconnected world.

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Sl No.	Program	Program Code	No of Program specific disciplines with code
1	B.Sc.	BSCCBCSYCM	8.Food and Nutrition, BSCCBCSFSNYCM

B.Sc. in Food Science and Nutrition
Department of Food Science and Nutrition

Program Specific Objectives:

➢ To provide students with the knowledge of basic terminology and several aspects of nutrition and the functions of food in healthy life sustenance;

➢ To ensure that students are familiar with the food classification, nutrition during special conditions and role of special functional food;

➢ To equip students with knowledge and understanding of modern aspects of nutritional science and novel food usage.

➢ To build competent professional in Food Science and Processing and work in Food Research Laboratories, Research institutes, baking industry, dairy industry, etc.

➢ To build competent professional Nutrition & Dieticians in hospitals and specialty clinics and for Sports nutrition. Thereby, the professionals can find job prospects in the field as Nutrition and Diet consultants in Food service organizations like Hotels, Hospitality services, Geriatric homes and also as administrators of Industrial canteens and other specialties.

Program Specific Outcomes:

➢ A successful completion of this course will enable students to: summarize and critically discuss/ understand both fundamental and applied aspects of food science and nutrition.

➢ They will be able to explain functions of specific nutrients in maintaining health, identifying nutrient specific foods and apply principles from the various facets of food science and related disciplines to solve practical as well as real-world problems.

➢ Use current information technologies to locate and apply evidence-based guidelines and protocols and get imparted with critical thinking to take leadership roles in fields of health, food research laboratories, dietetics, special nutritional needs and nutritional counseling.

B.Sc., Food and Nutrition

Sl. No	Sem	Course	Title of the Paper	Hrs/Week L:T:P	Credits
1	I	DSC-I	Human Nutrition I	4:0:2	6
2	II	DSC-II	Human Nutrition II	4:0:2	6
3	III	DSC-III	Food Science and Food Processing	4:0:2	6
4	IV	DSC-IV	Therapeutic Nutrition and Life Cycle Nutrition	4:0:2	6
5	V	DSE-IA	Food Preservation Technology	4:0:2	6
		DSE-IB	Diet Therapy	4:0:2	6
6	V	SEC-2	Any one of the below mentioned	2:0:0	2
		SEC – E1	Food Packaging Technology	2:0:0	2
		SEC – E2	Baking Technology	2:0:0	2
		SEC – E3	Home Based Catering	2:0:0	2
		SEC- E4	Sports Nutrition	2:0:0	2
7	VI	DSE-2A	Food Chemistry and Food Biotechnology	4:0:2	6
		DSE-2B	Applied Nutrition	4:0:2	6
8	VI	SEC-4	Any one of the below mentioned	2:0:0	2
		SEC – F1	Food Safety and Quality Testing	2:0:0	2
		SEC – F2	Dairy Technology	2:0:0	2
		SEC – F3	Institutional Food Service Management	2:0:0	2
		SEC – F4	Critical Care Nutrition	2:0:0	2

I SEMESTER

DSC-I: Human Nutrition

Course Objectives:
- To understand the structure and physiology of various organs
- To obtain a better understanding of the principles of nutrition through the study of physiology
- To provide an overview of the major macronutrients relevant to human health.

Course Outcomes: Students will acquire knowledge on
- basics of human physiology
- classification, metabolism, and importance of macronutrients
- determination of energy and its metabolism

II SEMESTER

DSC- II: Human Nutrition - II

Course Objectives:
- Provide a solid knowledge base from which can describe and explain the importance of water, micronutrients and identify their roles within a functioning organism.
- Discuss the scientific rationale for defining nutritional requirements in healthy individuals and populations
- Know the aims and objectives for assessing the nutritional status of an individual and the community

Course Outcome: students will gain knowledge on
➢ The importance of water and micronutrients in functioning of human body.
➢ Composition of the body and methods to assess the same.
➢ Computation of Nutrients requirements
➢ Methods used for assessment of nutritional status.

III SEMESTER

DSC-III: Food Science & Food Processing

Course Objectives:
➢ To obtain knowledge on different food groups and their contribution to nutrition.
➢ To provide understanding about composition and nutritive value of food and knowledge relevant to processing, shelf life extension and reduction of toxins
➢ To gain knowledge on food safety, hazards and designing of new food products

Course Outcome: Students will gain knowledge on
➢ traditional and modern food processing
➢ new product development and application there off
➢ commercial techniques of food preservation and packaging

IV Semester

DSC-IV: Title of the Course: Life Cycle and Therapeutic Nutrition

Course Objectives:
➢ To explain nutritional requirements across lifespan in various physiological stages.
➢ To relate the nutritional needs to physical growth, development and changes during ageing.
➢ To understand the concepts, principles of nutrition in diet therapy and develop the ability to plan and prepare diets for therapeutic conditions and role of dietitian.
➢ To apply knowledge of ethical practice in medical nutrition therapy, intervention program, physical fitness and cognitive development.

Course Outcomes – students will acquire knowledge on
➢ Growth, development and dietary requirements during lifecycle.
➢ role of dietitian in the hospital and community
➢ role of diet in different disease conditions
➢ planning and preparation of therapeutic diets

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Sl No.	Program	Program Code	No of Program specific disciplines with code
1	B.Sc.	BSCCBCSYCM	9.Geology BSCCBCSGEOYCM

Program Specific Objectives:
• To impart basic knowledge in Geology
• To give the skills required related to Geology
• To make the students aware of the various facets of Geology
• To make the students ready for placements in various organizations like Gelogical survey of India and other companies which need skill sets of geology
• To enable to set their own consultancy/start ups

Program Specific Outcome:

After completing this program specific discipline the students

- Get basic knowledge of Geology and this helps them to go for higher studies and do better in their profession
- Trained with skills required for their higher studies and jobs
- Students are placed in various organizations and regularly enter to higher studies also.
- Students have started their consultancy services

B.Sc., Geology

Sl No	Sem	Course	Title of the Paper	Hrs/Week L:T:P	Credits
1	I	DSC-I	DSC/T- 1: Fundamentals of Geology and Understanding the Planet Earth	4:0:2	6
2	II	DSC-II	DSC/T- 2: Mineral science	4:0:2	6
3	III	DSC-III	DSC/T- 3: Petrology	4:0:2	6
4	IV	DSC-IV	DSC/T- 4: Palaeontology and stratigraphy	4:0:2	6
5	V	DSE-IA	DSE/T- 1: Economic geology	4:0:2	6
		DSE-IB	DSE/T- 2: Engineering geology and hydrogeology, Engineering geology	4:0:2	6
6	V/VI	SEC-1/3	Disaster Management	2:0:0	2
7		SEC 2	------		
8	VI	DSE-2A	DSE/T- 3: Gemology, Environmental Geology and Medical Geology	4:0:2	6
		DSE-2B	DSE/T- 4: Structural geology and exploration geology	4:0:2	6
9	VI	DSE-2C	DSE/T- 5: Remote sensing, GIS, disaster and natural hazards management	2:0:0	2
		DSE-2D	DSE/T- 6: Mining Geology and Remote Sensing		
10	VI	SEC 4	------		

I SEMESTER

DSC-I: Title of the Course: Fundamentals of Geology and Understanding the Planet Earth

(i)Course Outcome:

The study of this paper strengthens students knowledge with respect to understanding the essentials of the structural dynamics of the earth.
The students will understand the origin of our solar system and planets, including earth. The students are exposed to the Geological time scale and be able to appreciate the dynamics of earth evolution through time.

II SEMESTER

DSC-II: Title of the Course: Mineral Science

(i) Course Outcome:

Studying the basics of mineralogy and crystallography helps in understanding and building the overall knowledge in Geology.

The students will be able to identify common rock-forming minerals n hand specimens as well as in thin sections. Besides, they will familiarise themselves with Bavarias crystal lattice and crystal; systems.

III SEMESTER

DSC-III: Title of the Course: Petrology

Course Outcome:

On completion of the course the students will have gained an understanding of the processes involved in the formation of igneous, sedimentary and metamorphic rocks, their textures, structures, classifications and their importance.

Students learn to identify, describe and classify rocks using hand specimens. The students will also acquire skills to determine and interpret geochemistry of rocks.

IV SEMESTER

DSC-IV: Title of the Course: Palaeontology and Stratigraphy

Course Outcome:

The study of stratigraphy and Palaeontology encompasses the aspects of the age of the earth, chronological arrangement of rocks and appearance and evolution of life through the geologic time. The knowledge of the concepts in stratigraphy, correlation, and paleontology would enable the students to understand the changes that occurred in the history of the earth and relate them to their field observations and also, in understanding the framework of the stratigraphy of India

The students will acquire skills of discovering and describing fossils and their taxonomic classification. They will also be introduced to interpreting paleoclimate and paleoenvironment conditions.

IV SEMESTER
DSE-IA- DSE/T- 1: Title of the Course: Economic Geology

(i) **Course Outcome:**

By the end of this course the student will have learnt about the distribution of mineral deposits both metallic and non-metallic, techniques of mineral exploration and exploitation, estimation of ore reserves, environmental impact of mining, and the importance conservation of mineral resources. Upon completion of this course, the student will acquire all knowledge and skills required for himself/herself becoming a mining geologist.

V SEMESTER
DSE-IB: DSE/T- 2: Title of the Course: Engineering Geology and Hydrogeology
Engineering Geology

(i) **Course Outcome:**

Upon completion of the course the student will become aware of the importance of geological studies and its applicability to various engineering problems.

The student will be educated on geological site investigations for engineering structures and will provide skills in geological mapping and making geotechnical measurements.

Hydrogeology

(i) **Course Outcome:**

On completion of the course, the student will have gained an understanding of hydrogeological concepts, exploration, exploitation and recharge of groundwater and methods of monitoring groundwater quality and sources of pollution
Students will be able to acquire skills of systematic hydrogeological surveys and water quality Monitoring

V SEMESTER
DSE-2A: DSE/T- 3: Title of the Course: Gemology, Environmental Geology and Medical Geology

Gemology:
(i) Course Outcome:

The basic idea is to make students well versed with the different terminologies used in the gem industry and to provide skills to become a successful gemmologist.
The students will acquire skills which will be useful to them in the gem industry.

Environmental Geology:

(i) **Course Outcome:**

Know the basic fundamentals of earth science as applied to the interaction between human activity and the natural environment. Understand the occurrence and availability of both surface and subsurface water resources and the role of the hydrologic cycle and pollution. Understand the role of plate tectonics in causing earthquakes and how this understanding can aid the assessment of seismic hazard.
Students will be able to test and evaluate water quality for drinking and agricultural use. They will also have knowledge about various natural disasters.

Medical Geology

(i) Course Outcome:

On completion of the course the student will be able to understand the distribution of trace elements and its cyclic movement through the abiotic-biotic environment and their influence on human health, flora and fauna.
The course provides a basic understanding or geogenic and anthropogenic distribution of trace elements, their toxic effects on human health and that of flora and fauna.

VI SEMESTER
DSE-2B: DSE/T- 4: Title of the Course: Structural Geology and Exploration Geology

Structural geology

(i) **Course Outcome:**

The course deals with geological structures resulting from the action of these forces on rocks. The student will gain knowledge of the geometry of the rock structures, understand the mechanism of the evolution of rock structures and its application in the field.
The students learn the skills of identifying different structure and measurements using Brunton compass. This is fundamental to geological mapping. This course also helps to know how to use structures and help students appreciate the dynamic nature of the Earth lithosphere. Learn how to read geologic maps and solve simple map problems using strike and preparations of cross sections.

Exploration Geology

(i)   Course Outcome:

The course provides the student essential and basic concepts of mineral expiration techniques and the art and science of mining mineral resources. Geophysics deals with methodologies for extracting geological information out of geophysical datasets generated from different petrophysical properties. In Geophysical exploration the student will gain first-hand knowledge dealing with the principles and their significance
This course tries to impart skills related to Geology in mining and enable him/her to perform duties of a geologist at the mining site. The students will acquire skills to use GPS, Electrical Resistivity and other methods for exploration. These have wide application in mineral exploration, groundwater studies, petroleum geology, etc.

<div align="center">

VI SEMESTER

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DSE-2C: **DSE/T- 5: Title of the Course: Remote Sensing, Gis Disaster And Natural Hazards Management**

Remote Sensing

Course Outcome:

The course is meant to address the fundamental techniques used for remote sensing. At the end of this course, the student will be appraised with all the theoretical knowledge, information and skills to use Remotely Sensed data for geological applications.
 After completion of this course, the student will be well versed with the world of Remote Sensing and the applications and Interpretation of data related to geosciences.

GIS

(i)   Course Outcome:

This course provides a theoretical and practical, hands-on approach to spatial database design and spatial data analysis with Geographical Information Systems as applied to the various fields of geosciences.
The course provides knowledge of the fundamentals of GIS theory, and the stages of developing and using a GIS platform of various geological applications. It also promotes proficiency in the use of the GIS softwares for visualization, query, mapping, and analytical purposes.

Disaster and Natural Hazards Management

(i)   Course Outcome:

Know the basic fundamentals of earth science as applied to the interaction between human activity and the natural environment. Understand the occurrence and availability of both surface and subsurface water resources and the role of the hydrologic cycle and pollution. Understand the role of plate tectonics in causing earthquakes and how this understanding can aid the assessment of seismic hazard.
Students will be able to test and evaluate water quality for drinking and agricultural use. They will also have knowledge about various natural disasters.

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DSE-2D: DSE/T- 6: Title of the Course Mining Geology and Mineral Processing

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(i) Course Outcome:

By the end of this course the student would have learnt about techniques of mineral exploration and exploitation, estimation of ore reserves, environmental impact of mining, and the importance conservation of mineral resources.
Upon completion of this course, the student will acquire all knowledge and skills required for himself/herself becoming a mining geologist.

Sl. No	Program	Program Code	No of Program specific disciplines with code
1	B.Sc.	BSCCBCSYCM	10. Mathematics, BSCCBCSMATYCM

PROGRAM SPECIFIC OBJECTIVES:

1) To equip students knowledge to learn and explain mathematics on their own.
2) To ensure students read and understand mathematical ideas in real _ world problems.
3) To provide students with the knowledge of mathematics necessary for their employment.
4) To build competent professionals in mathematics having experience in using technology to address mathematical ideas.
5) To provide students with the knowledge to read, write and understand basic proofs and problem solving skills.

PROGRAM SPECIFIC OUTCOMES:

1) A successful completion of the course will enable the students to demonstrate the ability to effectively utilize variety of techniques and strategies of fundamental and advanced mathematics in daily life.
2) Students will be able to demonstrate the ability to analyse data and draw appropriate conclusions in varies branches of mathematics and related disciplines in solving practical as well as real world problems.

B.Sc., Mathematics

Sl No	Sem	Course	Title of the Paper	Hrs/Week L:T:P	Credits
1	I	DSC-I	Analysis and differential equations	4:0:2	6
2	II	DSC-II	Algebra, calculus and differential equations	4:0:2	6
3	III	DSC-III	Analysis and calculus	4:0:2	6
4	IV	DSC-IV	Algebra and Calculus II	4:0:2	6
5	V	DSE-IA	Algebra, Analysis and Integral transforms	5:0:1	6
		DSE-IB	Applied Mathematics – I	5:0:1	6
6	V	SEC-1	Statistics and Probability	2:0:0	2
7	VI	DSE-2A	Linear Algebra and Complex Analysis	5:0:1	6
		DSE-2B	Applied Mathematics – II	5:0:1	6
8	VI	SEC-2	Graph Theory	2:0:0	2

<div align="center">

I Semester
DSEI: Algebra and Calculus

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Course Outcome:

➢ Gain knowledge about the various concepts on Theory of equations and Calculus.

➢ Learn to work with basic properties of Calculus.
➢ Students will be able to get the analytical knowledge and basic properties of Calculus.
➢ Students learn about Reduction formulae and definite integrals with its properties.

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II Semester
DSEII: Algebra, Analysis and Differential Equations

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Course Outcome:

➢ Work with various concepts of Matrices, which is one of the basic pillars of modern Mathematics.
➢ This course is concerned with Partial derivatives.
➢ In this course students learn about how to get solution to first order differential equations.
➢ Learn about how to solve algebraic, transcendental equations and first order LDE by various numerical methods.
➢ By numerical methods how to solve integrals.

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III Semester
DSEII: Analysis and Differential EquationsCourse Outcomes:

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➢ This course concerned with the fundamental of Real analysis such as Sequence and Series.
➢ This course introduces the linear and non linear PDE and gives profound knowledge in integrating function of several variable along with a line and a plane.

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III Semester

DSEIV: Algebra and Analysis

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Course Outcome:
➢ Learn to work with significance of the notation of Groups theory and to get the solution for second order linear differential equations by various methods.
➢ This course introduces the linear and non linear PDE and gives profound knowledge in integrating function of several variable along with a line and a plane.
➢ This course aims to provide detailed description of Fourier series.

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IV SEMESTER
DSE1A: Algebra, Analysis and Integral Transforms

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Course Outcome:
➢ This course is concerned with the Ring theory and Field extension to develop computational skill in abstract Algebra.
➢ Learn about Riemann inerrability of bounded functions and Algebra of R-integral functions.
➢ This course gives an introduction to the application of applied Mathematics that is Laplace Transformation and Inverse Laplace Transformations.

V SEMESTER
DSE1B: Applied Mathematics – I

Course Outcome:
➢ This course aims to provide detailed description of Fourier series & Fourier transforms.
➢ The optimal value or the best solution can be found through the optimization process.

V SEMESTER
SEC 2: Statistics and Probability

Course Outcome:
➢ The optimal value or the best solution can be found through the optimization process.

VI SEMESTER
DSE2A: Title of the Paper Linear Algebra and Complex Analysis

Course Outcome:
➢ The main objective is to introduce basic notions in Linear algebra that are often used in Mathematics and other Science
➢ This deals with the structure of Complex number field.
➢ Learn to work with a contour integral using fundamental theorem of Calculus and Cauchy'sintegral formula.
➢ Determine if an integral is improper by identifying if one or both of the limits of integration is infinite.

VI SEMESTER
DSE2B: Applied Mathematics – II

Course Outcome:
➢ By numerical methods how to solve integrals.
➢ The main aim is to makes students familiar with extreme of functional through Calculus of variation.
➢ This course determines the solution to a Linear problem.
➢ The optimal value or the best solution can be found through the optimization process.

VI SEMESTER
SEC 4: Graph Theory

Course Outcomes:

➢ By numerical methods how to solve integrals.
➢ The main aim is to makes students familiar with extreme of functional through Calculus of variation.
➢ This course determines the solution to a Linear problem.
➢ The optimal value or the best solution can be found through the optimization process.

Sl. No	Program	Program Code	No of Program specific disciplines with code
1	B.Sc.	BSCCBCSYCM	11. Microbiology BSCCBCSMICYCM

Program specific Title: B. Sc. Microbiology

Program Specific Objectives (PSO):

- To reveal and explore basic and modern knowledge in the area of invisible microbial world
- To up skill the students intellectual and encourage their critical as well as innovative way of thinking
- To train students for academics, research, industries as well as for entrepreneurship by directing their fundamental theory and practical research skills with technical excellence.

Program Specific Outcome (PSO):
Knowledge acquired over the course of three years aids students in rapidly acclimating tothe work environment such trainees, researcher, teaching and entrepreneur.

- Supports student's confidence in answering questions during competitive exams and interviews.
- Acquire sufficient information to suggest research ideas with the help of the subject teacher.
- Gain enough knowledge to propose research ideas with guidance from the concerned subject teacher.
- Apply learned practical skills and approach along with their theory concepts, when selected for various positions in both academic institutions and R & D program of industries.
- Build entrepreneurial skills through skill-based courses and networking with alumni.
- Professional Competence is attained through the development of effective communication and interactive skills for teaching the subject at the graduate and postgraduate levels.

B.Sc., Microbiology

Sl No	Sem	Course	Title of the Paper	Hrs/Week L:T:P	Credits
1	I	DSC-I	Fundamentals of Microbiology & Microbial Diversity	4:0:2	6
2	II	DSC-II	Microbial Physiology and Microbial Genetics	4:0:2	6
3	III	DSC-III	Molecular Biology & Recombinant DNA Technology	4:0:2	6
4	IV	DSC-IV	Food Microbiology & Industrial Microbiology	4:0:2	6
5	V	DSE-IA	Environmental Microbiology & Agricultural Microbiology	4:0:2	6
		DSE-IB	Advances in Microbiology, Biostatistics, and IPR	4:0:2	6
6	V	SEC-1	Microbial Quality Control in Industries OR	2:0:0	2
			Microbial analysis of air and water	2:0:0	2
7	VI	DSE-2A	Immunology & Medical Microbiology	4:0:2	6
		DSE-2B	Biophysics and Bioinformatics	4:0:2	6
8	VI	SEC-2	Practical skills in Biology & Microbiology OR	2:0:0	2
			Management of Microbial diseases	2:0:0	2

<center>**I Semester**</center>

<center>**DSC-I: Fundamentals of Microbiology and Microbial Diversity**</center>

Course Objectives:
- To enhance the students knowledge on the historical aspects and development of microbiology
- To acquire an overall knowledge on the morphology and functions of the structures with the prokaryotes and eukaryotes.
- To make the students knowledgeable on the various techniques involved.
- give an overview on microbial ecology-microbial habitats, their interactions and plant-microbe relationship.

Course Outcome:
- Student will be understand the milestones of Microbiology and its present status
- Identify key components and their functions in both prokaryotes and eukaryotes.
- Be able to understand in depth the techniques used in Microbiology
- Have an insight to the interactions and characteristics of microorganisms.

<center>**II Semester**</center>

<center>**DSC-II: Microbial Physiology and Microbial Genetics**</center>

Course Objectives:
- Students will be able to learn how to make microbes differentiate based on the metabolism and describe how microbes do catabolism to get energy and metabolism to build structure.
- To understand the importance of history, milestone, nature of genome organization, chemical structure and functions.
- To understand the concepts recombination and molecular basis of mutations.

Course Outcome:
- Student acquires the knowledge of fundamental chemical principles and reactions are utilized in biochemical processes.
- To understand the principles and mechanism of aerobic and anaerobic respiration in microorganisms.
- Students understand the mechanism of fermentation by specific microbes.
- Be able to understand in depth the principles and mechanism of photosynthesis.
- To Understand the genes and mechanisms of mutation
- Students should know the different gene transfer mechanisms
- Students should about know Plasmids and its applications
- Students should acquire knowledge on bacteriophage, viral, fungal and algal genetics.

<center>**II Semester**</center>
<center>**DSC-III: Molecular Biology & Recombinant DNA Technology**</center>

Course Outcome:
- Know the terms and terminologies related to molecular biology and microbial
- Understand the properties, structure and function of genes in living organisms at the molecular level
- Explain the significance of central dogma of gene action
- Have a conceptual knowledge about DNA as a genetic material, chemical composition and replication strategies
- Understand the molecular mechanisms involved in transcription and translation.
- Describe the importance of genetic code, translation and wobble hypothesis
- Handle and independently work on lab protocols involving molecular techniques

- To know the basics and concepts of various genetic engineering and recombinant DNA technological related terms
- Explain terms, theories, tools and techniques of modern genetic engineering.
- Describe the methodology involved in plant and animal cell engineering using microbes.
- Discuss applications and issues related to plant nutrition, quality improvement, environmental adaptation, transgenic crops and their use in agriculture Elucidate the significance of transgenic plants as bioreactors for the production of enzymes, plantibodies, edible vaccines and therapeutic proteins
- Address bioethical and biosafety issues related to plant transgenic
- Understand, conduct and gain a thorough knowledge to perform plant tissue culture experiments • Explain the basics of animal biotechnology
- Elucidate the molecular techniques involved in gene manipulation and rDNA technology
- Explain the gene transfer methods for the production of transgenic animals
- Address bioethical and biosafety issues related to animal transgenic.
- Acquire knowledge and lab skills to perform nanotechnology experiments in lab •
- Explain the application of genetic engineering in medical and its allied fields, gene therapy , genetic counseling.

• Acquire knowledge about antisense technology, Pharmacogenetics, Toxicigenomics, Tissue engineering, Biomolecular engineering and the impact of these novel strategies on human population.

II Semester
DSC-IV: Food and Industrial Microbiology Course Objectives:

- The syllabus is designed to make students to gain technical knowledge in Food and Diary an Industrial Microbiology with special reference to skill development. The students will be able to know the principles and methods of food preservation, production of different fermented foods, understand different food borne diseases: their causative agents, foods involved, pathogenesis and preventive measures.

- To understand food sanitation and control.

- To get equipped with a theoretical and practical understanding of industrial microbiology.

- Know how to screen and isolate microorganisms of industrial importance from the environment.

- Understand steps involved in typical microbial fermentation process: up streaming process: Inoculum development, the rationale in medium formulation, sterilization of medium, microbial fermentation and steps involved downstream processing for product recovery.

- The syllabus will help students to know design of bioreactors, factors affecting growth and production, heat transfer, oxygen transfer and understand the biochemistry of various fermentations.

- Identify techniques applicable for improvement of microorganisms based on known biochemical pathways and regulatory mechanisms.

- Comprehend the techniques and the underlying principles in various downstream processes to recover high quality microbial products.

- Intellectual Property Rights (IPR): Patents, Geographical Indications, Copyright etc.

Course Outcome:

- To get equipped with a theoretical and practical understanding of industrial microbiology
- Appreciate how microbiology is applied in manufacture of industrial products
- Know how to source for microorganisms of industrial importance from the environment
- It will help students to know design of bioreactors, factors affecting growth and production, heat transfer, oxygen transfer
- Understand the rationale in medium formulation & design for microbial fermentation, sterilization of medium and air
- Appreciate the different types of fermentation processes
- Understand the biochemistry of various fermentations
- Identify techniques applicable for Improvement of microorganisms based on known biochemical pathways and regulatory mechanisms.
- Comprehend the techniques and the underlying principles in various downstream processes to recover high quality microbial products.
- Intellectual Property Rights (IPR): Patents, Geographical Indications, Copyright etc.

III Semester
DSE-IA: Environmental Microbiology

Course Outcome:

- Appreciate the diversity of microorganism and microbial communities inhabiting a multitude of habitats and occupying a wide range of ecological habitats.
- Learn the occurrence, abundance and distribution of microorganism in the environment and their role in the environment and also learn differentmethods for their detection and characterization
- Competently explain various aspects of environmental microbiology and microbial ecology and to become familiar with current research in environmental microbiology.
- Understand various biogeochemical cycles – Carbon, Nitrogen, Phosphorus cyclesetc. and microbes involved
- Understand various plant microbes interactions especially rhizosphere, phyllosphereand mycorrhizae and their applications especially the biofertilizers and their production techniques
- Understand the basic principles of environment microbiology and be able to applythese principles to understanding and solving environmental problems – waste water treatment and bioremediation
- Know the Microorganisms responsible for water pollution especially Water-borne pathogenic microorganisms and their transmission
- Comprehend the various methods to determine the sanitary quality of water and sewage treatment methods employed in waste water treatment.
- The taxonomic, ecological, and genetic relationships among microorganisms, including such topics as nutrient cycling, microbial diversity, and the biotechnological application of microorganisms to solve environmental problems.

III Semester
DSE-2A: Immunology and Clinical Microbiology

Course Outcome:

- Demonstrate and understanding of key concepts in immunology along with overall organization of the immune system.
- Describe significance of maintaining a state of immune tolerance sufficient to prevent the emergence of autoimmunity.
- To understand tumor Immunology and help the students to understand its immune prophylaxis and immune therapy.
- To make them understand the salient features of serological (antigen antibody reactions) & its uses in diagnostics and various other studies.
- Learn about immunization and their preparation and its importance
- Demonstrate the underlying principles and mechanism involved in Chemotherapyand antimicrobial resistance mechanisms.
- Course provides learning opportunities in the basic principles of medical microbiology and infectious disease.
- Know the conceptual basis for understanding pathogenic microorganisms and the mechanisms by which they cause disease in the human body.
- It also provides opportunities to develop informatics and diagnostic skills, includingthe use and interpretation of laboratory tests in the diagnosis of infectious diseases and use of lab animals in medical field.
- To understand the importance of pathogenic bacteria in human disease with respect to infections of the respiratory tract, gastrointestinal tract, urinary tract, skin and softtissue and explain the methods of microorganisms control, e.g. chemotherapy and vaccines.
- Solve problems in the context of this understanding. Recall the relationship of this infection to symptoms, relapse and the accompanying pathology.

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Sl. No	Program	Program Code	No of Program specific disciplines with code
1	B.Sc.	BSCCBCSYCM	12.Physics BSCCBCSPHYYCM

Program Specific Objectives:

In this course, we aim to provide a solid foundation in various aspects of Physics, to show a broad spectrum of modern trends in Physics, to develop experimental and mathematical skills of students. The course structure and detailed contents of the courses regarding the various components like the class room teaching (theory), laboratory (experiments), tutorials and industrial / field visits and projects can be designed and planned to achieve by the students.

Program Specific Outcomes:

The Learning outcomes based curriculum framework in Physics should also allow for the flexibility and innovation in the program design of the UG education, and its syllabi development, teaching learning process and the assessment procedures of the learning outcomes. The process of learning is defined on the basis of final assessment of the program.

B.Sc., Physics

Sl No	Sem	Course	Title of the Paper	Hrs/Week L:T:P	Credits
1	I	DSC-I	DSC IA: Mechanics, relativity and properties of matter	4:0:2	6
2	II	DSC-II	DSC IB : Radiation, thermal physics and thermodynamics	4:0:2	6
3	III	DSC-III	DSC IC: Waves, sound and optics.	4:0:2	6
4	IV	DSC-IV	DSC ID: Electricity and electromagnetism.	4:0:2	6
5	V	DSE-IA	Atomic and molecular physics.	4:0:2	6
		DSE-IB	Nuclear Physics	4:0:2	6
6	V	SEC-1	------	2:0:0	2
7	VI	DSE-2A	Condensed matter Physics.	4:0:2	6
		DSE-2B	Electronics OR Astrophysics and solid-state physics	4:0:2	6
8	VI	SEC-2	------	2:0:0	2

I Semester

DSC-I: Mechanics, relativity and properties of matter

Course Objectives:

In this course, we aim to provide a solid foundation in various aspects of Physics, to show a broad spectrum of modern trends in Physics, to develop experimental and mathematical skills of students. The syllabi are framed in such a way that its brides the gap between the pre university and Post graduate levels of Physics, by providing a completer and more logical framework of basic Physics. The systematic and planned curricula from first semester to second semester shall motivate and encourage the students for pursuing higher studies in Physics, engage in research activities and become self-reliant.

Course Outcome:

By the end of the first semester, the students would have attained a common understanding in basic mechanics, properties of matter, Heat and thermodynamics. The students developed their experimental and data analysis skills through a wide range of experiments in the practical laboratories.

II Semester
DSC-II: Radiation, thermal physics and thermodynamics
Course Objectives:

In this course, we aim to provide a solid foundation in various aspects of Physics, to show a broad spectrum of modern trends in Physics, to develop experimental and mathematical skills of students. The syllabi are framed in such a way that its brides the gap between the pre university and Post graduate levels of Physics, by providing a completer and more logical framework of basic Physics. The systematic and planned curricula from second semester shall motivate and encourage the students for pursuing higher studies in Physics, engage in research activities and become self-reliant.

Course Outcome:

By the end of the second semester, the students would have been introduced to powerful tools for tracking a wide range of topics in heat and thermodynamics become familiar with additional relevant maxwells formulation. Further developed their experimental skills through a series of experiment which illustrates major themes of the lecture courses

III Semester

DSC-III: Waves, sound and optics.

Course Objectives:

In this course, we aim to provide a solid foundation in various aspects of Physics, to show a broad spectrum of modern trends in Physics, to develop experimental and mathematical skills of students. The syllabi are framed in such a way that its brides the gap between the pre university and Post graduate levels of Physics, by providing a completer and more logical framework of basic Physics. The systematic and planned curricula from second semester shall motivate and encourage the students for pursuing higher studies in Physics, engage in research activities and become self-reliant.

Course Outcome:

By the end of the third semester, the students would have been introduced to powerful tools for tracking a wide range of topics in optics, acoustics and scattering of light become familiar with additional relevant fourier formulation. Further developed their experimental skills through a series of experiment which illustrates major themes of the lecture courses.

IV Semester

DSC-IV: Electricity and electromagnetism

Course Objectives:

In this course, we aim to provide a solid foundation in various aspects of Physics, to show a broad spectrum of modern trends in Physics, to develop experimental and mathematical skills of students. The syllabi are framed in such a way that its brides the gap between the pre university and Post graduate levels of Physics, by providing a completer and more logical framework of basic Physics. The systematic and planned curricula from second semester shall motivate and encourage the students for pursuing higher studies in Physics, engage in research activities and become self-reliant.

Course Outcome:

By the end of the fourth semester, the students would have been introduced to powerful tools for tracking a wide range of topics in dielectric properties of sound, electricity and electromagnetism become familiar with additional relevant maxwells formulation. Further developed their experimental skills through a series of experiment which illustrates major themes of the lecture courses.

DSE-IA: Atomic and Molecular Physics

Course Objectives:

In this course, we aim to provide a solid foundation in various aspects of Physics, to show a broad spectrum of modern trends in Physics, to develop experimental and mathematical skills of students. The syllabi are framed in such a way that its brides the gap between the Pre University and Post graduate levels of Physics, by providing a completer and more logical framework of basic Physics. The systematic and planned curricula from second semester shall motivate and encourage the students for pursuing higher studies in Physics, engage in research activities and become self-reliant.

Course Outcome:

By the end of the fifth semester, the students would have been introduced to powerful tools for tracking a wide range of topics in atomic Physics and structure of molecules become familiar with additional relevant maxwells formulation. Further developed their experimental skills through a series of experiment which illustrates major themes of the lecture courses.

V Semester
DSE-IB: Nuclear Physics

Course Objectives:

In this course, we aim to provide a solid foundation in various aspects of Physics, to show a broad spectrum of modern trends in Physics, to develop experimental and mathematical skills of students. The syllabi are framed in such a way that its brides the gap between the pre university and Post graduate levels of Physics, by providing a completer and more logical framework of basic Physics. The systematic and planned curricula from second semester shall motivate and encourage the students for pursuing higher studies in Physics, engage in research activities and become self-reliant.

Course Outcome:

By the end of the fifth semester, the students would have been introduced to powerful tools for tracking a wide range of topics in fission and fusion , calculation of number of atoms become familiar with additional relevant maxwells formulation. Further developed their experimental skills through a series of experiment which illustrates major themes of the lecture courses.

VI Semester
DSE-2A: Condensed Matter Physics

Course Objectives:

In this course, we aim to provide a solid foundation in various aspects of Physics, to show a broad spectrum of modern trends in Physics, to develop experimental and mathematical skills of students. The syllabi are framed in such a way that its brides the gap between the pre university and Post graduate levels of Physics, by providing a completer and more logical framework of basic Physics. The systematic and planned curricula from second semester shall motivate and encourage the students for pursuing higher studies in Physics, engage in research activities and become self-reliant.

Course Outcome:

By the end of the sixth semester, the students would have been introduced to powerful tools for tracking a wide range of topics in condensed matter physics become familiar with additional relevant maxwells formulation. Further developed their experimental skills through a series of experiment which illustrates major themes of the lecture courses.

DSE-2B: ELECTRONICS**

Course Objectives:

In this course, we aim to provide a solid foundation in various aspects of Physics, to show a broad spectrum of modern trends in Physics, to develop experimental and mathematical skills of students. The syllabi are framed in such a way that its brides the gap between the pre university and Post graduate levels of Physics, by providing a completer and more logical framework of basic Physics. The systematic and planned curricula from second semester shall motivate and encourage the students for pursuing higher studies in Physics, engage in research activities and become self-reliant.

Course Outcome:

By the end of the sixth semester, the students would have been introduced to powerful tools for tracking a wide range of topics in electronics become familiar with additional relevant maxwells formulation. Further developed their experimental skills through a series of experiment which illustrates major themes of the lecture courses.

DSE-2B: Astrophysics and Solid-State Physics

Course Objectives:

In this course, we aim to provide a solid foundation in various aspects of Physics, to show a broad spectrum of modern trends in Physics, to develop experimental and mathematical skills of students. The syllabi are framed in such a way that its brides the gap between the pre university and Post graduate levels of Physics, by providing a completer and more logical framework of basic Physics. The systematic and planned curricula from second semester shall motivate and encourage the students for pursuing higher studies in Physics, engage in research activities and become self-reliant.

Course Outcome:

By the end of the sixth semester, the students would have been introduced to powerful tools for tracking a wide range of topics in heat and thermodynamics become familiar with additional relevant maxwells formulation. Further developed their experimental skills through a series of experiment which illustrates major themes of the lecture courses.

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Sl. No	Program	Program Code	No of Program specific disciplines with code
1	B.Sc.	BSCCBCSYCM	13.Sericulture BSCCBCSSERYCM

Program specific objectives (PSOs):

• To impart advanced and in-depth knowledge in the area of agriculture, animal husbandry and industry in general and sericulture in particular.

• To train the students to become progressive and innovative.

• To prepare he students for industry ready with basic and translational research skills with technical excellence.

Program Specific Outcomes (PSOs):

• In depth knowledge gained during the course of three years helps the students to quickly acclimatize to the work environment when they join as trainees or positions in public and private sector.

• Helps the students to face competitive exams in confidence for the masters as well as in civil service exams.

• Gain enough knowledge to propose research ideas in their higher studies.

• Develop practical skills along with their theory components, which help in various positions selected in both academic institutions and R & D programs of industries.

• To develop entrepreneurial skills, with effective communication and interactive skills.

B.Sc., Physics

Sl No	Sem	Course	Title of the Paper	Hrs/Week L:T:P	Credits
1	I	DSC-I	Biology of mulberry and silkworm	4:0:2	6
2	II	DSC-II	Mulberry Cultivation and Silkworm Rearing	4:0:2	6
3	III	DSC-III	Mulberry and Silkworm Crop Protection	4:0:2	6
4	IV	DSC-IV	Physiology of Mulberry and Silkworm	4:0:2	6
5	V	DSE-IA	Mulberry & Silkworm breeding and Silkworm Seed Technology	4:0:2	6
		DSE-IB	Agronomy and Entomology	4:0:2	6
6	V	SEC-1	Sericulture Technology	2:0:0	2

7	VI	DSE-2A	Silk Technology, Vanya Sericulture and Extension	4:0:2	6
		DSE-2B	Entrepreneurship development in sericulture	4:0:2	6
8	VI	SEC-2	Silk Technology	2:0:0	2

I Semester

DSC-I: DSC (SER) A: Biology of Mulberry and Silkworm

Course Objectives:

1) To introduce the concepts of origin & growth of sericulture & study sericulture as an art, science and industry.

2) To acquaint with general aspects of sericulture industry and the organizational setup.

3) To introduce to the basic aspects of Mulberry plant and silkworm races/breeds.

Course Outcome:

1) Gain the knowledge of origin and history of sericulture.

2) Will gain the knowledge of the organizations and industrial setup.

3) Will understand the classification and biology of mulberry and silkworm.

II Semester

DSC-II: DSC (SER) B: Mulberry Cultivation And Silkworm Rearing

Course Objectives:

1) To understand the scientific approach of mulberry cultivation & production.

2) To acquaint with ecology and ethology of silkworm rearing.

3) To familiarize with improved technologies in mulberry cultivation and silkworm rearing & its impact on cocoon productivity.

Course Outcome:

1) Students will gain the traditional and scientific approach of mulberry cultivation and production and silkworm rearing and production,

2) Make them industry ready by hands on training in practical classes and field exposure.

3) Acquires knowledge of improved technologies used and adopted in mulberry cultivation and silkworm rearing.

II Semester
DSC-III: Mulberry and Silkworm Crop Protection

Course Objectives:

1) To study the incidence, symptoms & damage caused by different pests and diseases of mulberry.

2) To study the incidence, symptoms & damage caused by different pests and diseases of Silkworm.

3) To acquaint with the management of pests and diseases through different methods to prevent crop loss (cocoons).

Course Outcome:

1) They gain the knowledge of disease incidences in mulberry to manage and avoid crop loss.

2) They also gain the knowledge of diseases of silkworm and to manage it.

3) They acquaint with the integrated management of pests and diseases through different methods to prevent crop loss (mulberry leaves and silkworm cocoons production).

II Semester
DSC-IV: DSC (SER) D: Physiology of Mulberry and Silkworm

Course Objectives:

1) To impart the in-depth knowledge of external and internal factors on mulberry and silkworm.

2) To study the physical and biochemical aspects of mulberry plant and requirements for good growth.

3) To study the physical and biochemical aspects of silkworm organ systems and their management.

Course Outcome:

1) Students will gain the knowledge of importance of external and internal aspects of mulberry and silkworm.

2) Gain the importance of environmental factors and nutritional requirements in mulberry and silkworm crop production.

3) Understand the insect organ system functions and as well as in other systems also.

DSE-IA- DSE (SER) A (1): Mulberry & Silkworm Breeding and Seed Technology

Course Objectives:
1) To gain the knowledge of germplasm bank, need of the present situations to protect, preserve and use the genetic resources.

2) To familiarize with the basic principles and recent approaches in mulberry and silkworm genetics and breeding.

3) To study the silkworm seed organization and to practice the silkworm egg preparations.

Course Outcome:

1) Gain the knowledge on the importance of plant and animal species preservation and utilization in general and mulberry and silkworm in particular.

2) They acquaint with the concept of evolution of new mulberry varieties and silkworm races for increased productivity.

3) They familiarize with the disease-free silkworm egg production practically, as it is the back bone of sericulture industry.

SER) A (2): Agronomy and EntomologyCourse Objectives:

1) To impart the knowledge of principles of crop production. The factors affecting it and itsmanagement.

2) To impart the knowledge of services from insects to man, the factors affecting it and its management.

3) To understand the IPM system.

Course Outcome:

1) Students will understand the importance of crop production holistically.

2) Students will underhand the importance of insects and its protection.

3) Study of IPM will help students to develop the concern for environment in building the nation.

SEC-2: Sericulture Technology

Course Objectives:

1) To gain the knowledge of whole sericulture industry superficially for non-sericulture students of B.Sc.

2) Deals with the components of sericulture industry.

3) To ignite the passion for the field in the young minds.

Course Outcome:

1) Helps the students to understand the subject in brief with scientific approach and helps to develop the interest in the subject.

2) Students will understand the components of sericulture from the view point of future prospective for research.

3) They develop the capacity to think behind the subject for the well being of the industry and the famers involved in building the nation's economy.

DSE-2A: DSE – (SER) B (1): Silk Technology, Vanya Sericulture and Extension

Course Objectives:

1) To introduce the concept of cocoon as raw material & its significance in reeling technology and to acquaint with the technologies of silk reeling & importance of reeling. devices as well as to understand the significance of raw silk production & processing of yarn.

2) To study non-mulberry sericulture as one of the occupations of millions of tribal people of north eastern India and its importance in protection of and development of forest resources.

3) To gain the knowledge of extension services.

Course Outcome:

1) Students will expose to the hands-on training of silk reeling will help them to take up silk reeling as a profession if they wish.

2) Study of non-mulberry sericulture will motivate the students to protect and preserve the natural resources of our country for the wellbeing of the countryman.

3) Students will understand the importance of communication, leadership qualities and extension of education.

DSE-2B: DSE (SER) B (2): Entrepreneurship Development in Sericulture

Course Objectives:

1) To import entrepreneurship thinking in young minds.

2) To understand the extension services in improving the qualities of famers.

3) To understand the support from the Govt./NGO's and its adaptations in improving the industry and the lifestyle of the farmers.

Course Outcome:

1) Students will develop the capabilities of self-development and motivation to become self-employed.

2) Gain the knowledge of marketing strategies and extension services.

3) Get the thorough knowledge of existing schemes and how well they can adopt if they become entrepreneurs.

<div align="center">**SEC-4: SILK TECHNOLOGYCOURSE**</div>

Course Objectives:

1) To gain the knowledge of non-sericulture students of B.Sc. to the subject.

2) To get the insight about the silk production technology

3) To understand the eco-friendly nature of the industry to ignite their entrepreneurial skills.

Course Outcome:

1) The non-sericulture students will get the in-depth knowledge of silk reeling technology.

2) Understand the pros and cons of the production of quality and quantity of silk thread and its importance in the Indian tradition and culture.

3) Students will gain the knowledge of the byproducts of sericulture industry in each and every component and their utilization for the betterment of the society. Also gain the knowledge of alternate resources available for the development of the industry.

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Sl No.	Program	Program Code	No of Program specific disciplines with code
1	B.Sc.	BSCCBCSYCM	14.Statistics BSCCBCSSTAYCM

Program Specific Objectives:

1. To prepare graduates who are not only statistically sound but also capable of using their appropriate statistical skills in interdisciplinary areas such as finance, health, agriculture, government, business, industry, telecommunication, and bio-statistics. As a result, they can pursue their future career either in the core field or in the applied field of Statistics.

2. To familiarize students with computational techniques and software used in the statistical arena.

3. To prepare students for undertaking further study.

4. To teach students to construct practical statistical models for several processes in the real-world.

5. To prepare the students to enrich with ability to examine basic statistical issues in a more logical and methodical manner. It is expected that the students will strengthen themselves both computationally and analytically.

6. Communication Skills and Team Work: The students are expected to develop effective and confident Communication skill after completion of the course. They will have an ability to work in a team as well as in isolation.

7. Moral and Ethical Awareness: After completion of the course, the students are expected to develop ethical and social responsibility as well. As a result, the students will be able to

identify ethical issues, avoid unethical behavior such as fabrication, falsification or misrepresentation and misinterpretation of data.

8. Scientific Reasoning: The students will be able to analyze, interpret and draw appropriate conclusions from both quantitative and qualitative data and critically evaluate ideas, evidence and experiences with an unbiased and consistent approach.

Program Specific Outcomes:

1. Self-directed Learning: The students are expected to be familiar with data collection, compilation, analysis and interpretation and writing of project reports independently.

2. Demonstrate the ability to use skills in Statistics and different practicing areas for formulating and tackling Statistics related problems and identifying and applying appropriate principles and methodologies to solve a wide range of problems associated with Statistics.

3. Recognize the importance of statistical modeling and computing, and the role of approximation and mathematical approaches to analyze the real problems using various statistical tools.

4. Plan and execute Statistical experiments or investigations, analyze and interpret data/information collected using appropriate methods, including the use of appropriate statistical software including programming languages, and report accurately the findings of the experiment/investigations.

5. The students are expected to be familiar ICT skills

6. The students are prepared for personal skills such as the ability to work both independently and in a group.

B.Sc., Physics

Sl No	Sem	Course	Title of the Paper	Hrs/Week L:T:P	Credits
1	I	DSC-I	Descriptive Statistics and Basic Probability	4:0:2	6
2	II	DSC-II	Probability distributions – 1	4:0:2	6
3	III	DSC-III	Probability distributions – 2 and Applied Statistics	4:0:2	6
4	IV	DSC-IV	Estimation and Testing of Hypotheses	4:0:2	6
5	V	DSE-IA	Sampling Techniques and Design of Experiments	4:0:2	6
		DSE-IB	Financial Statistics	4:0:2	6
6	V	SEC-2	Statistical computing using R-1	2:0:0	2
7	VI	DSE-2A	Statistical Quality Control, Reliability and Operations Research	4:0:2	6
		DSE-2B	Actuarial Statistics and clinical trials	4:0:2	6
8	VI	SEC-4	Statistical computing using R-2 OR Econometrics	2:0:0	2

DSC-I: Descriptive Statistics and Basic Probability

Course Objectives:

1. To introduce the students to new field/subject Statistics, Statistical methods, Probability and its application across various applied fields.
2. To develop the ability in students to deal and understand the types of data, identification, and their segregation.
3. To develop the ability in organizing, classifying and presenting the data using various forms of tables, diagrams, graphs, charts and plots especially used in the field of statistics.
4. To understand and enable the use of statistical tools and techniques available to deal with data.
5. To introduce the students into various applied fields of statistics like Biometry, Econometrics, Demography, Engineering, Medicine, Agriculture, Social sciences etc.

Course Outcome:

1. Students will gain knowledge regarding theoretical aspects and practical approach in statistical methods like measures of central tendency, dispersion, Skewness, correlation, regression, independence and association of attributes, probability, random variable and their applications.
2. Knowledge of Curve fitting and regression methods are very much useful building a career in forecasting and estimation filed data science.
3. Basic knowledge gained here helps them in successfully understand the other methods and techniques of the subject to be taught in the coming semesters.
4. The theory and practical of sample or population survey, data collection methods creates a strong foundation in students, which enhances and prepares them in conducting a research survey even in other curriculum aspects.
5. Statistical survey methods and sampling methods majorly helps students in conducting research activities in the field of agriculture, forest etc.
6. The knowledge of probability gained here prepares the student for advance studies/concepts of statistics like inferential statistics, Bayesian statistics, and their application.
7. Knowledge and experience gained here can be used in handling data efficiently, which arises from any field.
8. Students could develop a career in any of the applied field easily.

II Semester
DSC-II: Probability distributions – 1

Course Objectives:

1. To introduce the students to vast field of random variables and their probability approach, in studying real life situations/practical problems.

2. To develop the ability in students to deal and understand the types of random variable and their properties.

3. To introduce to the concept of Normal probability and its vast usage in practical situations and in other fields of science and social sciences.

4. The practical classes help to introduce them into various real life problems which could be dealt using random variable and probability techniques.

5. To lay a foundation to study the inferential statistics like estimation and hypotheses testing, applied statistical techniques like SQC, time series etc in the coming semesters.

6. To understand and enable the use of statistical tools and techniques available to deal with univariate and bivariate random variables.

Course Outcome:

1. Students will gain knowledge regarding theoretical and practical approach to discrete and continuous random variables (RVs), PMF, PDF, sketching of probability distribution and density functions, expectation and variance of RVs, Joint PMF/PDF, marginal and conditional probabilities, correlation coefficient of random variables and their applications.

2. Knowledge of Normal probability helps in successfully understanding the other methods and techniques of the subject to be taught in the coming semesters.

3. The theory and practical aspects learnt will develop ability in student to understand and solve real life problems.

4. The knowledge of probability and random variable gained here prepares the student for advance studies/concepts of statistics like inferential statistics, Bayesian statistics, and their applications.

5. The tools and techniques collectively learnt from I and II semester helps a student to enter into a field of data science, IT etc to successfully build career.

DSC-I and II: Descriptive Statistics and Basic Probability/ Probabilitydistributions – 1: Practicals:

1. Sketching of distribution and density functions of univarite random variables.

2. Problems on pmf, expectation, variance, quantiles, skewness, kurtosis(Discrete Case).

3. Problems on pdf, expectation, variance, quantiles, skewness, kurtosis (Continuous case).

4. Sketching distribution functions. Computation of probabilities for discrete probability distributions

5. Sketching distribution and density functions and Computation of probabilities for continuous probability distributions.

6. Computation of moments and Moment generating functions (discrete and Continuous Case).

7. Fitting of discrete distributions as Binomial, Poisson, Geometric.

8. Simulation from discrete distributions such as Binomial, Poisson, Geometric.

9. Simulation of random samples from Normal and exponential distribution.

10. Fitting of Normal and exponential distributions.

11. Computing marginal and conditional probability distributions and probabilities in bivariate case.

12. Computing marginal and conditional expectations, variances and correlation coefficient

13. Drawing random samples from Trinomial distribution

14. Drawing random samples from bivariate Normal distribution.

   (Computing the entire practical's Manually and using MS Excel

   also).

III Semester

DSC-III: Probability distributions – 2 and Applied Statistics

Course Objectives:

1. To introduce the concept of Central Limit Theorem, describes the shape, center, and spread of sampling distributions of sample statistics

2. To Understand the need for the t-distribution

3. To Understand the similarities, relation and differences between the standard normal distribution and sampling distributions such as t, χ^2 , and F distributions.

4. To introduce the students to the concept of applied statistics, in studying real life situations/ practical problems which are used in various fields.

5. To develop the ability of students to apply statistics in other fields at an appropriate level and knowledge acquired from their major to real world models.

6. To develop knowledge of statistics in students through an in-depth research/project experience.

7. To understand the concepts, formulation and application of index numbers in different economic and business situations.

8. To learn and develop scientific view to understand the time series data and its analysis and to estimate model parameters and compare models in terms of their estimation and prediction accuracy.

9. To identify appropriate source of data and to perform basic demographic analysis using various techniques across population and learn to measure theories used to understand population studies.

10. To learn and develop scientific view to study the statistical challenges of clinical comparison of two or more treatments in human subjects.

Course Outcome:

1. Students will gain the ability to apply Central Limit Theorems.

2. Students will Recognize situations in which the CLT does/does not apply; Use the Central Limit Theorem in approximating distributions of sample means;

3. Interpret law of large numbers and central limit theorem.

4. Students will be able to Generate sampling distributions of means to observe, empirically.

5. students will be able to describe the distributions of various statistics like , t, χ^2 and F

6. Students will be able to determine the mean and standard deviation of a sampling distribution of means, t, χ^2 and F.

7. Students will be able to Understand how the degrees of freedom determine the shape of a sampling distribution

8. Students gain knowledge/ability to formulate, analyse the use of index numbers to the real world problems and to calculate an indices from a given data.

9. Knowledge of time series and its components helps in measuring variations in the data and making predictions through graphical representation.

10. Students should have developed a clear understanding of vital statistics, collection of data using different sources, basic measures of mortality, fertility and population growth, concept of stable and stationary population and describes the concept of life table.

11. Ability in students to understand need and ethics of clinical trials and to apply designs of clinical trials and drug interaction study.

<h2 style="text-align:center">IV Semester
DSC-IV: Estimation and Testing of Hypotheses</h2>

Course Objectives:

1. To develop the knowledge and importance of inferential statistics
2. To enhance the knowledge of estimation of parameters
3. To enable the use of parametric and nonparametric inferential statistics

Course Outcome: Having successfully completed this module, students will be able to:

1. Learn the basic theory and techniques of estimation of parameters, namely, unbiasedness, consistency, MLE, MME etc.
2. A good understanding of basic theory and techniques of tests of hypotheses, likelihood ratio tests and their applications
3. Get the knowledge of applying large and small sample tests to real life problems
4. Knowledge of applying parametric and nonparametric test to a data.

<h2 style="text-align:center">V Semester</h2>

<h3 style="text-align:center">DSE-IA- Sampling Techniques and Design of Experiments</h3>

Course Objectives:

1. To estimate population parameters from a sample.
2. To find out the degree of reliability of the estimate.
3. To analyse when more than two samples are to be tested at a time on the basis of equality of several means.
4. Identifying relationships between cause and effect.
5. Providing an understanding of interactions among contributory factors.
6. Minimizing experimental error.

Course Outcome: Having successfully completed this module, students will be able to:

1. Apply various types of sampling methods, such as simple random sample, stratified random sample and systematic sample for some real life problems
2. Knowledge of drawing a sample using with/without replacement.
3. Compute sample size using proportional allocation, optimum allocation, systematic sample procedures.
4. To make generalisation about the population/universe from the studies based on samples drawn from it.
5. Knowledge of applying of Designs of experiments such as CRD, RBD, LSD and factorial experiments.
6. Understand theoretical knowledge of estimation of missing values, efficiency.
7. Knowledge of estimation of parameters, like unbiasedness of sample mean, sample variance, mean sum of squares due to error, treatment, total, block etc.
8. Knowledge of factors, levels, blocking.
9. Knowledge of analysing data on Agriculture, Biology, Statistics, Marketing, etc.

DSE-IB: Financial Statistics

Course Objectives:

1. Provides an introduction to financial mathematics and basic statistics within a financial context.
2. It will assist students to gain an appreciation of what statistical methods can achieve, as well as skills in analysing and interpreting business data and statistical analysis.
3. To prepare the students on data science as an analytical and decision making tool, in a variety of business contexts, with a major emphasis on interpretation and application.

Course Outcome: Students who successfully complete this unit will be able to:

1. Identify and apply commonly used techniques for data collection and analysis.
2. Apply fundamental concepts of probability and probability distributions to problems in business decision-making.
3. Apply statistical inference methods to conduct and explain the results of hypothesis testing.
4. Apply simple regression analysis to explain the relationship between variables to draw inferences about relationships.

<h1 style="text-align:center">SEC-2: Statistical computing using R-1</h1>

Course Objectives:

As the name suggests, this course on Statistical Computing uses R software for implementation and students are trained on several practical problems in this course to equip them to think independently and for analysis of statistical data. After finishing this course, one can write R codes for statistical methods and implement R codes for the various methods learnt in the B.Sc. Program.

Course Outcome:

A person successfully completing the Course will acquire practical knowledge of solving problems and proof techniques in several topics in Statistical Computing. Writing R codes, visualization and running R packages are part of the Course. .

<h2 style="text-align:center">VI Semester
DSE-2A: Statistical Quality Control (SQC), Reliability and Operations</h2>

Course Objectives:

1. To introduce the role of statistics in all manufacturing firms
2. To provide knowledge to the students about statistical quality control.
3. To introduce seven basic quality tools for quality improvement
4. To introduce control chart as a tool for studying the variability of a system for managers to determine how to improve a process/system.
5. To introduce the students to different OR models and their importance
6. Formulate and solve LPP, Assignment problems, Transportation problems. Inventory problems and game theory
7. To introduce the tools of product control in manufacturing system

Course Outcome: On successful completion of this course the students will be able to

1. Describe the various charts in SQC
2. Interpretation of these charts in real life situations.
3. Understand the concept of product control
4. Understand single and double sampling inspection plans, OC and ASN functions,
5. Will be able to Formulate and solve LPP, Assignment problems, Transportation problems.
6. Understand the concepts in inventory and build basic inventory models indifferent conditions
7. To understand and solve problems on game theory
8. To understand reliability and basic concepts and applications

DSE-2B: Actuarial Statistics and clinical trials

Course Objectives:

This course is framed to equip the students with concepts of actuarial science and different premium models.

Course Outcome: After opting for this course, the students will be equipped with knowledge about

1. modeling of individual and aggregate losses
2. fitting of distributions to claims data, deductibles and retention limits, proportional and excess-of-loss reinsurance
3. Risk models: models for individual claims and their sums
4. finding distribution of aggregate claims, compound distributions and their applications
5. applications of credibility theory
6. finding of survival function, curate future lifetime, force of mortality
7. handling problems on joint life and last survivor status and multiple decrement model
8. mean and variance of various continuous and discrete payments for assurance and annuity contracts
9. calculation of various payments from life tables using principle of equivalence, netpremiums, prospective and retrospective provisions/reserves
10. Real illustrations for the concepts mentioned above through laboratory assignments.

SEC-4 A: Statistical computing using R-2

Course Objectives:

As the name suggests, this course on Statistical Computing uses R software for implementation and students are trained on several practical problems in this course to equip them to think independently and for analysis of statistical data. After finishing this course, one can write R codes for statistical methods and implement R codes for the various methods learnt in the B.Sc. Program.

Course Outcome: A person successfully completing the Course will acquire practical knowledge of solving problems and proof techniques in several topics in Statistical Computing. Writing R codes, visualization and running R packages are part of the Course. .

SEC-4 B: Econometrics

Course Objectives:

Students are trained to Learn how to apply linear regression models in practice, identify situation where linear regression is appropriate, build and fit linear regression models on several practical problems on different regression models and estimation and analysis.

Course Outcome:

After the completion of the course, students will be able to think independently to build different regression models, fit linear regression models on several practical problems, interpret estimates and diagnostic statistics.

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Sl. No	Program	Program Code	No of Program specific disciplines with code
1	B.Sc.	BSCCBCSYCM	15. Zoology , BSCCBCSZOOYCM

Program specific objectives and outcomes:

- Understand the basic concepts of Cell biology, Developmental biology, Biochemistry, Taxonomy and ecology.
- Analyse the relationships among animals, plants and microbes which will enable the students to think of applications related to the interdisciplinary fields
- Perform procedures as per laboratory standards in the areas of Biochemistry, Bioinformatics, Taxonomy, Economic Zoology and Ecology
- Understand the applications of biological sciences in Biotechnology viz., Apiculture, Aquaculture, Agriculture and Medicine

B.Sc., Zoology

Sl. No	Sem	Course	Title of the Paper	Hrs/Week L:T:P	Credits
1	I	DSC-I	Animal diversity-I	4:0:2	6
2	II	DSC-II	Animal diversity -II	4:0:2	6
3	III	DSC-III	Biochemistry, physiology & Ethology	4:0:2	6
4	IV	DSC-IV	Cytology and Evolution	4:0:2	6
5	V	DSE-IA	Developmental Biology and Endocrinology	4:0:2	6
		DSE-IB	Medical Diagnostics	4:0:2	6
6	V	SEC-1	Applied Zoology	2:0:0	2
7	VI	DSE-2A	Environmental biology, Zoogeography and applied Biology	4:0:2	6
		DSE-2B	Animal Biotechnology	4:0:2	6
8	**VI**	SEC-2	Vectors and disease	2:0:0	2

DSC-I: Animal diversity-I

Course Objectives:

1. learn the concept of biodiversity and its importance as well as system of classification and nomenclature of animals

2. The concept of invertebrates elaborates different group of animals from protozoa to Annelid a with various example according to the coleom will be taught

3. Importance will be given to type study in each phylum along with the example

4. In practical session students will study the concept of invertebrates with the hands of experience by observing the specimen of phylum

Course Outcome:

After completing this course, the students will be able to know the basic concepts of animal taxonomy and Zoological nomenclature, this will help to evaluate the significance of museum specimens and the students will be able to develop an understanding of the basic characters used for classification.
They have hands on experience of materials demonstrating the diversity of protists and non-chordates.
Students are able to understand different animals from their habitat till reproduction

It will be further en+able the students to think and interpret individually and helps to undertake research in any aspect of animal taxonomy in future

II Semester

DSCII: Animal diversity -II

Course Objectives:

1. Students will study unique characters of phylum Onychophora to Cyclostomata

2. Students will learn the connecting link between the animals from different phyla

3. In practicals each individual will undergo the field study to observe the insects

4. Observation and recording of Arthropods in nature (Minimum ten species).

Course Outcome:

After completing this course, the students will be able to get the basic concepts of Onychophora to Cyclostomata & Protochordates that helps to evaluate the significance of museum specimens.

Further, the students will also be able to develop an understanding of the evolution of vertebrates with integrating structure, function and development in brain, aortic arches, kidneys.

It will help to undertake research in any aspect of invertebrates and protochrodates especially in the field of entomology and vertebrates in future.

III Semester
DSCIII: Biochemistry, physiology and Ethology

Course Objectives:

1. To provide a glimpse of Aims and scopes of physiology and biochemistry to thestudents.
2. To impart knowledge regarding structure and functions of nerve and muscle to the students.
3. To develop detailed understanding of mechanism of digestion, respiration andexcretion.
4. To provide knowledge about reproductive system as well as endocrine glands and their mechanism of action.
5. To give adequate information to the students regarding Metabolism of macromoleculessuch as carbohydrates, lipid and protein.
6. To make the students gain knowledge about enzyme functions, regulation and their mechanism of action as well.

Course Outcome:

1. Students are able to understand the Physiology of Digestion & Respiration.
2. Students understood the Physiology of Circulation & nerve impulse and ReflexAction.
3. Students gain the knowledge of Physiology of muscle contraction & Excretion
4. Students learn about Physiology & Types of Endocrine glands.
5. Structure, function, significance and Metabolism of Carbohydrates, Proteins andLipids will be elaborately studied.

IV Semester

DSCIV: Cytology and Evolution

Course Objectives:

1. Students examine the basic properties of cells and cell organelles, in addition tothe properties of differentiated cell systems and tissues.

2. The course aims to equip students with a basic knowledge of the structural andfunctional properties of cells.

3. Students will understand how these cellular components are used to generate andutilize energy in cells.

4. Students will understand the cellular components underlying mitotic cell division.

Course Outcome:

1 After completion of this course, students will be able to: Identify themacromolecules, their monomers, and their functions in cells.
2 Students are able to describe the structures and functions of cell organelles.
3 Students are able to discuss energy transfer, enzyme function and the pathwaysof cellular respiration.
4 Students can differentiate prokaryotic binary fission, the eukaryotic cell cycle,mitosis and meiosis.
5 Students are able to understand the DNA structure and replication, transcription,translation and gene expression.
6 Students are able to know the modern biotechnological techniques and theirimportance in various field of science.

V Semester

DSE1A: Developmental Biology and Endocrinology

Course Objectives:

1. Students will study the mendelian principles and classical genetical aspects andsome part of cytology
2. The aim of the course is to provide students with a deeper insight intothe evolutionary processes –
3. both selective and random - which can explain the genetic composition ofpopulations, form, behaviour and distribution of organisms.
4. To teach students the basic methods of analysing the evolutionary relationshipsbetween the organisms
5. Study of organic evolution and adaptations
6. Study of speciation
7. The above points are observed in the practical class along with the hands ofexperience

Course Outcome:

1. Solve problems in Mendelian genetics, including multiple alleles and X- linkage along with the Laws of Segregation and Independent Assortment
2. Describe the structure and replication of the genetic material and basic aspects of the flow of genetic information from DNA to proteins.
3. Apply knowledge about transcription, translation and the genetic code to demonstrate an understanding of the flow of genetic information from DNA to proteins students can describe some of the processes involved in theregulation of gene expression
4. Explain fundamental genetic concepts. Describe the phases of mitosis and meiotic in detail and explain the connection between chromosomal behavior in meiosis.
5. Apply the principles of Mendelian inheritance and their extensions (one- and two-locus traits with two or more alleles, gene interactions, sex linkage and linkage) by analyzing inheritance patterns from crosses
6. Describe the origins and genetic consequences of mutations and chromosomal abnormalities
7. Analyze allele and genotype frequencies within populations from the Hardy- Weinberg
8. Analyze basic processes in population genetics, mutation, migration, natural selection, sexual selection and genetic drift and describe how they affect the genetic diversity within a species
9. Discuss methods for detecting and analyzing variation at gene, genome and phenotypic levels within and between individuals, populations and species. 12 Describe the relationship between molecular and phenotypic evolution.

Semester V

DSE1B: Medical Diagnostics

Course Objectives:

1. To acquire basic knowledge of pathogenesis, diagnosis and management ofcommon medical conditions in the patients.
2. Provide actionable knowledge about disease diagnosis, prognosis, and treatment topolicy makers.
3. To study the First aid and its principles in the present era

Course Outcome:

1. Upon successful completion of this course students would familiarize the various dimensions of Medical lab technology and career opportunities available in these fields.
2. They can develop practical understanding among the students associated with Medical lab through classroom discussion/ participation and projects.
3. The can also develop transferrable skills among the students for managing Laboratory works efficiently so that they could be ready to join the Laboratory functions in any organization.
4. It provides brief insight about personal grooming and its stages, meaning and importance of knowledge of Laboratory base works and other key dimensions of laboratory management in Hospitals.
4. This would help students enhance their practical skills and would enable them work in a Hospital setup.

V Semester

SEC2: Applied Zoology

Course Objectives:

1. The applied Biology Programme is designed to equip the students with the practical uses of biological knowledge and to inculcate in the students an entrepreneurial and problem-solving ability.
2. Study about the sericulture, apiculture, fisheries and also some of the aspects of the applied branches in Zoology

Course Outcome:

1. After successfully completing this course, the students will be able to understand the culture techniques Honey bee and fish and their products.
2. They also understand the Bee keeping equipments and apiary management.
3. They also learn various types of aquarium fishes and its maintenance as well as fish transportation.
4. Students are able to understand thje concept of the applications in the field of applied biology
5. Students have lot of scope to adopt the applications which has been thought from the present paper.

VI Semester

DSE 2A: Environmental biology, Zoogeography and applied Biology

Course Objectives:

1. Creating the awareness about environmental problems among people.
2. Imparting basic knowledge about the environment and its allied problems.3.
3.Developing an attitude of concern for the environment.
4. Students will study how to assess the pollutants in water samples
5.Students are able understand the local varieties of the edible fishes
6. Zoogeography aims to explain the structure, function and history of the geo graphical ranges of animals. The absence or presence of a species in a given place has ecological as well as historical causes.

7. The Applied Biology Programme is designed to equip the students with the practical uses of biological knowledge and to inculcate in the students an entrepreneurial and problem- solving ability.

Course Outcome:

1. After completing this course, the students will be able to: Acquire an in- depth knowledge on the diversity and relationships in animal world. Develop a holistic appreciation on the phylogeny and adaptations in animals.
2. Enable the students to understand the evolution of universe and life. Understanding on the process and theories in evolutionary biology.
3. Develop an interest in the debates and discussion taking place in the field of evolutionary biology by visiting the lake available in the around localities.
4. The students will also be able to know the evolutionary and functional basis of animal ecology. Develop an understanding of how animals interact with each other and their natural environment. Studies engage in field-based research activities to understand well the theoretical aspects, taught besides learning techniques for gathering data in the field.
5. Analyse a biological problem, derive testable hypotheses and then design experiments and put the tests into practice.
6. Solve the environmental problems involving interaction of humans and natural systems at local or global level. The course is an introduction to wildlife management and gives an account of the tools used by wildlife managers. Topics covered are to equip students with adequate knowledge of various biodiversity monitoring methodologies, conservation and management issues of vertebrate pests, wildlife conflict and over abundant species, wildlife health and diseases

VI Semester

DSE2B: Animal Biotechnology

Course Objectives:

1. Identification and characterization of animal breeds.
2. Developing DNA - based diagnostics and genetically engineered vaccines for animals.
3. Studying animal genomics and its varied applications.
4. Developing embryo - transfer technology, cloning, transgenic animals.
5. DNA forensics, molecular diagnostics, cloning, wildlife conservation, stem cell research and bio - processing technologies are other import areas of animal biotechnology.

Course Outcome:

1. After successfully completing this course, the students will be able to develop an understanding of the fundamental molecular tools and their applications of DNA modification and cloning.
2. They can also develop future course of their career development in higher education and research with a sound base.
3. They can apply their knowledge with problem solving approach to recommend strategies of
4. Genetic engineering for possible applications in Biotechnology and allied industry.

SEC4: Title of the Course: Vectors and Diseases

Course Objectives:

1. Create a framework for networking to improve surveillance and monitoring of emerging vector-borne zoonotic diseases of viral origin.
2. Provide training for public health experts and improve national laboratories capacities to increase the communicable disease control.
3. Strengthen integrated surveillance (animal health, human health, entomological and environmental data).
4. Provide tools for awareness, risk assessment and monitoring of the emerging viruses of interest

Course Outcome:

1. After successfully completing this course, the students will be able to develop awareness about the causative agents and control measures of many commonly occurring diseases.
2. They can understand the favourable breeding conditions for the vectors and devise strategies to manage the vectors population below threshold levels, public health importance.

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Sl No.	Program	Program Code	No of Program specific disciplines with code
1	B.Sc.	BSCCBCSYCM	**AECC** **Language disciplines**: **Compulsory (One)**: 1(a)English, BSCCBCSENGYCM

ENGLISH LANGUAGE- PROGRAMME SPECIFIC OBJECTIVES

- To enable the learner to communicate effectively and appropriately in real life situations;

- To impact the use of English effectively for various purposes across the curriculum;

- To develop interest in the appreciation of Literature;

- To develop and integrate the use of the four language skills i.e. Reading, Listening, Speaking and Writing.

B.Sc. (Language Course): Ability Enhancement Compulsory Course (AECC):

English

Sl No	Sem	Course	Title of the Paper	Hrs/Week L:T:P	Credits
1	I	AECC	English I	2:1:0	3
2	II	AECC	English II	2:1:0	3
3	III	AECC	English III	2:1:0	3
4	IV	AECC	English IV	2:1:0	3

ENGLISH LANGUAGE- PROGRAMME SPECIFIC OBJECTIVES

- To enable the learner to communicate effectively and appropriately in real life situations;
- To impact the use of English effectively for various purposes across the curriculum;
- To develop interest in the appreciation of Literature;
- To develop and integrate the use of the four language skills i.e. Reading, Listening, Speaking and Writing.

I SEMESTER: B.Sc/BBA/BCA

AECC: Title of the Course: English I

Course Objectives:

- To introduce basic grammar through ample practice exercises for effective language learning
- To teach to use vocabulary appropriately and grammatical structures correctly
- To adopt strategies for developing effective reading and listening skills while engaging students in using correct pronunciation
- To instill confidence and develop competence in students in order to communicate in grammatically correct English.

Course Outcome:

- Students will be able to enrich their vocabulary and enhance their comprehension skills.
- They will acquire grammatical competence and communicative skill which in turn will improve their command over English
- Students will acquire greater fluency in English which is an important dimension of language learning.
-

II SEMESTER: B.Sc/BBA/BCA

AECC: Title of the Course: English II

Course Objectives:

- To introduce basic grammar through ample practice exercises for effective language learning
- To teach to use vocabulary appropriately and grammatical structures correctly
- To adopt strategies for developing effective reading and listening skills while engaging students in using correct pronunciation
- To instill confidence and develop competence in students in order to communicate in grammatically correct English.

Course Outcome:

- Students will be able to enrich their vocabulary and enhance their comprehension skills.
- They will acquire grammatical competence and communicative skill which in turn will improve their command over English
- Students will acquire greater fluency in English which is an important dimension of language learning.

III SEMESTER: B.Sc/BBA/BCA

AECC: Title of the Course: English III

Course Objectives:

- Teaching explicitly the structures and grammatical features of spoken and written texts
- Providing students with guided practice in writing as they develop language skills for meaningful communication
- Set some language-focussed tasks to enable students to acquire critical thinking
- Creating scope in the classroom for meaningful and purposeful interaction through language

Course Outcome:

- Students' engagement with various strategies of writing and revising like paragraph writing, correction of sentences, essay writing and use of language as a means of creative expression will make them confident communicators .
- Students, in acquiring the skill to use language to recreate experience, will be able to order their experiences into meaningful narratives and thus would be prepared for real-world uses of language.
- Since communicative competence is a prerequisite for success and advancement in many fields of employment in today's world, this course will immensely benefit the students in their future endeavours.

IV SEMESTER B.Sc/BBA/BC

AECC: Title of the Course: English IV

Course Objectives:

- Teaching explicitly the structures and grammatical features of spoken and written texts
- Providing students with guided practice in writing as they develop language skills for meaningful communication
- Set some language-focussed tasks to enable students to acquire critical thinking
- Creating scope in the classroom for meaningful and purposeful interaction through language

Course Outcome:

- Students' engagement with various strategies of writing like paragraph writing, précis writing, comprehension passages and use of language as a means of creative expression will make them confident communicators .
- Students, in acquiring the skill to use language to recreate experience, will be able to order their experiences into meaningful narratives and thus would be prepared for real-world uses of language.
- Since communicative competence is a prerequisite for success and advancement in many fields of employment in today's world, this course will immensely benefit the students in their future endeavours.

Sl. No	Program	Program Code	No of Program specific disciplines with code	Page No.
1	B.Sc	BSCCBCSYCM	**Optional any one (Nine):** 1(b)Kannada, BSCCBCSKANYCM	

B.Sc. (Language Course): Ability Enhancement Compulsory Course: Kannada Language

Sl No	Sem	Course	Title of the Paper	Hrs/Week L:T:P	Credits
1	**I**	AECC	Kannada I	2:1:0	3
2	**II**	AECC	Kannada II	2:1:0	3
3	**III**	AECC	Kannada III	2:1:0	3
4	**IV**	AECC	Kannada IV	2:1:0	3

Program Specific and course outcomes of Kannada Language

1. eÁÕ£Ádð£ÉUÁV :

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ÛCvÀåUÀvÀåªÁVzÉ. §ºÀÄvÉ¥À ¸ÀàzsÁðvÀäPÀ ¥ÀjÃPÉëUÀ¼À°è PÀqÁØAiÀÄ PÀ£ÀßqÀ ¥ÀwæPÉÚUÀ½zÀÄÝ, ¸Á¥ÀiÁ£Àå ¥ÀwæPÉAiÀÄÄµÉÖÃ ªÀÄºÀvÀé ¥ÀqÉ¢gÀÄvÀÛªÉ. ¥ÀoÀåUÀ¼À°è ¨sÉÆÃ¢ü¸ÀÄ PÀ«UÀ¼À ¥ÀjZÀAiÀÄ, PÀ«vÉAiÀÄ ¸Á®UÀ¼À¼À, £ÁIPÀUÀ¼À°À, PÁzÀA§jUÀ¼À°À ¥ÁvÀæUÀ¼À£ÀÄÄß C¨sÀå¹¸ÀÄÄ ªÀÄ®PÀ PÀ£ÀßqÀzÀ §UÉUÉ ªÀÄvÀÀ PÀ£ÀßqÀ ¸Á»vÀå ¥ÀæPÁgÀUÀ¼À eÁÕ£À¥À£ÀÄÄß ¥ÀqÉAiÀÄÄvÁÛUÉ. ¸ÀÄ®¸ÀAz°è PÀ£ÀßqÀ ¥ÀwæPÉAiÀÄ°è ºÉZÀÄÑ CAPÀ ¥ÀqÉAiÀÄÄÄª ªÀÄvÀÀ PÀ GzÉÆåÃUÀ ¥ÀqÉAiÀÄÄ§ºÀÄzÀÄ.

4. ¥ÁæAiÉÆÃVPÀ PË±À®å :

vÀgÀUÀwAiÀÄ°è ¥ÁæAiÉÆÃVPÀ vÀgÀUÀwUÀ¼À°è £ÀqÉ¸ÀÄªÀ «zÁåyðAiÉÄÃ ¸ÀéAiÀÄ°ÄAzÀ¸ÁZÀ° ªÀÄÁqÄÄ®Ä, C©ü¥ÁæAiÀÄ ªÀÄÀr®Ä CªÀPÁ±À ¤qÀ¯ ÁUÀÄvÀ Àå£ÀÄ. D ªÀÄÄÆ®PÀ ªÀÀ£ÁQPÀ C©üÀÅQÛ ªÀÄÄÄÄ §gÀªÀÑUÀÄAiÀÄ PË±À®åªÀ£ÀÄÄ ¥ÁæAiÉÆÃVPÀ vÀgÀUÀwÚAiÀÄ°è ¥ÀqÉAiÀÄÄvÁÛUÉ. ¨sÁµÉAiÀÄ GZÁÑgÀuÉ, ªÀÁ®À£Àt, «ÄAiÀÄAz ªÉÄÃÀ É »rvÀ ¸À¢ü¸ÀÄÄ®Ä eÁÕ£À¥À£ÄÄß ºÉÆAz§ºÀÄzÀÄ. ¥Àæ§ÄÀÞvÉ¬ÄAzÀ ¨sÁµÉAiÀÄ §¼ÀPÉ ªÀÄÄÄÄ §gÉAiÀÄÄÀ PË±À®å ºÉÆAzÀÄÀ ªÀÄÄÆ®PÀ ªÀÄÄÁzsÀå°À°ÄAiÀÄ°è GzÉÆÃUÀÄÀPÀ±ÉÆÃ®Æ C£ÀÄPÀÆ®UÀÄ£ÀÛªÀÛzÉ. «zÁåyðUÀ¼À°è PÀ£ÀvÀÀPÆÀ®®, C£ÉéÃµÀuÉ, aAvÀ£É, ZÀAZÉð, DvÀÄÀ«a±À®±Ùð ¨sÉ¼ÀÛ¨sÀÄÁ ¥ÀoÀÀ «µÀAiÀÄÁ£À£ÀÄß ¸ÀéAiÀÄ¥À°æÀ°£ð ¸À¢ÄÄÄÄÀ¸ÁÀÛÀ, ¥Àæ²ß¸ÀÄÀ ªÀÄÄ¢üÉÆÃ¸Á¥À ªÀÄÄÆÆrzÀ NzÀ §gÉÆ, ªÀiÁvÀÄÀUÁjP ªÉÆÃzÆ ÁzÀ PË±À®åªÀ¼À°è G¢ÝÃÄ¤£ÀÄÉÆÃ½¼ÀÀPÉÄ½¼ÀÀÀîªÀ ªÀÄÄÆ®PÀ ¥ÀuÁ¤£ûPÀ, ªÀÁåPÀÛÙvÀ, ¨Ë¢ÞPÀ «PÀ¸À¼ÀÀÁUÀvÀÀÀåzÉ.

Sl. No	Program	Program Code	No of Program specific disciplines with code
1	B.Sc	BSCCBCSYCM	**Optional any one (Nine):** 1(c)Hindi BSCCBCSHINYCM

B.Sc. (Language Course): Ability Enhancement Compulsory Course : Hindi Language

Sl No	Sem	Course	Title of the Paper	Hrs/Week L:T:P	Credits
1	I	AECC	Hindi I : Hindi Gadya aur Grammar	2:1:0	3
2	II	AECC	Hindi II : Hindi Kahanies	2:1:0	3
3	III	AECC	Hindi III: Nataka Sahitya aur Praoyojana mulak Hindi	2:1:0	3
4	IV	AECC	Hindi IV: Hindi Kavya aur Anuvaad	2:1:0	3

I Semester: Title of the paper: Hindi Gadya aur Grammar.

In this paper, students have opportunity to learn Hindi Literature, Short Essays

and ShortArticles etc. and Classic Hindi Grammar.

II Semester: Title of the paper : Hindi Kahanies.

In this paper, students have opportunities to learn Hindi short stories and Grammar.

III Semester: Title of the paper : Nataka Sahitya aur Praoyojana mulak Hindi.

In this paper, students have opportunities to learn Hindi Dramas and Official Language.

IV Semester: Title of the paper : Hindi Kavya aur Anuvaad.

In this paper, students have opportunities to learn hindi Poems and Translation. Hindi Literatureand Understanding social awareness.

We have been creating, learning environment when students have opportunities to improve thislanguage learning.

Sl. No	Program	Program Code	No of Program specific disciplines with code
1	B.Sc	BSCCBCSYCM	**Optional any one (Nine):** 1(d) Sanskrit BSCCBCSSANYCM

Program specific Objectives and outcome:

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Program specific objectives and outcome

Sanskrit is very ancient language in the world. It is Sanskrit because it has Samskaara or culture. Each word of Sanskrit can be derived with Grammatical Rule. This is a Divine Language. This is not a reason to give the importance for Sanskrit. But Sanskrit has everything. It means, Whole ancient Indian literature is kept in Sanskrit Language. Four Vedas named Rugveda, Yajurveda, Saamaveda and Atharvaveda, Four Upavedas named Aayurveda, Dhanurveda, Gaandharvaveda and Arthaveda, Six parts of Veda named Shikshaa, Vyaakarana, Chandas, Nirukta, Jyothishya and Kalpa, Eighteen Puraanas, Twelve Darshanas or Six important Darshanas, Political Science, Law and Punishment, Natya-Shastra means Dance, Drama, Music, Musical Instruments, Shilpa Shastra means any art or craft on wood or stone, Vaastu is Architecture, Ramayana, Mahabharatha and Poetry - these all are composed in Sanskrit. So, Sanskrit is very rich language by it's collection of ancient Indian literature. If anybody likes to know something in ancient Indian literature, he must have the knowledge about Sanskrit language. Translation gives only outlook. Necessity of Sanskrit is everywhere to have great depth or inner mind in related subject. Simply we can say that Yoga, Ayurveda the ancient medical theory, Natya the ancient theory of Music, Dance, Drama, Musical Instruments, all are explained in Sanskrit. So, everybody or every Indian have to study the divine language to enjoy the ancient science of India.

Another derivation can be told that Samskruthi is culture and Samskrutha is

language. The language which has culture is called Sanskrit. So, culture and Sanskrit language, both are faces of a coin. Learning Sanskrit creates good culture and humanity in students. Other advantages of Sanskrit are Good pronunciation, Increase of memory power and Peace of mind. Sanskrit is mother tongue of all Indian languages. This is the reason that learning Sanskrit helps to study any Indian language easily. So, we are requesting all of you to learn Sanskrit to enjoy the great knowledge of ancient India.

B.Sc. (Language Course): Ability Enhancement Compulsory Course: Sanskrit Language

Sl No	Sem	Course	Title of the Paper	Hrs/Week L:T:P	Credits
1	I	AECC	Sanskrit I	2:1:0	3
2	II	AECC	Sanskrit II	2:1:0	3
3	III	AECC	Sanskrit I	2:1:0	3
4	IV	AECC	Sanskrit I	2:1:0	3

Course objectives and outcome:

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Course objectives and outcomes

Prose, Poetry, Drama and Champoo are the most important varieties of Sanskrit Literature. It can be known the Sanskrit Literature easily if these varieties are known by the students. So, four varieties of Sanskrit Literature are kept in this syllabus. Basic level knowledge is given for the students with simple texts in High School and P.U. Level. Now higher level compositions are selected for Degree level classes.

* I Semester: Beginning of the story "kathaamukham" from Kadambari of Bana Bhatta is selected for first semester. Composing the complex sentences, Composing the long compounds and Figures of Speech with rhythm are practiced here.

* II Semester: First Canto from Raghu-Vamsham of Kalidasa is selected as text for second semester. Singing the verses, composing the verses, composing the sentences from verses and Metre of the verses are practiced here.

* III Semester: A Drama Naganandam of Shreeharsha is selected for third semester. Dramahas Verses and Conversations. So, studying a drama improves Communication Skills in Sanskrit language.

* IV Semester: "Champoo" a kind of poetry which is mixed with prose and verses. But Champoo is Extraordinary text, it makes more fluency and beauty (attraction) in the language. So, Champoo is given for last semester (4th semester).

* General (common) Subjects: Forms of the nouns and verbs, Sandhi (conjunction between words), Samasa (Compounds) and Figures of Speech are common in all semesters. It cannot be explained the advantage of each portion of Sanskrit, however the beauty of a hill cannot be pointed at a place. But each part of a hill makes the hill beautiful.

Sl. No	Program	Program Code	No of Program specific disciplines with code	Page No.
1	B.Sc	BSCCBCSYCM	**Optional any one (Nine):** 4(e) Malayalam, BSCCBCSTAMYCM 5(f) Persian, BSCCBCSPERYCM 6(g) Tamil, BSCCBCSARAYCM 7(h)French, BSCCBCSFREYCM 8(i)Arabic, BSCCBCSARAYCM 9(j)Malayalam, BSCCBCSMALYCM This is included as one of the four ability Enhancement compulsory courses	

The objective and outcomes of the above Modern Indian Languages: The above language option is given to students of under graduate to choose the one which they wish to pursue with self study. Hence during the course of self-study, they will build up language skills which will help them as added advantage for their profession to speak local languages with better knowledge of the language.

Sl. No	Program	Program Code	Ability Enhancement Compulsory Course
1	B.Sc	BSCCBCSYCM	1(k) Environmental Studies, BSCCBCSESTYCM

Course Objectives:

- To understand the multidisciplinary nature of natural resources their associated problems.

- To develop the concept of conservation of biodiversity and ecosystems for future generations.

Course Outcome:

- Students will understand the uses and exploitation of various natural resources like forest, water, minerals food and energy, along with case studies to preserve and sustain our environment.

- It will enable them to understand the concept and types of ecosystems.

- Conservation of biodiversity, endangered, endemic species are studied at global, national and local levels.

- Help the students to understand the causes, effects and control measures of various environmental pollution also by taking into account the social issues associated with it.

Sl. No	Program	Program Code	Ability Enhancement Compulsory Course
1	B.Sc	BSCCBCSYCM	**Ability enhancement disciplines** Indian Constitution , BSCCBCSINCYCM

Course Objectives:

- To understand the fundamental rights and duties as being citizen of India

- To know the entire outline of our federal structure

- T develop the belongingness to our country and be patriotic

Course Outcome:

- Students become aware of the fundamental rights and meantime become responsible towards the duties as being citizen of India

- The knowledge of federal structure after completion of the course helps them to know the depth of governing structure of our country which always supports justice to every one equally.

- Our students become patriotic.

Sl. No	Program	Program Code	Skill Enhancement Course
1	B.Sc	BSCCBCSYCM	SEC1/3: Disaster Management, BSCCBCSDSMYCM

Course Outcome:

(i) Course learning outcome:

Know the basic fundamentals of earth science as applied to the interaction between human activityand the natural environment. Understand the occurrence and availability of both surface and subsurface water resources and the role of the hydrologic cycle and pollution. Understand the role of plate tectonics in causing earthquakes and how this understanding can aid the assessment of seismic hazard.

Students will be able to test and evaluate water quality for drinking and agricultural use. They willalso have knowledge about various natural disasters.

Sl. No	Program	Program Code	Skill Enhancement Course
1	B.Sc	BSCCBCSYCM	SEC1/3: Computer Application

Course Objectives:

- To make the students digitally educated

- To make the students technology oriented

Course Outcome:

- Students become equipped with digital knowledge which is the need of the hour.

- This equips the students of all courses in a digital technology driven direction and gives a common platform for all students of our college

Sl. No	Program	Program Code	Skill Enhancement Course
2	B.C.A	BCACBCSYCM	Bachelor of Computer applications

Program specific outcome:

- This is professional course and gives immediate employment to the students

- They become digital technology oriented and are in demand for their service in all sectors

Course details: Discipline Specific Courses:

DSC-1:	Computer Concepts and C Programming	4:0:2
DSC-2:	Fundamentals of Information Technology	4:0:2
DSC-3:	Discrete Transformations	4:2:0
DSC-4:	Data Structures and File Processing	4:0:2
DSC-5:	System software and Operating Systems	4:0:2
DSC-6:	Digital Electronics and Computer Organization	4:2:0
DSC-7:	Object Oriented Programming with Java	4:0:2
DSC-8:	Operation Research	4:2:0
DSC-9:	Accounting	4:0:2
DSC-10:	Database Management Systems	4:0:2
DSC-11:	Numerical and Statistical Analysis	4:0:2
DSC-12:	Data Communication and Computer Networks	4:2:0

List of Electives for both Vth and VIth Semesters:

(Select three of the following electives in **Vth** semester and two of the following electives in **VIth** semester, without repetition.)

Computer Graphics and animation   (L:T:P::4:0)

Software Engineering   (L:T:P::4:2:0)

.NET Programming   (L:T:P::4:2:0)

Software Testing   (L:T:P::4:1:1)

Web Technology   (L:T:P::4:0:2)

Digital Image Processing   (L:T:P::4:0:2)

Network Security   (L: T:P::4:2:0)

Cloud Computing and Big Data Analytics   (L:T:P::4:1:1)

Skill Oriented Course

SEC-1: DTP (Page Maker and CorelDraw)   (L:T:P:1:0:1)

SEC-2: Cyber Security   (L:T:P:1:0:1

SEC-3: Accounting Software (Tally)   (L:T:P:1:0:1)

SEC-4: Android Programming   (L:T:P:1:0:1)

I SEMESTER

COMPUTER CONCEPTS AND C PROGRAMMING
Course Objectives: Students will try to learn
- To make the student learn a programming language.
- To develop logics, this will help them to create programs, applications in C.
- To learn problem solving techniques.
- Also learn the basic programming constructs they can easily switch over to any other language in future.

Course Outcome: Students will be able to
- Analyze a given problem and develop an algorithm to solve the problem
- Improve upon a solution to a problem
- Use the 'C' language constructs in the right way
- Design, develop and test programs written in 'C'
- Use different data types in a computer program.
- Design programs involving decision structures, loops and functions.
- Understand the dynamics of memory by the use of pointers and Structures.

FUNDAMENTALS OF INFORMATION TECHNOLOGY

Course Objectives: Students will try to learn:
- IT in a simple language to all undergraduate students, regardless of their specialization.
- It will help them to pursue specialized programs leading to technical and professional careers and certifications in the IT industry.
- Skills relating to IT basics, computer applications, programming, interactive medias, Internet basics etc.

Course Outcome: Students will be able to:
- Understand basic concepts and terminology of information technology.
- Have a basic understanding of personal computers and their operations.
- Be able to identify issues related to information security.

DISCRETE TRANSFORMATIONS

Course Objectives: Students will try to learn:
- Concepts of mathematical logic for analyzing propositions and proving theorems.
- Use sets for solving applied problems, and use the properties of set operations algebraically.
- Work with relations and investigate their properties.
- Investigate functions as relations and their properties.
- Introduce basic concepts of graphs, digraphs and trees.

Course Outcome: Students will be able to:
- Analyze logical propositions via truth tables.
- Prove mathematical theorems using mathematical induction.
- Understand sets and perform operations and algebra on sets.
- Determine properties of relations identify equivalence and partial order relations, sketch relations.
- Identify functions and determine their properties.
- Define graphs, digraphs and trees, and identify their main properties.
- Evaluate combinations and permutations on sets.

II SEMESTER

DATA STRUCTURES AND FILE PROCESSING

Course Objectives: Students will try to learn:
- Understand and remember algorithms and its analysis procedure.
- Introduce the concept of data structures through ADT including List, Stack, Queues.
- To design and implement various data structure algorithms.
- To introduce various techniques for representation of the data in the real world.
- To develop application using data structure algorithms.
- Compute the complexity of various algorithms.

Course Outcome: Students will able to:
- Select appropriate data structures as applied to specified problem definition.
- Implement operations like searching, insertion, and deletion, traversing mechanism etc. on various data structures.
- Students will be able to implement Linear and Non-Linear data structures.
- Implement appropriate sorting/searching technique for given problem.
- Design advance data structure using Non-Linear data structure.

SYSTEM SOFTWARE AND OPERATING SYSTEMS

Course Objectives: Students will try to learn:
- To understand the main components of an OS & their functions.
- To study the process management and scheduling.
- To understand various issues in Inter Process Communication (IPC) and the role of OS in IPC.
- To understand the concepts and implementation Memory management policies and virtual memory.
- To understand the working of an OS as a resource manager, file system manager, process manager, memory manager and I/O manager and methods used to implement the different parts of OS
- To study the need for special purpose operating system with the advent of new emerging Technologies

Course Outcome: Students will able to:
- Describe the important computer system resources and the role of operating system in their management policies and algorithms.
- Understand the process management policies and scheduling of processes by CPU
- Evaluate the requirement for process synchronization and coordination handled by operating system
- Describe and analyze the memory management and its allocation policies.
- Identify use and evaluate the storage management policies with respect to different storage management technologies. 6. Identify the need to create the special purpose operating system.

DIGITAL ELECTRONICS AND COMPUTER ORGANIZATION

Course Objectives:
- The concept of various components.
- The concepts that underpin the disciplines of analog and digital electronic logic circuits.
- Various Number system and Boolean algebra.
- Design and implementation of combinational circuits.
- Design and implementation of sequential circuits
- To understand the structure, function and characteristics of computer systems.
- To understand the design of the various functional units and components of computers.
- To identify the elements of modern instructions sets and their impact on processor design.
- To explain the function of each element of a memory hierarchy.
- To identify and compare different methods for computer I/O.

Course Outcome: Students will able to:
- Understand the concepts of various components to design stable analog circuits.
- Represent numbers and perform arithmetic operations.
- Minimize the Boolean expression using Boolean algebra and design it using logic gates.
- Analyze and design combinational circuit
- Design and develop sequential circuits.
- Understand the theory and architecture of central processing unit.
- Analyze some of the design issues in terms of speed, technology, cost, performance.
- Design a simple CPU with applying the theory concepts.
- Use appropriate tools to design verify and test the CPU architecture.
- Learn the concepts of parallel processing, pipelining and inter-processor communication.
- Understand the architecture and functionality of central processing unit.
- Exemplify in a better way the I/O and memory organization.
- Define different number systems, binary addition and subtraction, 2's complement representation and operations with this representation.

III SEMESTER
OBJECT ORIENTED PROGRAMMING WITH JAVA

Course Objectives: Students will try to learn:
- To understand how to design, implement, test, debug, and document programs that use basic data types and computation, simple I/O, conditional and control structures, string handling and functions.
- To understand the importance of Classes & objects along with constructors, Arrays and Vectors.
- Discuss the principles of inheritance, interface and packages and demonstrate though problem analysis assignments how they relate to the design of methods, abstract classes and interfaces and packages.
- To understand importance of Multi-threading & different exception handling mechanisms.
- To learn experience of designing, implementing, testing, and debugging graphical user interfaces in Java using applet and AWT that respond to different user events.

Course Outcome: Students will be able to:
- Implement Object Oriented programming concept using basic syntaxes of control
- Structures, strings and function for developing skills of logic building activity.
- Identify classes, objects, members of a class and the relationships among them needed for a finding the solution to specific problem
- Demonstrates how to achieve reusability using inheritance, interfaces and packages and describes faster application development can be achieved.
- Demonstrate understanding and use of different exception handling mechanisms and concept of multithreading for robust faster and efficient application development.
- Identify and describe common abstract user interface components to design GUI in Java using Applet & AWT along with response to events.

OPERATION RESEARCH

Course Objectives: Students will try to learn:
- 1 .To impart knowledge in concepts and tools of Operations Research
- To understand mathematical models used in Operations Research
- To apply these techniques constructively to make effective business decisions

Course Outcome: Students will be able to:
- Identify and develop operational research models from the verbal description of the real system.
- Understand the mathematical tools that are needed to solve optimization problems.
- Use mathematical software to solve the proposed models.
- Develop a report that describes the model and the solving technique, analyse the results and propose recommendations in language understandable to the decision-making processes in Management Engineering.

ACCOUNTING

Course Objectives: Students will try to learn:
- An overview of the process in financial management of the firm
- The concept of accounting and financial management.
- The accounting standards, book keeping and preparation of journal, ledger and trial balance and other accounting related statements.
- Improving students' understanding of the time value of money concept and the role of a financial manager in the current competitive business scenario.
- Will learn accounting through software.

Course Outcome: Students will be able to:
- Understand basic concepts of Accounting.
- Record the transactions in bank reconciliation statement and record transactions through one journal.
- Understand the meaning of depreciation and need for charging depreciation, preparing the final accounts and company's financial statement as per the company's act.
- Knowledge regarding how to create ledgers, journals and balance sheet.

IV SEMESTER

DATABASE MANAGEMENT SYSTEMS
Course Objectives: Students will try to learn:
- To describe a sound introduction to the discipline of database management systems.
- To give a good formal foundation on the relational model of data and usage of Relational Algebra.
- To introduce the concepts of basic SQL as a universal Database language
- To demonstrate the principles behind systematic database design approaches by covering conceptual design, logical design through normalization.

Course Outcome: Students will able to:
- Explain the features of database management systems and Relational database.
- Design conceptual models of a database using ER modeling for real life applications and also construct queries in Relational Algebra.
- Create and populate a RDBMS for a real life application, with constraints and keys, using SQL.
- Retrieve any type of information from a data base by formulating complex queries in SQL.
- Analyze the existing design of a database schema and apply concepts of normalization to design an optimal database.
- Build indexing mechanisms for efficient retrieval of information from a database.

NUMERICAL AND STATISTICAL ANALYSIS

Course Objectives: Students will try to learn:
- To develop the mathematical skills of the students in the areas of numerical methods.
- To teach theory and applications of numerical methods in a large number of engineering subjects which require solutions of linear systems, interpolation
- To lay foundation of computational mathematics for post-graduate courses specialized studies and research.

Course Outcome: On successful completion of the course students will be able to:
- Apply numerical methods to find our solution of algebraic equations using different methods under different conditions, and numerical solution of system of algebraic equations.
- Apply various interpolation methods and finite difference concepts
- Work out numerical differentiation and integration whenever and wherever routine methods are not applicable.
- Work numerically on the ordinary differential equations using different methods through the theory of finite differences

DATA COMMUNICATION AND COMPUTER NETWORKS

Course Objectives: Students will try to learn:
- Study the basic taxonomy and terminology of the computer networking and enumerate the layers of OSI model and TCP/IP model.
- Acquire knowledge of Application layer and Presentation layer paradigms and protocols.
- Study Session layer design issues, Transport layer services, and protocols.
- Gain core knowledge of Network layer routing protocols and IP addressing.
- Study data link layer concepts, design issues, and protocols.
- Read the fundamentals and basics of Physical layer, and will apply them in real time applications.

Course Outcome: Students will able to:

- Describe the functions of each layer in OSI and TCP/IP model.
- Explain the functions of Application layer and Presentation layer paradigms and Protocols.
- Describe the Session layer design issues and Transport layer services.
- Classify the routing protocols and analyze how to assign the IP addresses for the given network.
- Describe the functions of data link layer and explain the protocols.
- Explain the types of transmission media with real time applications

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V and VI SEMESTER

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COMPUTER GRAPHICS AND ANIMATION

Course Objectives: Students will try to learn:
- To introduce the use of the components of a graphics system and become familiar with building approach of graphics system components and algorithms related with them.
- To learn the basic principles of 3- dimensional computer graphics.
- Provide an understanding of how to scan convert the basic geometrical primitives, how to transform the shapes to fit them as per the picture definition.
- Provide an understanding of mapping from a world coordinates to device coordinates, clipping, and projections.
- To be able to discuss the application of computer graphics concepts in the development of computer games, information visualization, and business applications.
- To comprehend and analyze the fundamentals of animation, virtual reality, underlying technologies, principles, and applications.

Course Outcome: Students will able to:
- To list the basic concepts used in computer graphics.
- To implement various algorithms to scan, convert the basic geometrical primitives, transformations, Area filling, clipping.
- To describe the importance of viewing and projections.
- To define the fundamentals of animation, virtual reality and its related technologies.
- To understand a typical graphics pipeline 6. To design an application with the principles of virtual reality

SOFTWARE ENGINEERING
Course Objectives: Students will try to learn:
- Knowledge of basic SW engineering methods and practices, and their appropriate application.
- Describe software engineering layered technology and Process frame work.
- A general understanding of software process models such as the waterfall and evolutionary models.
- Understanding of software requirements and the SRS documents.
- Understanding of the role of project management including planning, scheduling, risk management, etc.
- Describe data models, object models, context models and behavioural models.
- Understanding of different software architectural styles.
- Understanding of software testing approaches such as unit testing and integration testing.
- Describe software measurement and software risks.
- Understanding on quality control and how to ensure good quality software.

Course Outcome: Students will able to:
- Select and implement different software development process models.
- Extract and analyze software requirements specifications for different projects.
- Develop some basic level of software architecture/design.
- Apply standard coding practices.
- Define the basic concepts and importance of Software project management concepts like cost estimation, scheduling and reviewing the progress.
- Identify and implement of the software metrics.
- Apply different testing and debugging techniques and analyzing their effectiveness

.NET PROGRAMMING
Course Objectives: Students will try to learn:
- Microsoft framework architecture
- Development of console application
- Building windows application
- OOPs using C#.NET
- Learn data access mechanism provided .net
- Create and consume libraries
- Create a web application using .net
- Developing the website & application
- Application security
- Dot Net IDE Component Framework.
- Programming concepts in .Net Framework.

Course Outcome: Students will able to:
- Create user interactive web pages using ASP.Net.
- Create simple data binding applications using ADO.Net connectivity.
- Performing Database operations for Windows Form and web applications.

SOFTWARE TESTING
Course Objectives: Students will try to learn:
- Basic software debugging methods.
- White box testing methods and techniques.
- Black Box testing methods and techniques.
- Designing test plans.
- Different testing tools (familiar with open source tools)
- Quality Assurance models.

Course Outcome: Students will able to:
- Investigate the reason for bugs and analyze the principles in software testing to prevent and remove bugs.
- Implement various test processes for quality improvement
- Design test planning.
- Manage the test process
- Apply the software testing techniques in commercial environment
- Use practical knowledge of a variety of ways to test software and an understanding of some of the tradeoffs between testing techniques.

WEB TECHNOLOGY
Course Objectives: Students will try to learn:
- The best technologies for solving web client/server problems
- To analyze and design real time web applications
- To use Java script for dynamic effects and to validate form input entry
- To Analyze to Use appropriate client-side or Server-side applications

Course Outcome: At the end of the course students are able to:
- Choose, understand, and analyze any suitable real time web application.
- Integrate java and server side scripting languages to develop web applications.
- To develop and deploy real time web applications in web servers and in the cloud.
- Extend this knowledge to .Net platforms.

DIGITAL IMAGE PROCESSING
Course Objectives: Students will try to learn:
- To study the image fundamentals and mathematical transforms necessary for image processing.
- To study the image enhancement techniques
- To study image restoration procedures.
- To study the image compression procedures.

Course Outcome: At the end of the course students are able to:
- Review the fundamental concepts of a digital image processing system.
- Analyze images in the frequency domain using various transforms.
- Evaluate the techniques for image enhancement and image restoration.
- Categorize various compression techniques.
- Interpret Image compression standards.
- Interpret image segmentation and representation techniques.

NETWORK SECURITY
Course Objectives: Students will try to learn:
- To know about various encryption techniques.
- To understand the concept of Public key cryptography.
- To study about message authentication and hash functions
- To impart knowledge on Network security
- To be able to secure a message over insecure channel by various means
- To learn about how to maintain the Confidentiality, Integrity and Availability of a data
- To understand various protocols for network security to protect against the threats in the networks.

Course Outcome: At the end of the course students are able to:
- classify the symmetric encryption techniques
- Illustrate various Public key cryptographic techniques
- Evaluate the authentication and hash algorithms.
- Discuss authentication applications
- Summarize the intrusion detection and its solutions to overcome the attacks.
- Basic concepts of system level security

CLOUD COMPUTING AND BIG DATA ANALYTICS
Course Objectives: Students will try to learn:
- To study the basic technologies that forms the foundations of Big Data.
- To study the programming aspects of cloud computing with a view to rapid prototyping of complex applications.
- To understand the specialized aspects of big data including big data application, and big data analytics.
- To study different types Case studies on the current research and applications of the Hadoop and big data in industry

Course Outcome: At the end of the course students are able to:
- Student must be Able to understand the building blocks of Big Data
- Student must be able to articulate the programming aspects of cloud computing(map Reduce etc)
- Student must be able to understand the specialized aspects of big data with the help of different big data applications
- Student must be able to represent the analytical aspects of Big Data
- Student must be know the recent research trends related to Hadoop File System, Map Reduce and Google File System etc

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3	B.B.A	BBABCSYCM	**Bachelor of** Business Administration BBACBCSMANYCM Electives : 1. Marketing Management 2. Human Resource Management 3. Financial management

PROGRAM SPECIFIC OBJECTIVES AND OUTCOME
Elective: Marketing Management: Program specific Objectives:
- To help students to understand the concepts of marketing and its 4 P's. How the 4 P's: product, price, place and promotion decisions affect the success of any business
- To help students to understand the working of rural marketing institutions and to familiarize with the special problems related to sales in rural markets, consumer behavior and consumer satisfaction in rural region
- The purpose of this program is to expose the students different issues concerned with Advertising and Sales
- Provides understanding the management of retail business and supply chain. Provides an insight into customer relationship management and effective retail space management
- Students learn the tools and techniques necessary to effectively manage the sales function of an organization

Elective: Marketing Management: Program specific outcomes:

- Student learns the nature, scope and importance of marketing.

- It helps to understand basic concepts of marketing.

- It develops the basic and essential skills of students related to marketing.

- It improves the ability of the students and creates employability opportunities in marketing which are essential for industries.

- Students get insights into all functional areas of retailing.

- The students also get an insight on consumer behavior and social responsibility of marketing towards business.

- Students will able to Categorize issues in rural markets and Analyze marketing environment, consumer behavior, distribution channels, marketing strategies, etc

- Students will be able to describe different types of advertisement, discuss the ethics in advertisement

- Students will be able to implement the key issues in supply chain management effectively.

Elective: Human Resource Management: Program specific Objectives

- The objective of this course is to acquaint the students with the basics of Human Resource management, its scope and functions

- To understand theoretical foundations of key areas of HRD, importance of HRD, its scope and how it helps in improving the Quality of Work Life of employees in an organization.

- They also get an insight into what if training, development, career development, employee empowerment and related concepts.

- The course helps in understanding performance management techniques, various motivation theories and importance of job evaluation in assessing the relative worth of the job.

- The course helps to give insight with regard to wage and salary administration, various incentive plans, benefits and services, discipline and Industrial relations for a strong & effective workforce through right policies & practices

- Students are exposed to Recruitment and Selection Process though Practice work.

- Students get to understand important legal provisions governing the industrial

Elective: Human Resource Management: Program specific Outcomes

- Students apply motivational theories in their life.

- Students understand the employee contributions and participations in solving any industrial disputes.

- Students will be able to understand the importance of human resources and their effective management in organizations.

- They get an insight into what are human resource planning, job analysis and design, recruitment sources and selection methods, different tests used in selection and the process of interview.

- Enables students to develop integrated view on role of HRD in modern business.

- They develop insight into various HRD programs, to help keep employees empowered.

- They understand the importance of Workers participation in Management, in the form of works committees, Joint Management Councils, worker directors, Co-partnership.

- The students would be able to understand how employees can be managed effectively using motivation techniques.

- They would be able to design jobs and carryout job evaluations

- Helps in Designing and Executing effective Incentive programs and employee management techniques. Students will be able to analyze core and legal issues, policies and practices surrounding employee relations, and the strength of trade union movement in India

Elective: Financial management: Program Specific Objectives
- To acquaint the students with the fundamental aspects of financial management in the business.
- To acquaint the students with the fundamental aspects and the importance of Working Capital Management in business.
- To expose the students with an overview of banks and other financial services companies.

- To acquaint the students with the basics of security Analysis and portfolio management

- Students got knowledge about the interpretation and analysis of financial statements effectively
- Students able to understand long-term and short term financing

- To make Students read and studied about dividend policies

- Students are acquainted with current financial practices

- Students are well acquainted with Financial Markets

Elective: Financial management: Program Specific Outcomes
- Empowers the students with knowledge of financial planning, procurement, investment and distribution of finance in companies.
- Students will learn about the capital structures which is most appropriate for the company and they will be able to calculate cost of various sources of capital.
- They also get an insight into meaning, importance of Capital Budgeting and also learn its techniques.
- Students will be able to determine working capital requirement, optimum inventory level. Enables them to prepare cash budget and estimate the various kinds of leverages.
- Students will be able to evaluate credit policies of the company.

- Students learn about financial services in India as Indian Financial System, Financial Markets, Banking and Insurance Sector in India and Recent Trends in Accounting and Finance.
- Students are acquainted with current financial practices and also acquainted with Financial Markets knowledge.
- Students will be able to; explore different avenues of investment, equipped with the knowledge of security analysis, apply the concept if portfolio management for better investment.
- Students will have the knowledge of analysing market efficiency

COURSE STRUCTURE- BBA

Sl. No.	Subject	COURSES	Credits	L:T:P Pattern	Work
	I Semester				
1.1	Kannada-1/Sanskrit/Urdu/Tamil/ Telugu//Marathi/Hindi	AECC	3	2:1:0	4
1.2	English-1	AECC	3	2:1:0	4
1.3	Financial Accounting -I	DSC-1	5	4:1:0	6
1.4	Principles of Management	DSC-2	4	3:1:0	5
1.5	Business Environment	DSC-3	4	3:1:0	5
1.6	Environmental studies	AECC	3	2:1:0	4
			22		28hrs
	II Semester				
2.1	Kannada-2/Sanskrit/Urdu/Tamil/Telugu/Marathi/Hindi	AECC	3	2:1:0	4
2.2	English-2	AECC	3	2:1:0	4
2.3	Business Decision Theories	DSC-4	4	3:1:0	5
2.4	Management of Services	DSC-5	4	3:1:0	5
2.5	Financial Accounting - II	DSC-6	5	4:1:0	6
2.6	Constitution of India	AECC	3	2:1:0	4
			22		28hrs
	III Semester				
3.1	Kannada-3/Sanskrit/Urdu/Tamil/ Telugu/ /Marathi/Hindi	AECC	3	2:1:0	4
3.2	Business Communication-I(English – 3)	AECC	3	2:1:0	4
3.3	Banking Theory and Practice	DSC-7	4	3;1:0	5
3.4	Financial Accounting-III	DSC-8	5	4:1:0	6
3.5	Cost Accounting	DSC-9	5	4:1:0	6
3.6	Disaster Management	AECC	2	2:0:0	2
			22		26hrs
	IV Semester				
4.1	Kannada-4/Sanskrit/Urdu/Tamil/ Telugu//Marathi/Hindi	AECC	3	2:1:0	4
4.2	Business Communication-II (English – 4)	AECC	3	2:1:0	4
4.3	Quantitative Techniques	DSC-10	5	4:1:0	6
4.4	Commercial Law	DSC-11	4	3:1:0	5

4.5	Organizational Behaviour	DSC-12	4	3:1:0	5	
4.6	Management Accounting	DSC-13	5	4:1:0	6	
			24		30hrs	

	V Semester				
	Financial management		5		
	Management accounting		5		
	Office Administration and Mgt.		4		
	Quantitative Technique		4		
	Taxation – I		5		
	Elective – I-HRM		5		
	Elective – I-FM		5		
	Elective – I-MM		5		

	VI Semester				
	Financial Management – II		5		
	Principles and Practice of Auditing		4		
	Marketing Management		4		
	Taxation – II		5		
	Elective – II-HRM		5		
	Elective – II-FM		5		
	Elective –II-MM		5		
	Entrepreneurship Development		4		

COURSE OBJECTIVES AND OUTCOMES:

I Semester

Course Title: FINANCIAL ACCOUNTING-I

Course code: BBA210

Course Objectives: To provide fundamental accounting knowledge and familiarize basic accounting concepts.

Course Outcome: Show proficiency in basic accounting concepts, conventions and understanding the accounting process. Understand the process and preparation of financial statements for Sole Proprietorship and Company.

Course Title: PRINCIPLES OF MANAGEMENT

Course code: BBA220

Course Objectives: Course familiarizes the students with the basic principles and practices of management

Course Outcome: Students will get familiar with the basic concepts and principles of management, develop leadership skills, learn about business in the light of the environment, learn tools and techniques used in managing organizations.

Course Title: BUSINESS ENVIRONMENT:

Course code: BBA230

Course Objectives: to provide knowledge of the environment in which businesses operates. Provides insightsinto aspects related to economic operations and financial framework.

Course Outcome: students will be able to understand present dynamic world of business by analyzing the strength, weaknesses, opportunities and threats in the light of changing environment

II Semester

Course Title: BUSINESS DECISION THEORIES:

Course code: BBB230

Course Objectives: The purpose of this course is to familiarize the students with the concepts ofEconomics applicable to Business.

Course Outcome: Students will learn how consumers make decision, how firms analyze market demand, how firms analyze their internal costs, how firms interact in different market structures and make price, output decision.

Course Title: MANAGEMENT OF SERVICES
Course code: BBB220

Course Objectives: to study breakthrough services in order to understand the operations of successful service firms that can be bench marks for future management practice.

Course Outcome: provide an understanding of the Indian service sector. To make the students comprehend, the latest offerings and the day to day operations in various service organizations.

Course Title: FINANCIAL ACCOUNTING –II
Course code: BBB210

Course Objectives: To impart knowledge of accounting systems adopted in different Business Organizations, profit and nonprofit organizations. To enable the students to prepare different kinds of financial statements

Course Outcome: Empowers students to understand and prepare joint venture, branch and partnership accounts. It introduces students to various purchasing systems in accounting.

Course Title: BANKING THEORY ANDPRACTICE

Course code: BBC210

Course Objectives: The Objective of this course is to provide a brief idea and framework of Banking law and practices

Course Outcome: Students will be able to understand functions of banking. Describe policy reforms in banking industry. Understand the modern conventions of banking sector.

Course Title: FINANCIAL ACCOUNTING-III

Course code: BBC220

Course Objectives: To provide advanced accounting knowledge and familiarize students in corporate accounting practices.

Course Outcome: Students will be able to account for various adjustments related to share capital. It enables to prepare and understand final accounts of joint stock companies and understand accounting system in corporate sector. Students will be able to understand and prepare accounts for liquidation

COST ACCOUNTING

Course code: BBC230

Course Objectives: The course exposes the students to the Cost Accounting systems adopted in different Manufacturing Organizations. Develop an insight into advanced cost accounting methods and procedures.

Course Outcome: To enable students to conceptualize various methods and techniques of cost accounting and its application. Students will be able to use methods of time keeping and book keeping and will define the terms of variance analysis.

**Course Title: DISASTER
MANAGEMENT**
Course code: BBC150

Course Objectives: to understand approaches to disaster risk reduction and the
relationship between thevulnerability, disaster, disaster management and risk reduction.

Course Outcome: capacity to work theoretically and practically in the process of disaster management and theirinterconnections, particularly in the field of the public health aspects of the disasters.

Semester IV

Course Title: QUANTITATIVE TECHNIQUES
Course code: BBD310

Course Objectives: This course enables the students to gain basic understanding of quantitative techniques and its applicability to business.

Course Outcome: They will develop knowledge to apply basic financial mathematical techniques and Develop problem solving skills. Students enable to demonstrate their competence and confidence in using descriptive statistics and statistical process control.

Course Title: COMMERCIAL LAW Course code: BBD320

Course Objectives: The objective of this paper is to provide as brief idea about legislations of business; Contract Act, Negotiable Instruments Act and Competition Act, Contract of Indemnity and Guarantee, Bailment and Pledge, and Contact of Agency and how it is used in managing various business operations.

Course Outcome: Students will understand the legal aspects while entering into a contract, the meaning and importance of Negotiable Instruments and the legal aspects relating to it and also understand the importance of Competition Act, Contract of Indemnity and Guarantee, Bailment and Pledge, and Contact of Agency and how it can be used in businesses.

Course Title: ORGANISATIONAL BEHAVIOUR
Course code: BBD330

Course Objectives: to understand individual and group behavior in the organization including communication, leadership, power and politics, conflicts and negotiations.

Course Outcome: through this course student will be able to explore various dimensions of individual and group behavior and apply this knowledge in managing human resources effectively. It will provide hands on experience to work on industry assignments and gain practical knowledge

Course Title: MANAGEMENT ACCOUNTING
Course code: BBD340

Course Objectives: This course provides the students an understanding of the application of accounting techniques for management decision making.

Course Outcome: Students will have knowledge of components of costs that constitute business analysis. Students will be able develop an attitude to focus on financial statement users, their information needs, and how financial statement analysis addresses those needs. Students will acquire the basic knowledge required for application of tools for decision making.

Course Title: Financial Management – I

Course Code: BBE010

Course Objectives: To acquaint the students with the fundamental aspects of financial management in the business.

Course Outcome: Empowers the students with knowledge of financial planning, procurement, investment and distribution of finance in companies. Students will learn about the capital structures which is most appropriate for the company and they will be able to calculate cost of various sources of capital. They also get an insight into meaning, importance of Capital Budgeting and also learn its techniques.

Course Title: Management Accounting

Course Code: BBE020

Course Objectives: This course provides the students an understanding of the application of accounting techniques for management decision making.

Course Outcome: Students will have knowledge of components of costs that constitute business analysis. Students will be able develop an attitude to focus on financial statement users, their information needs, and how financial statement analysis addresses those needs. Students will acquire the basic knowledge required for application of tools for decision making.

Course Title: Office Administration and Management

Course Code: BBE030

Course Objectives: This course enables the students to know about the office administration and management which is the part of information management.

Course Outcome: Describe the changing work environment and the skills needed by the administrative assistant to function in such an environment.

Course Title: Quantitative Technique

Course Code: BBE040

Course Objectives: This course enables the students to gain basic understanding of quantitative techniques and its applicability to business.

Course Outcome: They will develop knowledge to apply basic financial mathematical techniques and Develop problem solving skills. Students enable to demonstrate their competence and confidence in using descriptive statistics and statistical process control.

Course Title: TAXATION – I

Course Code: BBE050

Course Objectives: This course enables the students to know the basics of Income Tax and its Implications.

Course Outcome: Students will be able to define the procedure of direct tax assessment, file IT returnon individual basis, compute total income and define tax complicacies, differentiate between direct and indirect tax assessment and they will understand the various deductions to be made from gross total income..

Course Title: Elective 1-MM- Marketing Research

Course Code: BBE150

Course Objectives: To introduce students to the research methods in business marketing and also providesexperience in designing questionnaire and statistical analysis.

Course Outcome: Enables students to understand the role of business research in decision making. Learn different kinds of research design, primary scales of measurement, sampling techniques andmethods for analysis of data. Students will be able to carry out a simple sample survey, analyze the results and present the findings

Course Title: Elective 1- HRM- Principles And Practice Of Human Resource Management
Course Code: BBE120

Course Objectives: The objective of this course is to acquaint the students with the basics of HumanResource management, its scope and functions

Course Outcome: Students will be able to understand the importance of human resources and their effective management in organizations. They get an insight into what is human resource planning, job analysis and design, recruitment sources and selection methods, different tests used in selection and the process of interview

Course Title: Elective 1- FM- INDIAN CAPITAL MARKET

Course Code: BBE150
Course Objectives: This course aims at acquainting the students with the working of financial markets inIndia.

Course Outcome: Students learn about financial services in India as Indian Financial System, Financial Markets, Banking and Insurance Sector in India and Recent Trends in Accounting and Finance, Students are acquainted with current financial practices and also acquainted with Financial Markets knowledge.

<div align="center">VI Semester</div>

Course Title: Financial Management – II

Course Code: BBF

Course Objectives: To acquaint the students with the fundamental aspects and the importance ofWorking Capital Management in business.

Course Outcome: Students will be able to determine working capital requirement, optimum inventory level. Enables them to prepare cash budget and estimate the various kinds of leverages. Students will be able to evaluate credit policies of the company.

Course Title: Principles and Practice of Auditing

Course Code: BBF010

Course Objectives: This course provides the students an understanding of the application of Verificationtechniques for finding the integrity of accounting transactions

Course Outcome: helps to understand the auditing environment in the corporate entities and studentswill understand roles and responsibilities of auditor

Course Title: Marketing Management

Course Code: BBF020

Course Objectives: The objective of this course is to help students to understand the concepts of marketing and its 4 P's. How the 4 P's: product, price, place and promotion decisions affect the success of any business

Course Outcome: On successful completion of the course, students will be able to: have an in depth understanding of the marketing concepts, and how strategies with regard to the 4 P's have to be effectively designed and managed. The students also get an insight on consumer behavior and social responsibility of marketing towards business.

Course Title: Taxation – II

Course Code: BBF040

Course Objectives: The course provides basic ideas about Tax law concerning Business organizations.

Course Outcome: Enables students to define the procedure of direct tax assessment. They will understand the concept of recovery and refund of tax. Students will define tax complicacies and structure and aware about IT authorities and their powers and appeal & revision, tax penalties, offences and prosecutions.

Course Title: Elective II- HRM- Industrial Relations

Course Code: BBF120

Course Objectives: The course helps to give insight with regard to wage and salary administration, various incentive plans, benefits and services, discipline and Industrial relations for a strong & effective workforce through right policies & practices

Course Outcome: Helps in Designing and Executing effective Incentive programs and employee management techniques. Students will be able to analyze core and legal issues, policies and practices surrounding employee relations, and the strength of trade union movement in India

Course Title: Elective II- MM-Advertisement and Sales Management
Course Code: BBF130

Course Objectives: The purpose of this course is of expose the students different issues concerned withAdvertising and Sales.

Course Outcome: Students will be able to describe different types of advertisement, discuss the ethics in advertisement, identify and make decisions regarding the most feasible advertising appeal and media mix, describe different types of sales persons and explain the steps involved in sales force management.

Course Title: Elective II- FM-Security Analysis and Portfolio Management

Course Code: BBF230

Course Objectives: The objective of this course is to acquaint the students with the basics of security Analysis and portfolio management

Course Outcome: Students will be able to; explore different avenues of investment, equipped with the knowledge of security analysis, apply the concept if portfolio management for better investment and students will have the knowledge of analysing market efficiency Analysis and portfolio management

Course Title: Entrepreneurship Development

Course Code: BBF220

Course Objectives: This course will enable students to develop an understanding of entrepreneurship and small business management. The course would give an insight about the importance of small business for economic development, the support available to small business from Government. Develops entrepreneurial skill and motivates them to become entrepreneurs.

Course Outcome: The students should be able to develop an understanding about entrepreneurship and small business and appreciate their role in an economy, particularly in the FSM economy. Develop and demonstrate competence in basic business and marketing planning and in identifying opportunities and challenges of small business entrepreneurs

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