



**J.S.S Banashankari Arts, Commerce and
Shantikumar Gubbi Science College,
Vidyagiri, Dharwad-580 004
Karnataka**

**UG & PG
PROGRAMME OUTCOMES,
PROGRAMME SPECIFIC OUTCOMES
&
COURSE OUTCOMES**

**FOR THE YEAR
2019-2020**

UG SECTION

ABILITY ENHANCEMENT COMPULSORY COURSE- (AECC):

CLASS	COURSE/PAPER	COURSE OBJECTIVES	COURSE LEARNING OUTCOMES
B.A., B.Com. & B. Sc.I Semester (CBCS- AECC) wef 2020-21	ENVIRONMENTAL STUDIES – (ES)	<p>1.This paper intends to build conceptual understanding of students by enlightening them to the basic principles behind various environmental processes. Environmental studies are the study of human interaction with the environment and in the interests of solving complex problems.</p> <p>2. To gain an understanding of the concepts fundamental to environmental science.</p> <p>3. To understand the complexity of ecosystems and possibly how to sustain them.</p> <p>4. To understand major environmental problems including their causes and consequences.</p> <p>5. To understand current and controversial environmental issues and possible solutions to environmental problems and their pros and cons.</p>	<p>1. Understand the scope and need for public awareness about multidisciplinary nature of Environmental studies.</p> <p>2. Ability to describe the structure and functions of ecosystems and energy flow in these. Demonstrate the ability to analyze and recognize the interrelationships in a food chain and a food web.</p> <p>3. Enable to understand the forest, water, mineral and renewable non renewable energy resources.</p> <p>4. Able to understand the biodiversity and its conservation. Threats to biodiversity.</p> <p>5. Enable to understand the causes , effects and control measures with one case study for air pollution, water pollution, soil pollution, noise pollution, radioactive pollution</p>

<p>B.A., B.Com. & B. Sc.II Semester (CBCS- AECC) wef 2020-21</p>	<p>INDIAN CONSTITUTION- (IC)</p>	<p>This course acquaints students with the constitutional design of Structures and democratic institutions, and their actual working over time. This course aims at enabling the students to understand constitutional history- along with the major provisions enumerated in the Constitution of India.</p>	<ol style="list-style-type: none"> 1. Understand the Constitutional History of India, Nature and Composition of Constituent Assembly. The Preamble and Its Philosophy, Salient features of the Constitution. Citizenship and method of Amendment of the Constitution. 2. Able to understand Fundamental Rights and Fundamental Duties. Directive Principles of State Policy & etc. 3. Enable to understand about State, Union & local Government, Composition, Powers and Functions of Speaker, President, Prime Minister and Council of Ministers & election system, etc. 4. Students come to know the Administration as well as judiciary system, Composition, Powers and Functions of High court and Supreme court.
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B.A., & B. Sc.III Semester	PERSONALITY DEVELOPMENT AND COMMUNICATION SKILL- (PDCS)	I-Meaning, Definition and Importance of Personality Development	Students will come to know about importance of personality development in their life.
		SECTION-B-Theories of Personality	Through various theories of personality students understand intricacies of personality.
		II-Determinants of Personality	In this chapter students will understand what are the factors which make or break the personality.
		III-The Self Concept	Students will understand skills of building Self.
		IV-Communication and its Importance	Students come to know about skills of communication.
		V-Leadership as a Process	Students learn about leadership qualities.
B.A., & B. Sc.IV Semester	COMPUTER APPLICATION	<p>The emphasis in computer science courses, in outcome-based curriculum framework, help students learn solving problems, accomplishing IT tasks, and expressing creativity, both individually and collaboratively. The proposed framework</p>	<ol style="list-style-type: none"> 1. Characteristics of computers-basic applications of computer-generations of computers-central processing unit-input/output devices-memory. 2. Concepts of data processing-definition of information and data-basic data types-storage of information and data as files. 3. Introduction to operating system-definitions and

		<p>will help Students learn programming techniques and the syntax of one or more programming languages.</p>	<p>functions-basic components of windows copying and moving files and folders.</p> <p>4. An introduction to word processing and ms-word-working with documents, using tables, pictures and charts-macros.</p> <p>5. An introduction to spread sheets and ms-Excel-working with spread sheets, using tables, pictures and charts-macros and inbuilt functions.</p> <p>6. An introduction to ms-Access-working with tables and queries.</p> <p>7.An introduction to web page design using HTML.</p>
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KANNADA

COURSE OUTCOMES

Kannada literature has around 2000 years of antiquity. Kannada literature teaches the culture, values, and People's lives of Kannada naadu. This language is an illusion of knowledge. Kannada is the pioneer of religion and the epitome of literature. Kannada is the embodiment of internal and external purification. It makes the perfect personality of human being.

It has been doing Knowledge evolution and intellectual development of modern life. It is a good source of knowledge for competitive exams. There is a plenty of opportunities for the students of Kannada language and literature in the filled of educational sector, mass media and communication, print media, film industry, anchoring field, research institution, dram and theater field and also in several areas. It is thus recognizable of the outcome of Kannada literature curriculum.

B.A- I Semester [both basic and optional]

1. Pracheena Kannada Sahitya Mattu Kavya

- The course enables the student to understand the whole Ancient Kannada Literature and also help to understand Sanskrit, Prakrut, and Pali Literaturere.
- It trains the students effectively in the learning process of Kannada Language and Literature.
- It enables students to understand the origin of Kannada Ancient Literature, its development and its themes.
- It enables the students to study about influence and support towards Kannada Literature.
- It enables the students to study about the early period poets such as Adi Kavi Pampa, Ponna & Ranna.

B.A- II Semester [Both Basic and Optional]

1 Madhyakaleena kannada Literature helps the students about Vachana Sahitya.

- The history of kannada sahitya owned its position in Medival Kannada Literature.
- There is a number of varieties like Vachana Sahitya, Keertana Sahitya, Shatpadi & Ragale Roopugalu in kannada literature.

- The reason of Medieval Kannada Literature is to understand the students about the properties of Medieval Kannada literature like Social Equality, Devotion, Religious, Atma Jnyna, Shoonya Sampadane, Truth, Pavitrata, Literary Values.
- It enriches the influence and support about Raghavanka's Harishchandra Kavya. The importance about this is "Truth is God and God is Truth"

B.A-III Semester[Both Basic and Optional]

1 Aaru Atma Kathagala Aayda Bhagagalu

- It enables to study about the important writers like D.Javaregouda, R.C.Hiremath, S.J.Nagalothimath, B.Jayashree, P.Lankesh, & G.S.Shiddalingayya amongst the students.
- It helps the students to study the life of S.J.Nagalothimath who grown from poerty and became doctor, writer and served for society.
- It helps the students to understand to achieve something in life with the reference to the G.S.Shiddalingayya, P.Lankesh, & B.Jayashree.
- It enables the students to study about the considerable Jnyanapeetha Awardee Kuvempu's life history, works, & Literary Achievements.
- There is a learnability for students about racial discrimination, social inequality & poor with reference to the drama Beralge Koral by Kuvempu and it enables to study the characters of drama Ekalavya and Dronacharya.

B.A- IV Semester[Both Basic and Optional]

Kannada Grammar and Sarasammana Samadhi - Novel

- It helps the learners to understand the history, evolution, literary movement & Development of literary forms in kannada literature to persistent the Ethical Values of life.
- It orients & enhances the knowledge about the basic language the grammar the bridge course sessions are conducted by the language department.
- It develops the interpersonal and communication skills
- It imports & motivate the learners to understand there State Language easily and with confidence enabling for better communication skills.
- There is a enablity for students to study the Shivram Karant's novel 'Sarasammana Samadhi'
- It helps the students to study about Ancient Kannada Literature, Bharatiya Kavya Meemamse, and the grammar topic such as Chandassu and Alankaargalu.

B.A- V Semester[Both Basic And Optional]

1. Vaicharika Sahitya Hagu Kathana Kavanagalu

- It enables the students to study about Prof. Keertinath Kurkoti's 'Sahityadalli Vaicharikathe', Gopala Krishna Adiga's 'Swatantrada Hasivu'
- It also enables to study about ideological literature like Chandra Shekhar Kambar's 'Moukhika Parampare Mattu Sahitya', Devnur Mahadev's 'Antaralla Mattu Adara Bagge Vivechane'.
- It enables to study about "Hosagannada Sahitya Aarambha, Prerane Prabhava"
- It explains the "Dalita Mattu Bandaya Sahitya"
- It helps to study about "Navya Sahitya and Pragatisheela Chaluvalli".

B.A- VI Semester[Both Basic And Optional]

1. Halagannada Vyakarana mattu Bhasha Vignana

- Bharatiya Vyakara Shastra has its own position in Kesharaja's Shabdhamani Darpana which is a great work in kannada.
- It helps the students to study about the prnini's grammar epic Ashtadyadi by reference with Kesharaja & other notable Scholars.
- It enables to live & understand the life in society and it provides degree to lead a dignified life for the students.
- It helps to face and prepare for the competitive exams for successive life for the students.
- it helps the students to understand that how the language helps as a tool for knowledgeable life.

B.Sc- I Semester MIL[Kannada]

Vijnyan Savahan mattu Adhunik Kannada Kavya

- This course helps to study about Science & Technology.
- Science is the centre of world's development.
- Science is the strength for improvement mankind and uses its all knowledge. Science is a essential part of life.
- Invention and Research are focused for better human life.
- Truth is the important and main aim of science.
- The course helps to understand the all above theme.

B.Sc- II Semester MIL[Kannada]

Parisar Sahitya Mttu Kadambari

- This course helps the students to study about the Nature and Environment.
- The environment is the system of living and non-living things.
- Environmental Novels are in Kannada literature.
- Poornacchandra Tejaswi's Karvalo is one of the best novel
- The main target of this course is the study of environmental and Pollution.

B.Sc- III Semester MIL[Kannada]

Chintan Sahitya Sankalan Mattu Yayati - Naatak

- it enables the students to study about literature of thought B.G.L Swami's 'Anehalladalli Hudugiyaru' and K.S.Ahmed's 'Sarabagin Soutu'.
- Prof.Baragur Ramachandrappa's 'Maanviyate Onde Anisike' is a study of humanity well known thinker.
- The study of human life style was done by Dr.Sudha Murthy & Nemichandra.
- Yayati is a well known drama done by Girish Karnad is the symbol of love and jealous.
- It helps the students to study that how the Literary Thoughts & Dramas help as tool for knowledgeable life.

B.Sc- IV Semester MIL[Kannada]

Chintan Sahitya Sankalan Mattu bili Saheban Bharat

- The course is designed to provide students about Ancient Kannada Literature and its effected from Sanskrit,Prakrut ,Pali Literature.
- It trains the students effectively in the learning process of Kannada Language and Literature.
- It enables the students to study about Vachana Sahitya.
- It helps to study the Jim Karbet's Prevention of forests,Animals lovely hood nature and other good characteristics.
- It helps to study the Jim Karbet's biography "Bili Sahebana Bharata".

B.Com- I Semester MIL[Kannada]

Vinijya Savahan Mattu aadhunik Kannada Kavya

- This course helps the students to study about communicative language and Mordern Kannadab Property.
- As a person grow his communication skills also start developing. There are so many varieties for communication skills.
- It helps to understand commercial communicative scope and values.
- This course helps to understand the importance and its outcomes of communication and modern Kannada Poetry.
- There are various types of Poetry provided in modern Kannada Literature.

B.Com- II Semester MIL[Kannada]

Parisar Sahitya Mattu Kadambari

- this course helps to study the students about commerce & Environ mental Literature.
- System of living and non-living things is called Environment.
- Devnur Mahadev's 'Kusumabale' is one of the Environmental Novels in Kannada Literature.
- It teaches how to live has described in novel like language, style, techniques, themes, characters.
- The course helps to understand all above main course.

B.Com- III Semester MIL[Kannada]

Lalita Prabhand sampad Mattu Vanijya Kannada

- The course is designed to provide the students bout commerce and Environmental Literature.
- It helps to understand Elegant Essay Literature like R.Y.Dharwarkar, Giraddi Govindaraj & Gorur Ramaswamy Ayangar.
- It helps to study how to lead a Elegant Life.
- Commercial letters like Enquiry letters, Orders Letters, Verification Letters, Reply Letters and Circular Letters writing.

B.Com- IV Semester MIL[Kannada]

Lalita Prabhand sampad Madi Madidavaru, Novel

- The course is designed to provide the students about commerce and Environmental Literature.
- The course helps to understand Elegant Essay Literature & writers.
- Novels & Elegant Essay tells us how to lead a valuable life.
- The course helps to understand the freedom of nation & its importance.
- Commercial letters like Enquiry Letters, Order Letters, Verification Letters, and Reply Letters, Circular Letter writing.

DEPARTMENT OF ENGLISH

Class	Course	Course Learning Outcome
B.A I (CBCS)	Basic English (AECC) Shalmala: An Anthology of Poetry and Prose.	CO1. This paper aims at introducing English poetry and prose to develop reading and Comprehension skills. CO2. It teaches them the basics of communicative English.
B.A II (CBCS)	Text Book: Shalmala: An Anthology of Poetry and Prose.	CO1. This course introduces students, the various genres of literature besides basic grammar competency. CO2. It facilitates LSRW skills.
BA III	Drama : Chandrashekhara Kambar's Sirisampige (Any edition, 1991) II. Grammar and Composition: cloze test, pair of words, interpretation of notices and instructions and letter to the officials on public issues, précis writing.	CO1. Literature enables them to recognise and study the literary works which are imbued with cultural, historical and generic context. CO2. Students will be familiar with articulation and spoken English with good pronunciation besides it enhances their vocabulary.
B.A IV	I. R K Narayan's Man Eater of Malgudi. II Grammar and Composition. Framing of WH questions, use of affixes, Transformation of sentences,	CO1. Pupils are provided knowledge about literature of Indian society in addition to this, students will be acquainted with Advance English grammar.

	comprehension of a passage, paragraph writing and job application	
B.A V	That Long Silence - Shashi Deshpande Grammar Idiom and phrases, press reports, copy writing for advertisements and expansion of ideas etc.	CO1. Through this novel students come to know the pathetic condition of Indian woman. It is the reflection of sufferings of an Indian woman in the family and society. It even speaks about the feminism. CO2. All these concepts facilitate students to develop their critical bent of mind and drive them as masters of English language.
B.A VI	Portraits in Prose- An anthology of biographical sketches. Grammar and Composition	CO1. Students are exposed to different personalities and their achievements such as Leo Tolstoy, Mahatma Gandhi, Rabindranath Tagore, Mother Theresa, Vinobha etc. CO2. All such biographies enable students to learn and acquire their good qualities. These biographies become role models to students. It inspires them to work hard and contribute to the English literature. CO3. Grammar which moulds students into a competitive and assist them to absorb the knowledge in the subject.
B.A I Optional English (CBCS)	1. History of English Literature (Elizabethan age to the Age of Milton 1557- 1660) 2. Bacon's Essays	Students will be acquainted with Chaucer, Spenser, Shakespeare Milton, Dryden and their literary outputs. Besides socio political movements of respective ages are understood. Students can understand various literary forms with their application and examples in literature.

	<p>3. Drama: As You Like It</p> <p>4. Literary Forms</p>	<p>Students are driven to read the plays of Shakespeare.</p> <p>Students are capable to appreciate the poems with different perspectives and figures of speech. They can critically analyse in accordance with socio political background.</p>
B.A II Optional English (CBCS)	<p>1. History of English Literature (1660 to 1798)</p> <p>2. Literary Forms Satire, novel, essay, mock epic</p> <p>3. Drama: She Stoops to Conquer</p> <p>4. Phonetics Transcription and Stress Pattern.</p>	<p>Students are acquainted with ascending of Charles II in 1660 followed by the age of Dryden, comedy of manners, age of transition and features and major writers of Romantic age and neo classical age.</p> <p>Students will be familiar with literary genres and their importance.</p> <p>Students are given appropriate practices of stressing the words with correct syllables and stress.</p>
B.A III Optional English	<p>I. The History of English Literature Romantic Period and Victorian Period (1798-1900)</p> <p>II. The Select Poems from the Romantic and Victorian Periods</p> <p>III. Charles Dickens' Hard Times</p> <p>IV: Literary Forms:</p> <p>V: Brief notes on Figures of Speech</p>	<p>CO1. Demonstrate a broad understanding of literature in English and translation and appreciates the role that historical context plays in the creation and interpretation of literary works.</p> <p>CO2. Engage questions of justice, value, spirituality and meaning raised by literary texts.</p> <p>CO3. Read closely, analyse, interpret and produce texts in variety of formats and genres.</p> <p>CO4. Draw from different critical perspective and appreciate how differences in theoretical framework can produce multiple readings of a text.</p>

		<p>CO5. Draw effectively from craft principles in more than one genre in order to create a variety of creative pieces.</p> <p>CO6. Analyse the role that intersections among race, gender , class , sexuality or national or global history play in literary studies.</p> <p>CO7. Write and speak effectively for specific audience and purpose in university, public and professional life.</p> <p>CO8. For Literature: Conduct scholarly inquiry to produce literary research.</p> <p>CO9. For Creative Writing: Demonstrate the professional habits of creative writers, revision, workshops , public reading and submission for publication.</p>
B.A IV	<p>I. The History of English Literature: The Modern Age (the 20th century)</p> <p>Topics:</p> <p>Movements in 20th Century Poetry</p> <p>Trends in 20th century novel</p> <p>Schools of Drama in 20th century</p> <p>The 20th Century Prose</p> <p>II. The Select Poems</p> <p>III. A Play from the Modern Age</p> <p>J. M. Barry’s Admirable</p>	<p>CO1. Students come to know about the Modern age and characteristics of the age.</p> <p>CO2.Students are exposed to the various poems of this age.</p> <p>CO3.The poetry section will make students to understand about various poems of different writers.</p> <p>CO4.Students will be benefitted of literary forms and terms.</p>

	<p>Crichton</p> <p>IV. Literary Forms</p> <p>V. Literary Terms</p>	
<p>B.A V Optional English (Paper 1)</p>	<p>LITERARY CRITICISM.</p>	<p>CO1. Students are exposed to the nature, concept and types of criticisms. They are even made familiar with the topics such as REALISM, ROMANTICISM, FORMALISM, SUBLIME, MARXIST CRITICISM, IMAGINATION, IMITATION FEMINISM, ECOCRITICISM etc. All these topics are studied in depth by the students and they gain the world wide knowledge about the different criticisms and their usages and they even understand the application of these concepts in their future professional life.</p>
<p>B.A V Optional English (Paper 2)</p>	<p>History of Indian English Literature.</p> <p>Train to Pakistan by Khushwant Singh</p> <p>A Bouquet of Indian Poetry</p> <p>The 4th section is regarding the brief notes of books written by greatest talents of India such as ABDUL KALAM, TAGORE etc...</p>	<p>CO1. Students study the contributions of Indian poets, novelists, and prose writers of pre and post-independence.</p> <p>CO2. Through this novel student recap the history of partition of India and Pakistan in 1947.</p> <p>CO3. Students have an opportunity to read and enjoy the variety of poems by various famous poets of India.</p> <p>CO4. These topics enable students to realise the importance of Indian literature and make them feel proud of their land and its culture and literature.</p>
<p>B.A VI Optional English</p>	<p>Rise and Growth of English Language</p>	<p>CO1. Students will understand the rise and growth of English language.</p>

(Paper 1)	<p>English as a Global Language.</p> <p>English Vocabulary</p> <p>Bible Translation</p> <p>Spoken English.</p> <p>English in India.</p> <p>English Speaking Skills.</p>	<p>CO2. The second section speaks about the general characteristics of English and students understand the importance and role of English language.</p> <p>CO3. Students here understand the influences of Greek, Latin and French on the English language.</p> <p>CO4. This section deals with the contributions of Bible translators, Shakespeare and Milton and it enables students to read thoroughly and learn the contributions of these personalities to modern English.</p> <p>CO5. Students study the stress and intonations and are exposed to terms such as syllable, stress, falling and rising tone etc. which help them gain confidence while communicating.</p> <p>CO6. Students are exposed to theories, concepts, and development of English during the colonial and post- colonial period.</p> <p>CO7. Even students are made to understand the teaching skills and learning difficulties of English as a second language.</p> <p>CO8. These concepts are very much helpful for students while communicating and expressing their ideas and when they are working in any profession or while dealing with the people in society. Here students study introducing one and others, telephone skills, interview skills, public speaking skills and</p>
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		presentation skills etc. All these are the fundamental concepts which are essential for the students who are making their career successful.
B.A VI Optional English (Paper 2)	World Classics Things Fall Apart by Chinua Achebe Antigone by Sophocles On Poets and Poetry by T.S. Eliot. BRIEF NOTES ON CLASSICS.	CO1. Through this novel, students understand the culture of Africa and social conditions prevailed in those countries. Colonialism and its adverse effects. Superiority of English, Racism etc. all these are heart touching themes in this novel. CO2. It's the tragic play written in the year 441 BCE. Students through this play come across certain themes such as pride, position of women, the threat of tyranny etc. CO3. He speaks about what is Classic? This enables students to learn in depth about the concept called Classic and Eliot's views on features of classic art and literature. CO4. Hence, students are benefited immensely through this syllabus and gain in depth knowledge of each and every element related to English literature and make their life fruitful.
B.A I Additional English (CBCS)	Text Book : Life and Learning, III Grammar and Composition	CO1. This paper introduces English poetry and prose to develop reading and comprehension skills. CO2. It teaches them the basics of communicative English.

B.A II Additional English (CBCS)	I.Text Book: Seven One-Act Plays. II. Grammar and Composition	CO1. Learn different short stories of various famous writers and acquaint with society and literature of that age. CO2. Learning advance language skills. CO3. Enhance vocabulary.
B.A III Additional English	I Novel: E M Forster's A Passage to India. II Grammar and Composition:	CO1. Students understand the Indian society, people and governance during British rule in India. CO2.Students will learn to use language creativity and critically.
B.A IV Additional English	I Short Stories: Let's Go Home and other Stories. II Grammar and Composition.	CO1. Learning of all these stories will help student to acquire knowledge of people and society presented in the stories. CO2.Emphasise Advance English communication and Creativity through language.
B.COM I Basic English (CBCS)	Text Book: Life and Learning. III Grammar and Composition	CO1. The paper introduces English Poetry and Prose to develop reading skills CO2. It teaches the learners basics of English Grammar
B.COM II Basic English (CBCS)	Text Book: Life and Learning. III Grammar and Composition	CO1. This paper introduces English poetry and prose to develop reading and comprehension skills. CO2. It teaches them the basics of communicative English.
B.COM I Additional	I. Text Book: Selected Essays	CO1. Learning of all these stories will help student to acquire knowledge of different

English (CBCS)	II. Grammar and Composition	people and society presented in the stories CO2. Advance English communication. CO3. Creative through language.
B.COM II Additional English (CBCS)	I Text Book – The Curtain II. Grammar and Composition:	CO1. To help learners use English language for contemporary academic and social needs. CO2. Students develop all the four language skills which will enhance their communication abilities taking support from literary text.
B.Sc I Basic English (CBCS)	Text Book: Timeless Wisdom III Grammar and Composition	CO1. To help learners use English language for contemporary academic and social needs. CO2. Students develop all the four language skills which will enhance their communication abilities taking support from literary text.
B.Sc II Basic English (CBCS)	Text Book: Timeless Wisdom, III Grammar and Composition	CO1. To help learners use English language for contemporary academic and social needs. CO2. Students develop all the four language skills which will enhance their communication abilities taking support from literary text.
B.Sc III Basic English	I. Rabindranath Tagore’s Chitra II. Grammar and Composition.	CO1. To help learners use English language for contemporary academic and social needs. CO2. Students inculcate all the four language skills which will enhance their communication abilities taking support from literary text.
B.IV Basic English	I. R K Narayan’s The Vendor of Sweets. II Grammar and Composition	CO1. Students learn about Indian writer R.K.Narayan’s novel The Vendor of the Sweets. In this novel CO2. R.K.Narayan described Indian society.

		CO3. In grammar section students build creativity through language.
B.Sc I Additional English (CBCS)	On The Stage –One Act Plays Grammar and Composition	CO1. Through these one act plays students understood chaos of modern life, romance of young and old age people, using tricks in relations and hardships of fisher community. CO1. In this section students learnt different language skills like writing slogans, headlines and report. Students also learnt skimming and scanning of paragraphs.
B.Sc II Additional English (CBCS)	I. Text Book – Twelve Short Stories II. Grammar and Composition	CO1. Students will assimilate various stories written by well-known writers. CO2. Students will imbibe language skills like reading, writing and speaking.
B.Sc III Additional English	I Novel: Mulk Raj Anand’s Untouchable II Grammar and Composition:	CO1. In Untouchable novel, students will learn about practice of untouchability, casteism and pathetic life of marginalised people in India. CO2. In grammar and composition, students learn writing skills.
B.Sc. IV Additional English	I Short Stories Popular Short Stories II Grammar and Composition.	CO1. Students are acquainted with short stories of different writers. CO2. Grammar and Composition will enhance the language skills.

HINDI MIL

Course Outcome

Hindi MIL Outcome for Semester

Course : B.A. - I SEM

पाठ्य क्रम : १) कहानी संकलन - कथा कमल
२) सामान्य निबंध और अनुवाद

- ❖ हिन्दी भाषा तथा हिन्दी साहित्य के विविध प्रकारों को परिचय के साथ-साथ बहुचर्चित कहानी विधा की जानकारी ।
- ❖ पारिवारिक संबंध जैसे माता-पिता आदि संबंधों का महत्व समझाया जायेगा, धार्मिक सहिष्णुता आदि की आवश्यकता भी समझायी जायेगी ।
- ❖ कार्यालयीन भाषा का परिचय करवाया जायेगा ।
- ❖ जीवन में मानवीय मूल्यों की अनिवार्यता सभी को है इसका परिचय होगा ।
- ❖ अनुवाद की आवश्यकता और उसके महत्व के बारे में बताया जायेगा ।
- ❖ वैचारिक क्षमता और हिन्दी भाषा पर प्रभुत्व होगा ।

Hindi MIL Outcome for Semester

Course : B.A. - II SEM

पाठ्य क्रम : १) आधुनिक कविता सरिता
२) हिन्दी व्याकरण

- ❖ नयी कविता की जानकारी के साथ साथ हिन्दी के सुप्रसिद्ध कवियों का परिचय होगा ।
- ❖ मानव जीवन में अनुराग, करुणा, विश्वास, आपसी समझदारी आदि जीवन की बुनियाद रही है इसे बताना ।
- ❖ मनुष्य जीवन में निसर्ग हमेशा प्रेरणा स्रोत रहा है ।
- ❖ हिन्दी व्याकरण का परिचय कराना ।

**Hindi MIL Outcome for Semester
Course : B.A. - III SEM**

पाठ्य क्रम : १) बकरी (नाटक) - सर्वेश्वर दयाल सक्सेना
२) सामान्य निबंध

- ❖ हिन्दी नाटक प्राचीन विधा रही है इसकी जानकारी ।
- ❖ हिन्दी नाटक साहित्य में रंग मंच की आवश्यकता के बारे में जानकारी
- ❖ भारतीय ग्रामीण जनता में गाँधीजी के प्रति श्रद्धा, और उनके सिद्धांतों के प्रभाव की जानकारी होगी ।
- ❖ प्रजातंत्र व्यवस्था में सामान्य आदमी के महत्व को समझाना
- ❖ नये नेताओं द्वारा गांधीजी के तत्वों का राजनीतिकरण किस प्रकार हो रहा है उससे परिचित कराना ।
- ❖ नेताओं द्वारा आम जनता, भोली भाली ग्रामीण जनता का किस प्रकार शोषण किया जाता है इसे बताना ।
- ❖ निबंध लेखन के जरिये हिन्दी भाषा, तथा सो में बदलाव लाना ।

**Hindi MIL Outcome for Semester
Course : B.A. - IV SEM**

पाठ्य क्रम : १) गद्य धारा – संपादक - सुरेश
२) अनुवाद

- ❖ हिन्दी गद्य के विविध विधाओं की जानकारी ।
- ❖ संस्मरण, रेखाचित्र आदि के जरिये प्रसिद्ध व्यक्तियों का परिचय ।
- ❖ लेखन शैली की जानकारी ।
- ❖ अनुवाद की आवश्यकता और महत्व को बताना
- ❖ आधुनिक हिन्दी गद्य लेखन में आये बदलाव के बारे में जानकारी ।

Hindi MIL Outcome for Semester
Course : B.A. - V Semester

पाठ्य क्रम : १) उपन्यास : रूकोगी नहीं राधिका – उषा प्रियंवदा
२) सामान्य निबंध

- ❖ हिन्दी उपन्यास तथा उपन्यासकारों की जानकारी ।
- ❖ महिला उपन्यासकार भी उपन्यास कार्य के द्वारा साहित्य को अपना विशेष योगदान दे रही है। इसकी जानकारी विदेश में स्थित भारतीयों की जीवन शैली तथा उनके जीवन मूल्य आदि के बीच चल रहे संघर्ष से अवगत कराना ।
- ❖ अधुनिक शिक्षित नारी तथा उसकी स्वतंत्र सोच के परिणाम स्वरूप उत्पन्न संघर्ष से परिचित कराना।
- ❖ नारीवाद पर लिखे जा रहे उपन्यास की जानकारी निबंध लेखन के जरिये विचार शक्ति के साथ-साथ भाषा में प्रगती होगी ।

Hindi MIL Outcome for Semester
Course : B.A. - VI SEM

पाठ्य क्रम : १) स्मृति की रेखाएँ – महादेवी वर्मा
२) अनुवाद

- ❖ हिन्दी गद्य साहित्य में रेखाचित्र विधा का परिचय ।
- ❖ संपर्क में आये जनसामान्य का जीवन परिचय ।
- ❖ रेखाचित्र शैली का परिचय ।
- ❖ आधुनिक जीवन शैली में अनुवाद की अनिवार्यता और उसके महत्व के बारे में बताया जायेगा ।
- ❖ सुप्रसिद्ध ज्ञानपीठ पुरस्कार से पुरस्कृत कवयित्री महादेवी वर्मा जी एक सक्षम कविता लेखन के साथ-साथ गद्य लेखन में भी माहिर है इसकी जानकारी ।

Hindi MIL Outcome for Semester
Course : B.Sc. - I SEM

पाठ्य क्रम : १) गद्य प्रभा – डॉ. शालीनी श्रीवास्तव
२) अनुवाद

- ❖ हिन्दी गद्य साहित्य की विविध विधाओं की जानकारी खगोल शास्त्र की जानकारी के द्वारा उसकी विस्मयता के बारे में परिचय।
- ❖ मनुष्य के लिए शारिरीक स्वास्थ्य के साथ-साथ मनुष्यता की भी अनिवार्यता होती है इससे परिचित करवाना ।
- ❖ भारत भूमि ऐतिहासिक और सांस्कृतिक धरोहर रही है जानकारी ।
- ❖ अनेक भाषाओं को हिन्दी अनुवाद के जरिये अवगत कराया जा सकता है ।
- ❖ हिन्दी भाषा और लेखन शैली में प्रगती ।

Hindi MIL Outcome for Semester
Course : B.Sc. - II SEM

पाठ्य क्रम : १) एकांकी सप्तक – चंपा श्रीवास्तव, प्रो. राजेन्द्र कुमार
२) निबंध

- ❖ हिन्दी दृश्य काव्य परिचय
- ❖ जनप्रिय एकांकी विधा की जानकारी
- ❖ एकांकी के द्वारा भारतीय समाज, इतिहास, पुराण आदि का परिचय ।
- ❖ एकांकी तत्व के जरिये लेखन शैली का परिचय ।
- ❖ एकांकी की रचना अधिकतर दर्शनीय होने के कारण रंगमंच की रचना अधिकतर दर्शनीय होने के कारन रंग मंच जरूरी होता है उसका परिचय ।
- ❖ लेखन शैली में योग्य विचारों के प्रस्तुती करण का महत्व

Hindi MIL Outcome for Semester
Course : B.Sc. - III SEM

पाठ्य क्रम : १) कहानी संकलन : आठ अच्छी कहानियाँ – सं. मार्कण्डेय
२) अनुवाद

- ❖ हिन्दी गद्य साहित्य में कहानी विधा की जानकारी ।
- ❖ मनुष्य जीवन में हर एक के प्रति प्रेम अत्यंत आवश्यक होता है उसकी जानकारी ।
- ❖ हिन्दी के सुप्रसिद्ध कहानिकारों का परिचय ।
- ❖ अनेक परिस्थितियों से अवगत कराना ।
- ❖ अनुवाद की अनिवार्यता और उसके महत्व को बताना ।

Hindi MIL Outcome for Semester
Course : B.Sc. - IV SEM

पाठ्य क्रम : १) काव्य कलश (कविता संग्रह) – डॉ. विकल गौतम
२) निबंध

- ❖ हिन्दी नयी कविता की जानकारी ।
- ❖ पद्य रचना शैली के बारे में बताना ।
- ❖ मानव जीवन में प्रेम, सौंदर्य तथा प्रकृति का महत्व बताना ।
- ❖ मनुष्य के लिए प्रकृति हमेशा प्रेरणा स्रोत रही है, बताना ।
- ❖ मनुष्य के लिए प्रकृति वरदान है, बताना ।
- ❖ निबंध लेखन द्वारा विचारों के प्रस्तुतीकरण को सक्षम बनाना ।

Hindi MIL Outcome for Semester
Course : B. Com. - I SEM

पाठ्य क्रम : १) गद्य प्रवाह (आधुनिक गद्य संग्रह)
२) अनुवाद और वाणिज्य पत्राचार

- ❖ हिन्दी गद्य की अनेक विधाओं की जानकारी
- ❖ वाणिज्य पत्र का महत्व और आवश्यकता
- ❖ संपर्क भाषा हिन्दी इसका परिचय ।
- ❖ भारतीय भाषाओं में अनुवाद की अनिवार्यता और उसके महत्व के बारे में बताना ।
- ❖ कार्यालय भाषा हिन्दी के बारे में बताना ।
- ❖ प्रेम, मानवीय मूल्य, व्यवसाय आदि के बारे में बताना ।

Hindi MIL Outcome for Semester
Course : B. Com. - II SEM

पाठ्य क्रम : १) कव्य रत्न (आधुनिक काव्य संग्रह)
२) वाणिज्य निबंध और संक्षिप्तिकरण

- ❖ हिन्दी आधुनिक काव्य के बारे में बताना ।
- ❖ हिन्दी के प्रसिद्ध नये कवियों का परिचय ।
- ❖ मानव जीवन में श्रद्धा, विश्वास, प्रेम, समझदारी आदि अहम भूमिका निभाते हैं इसकी जानकारी ।
- ❖ वाणिज्य निबंध लेखन की जानकारी तथा उसकी अनिवार्यता को बताना ।
- ❖ आधुनिक व्यस्त जीवन में संक्षिप्तिकरण अहम भूमिका निभाती है बताना ।

Arts Stream

Department of Economics

B A Economics

Programme Outcome:

The principal aims of objectives of the BA Economics programme are:

- ❖ To offer an opportunity to the students a well-defined education in Economics;
- ❖ To make available planned curricula which support the academic development of students;
- ❖ To provide and adapt curricula that prepares our graduates for employment and further study as economists
- ❖ To provide the students with the prospect to pursue courses that emphasizes quantitative and theoretical aspects of Economics.
- ❖ To provide students with the opportunity to focus on application of economic theories in policy issues.
- ❖ To provide an opportunity to the students to choose from a wide range of economic specialization;
- ❖ To provide a well-resourced learning environment for Economics.

Programme Specific Outcome:

The studies of Economics in specific programme outcomes are as follow,

Economics is one of the important subjects in social sciences. The study of economics helps the students to understand the basic economic concepts like micro, macroeconomic theories and policy implications. Economics looks at production, consumption, distribution, investments, taxation and how people spend and save money etc,. Economics is the study of how societies, governments, businesses, households, and individuals allocate their scarce resources. Study of economics has two important features. First, it develops conceptual models of behavior to predict responses to changes in policy and market conditions. Second, it uses rigorous statistical analysis to investigate these changes. Economists are well known for advising the government on economic issues and formulating policies. Economics also contribute to the development of many other public policies including health care, welfare, minimum wage polices, public distribution scheme, school reform and efforts to reduce inequality, pollution and crime. The study of economics can also provide valuable knowledge for making decisions in everyday life. The complementary study

of econometrics, the primary quantitative method used in the discipline, enables students to become critical consumers of statistically based arguments about numerous public and private issues rather than passive recipients unable to sift through the statistics.

Course Outcome:

B.A.I Semester:

Micro Economics

The students will understand the concepts and definitions of microeconomics and their approaches to solving the economic problems. It also helps to understand the consumers' behavior in relations in decision making and equilibrium of consumption, demand and supply. Students also learn the concepts of costs and revenue functions and curves. The equilibrium of price and output under perfect, monopoly monopolistic and oligopoly markets are providing market structure and price and output determination. How the factor prices are determined to achieving social welfare with theoretical aspect is also studied.

B.A.II Semester

Macro Economics:

The main objective of the study of this paper is to understand about macro economic analysis to solving countries economic problems. The various definitions, concepts, measurements and problems of National Income give the picture of the strength of the country's economy. Determine the employment various theories are studied like classical, Keynesian etc,. How the output and national income determined with the effects of multiplier and accelerators are also studied. The business cycle theories give fluctuations in prices with inflation and deflation.

B.A.III Semester

Mathematics and Statistics for Economics

The objectives of this paper are to explain the basic methods of data analysis in Economics using mathematical and statistical tools/models. Use of Mathematics tools like Ratios, Proportions, Variables, Constants, Parameters, Equation and Identities are important for further study of economics. The functional relations, price and output determination with demand and supply are studied in this paper. Statistical tools like data analysis, frequencies tabulations are studied to understand further measurement of central tendencies. Application of Mean, Median, Mode, Range, Quartile Deviation, Mean Deviation, Standard Deviation, and Coefficient of variations, Correlation and Regression analysis are important to further study of economic data.

B.A.IV Semester

Monetary Economics

The study of this paper put light on working of the monetary system of the country. The meanings of money, definition, functions with its components are studied to get idea of the evolution of money. In the approaches of money three important theories are studied like Fisher's Cash Transaction Approach, Cambridge Cash Balance Approach and Keynesian Liquidity Preference Approach. To understand money market and capital markets various features are studied with their instruments. The functioning of SEBI its working with Sensex and Nifty are also studied. To know the banking in the country various commercial banks and central banks are studied with their definitions, functions, multiple credit creation of the commercial banks and qualitative and quantitative credit control measures of central bank.

B.A.V Semester

Indian Economy (Compulsory Paper):

The main aim of this paper is to understand difference between growth and development and its indicator with HDI. The importance of resources like land, water, air, mineral and precious resources are the strength for the economic development. The study of human resource its growth, causes and effects of population explosion provides strength and weakness of the Indian Economy. To know about the status of poverty and unemployment, its extent and various measures by the government is essential to the students. Students are also provide the information to analyze the problems of Indian agriculture, productivity and production of agricultural product, the causes for low productivity and production various measures undertaken by the government to improve the agricultural productivity like introduction of land reforms, agricultural markets etc.

B.A. V Semester:

Paper 5.1: Public Economics (Elective/Optional Paper)

The main objectives of this paper are to acquaint the students with the concept and definition of public and private fiancé and goods, principle of maximum social advantage theory while imposing taxes and expenditure. Public fiancé is studied under five heads mainly public revenue including source of taxation like direct and indirect taxation, its cannons and recent modification GST. In second part students will learn on public expenditure, types, causes for growth in public expenditure and effects on the economy. Under third section public debt, its types, burden of public debt, causes for growth and redemption of public debt. In forth division budget

will be analyze with its definition, types, deficit budget its tools. In the last section it familiarizes fiscal policy regarding centre state distribution of tax resources.

Paper 5.2: Environment Economics (Elective/Optional Paper)

The objectives of this paper are to enable the student to understand the importance of environment its types and resource conservation. To identify the causes of various types of pollutions and reflect upon what needs to be done to promote sustainable development is the main focus of this paper.

Paper 5.3: Demography (Elective/Optional Paper)

The main aims of this paper are to facilitate the student with theories of population studies, demographic transition, various sources of demographic data, indicators of demography, population growth and its impact, remedies to control, migration and population policy. The same are studied in relation to Karnataka.

Paper 5.4: Financial Institutions and Markets (Elective/Optional Paper)

The objectives of this paper are to understand the financial systems, operation of primary and secondary markets, objectives and functions of various financial institutions in India and international financial markets and their operations.

Paper 5.5: Rural Development (Elective/Optional Paper)

The objectives of this paper is to understand the basics of rural development, including characteristics, problems, theories and programmes of rural redevelopment and to study the poverty and unemployment, trends and patterns of economic diversification in rural areas; to study the role of infrastructural facilities in rural development and rural credit and agriculture markets in India.

Paper 5.6: Entrepreneurship Development

This paper aims at making the students understand entrepreneurship and its benefits, to inculcate the characteristics of an entrepreneur, to make the students aware of the latest developments in the field of entrepreneurs, to make the student familiar with the industries and enable the students to prepare a project.

Paper 5.7: Economics of Tourism

The objectives of the paper are to examine the importance of tourism in national economy, economics of tourism, economics impact of tourists, tourism marketing and tourism planning and policy for sustainable tourism development.

Paper 5.8: Agriculture Economics (Elective / Optional Paper)

The objectives of this paper are equip students to understand different farming systems, role of agriculture economic development, to understand the progress, problems and prospects of Indian agriculture in the global environment, problems of agriculture marketing and remedial measures and to know the sources of credit and deployment credit for development of agriculture in India.

Sixth Semester

Paper 6: Indian Economy- II (Compulsory)

The objectives of this are to analyze the structure and condition of Indian Industries and development types of industries, to examine the various problems of industrial labour their disputes and settlement, to know about the performance of Indian banking sector from class banking to mass banking, to understand the structure of India's foreign trade, composition, volume and value of trade, to examine the trends and patterns of public expenditure and revenue of Central Government and recent budget analysis.

Paper 6.1: International Economics (Elective/Optional Paper)

The objective of this paper is to make possible the students to understand theories of international trade comparative cost theory and modern theory, role of WTO in foreign trade, balance of payment and determination of foreign exchange rate, foreign investment, Make in India v/s Made in India and institution promoting international trade and investment, and have a look on new international economic order, SAARC and BRICS.

Paper 6.2: Karnataka Economy (Elective/Optional Paper)

The objectives of this paper to understand the structural changes, sectoral aspects and features of the Karnataka Economy since the formation of the state, demographic features of Karnataka, development of agriculture, industry and service sectors, and Karnataka state finances.

Paper 6.3: Human Resource Management (Elective/Optional Paper)

The Objectives of this paper are to enable the Students to understand thoroughly the theories of human resource planning and management and to familiarize the students about the vital aspects of HRM.

Paper 6.4: Basic Econometrics (Elective/Optional Paper)

The objectives of the paper are to acquaint the students with basic concepts of statistics, mathematics, and importance of econometrics in economics, methodology of econometrics, formulation of hypotheses and testing, regression model and its applications in economics.

Paper 6.5: Industrial Economics (Elective/Optional Paper)

The objectives of this paper are to understand the various problems confronting the entrepreneurs in the process of industrialization, to study the significance of industrialization for a developing country for its survival in the highly challenging, complicated and dynamic competitive economic systems; and to examine the impact of rationalization in the process of development and expansion of major and small-scale industries.

Paper 6.6: Research Methodology (Elective/Optional Paper)

The objectives of this paper are to impart basic knowledge for identification of research issues, formulation of objectives, hypotheses, sampling techniques, data collection, analysis and interpretation skills and to develop original thinking and writing skills of the students

Paper 6.7: Development Economics (Elective/Optional Paper)

The Objectives of this paper are to provide the students with the essential tools and concepts of development economics, general theories of economic growth and development, problems of economics development and to prepare them to understand what helps development to succeed.

Paper 6.8: Co-operative Management (Elective/Optional Paper)

The objectives of this paper are to enable the students to understand the ethics and philosophy of co-operation, co-operative movement in India, co-operative management and non-credit co-operatives.

B.Com Course

B. Com I Semester

Managerial Economics – I

The course is designed to provide the students with the knowledge of meaning of economics, theory of consumers Behavior, demand & supply, elasticity of demand and supply its measurement. This paper is also enabling to students to know about various cost concepts and production functions. AFC, AVC, TC, MC, TR, AR. MR. etc are studied under this paper

B.Com II

Managerial Economics -II

The students are allowed to understanding of economic concepts and their applications in the functioning of managerial entity. Meaning of the markets, types, determination of price & output relationship in the perfect, monopoly, monopolistic and oligopoly markets, general equilibrium & welfare economics concepts used by individual economical activity in the world, individual businesses ideas in the market filed & difference between the production & cost prices techniques, & to understand the difference in the marketing strategies as dedicated by products, etc.

B.Com III

Monetary Economics

The study of this paper put light on working of the monetary system of the country. The meanings of money, definition, functions with its components are studied to get idea of the evolution of money. In the approaches of money three important theories are studied like Fisher's Cash Transaction Approach, Cambridge Cash Balance Approach and Keynesian Liquidity Preference Approach. To understand money market and capital markets various features are studied with their instruments. The functioning of SEBI its working with Sensex and Nifty are also studied. To know the banking in the country various commercial banks and central banks are studied with their definitions, functions, multiple credit creation of the commercial banks and qualitative and quantitative credit control measures of central bank.

B.Com IV

International Economics

The student will be able to understand the theories of international trade, role of WTO in foreign trade, balance of payment, balance of trade and determination of foreign exchange rate, foreign investment, Make in India v/s Made in India and institution promoting international trade and investment. GATT, IMF, IBRD, ADB, etc.,

B. Com V

Indian Economy

The main aim of this paper is to understand difference between growth and development and its indicator with HDI. The importance of resources like land, water, air, mineral and precious resources are the strength for the economic development. The study of human resource its growth, causes and effects of population explosion provides strength and weakness of the Indian Economy. To know about the status of poverty and unemployment, its extent and various measures by the government is essential to the students. Students are also provide the information to analyze the problems of Indian agriculture, productivity and production of agricultural product, the causes for low productivity and production various measures undertaken by the government to improve the agricultural productivity like introduction of land reforms, agricultural markets etc.

B.Com VI

Industrial Economics

The student will be able to understand the various problems confronting the entrepreneurs in the process of industrialization, the importance of industrialization and problems of small, medium and large scale industries, to study the significance of industrialization for a developing country for its survival in the highly challenging, complicated and dynamic competitive economic systems; and to examine the impact of rationalization in the process of development and expansion of major and small-scale industries.

Academic year 2020-21

From this academic year CBCS model of curriculum has been introduced for I and II semester of BA and B.COM courses.

BA Economics (CBCS)

I Semester: Principles of Micro Economics

Course Code: DSC-1A-Econ

The objective of this paper is to understand the economic behavior of consumers and producers. It put light on selection of commodities, to fulfill the utility through the law of diminishing marginal utility ,law of equi-marginal utility, consumer surplus and indifference curve techniques. It also gives an idea of demand and supply with elasticity in determination of price and output. The paper also puts the light on production, cost and revenue functions. The v various, market structures like perfect, monopoly, monopolistic and oligopoly competition are understood in

relation to determination of price and output. The factor pricing and theory of distribution is also studied in this paper.

B. Com Economics (CBCS)

GE -1A Business Economics I

The paper intended to familiarize the students with understanding of economic concepts and their application in functioning of business. In this paper students learn meaning, definition, nature, scope and objectives of business economics. The demand and supply determinants are also discussed in detail. Under production and cost analysis, Cobb-Douglas production function, law of variable proportions, laws of returns to scale etc. are studied. In case of cost the various types of cost like TFC, TVC, TC, AFC, AVC, AC and MC are studied during long and short run.

Dept of Geography

Course outcome:

CBCS Syllabus introduced in 2020-21

BA I Semester – Theory

Title: Physical Geography

- They will understand the origin of the Earth through the theories propounded by different scholars.
- Students learn the structure and composition of the atmosphere. This will help them to analyze the weather conditions of a region.
- The Winds chapter gives an idea of role of winds on the monsoon system and in turn on economy.
- They will understand the different types of rainfall and at the same time distribution of rainfall in different parts of the country.
- The study of Oceans gives knowledge about relief of ocean floor, distribution of temperature and salinity of ocean water.
- They will understand the components of the ocean water like temperature and salinity.
- They will understand the formation of rocks along with the process of weathering

BA I semester (Practical)-

Scales and maps

- Students will learn the importance of scales and maps in their daily life.
- They will learn the metric system properly for the sake of converting the scales from one method to another.
- Students will be able to enlarge and reduce the maps after learning the enlargement and reduction of maps.
- They will realize the importance of maps and scales.
- Maps and scales are universally accepted as the tools for study.

BA II semester

Theory- Human Geography

- They will learn the importance of human geography, which gives the proper knowledge about different races of the world.
- Students will understand the growth and distribution of population.

- They will understand the social, cultural and political life of the tribes across the world, even the political, economical and social life of tribes in India such as Todas and Bills will be understood through many available sources.
- They will understand the literacy rate of the world.
- They will realize the different patterns of settlements in the world and difference between urban and rural settlements, even students will understand the present problems of rural as well as urban settlements.

BA II Semester: Practical

Interpretation of Indian daily weather maps reports.

- Students will learn how to represent the data through diagrams like line graphs, bar graphs, etc.
- They will learn the method of representing data through dot maps and other maps, these maps will be helpful for the representation of population distribution, crop distribution etc.
- They will learn the uses of thermometer.
- Students will learn the weather conditions of different parts of the country, along with this they will be able to interpret the given weather maps.

BA III semester

Theory- Regional geography of Karnataka

- Students will get the knowledge about the geographical location, size and extent of Karnataka state.
- They will know the physical features, rivers, soils and natural vegetation of Karnataka state
- They will learn the geographical requirements, production and distribution of some major crops of Karnataka state.
- They will understand the different methods of irrigation practiced and will get some ideas about the river valley projects.
- Students will learn the importance of tourism and impacts of tourism on economic development. They will get more knowledge about the various tourist centres.
- Students will be able to understand the sea trade of Karnataka state.

BA III semester (Practical)

Interpretation of IMD weather maps and weather instruments

- Students will get to know different weather instruments used to measure weather elements. They will understand the importance of thermometer, wind vane and other instruments.
- Students will learn the weather conditions of different parts of the country along with this they will be able to interpret the given weather maps.

BA IV semester

Theory-Regional Geography of India

- Students will learn the various physiographic divisions of the country.
- They will learn the growth and distribution of population in India even they realize the problems associated with overpopulation.
- Students will learn transport system of the country along with its present situations.
- Many river projects such as Damodar valley projects, Hirakud project and many other projects will be learnt through this syllabus.
- It throws light on the water disputes between the states in India.
- It throws light on production and distribution of various crops.
- It gives knowledge of various minerals available in country and their quantity.
- It gives knowledge of various industries established in the country and their production.

BA IV semester (Practical)

Interpretation of SOI Topographical Maps

- They will learn the different physical features of the places/regions with the help of Toposheets.
- Toposheets will help us to interpret the various physical aspects as well as manmade features on the land.
- They will be more useful for the planners.

BA V semester

Theory paper-I Evolution of Geographical Thought

- It is useful for the students to understand the contribution of different thinkers to the field of geography.
- Important writings related to geography and how it is helped to the growth of discipline.

Theory Paper II

Human and Economic Geography of the World

- They will understand the various physiographic divisions of the world.
- It is useful to know the production and distribution of various major crops of the world.
- They will understand the production and distribution of various minerals and along with that they will understand the major industries of the world.
- Students will learn the different races of the world.

Practical paper 1 –

Map Projections

- All map projections are useful to understand the earth in different directions.
- They will learn how to transform the graticule of latitude and longitudes on plain paper

Practical paper-II

Statistical diagrams and Basic statistics

- They will learn how to represent this geographical data with the help of diagrams.
- It will be more useful for the students to learn application of statistical methods in geography.
- They will realize the significance of representation of geographical data through diagrams and they will learn how to construct diagrams.

BA VI Semester

Theory –I Environmental Geography

- They will learn interrelationship between man and environment.
- It throws light on the environmental issues and remedial measures.
- Students will realise the Endangered and Endemic Species of India and Their present condition along with that they will become aware of protection of all the endangered species.
- It throws light on Ozone layer depletion and alerts the student community.
- Students will understand that what their role on the protection of the nature was.
- It makes the students more responsible persons in the field of competitive field.
- Many geographers have contributed to the field of research and science.

BA VI Semester

Paper II: Agriculture and Rural Geography

- They will clearly understand the green revolution and its impact on our agricultural system.
- Students will understand the major agro-climatic regions of the country.
- Information regarding the functions of NREGA has been given.
- It will help the students to understand the objects of the programme.
- Nature and characteristics will be understood with the help of this syllabus.
- They will understand the importance of agricultural India.

Practical 1- Computer Application and GIS

- They will understand basic concepts of computer and its use in Geography.
- They will understand how to create MS Word, MS excel and MS PowerPoint.
- Students will understand the importance of Geographic Information System.

Practical 2- Field Work and Project Report

- They will understand the method of collecting the data by direct or indirect methods
- Students will learn certain innovative ideas of collecting information.
- Students will learn the method of preparing project report for selected problems.

DEPARTMENT OF POLITICAL SCIENCE

CLASS	COURSE /PAPER	COURSE OBJECTIVE	CORSE LEARNING OUTCOME
BA I SEM. (CBCS)	BASIC CONCEPT OF POLITICAL THEORY	This is understanding to the students with the basic of equality , liberty , freedom, sovereignty, and democracy in feature level perspectives to the students community to face the real fact situations and make them fit to in global citizens.	To increase understanding of the political science discipline ITS principal theoretical frameworks and applications and methods of inquiry its major subfields of study and its interrelationships with the other social science fields.
BA II SEM. (CBCS)	WESTREN POLITICAL THOUGHT	This subject is to provide various ideas about ,education ,justice, political thoughts, types of government and political ideology.	To increase knowledge of the history of classical and modern political thought, of the fundamental values and ethical issues contested in politics over time, of alternative moral and ethical framework for interpreting and evaluating contemporary political discourses.

BA III SEM.	INDIAN POLITICAL THOUGHT	This concept deals with the political , economic and social reformers and their hard work to the society and country.	To enlighten the society about their rights, equality, and respect the others.
BA IV SEM.	COMPARATIVE GOVERNMENT AND POLITICS	This provides to the comparison of governments ,power ,functions of legislature , executive and judiciary. And also educated them to value oriented citizens and systems.	To increase recognition of the major problem, the leading policies and the legal issues confronting contemporary political system, particularly an the USA & UK.
BA V SEM. PAPER 1	PUBLIC ADMINISTRATION	Students will be able to lead and manage in public governance solve problems ,make decisions synthesize and apply a public service perspectives.	Research and write a decision memo for a public maker. Use the internet to develop a profile of a government bureau and agency. Identify & describe the major theories of public organizations and bureaucratic behavior.
BA V SEM. PAPER II	INTERNATIONAL ORGANIZATION	To allow a better understanding of the structure of international relations. To provide a general understanding of the major international organization with particular emphasis of	To increase knowledge of diverse political system around the world, including empirical area based knowledge.

		operation. To promote future study of the European union and the united nations.	
BA VI SEM. PAPER I	INTERNATIONAL RELATIONS	Bring research skills to bear on a specific issue related to international affairs, producing a research paper , personal reflection, active citizenship and demonstrate an on going interest in national and global politics.	To increase knowledge of diverse political system around the world ,including empirical area based knowledge ,broader theoretical understanding of different political system , institution and process the changing domestic and global context within which they operate.
BA VI SEM. PAPER 2	POLITICAL PROCESS AND INSTITUTION IN INDIA	Participate as a civically engaged member of society analyses political and policy problems and formulate policy options use electronic and traditional library resources to research key local, state, national and international policy issues and present results.	Indian political system formulation of policy , election system, political party , federal system, bicameral system

DEPARTMENT OF SOCIOLOGY (UG)

YEAR 2019-20

Programme Outcome

PO1: The objective of the department is to educate students of sociology in both theoretical and practical field. As sociology is a multidisciplinary subject which helps students to pursue higher studies and research.

PO2: The purpose of the department is to provide high quality learning among students so that they can actively engage in academic and other curricular activities.

PO3: Sociology students can get knowledge by studying various courses papers which would eventually help them to utilize subject oriented skills in their future higher studies and research.

PO4: Sociology learners gain knowledge about Western and Indian sociology and its utilization in the study of society and community as a whole.

PO5: The study of sociology provides ample of employment opportunities to students in field of medicine and health, industries, corporate sector, educational field, agriculture and economy, rural and urban sector etc.

PROGRAMME SPECIFIC OUTCOMES

The completion of Under-graduate programme in sociology will eventually help the students to build up their career in diverse fields.

PSO1: Provides basic knowledge to students in the subject of sociology mainly to understand about society in general.

PSO2: Delivering effective knowledge to students in the core area of sociology to understand about theoretical and field approach in the subject.

PSO3: Facilitating sociology students to gain ample of knowledge and apply specific subject skills which would help them to pursue research and other academic activities.

PO4: Students can fulfill their academic needs and progress towards employment and other opportunities.

PO5: The subject itself helps the students to mould their personality and be responsible citizens of the society.

Class	Course/Paper	Course Learning Outcomes
B.A I Semester (CBCS) wef 2020-21	DSC -1 A Introduction to Sociology	<p>CO1: Provides a basic framework to students regarding study of sociology as it is as multidisciplinary branch in social sciences.</p> <p>CO2: Sociological perspectives give in-depth knowledge to learners essential for stability and continuity of society.</p> <p>CO3: Basic concepts of sociology provide an ideology to learners to understand about society.</p> <p>CO4: Learners also study socialization through basic agencies called “social institutions”.</p> <p>CO5: Learners take a note that society, culture and civilization goes hand in hand as stability and continuity of civilization depends on culture.</p>
B.A II Semester (CBCS) wef 2020-21	DSC -1 B Social Institutions and Change	<p>CO1: Provides an insight to learners to understand about social institutions for continuity of any society where members look forward to fulfill their desires/ needs.</p> <p>CO2: The course paper provides an in-depth knowledge to its learners regarding emergence of social groups in the society</p> <p>CO3: The study of mobility is a change in social status relative to one’s current social location within a given society.</p>

		<p>CO4: To understand about formal and informal agencies of social control being active in society to direct societal activities carried on by its members.</p> <p>CO5: Learners take a note that social change and globalization represent an idea that changes involves alteration of social order in society.</p>
B.AIII Semester	Study of Indian Social Thought	<p>CO1: Provides a comprehensive study about social thought which is an idea rose from a common person, philosopher, writer, poet, scholar, educationist, politician, social reformer as well as sociologists.</p> <p>CO2: Learners also understand about Indian sociologists and their contributions to sociology</p> <p>CO3: The course also elaborates about well known social reformers and their contribution to society.</p> <p>CO4: Learners understand that traditional ideologies protect ethical values of Indian society</p> <p>CO5: Learners pick out that great Indian social reformers are remembered today for what they have done in the form of precious remarkable gift to the people of Indian society.</p>
B.AIV Semester	Study of Western Social Thought	<p>CO1: The course provides an inclusive study to its learners about western sociologists and their contribution to sociology.</p>

		<p>CO2: Learners also understand about study of social facts and evolution in society.</p> <p>CO3: The course also elaborates about well known western sociologists and their sociological theories applicable to study of society.</p> <p>CO4: Learners understand sociology need valid theories to genuinely prove about social events and happenings in society.</p> <p>CO5: All these western sociological theories provide an insight to its learners that different sociological phenomenon emerge with respect to changing society.</p>
B.AV Semester	Paper 1- Study of Indian Society	<p>Paper 1</p> <p>CO1: The paper itself throws light on the study of philosophical basis of Indian society in which learners study about sociological study in which sociologists have critically responded to challenges of study of Indian society using diverse perspectives, approaches and paradigms.</p> <p>CO2: Learners attempt to see the sights about recent changes caused in social system with reverence to changing society in order to meet the necessities of people by upgrading new values; where old values seems to be faded to a certain extent.</p> <p>CO3: Learners understand about marginal communities in India need special attention and should be given rights and facilities in all fields with the effort of both Central and State government and improve their living.</p>

	<p>Paper 2 - Rural Development in India</p>	<p>CO4: Learners get to know about caste system in India and caste is only ascribed identity, not as a complete social form regulating its control on people in all aspects.</p> <p>CO5: Learners understand that village studies have enriched the knowledge of Indian society in general and rural India in particular by providing knowledge about growth of rural society and Indian social reality.</p> <p>Paper 2</p> <p>CO1: Learners also sought to know about the magnitude of rural study, rural problems and villages as backbone of India's economy.</p> <p>CO2: Learners gain knowledge by studying green revolution which enhanced India's agricultural productivity within shorter period of time and farmers standard of living was improved.</p> <p>CO3: Learners revise that Panchayats' are local-self governing bodies on whose shoulder the responsibility of rural development is entrusted.</p> <p>CO4: Learners understand that various rural development programmes come up with their own agenda to achieve prosperous rural economy and enrich life of rural people.</p> <p>CO5: Learners bring to a close that government and NGO's have improved rural living to a largest sense and controlled life of villagers also provided maximum benefits to them which they desired and deserved for.</p>
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		<p>CO2: Learners clearly understand that adults commit crimes due to various reasons which harm society in general and targeted individuals in particular.</p> <p>CO3: Learners study that women are deprived of basic fundamental rights and undergo gender discrimination, harassment, sexual abuse, gender pay gap and much more; which needs proper intervention.</p> <p>CO4: Learners reveal about National Integration helps to stabilize democracy, increase economic growth, develop nation, and give people all vital rights and duties.</p> <p>CO5: Learners understand that corruption hampers India's growth and development.</p>
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History

Course outcome:

Introduction-

The History of Our Country was very much regarded as to the otherworld. India was rich with its Natural resources, for the last 5000 Years. History of our country is greatly influenced by its Geographical features or natural conditions prevailing therein. The course of study begins from pre-history period or pre-historic age. The life of primitive man was not better, he began to progress towards civilization. He had overcome with different stages. From this point of study to till the Indian independence. Our Historians have divided the History in to three border section like ancient, Medieval, modern History.

BA-Ist sem- Pre-history to khushanas:

In this topic begins from influence of Geographical features or naturals conditions on Indian History. Pre-History of mankind, growth of civilization, Glorious literature of ancient India, the Vedic age, Rise of New religions, Establishment of Empire. This factor makes to get the knowledge of Socio religious political and Cultural Progress of India

IInd Sem From Guptas to Muslim Invasions

It begin from the Ist Great Empire of India the mauryans, various Dynasties of North the Vardhana's in south the Chalukya's Rashtrakuta's pallava's, and the invasions of the Arab's.

IIIrd sem Medieval History- from-1206 to 1526

It deals with Turkish invasions, and establishing Delhi Sultans, It also deals with political Administrative conditions of medieval period. It is also further continue to study the Vijayanagar Empire,with Special Reference to Cultural contributions or the Golden age of the Empire. It also includes the Adil Shahi's and the Bahamani's of Kalburgi's, and Bhakti Movement and sufi cult.

IV-sem: Medieval History from 1526-1707

It was the further extension of turkish imperialism, inversion of Babar & establishment of Delhi Power, It further makes the Empire of mughal's, it has Contribution of Administration literature, art and architecture. Now it's the place of Tourist Attraction. Further the Marata Empire was also established under the Great Shivaji Maharaja and his admistration and constrution of forts of Model to Modern India.

BA Vth Sem Modern Indian History (from-1707 to 1857)

In this course of study begins from British occupation of power from its East India Company. The British administration implementation of act, revenue reforms by Governor Generals caused, effected on Indian's and made them with slavery and depraving many of opportunity. by this way caused the outbreak of revolt or the 1st was of independence.

BA Vth Sem- Modern Indian history from 1857 to 1900

It is the extension of British power, slavery and depriving was continued by British East India Company, by their foreign polices with vicereys. British started machinery Schools and Hospitals in a way to launch the religion. This makes to outbreak socio religions movement In 18th and 19th century, further Constitutional developments and different acts caused affected the mass of Indians. Hence the rise and growth of national movement was started ultimately India become free and got independence.

IInd Paper. [optional]:BA- Vth sem; Easly Times to 1336.

The paper covers with early dynasties and the empires of Karnataka it also deal with administration and their cultural contributions, Bhakti movement and socio-religious reforms Basaveshvara.

BA VI sem- History and cultur of Karnataka from 1336 to 1956

In this study the topic of vijayanagar Empire, Hydar Ali, Tippu Sultan, and Wadayars of Mysore Samtan will be covered. Further The freedom movement, Unification movement of Karnataka will be covered.

Conclusion:

The whole Syllabus covers the history of India and on Particular with Karnataka History. Subject History is one of the major Subjects of study in Social Science, So it's called as mother of all the social science. The subject helps to the Student to appear for Competitive exams like UPSC & KPSC and other.

Competitive Exams of central Government and state Government. It makes them to Develop their personality it helps them to get Employments.

SCIENCE STREAM

DEPARTMENT OF PHYSICS (UG)

PROGRAMME OUTCOMES

PO1: The Objective of the Department is educating students on various areas of both theoretical and practical aspects of Physics, such that employment in the industries is possible. Students are also encouraged to pursue further studies or go for research.

PO2: The main aim of the department is to provide high quality learning in physics, grooming bright undergraduates who will push frontiers of knowledge in physics and its related disciplines through scholarly activities.

PO3: Students studying physics are set to work on newest ideas in science and technology, in academia, the government, or the private sector.

PO4: A physicist can opt for basic research in astrophysics, cosmology, particle physics, atomic physics, photonics or condensed matter physics, renewable energy, quantum information science, materials development, biophysics or medical physics.

PO5: The physicists are in the forefront of all technical adventures in science and technology. Careers include teaching, medicine, law (especially intellectual property or patent law), science writing, history of science, philosophy of science, science policy, energy policy, government, or management in technical fields.

PO6: Study of Physics prepares the students for almost any career, because students learn how to analyze complex frustrating problems and they are equipped with a strong quantitative background that can be applied in any technical field.

PROGRAMME SPECIFIC OUTCOMES

The completion of this Under Graduate programme will

PSO1: Provide a fundamental knowledge in the core areas of Physics supported by the interdisciplinary courses.

PSO2: Deliver an effective knowledge in the fundamental areas of Physics with a clear and a potential understanding of the integrated approach of Theory with Practicals.

PSO3: Facilitate in acquiring intrinsic skills in the relevant Core areas to progress towards Higher education and Research.

PSO4: Accomplish the individual with employable skills thus evolving one as a self-disciplined personality committed to serve the society with an environment friendly attitude.

COURSE OUTCOMES

Class	Course/Paper	Course Learning outcomes
B. Sc.I Semester (CBCS) wef 2020-21	DSC-PHYT:101 Mechanics and properties of Matter	<p>CO1. To understand the Newtonian mechanics and solve the problems related to the motion of system of particles.</p> <p>CO2. To understand basic theories related with properties of matter and its application to determine values of various physical quantities associated with matter.</p> <p>CO3. To understand frames of reference and Newton's laws and apply them in calculations of the motion of simple Systems.</p> <p>CO4. To acquire the knowledge of linear and angular momenta and apply them in solving physical problems.</p> <p>CO3. To understand the Newtonian relativity, Michelson Morley experiment and concepts of special theory of relativity.</p> <p>CO4. To understand the concepts - gravitation, elasticity.</p> <p>CO5. To study the Block diagram of CRO and functions of various control knobs of front panel, explanation of waveform display and uses of CRO.</p>
	DSC-PHYP:102 Practicals	<p>CO1. Solve problems and perform experiments in the topics related to moment of inertia, young's modulus, rigidity modulus, Poisson's ratio, Torsional pendulum, Bar pendulum, Parallel axes theorem and Use of CRO.</p>
B. Sc.II Semester (CBCS) wef 2020-21	DSC-PHYT:201 Thermal Physics and Fluid Mechanics	<p>CO1. To qualitatively understand distribution functions in case of Maxwell-Boltzmann statistics, Bose Einstein statistics and Fermi-Dirac statistics and the comparison between them. Bose-Einstein and Fermi-Dirac distributions.</p> <p>CO2. To understand Carnot's ideal heats engine, Carnot cycle and its efficiency, Carnot's theorem, Otto and Diesel engines with their efficiencies.</p> <p>CO3. The course will also develop understanding of fundamental laws of thermodynamics.</p>

		<p>CO4. To learn the concept of radiations, Stefan's law & its derivation using radiation pressure. Determination of Stefan's constant. Wein's displacement law, Rayleigh-Jeans's law, Planck's law of radiation, Ferry's total radiation Pyrometer.</p> <p>CO5. To understand H-R diagrams. To qualitatively understand the formation and evolution of stars.</p> <p>CO6. Analyze the viscous nature of the fluids and to determine the property of the liquids. Basics of Surface Tension, Determine the surface tension of different liquids and correlate the property with different natural phenomena</p>
	<p>DSC-PHYP:202 Practicals</p>	<p>CO1. Perform experiment with appropriate equipments and procedures for the determination of particular physical parameter.</p> <p>CO2. Draw the electrical circuit, select the appropriate meters, perform the experiments, record and interpret the results</p>
<p>B. Sc.III Semester</p>	<p>PHY 3.1 : Geometrical Optics and Electricity</p>	<p>CO1. Understand the properties of light like reflection, refraction, Understand the Fermat's Principle and Lagrange's law. Understand the natural behavior of aberration in lens</p> <p>CO2. Gain Knowledge on the basic concepts of electric and magnetic fields. concept of conductors, dielectrics, Understand the polarization in dielectrics. Clausius-Mosotti equation and limitations, the concept of electric Images and its uses.</p> <p>CO3. Learn Biot-savart's law and its applications, theory of Helmholtz Galvanometer. Ampere's circuital law & its applications to solenoid and toroid, the concept of time constant in transient circuits (RC,RL)</p> <p>CO4. To learn the concept of 'j' operator to analyze AC series and parallel resonant circuits. Q factor, sharpness of resonance.</p> <p>CO5. Understand the theory of B.G capacitance of</p>

		capacitor using BG by absolute method, self inductance by Rayleigh's method and mutual inductance by direct method. Theory of earth inductor.
	PHY 3.2 : Physics Lab – III Practicals	CO1. Use optical sources and lasers for the determination of optical parameters with appropriate procedure, tabulate the findings and analyze the results. CO2. Connect the electrical circuit, select the appropriate meters, perform the experiments, record and interpret the results.
B. Sc.IV Semester	PHY 4.1 : Physical Optics, Thermoelectricity and Electromagnetic theory	CO1. Study the theory & relevant experiments of interference using Biprism, air wedge, Newton's rings and michelson interferometer CO2. Study the theory and experimental past of diffraction by fresnels and fraunhoffer methods CO3. Study the theories for production of polarization of light CO4. Understand the resolving power of different optical instruments. CO5. Understand different types of thermoelectricity and thermoelectric diagrams CO6. Gain knowledge on Mathematical background – gradient of scalar, divergence and curl of a vector, their physical significance, Gauss', Stoke's and Green's theorems, EM waves, propagation and their properties. Maxwell's equations in differential forms, integral forms & their physical significance. Poynting theorem
	PHY 4.2 : Physics Lab – IV Practicals	CO1. Use optical instruments- spectrometer, biprism, polarimeter, telescopes, sources and lasers for the determination of optical parameters with appropriate procedure, tabulate the findings and analyze the results. CO2. Connect the electrical circuit, select the appropriate meters, performs the experiments, record and interprets the results.

B. Sc.V Semester	PHY 5.1 : Classical Mechanics, Quantum Mechanics and Atomic Spectra	<p>CO1.To understand the Newtonian mechanics and solve the problems related to the motion of system of particles different types of Constraints, degrees of freedom, virtual work. Familiarize with Lagrangian and Hamiltonian formulations of classical mechanics</p> <p>CO2. To study the fundamentals of Quantum Physics, the uncertainty principle. Schrodinger time dependent and time independent wave equation, Understand physical interpretation of wave function, dual nature of matter</p> <p>CO3. To study Bose-Einstein and Fermi-Dirac statistics.</p> <p>CO4. Understand different models of atom, different types of interactions, familiar with LS and jj coupling schemes.</p> <p>CO5. To learn Normal and Anomalous Zeeman effects. energy level diagram of sodium</p>
	PHY 5.2 : Molecular Spectra, Lasers, Relativity and Electronics	<p>CO1. To study different kinds of motions in molecules and to understand rotational spectra.</p> <p>CO2. To understand Rayleigh and Raman scattering.</p> <p>CO3. To describe the theory and working of Gas and Diode lasers.</p> <p>CO4. To understand the Newtonian relativity, Michelson Morley experiment and concepts of special theory of relativity.</p> <p>CO5. To study Thevenin's and Norton's theorems.</p> <p>CO6. Analyze the characteristics of transistor and FET, transistor and FET biasing circuits, working of single stage and multistage amplifiers using, transistor and FET. the relationship between amplifier and oscillators</p>
	PHY 5.3 : Physics Lab –V Practicals	CO1. Draw the electrical circuit, select the appropriate meters, performs the experiments, record and interprets the results.
	PHY 5.4 : Physics Lab –VI Practicals	CO1. Draw the electrical circuit, select the appropriate meters, performs the experiments, record and interprets the results.

B. Sc.VI Semester	PHY 6.1: Solid State Physics, Nuclear Physics, and Nanoscience	<p>CO1. To study the crystal systems and understand different crystal structures, thermal and electrical properties in the free-electron model.</p> <p>CO2. Know the fundamental principles of semiconductors, including pn-junctions, the charge carrier mobility and density. Fermi surface, basic models of magnetism, Occurrence of superconductivity, destruction of superconductivity by magnetic field, Meissner effect, isotope effect and applications</p> <p>CO3.To understand the liquid drop model and shell model , particle detectors and accelerators.</p> <p>CO4. To study about nanomaterials, their properties quantum structures: quantum wells, wires and dots; nanomaterials; synthesis, characterization, properties and applications.</p>
	PHY 6.2: Astrophysics, Computational Physics, Electronics and Communication	<p>CO1. To understand H-R diagrams, the formation and evolution of stars. End stages of stars – white dwarfs, neutron stars and black holes. Different types of telescopes and their characteristics.</p> <p>CO2. To study the basics of C-Programming. Write C program for problem based on numerical analysis and mathematical concepts, execute it for its output.</p> <p>CO3. To describe the workings of DTL gates.</p> <p>CO4. To learn about Operational amplifiers and different types of filters.</p> <p>CO5. To understand the necessity of modulation and demodulation.</p>
	PHY 6.3 : Physics Lab –VII Practicals	<p>CO1. Draw & connect the electrical circuit, select the appropriate meters, perform the experiments, record and interpret the results</p>
	PHY 6.4 : Physics Lab –VIII Practicals	<p>CO1. Draw & connect the electrical circuit, select the appropriate meters, perform the experiments, record and interpret the results.</p> <p>CO2. Executing C Programs for period of a simple pendulum and range & height of a projectile.</p>

DEPARTMENT OF CHEMISTRY

I. Programme Outcomes: B. Sc Chemistry

After successful completion of three year degree program in Chemistry a student should be able to;

1. Acquire the knowledge with facts and figures related to Organic, Physical, Inorganic and other branches of Chemistry..
2. Understand the basic concepts, fundamental principles, and the scientific theories related to various scientific phenomena and their relevancies in the day-to-day life.
3. Acquire the skills in handling scientific instruments, planning and performing in laboratory experiments.
4. Demonstrate, solve and an understanding of major concepts in all disciplines of chemistry.
5. Solve the problem and also think methodically, independently and draw a logical conclusion.
6. Employ critical thinking and the scientific knowledge to design, carry out, record and analyze the results of chemical reactions.
7. Create an awareness of the impact of chemistry on the environment, society, and development outside the scientific community.
8. Find out the green route for chemical reaction for sustainable development.
9. To inculcate the scientific temperament in the students and outside the scientific community.
10. Use modern techniques, decent equipments and Chemistry software's.
11. .Be able to think creatively to propose novel ideas.
12. Realize how interdisciplinary approach in chemistry helps in providing better solutions and new ideas for the sustainable development.
13. Imbibe ethical, moral and social values in personal and social life leading to highly cultured and civilized personality.
14. Develop various communication skills such as reading, listening, speaking, etc., which will help in expressing ideas and views clearly and effectively.
15. Realize that pursuit of knowledge is a lifelong activity and in combination with untiring efforts and positive attitude and other necessary qualities leads towards a successful life.

II. Programme Specific Outcomes (PSO): B. Sc. Chemistry

1. B.Sc. Chemistry provides backbone in all the traditional branches of Physical, Inorganic, organic and Analytical chemistry.
2. The experimental work will be continues throughout the session to develop the theoretical knowledge and practical as well.
3. Graduates from this course will be better prepared to understand the new environment friendly systems and can understand the processes that the chemical industry is adopting.
4. The course has been designed to have insight in almost all the aspects of chemistry and to build a solid foundation in the subject to choose a career in industry or academics or research.
5. The syllabus very well designed and it covers the spectroscopy, Analytical Chemistry, Industrial Chemistry, Pharmaceutical compounds, Principles of Volumetric and Gravimetric estimations.
6. The employment areas for the B.Sc. Chemistry graduates include pharmaceutical industries, chemical manufactures, forensic science department, plastic industries, agro industries etc. apart from these they are also recruited in the field such as oil, gas and power sectors, defence services.

III. Course Outcomes (CO): B. Sc Chemistry

Course Out Comes of B.Sc. Chemistry

Choice Based Credit System (CBCS) – Effect from 2020 -21

Discipline Specific Course(DSC) under CBCS

Semester - I CHEMISTRY: CHT: A

Credits: I. Theory : 04 Theory class 4hrs /wk. Total theory: 60 Lectures

Atomic Structure (14 Lectures)

1. On successful completion, students would have clear understanding of the concepts related to atomic structure.
2. Bohr's theory and its limitations, dual behaviour of matter and radiation, de Broglie's relation, Heisenberg Uncertainty principle.

3. To learn Hydrogen atom spectra. Need of a new approach to Atomic structure. What is Quantum mechanics?
4. Time independent Schrodinger equation and meaning of various terms in it. Significance of ψ and ψ^2 , Schrödinger equation for hydrogen atom.
5. Radial and angular parts of the hydrogenic wave functions (atomic orbital's) and their variations.
6. Significance of quantum numbers, and Shapes of orbitals.
7. To learn Rules for filling electrons in various orbitals, Electronic configurations of the atoms. Stability of half-filled and completely filled orbital's, concept of exchange energy. Relative energies of atomic orbitals, Anomalous electronic configurations.

Chemical Bonding and Molecular Structure (16 Lectures):

1. Students have to learn General characteristics of ionic bonding. Energy considerations in ionic bonding, lattice energy and hydration energy and their importance in the context of stability and solubility of ionic compounds.
2. Statement of Born-Landé equation for calculation of lattice energy, Born-Haber cycle and its applications, polarizing power and polarizability. Fajan's rules, ionic character in covalent compounds, bond moment, dipole moment and percentage ionic character.
3. To learn the concept of Covalent bonding: VB Approach: Shapes of some inorganic molecules and ions on the basis of VSEPR and hybridization.
4. Concept of resonance and resonating structures.
5. MO Approach: Rules for the LCAO method, bonding and antibonding MOs and their characteristics combinations of atomic orbitals, nonbonding combination of orbitals,
6. MO treatment of homonuclear diatomic molecules and heteronuclear diatomic molecules.
7. To learn Comparison of VB and MO approaches.

Fundamentals of Organic Chemistry: (8 Lectures)

1. Students will be able to learn Physical Effects, Electronic Displacements effects.
2. Cleavage of Bonds: Homolysis and Heterolysis. Structure, shape and reactivity of organic molecules.

3. Nucleophiles and electrophiles. Reactive Intermediates: Carbocations, Carbanions and freeradicals.
4. Strength of organic acids and bases: Comparative study with emphasis on factors affecting pK values.
5. Aromaticity: Benzenoids and Hückel's rule.

Stereochemistry: (10 Lectures)

1. To learn the comparison between Conformations and Configurational isomers.
2. Study the concept of conformations with respect to ethane, butane and cyclohexane.
3. Molecular representations and interconversion of Wedge Formula, Newman, Sawhorse and Fischer representations.
4. Concept of chirality (up to two carbon atoms). Geometrical and Optical isomerism; Enantiomerism, Diastereomerism and Meso compounds.
5. Threo and erythro isomers.
6. Relative configurations D and L notations.; *cis - trans* nomenclature; CIP Rules: R/ S (for up to 2 chiral carbon atoms) and E / Z Nomenclature (for upto two C=C systems).

Aliphatic Hydrocarbons : (12 Lectures)

1. Students will able to learn preparation and reactions of alkanes, alkenes and alkynes.
2. Clear the concept learning mechanism of Free radical mechanism of halogenations of alkanes.
3. Mecanism of addition reactions of alkenes and alkynes.
4. Concept of polymerization, ozonolysis in alkenes and alkynes..
5. Acidity of alkynes, formation of metal acetylides and their applications.

Practical : 02 Practical: CHEMISTRY LAB: CHPr: A

4 hrs./wk. Total Practical: 52 hrs.

1. Meaning of terms such as standard solution, Normality, Molarity, Molality, Equivalent mass. Types of titrations, equations and indicator used in the titration. Calibration of glass wares (burette, pipette, volumetric flask) and weights (both grams and milligrams).

2. Students will have to learn and gain hands on experience of standard solution preparation in different concentration units and learn volumetric estimation through acid-base, redox reactions and Complexometric titrations.
3. To learn organic estimations like Phenol, Aniline, amide and Ester.
4. Estimation of Aspirin in Commercially sample.

Discipline Specific Course (DSC) under CBCS

B.Sc. Semester - II

CHEMISTRY: CHT: B

Credits: I. Theory : 04 Theory class 4hrs /wk. Total theory: 60 Lectures

Kinetic Theory of Gases: (8 Lectures)

In this unit students have to learn:

1. Postulates of Kinetic Theory of Gases and derivation of the kinetic gas equation. Deviation of real gases from ideal behavior, compressibility factor, causes of deviation.
2. van der Waals equation of state for real gases. Boyle temperature (derivation not required).
3. Critical phenomena, critical constants and their calculation from van der Waals equation (numerical problems).
4. Andrews isotherms of CO₂. Maxwell Boltzmann distribution laws of molecular velocities and molecular energies. and their importance.
5. Temperature dependence of these distributions. Most probable, average and root mean square velocities and their comparisons.
6. Collision cross section, collision number, collision frequency, collision diameter and mean free path of molecules.
7. Viscosity of gases and effect of temperature and pressure on coefficient of viscosity.

Liquids: (7 Lectures)

1. The students are expected to learn the qualitative treatment of the structure of liquid along with the physical properties of liquid, viz, vapour pressure, surface tension and viscosity.
2. To learn the Determination of surface tension using stalagmometer (drop weight and drop number method). Viscosity of a liquid and determination of coefficient of viscosity using Ostwald viscometer.

3. Effect of temperature on surface tension and coefficient of viscosity of a liquid (qualitative treatment only). Refractive index and its determination by Abbe's refractometer.

Solids: (7 Lectures)

1. In this unit students are expected to learn Symmetry elements, unit cells, crystal systems.
2. Bravais lattice, types and identification of lattice planes.
3. Laws of Crystallography - Law of constancy of interfacial angles, Law of rational indices.
4. Miller indices. X-Ray diffraction by crystals, Bragg's law. Structures of NaCl, KCl and CsCl (qualitative treatment only).
5. Defects in crystals. Glasses and liquid crystals.

Chemical Kinetics: (8 Lectures)

1. To learn The concept of reaction rates. Effect of temperature, pressure, catalyst and other factors on reaction rates.
2. Concept of Order and molecularity of a reaction and their applications.
3. Half-life of a reaction.
4. Methods for determination of order of a reaction by half life period and differential equation method.
5. Concept of activation energy and its calculation from Arrhenius equation.
6. Theories of Reaction Rates: Collision theory and Activated Complex theory of bimolecular reactions. Comparison of the two theories.

Organic Chemistry:

Students have to learn Aromatic Hydrocarbons, Alkyl and Aryl halides, Alcohols, Phenols, Ethers, and Aldehydes and Ketones, their Functional group approach for the reactions (preparations & reactions) to be studied in context to their structure.

1. Aromatic hydrocarbons:

Preparation (Case benzene): from phenol, by decarboxylation, from acetylene, from benzene sulphonic acid. *Reactions*: (Case benzene): Electrophilic substitution: nitration, halogenation and sulphonation. Friedel-Craft's reaction (alkylation and acylation) (upto 4 carbons on benzene). Side chain oxidation of alkyl benzenes (upto 4 carbons on benzene).

2. Alkyl and Aryl Halides:

Alkyl Halides (Up to 5 Carbons): Types of Nucleophilic Substitution (SN1, SN2 and SNi) reactions. *Preparation*: from alkenes and alcohols. *Reactions*: hydrolysis, nitrite &

nitro formation, nitrile & isonitrile formation. Williamson's ether synthesis: Elimination vs. substitution.

Aryl Halides Preparation: (Chloro, bromo and iodo-benzene case): from phenol, Sandmeyer & Gattermann reactions. *Reactions (Chlorobenzene):* Aromatic nucleophilic substitution (replacement by $-OH$ group) and effect of nitro substituent. Benzyne Mechanism: KNH_2/NH_3 (or $NaNH_2/NH_3$). Reactivity and Relative strength of C- Halogen bond in alkyl, allyl, benzyl, vinyl and aryl halides.

3. Alcohols, Phenols and Ethers

Alcohols: Preparation: Preparation of 1° , 2° and 3° alcohols: using Grignard reagent, Ester hydrolysis, Reduction of aldehydes, ketones, carboxylic acid and esters. *Reactions:* With sodium, HX (Lucas test), esterification, oxidation (with PCC, alk. $KMnO_4$, acidic dichromate, conc. HNO_3). Oppeneauer oxidation *Diols:* (Upto 6 Carbons) oxidation of diols. Pinacol-Pinacolone rearrangement.

Phenols: (Phenol case) *Preparation:* Cumene hydroperoxide method, from diazonium salts. *Reactions:* Electrophilic substitution: Nitration, halogenation and sulphonation. Reimer-Tiemann Reaction, Gattermann-Koch Reaction, Houben-Hoesch Condensation, Schotten – Baumann Reaction.

4. Ethers (aliphatic and aromatic): Cleavage of ethers with HI.

Aldehydes and ketones (aliphatic and aromatic): (Formaldehyde, acetaldehyde, acetone and benzaldehyde) *Preparation:* from acid chlorides and from nitriles. *Reactions* – Reaction with HCN, ROH, $NaHSO_3$, R- NH_2 derivatives. Iodoform test. Aldol Condensation, Cannizzaro's reaction, Wittig reaction, Benzoin condensation. Clemensen reduction and Wolff Kishner reduction. Meerwein-Pondorff Verley reduction.

CHEMISTRY LAB: CHPr: B

II. Practical : 02 Practical: 4 hrs./wk. Total Practical: 52 hrs.

1. Students can take hands on experience regarding crystallization, fractional crystallization, sublimation, reflux, distillation, fractional distillation, distillation under reduced pressure , steam distillation and determination of melting point of the crystallized solid & boiling point of the liquid
2. To learn and analyze organic compounds through systematic qualitative analysis.
3. To learn preparation of organic compounds and confirmation through determination of melting points.

SEMESTER-III CH: 3.1-CHEMISTRY-III

5 hrs per week, Total 60 hrs, Duration of Exam-3hrs

Marks for theory-80, Marks for IA-20

1. To enable the students to understand the importance of inert gases and their compounds in the present scenario. Differentiate the Metals and non-metals and their physical and chemical properties and applications.
 2. To understand and analyze the present situation and development trends of metallurgy as profession. Can tell the reducing ability of metals using Ellingham diagrams, thorough with the general principles of metallurgy during the extraction of metals which are significant in our day to day life.
 3. To enable the students to understand the three dimensional crystal structure of solids, predict the number of particles in unit cells. Understand Defects in crystals.
 4. Explain the different types of structural and stereo isomers Represent organic molecules by Fischer, Flying wedge, Sawhorse and Newman projection formulas Explain optical isomerism in compounds containing asymmetric carbon like glyceraldehyde, lactic acid and tartaric acid. To understand the concept of Enantiomerism, Racemization, Resolution, Asymmetric synthesis and Walden Inversion.
 5. Discuss halogen compounds and their properties. Discuss kinetics, mechanism and stereochemistry of SN1 and SN2 reactions. Compare between E1 and E2 reactions. Understand the evidences, reactivity and mechanism of various elimination and substitution reactions.
1. Recognize the alcohol, phenol and ether functional groups and able describe their properties.
 2. Apply the laws of thermodynamics to various gas processes and cycles, explain the basic concepts of thermodynamics.
 3. Explain the terms pH; K_a , pK_a , pK_b ; K_w etc. and apply them in calculations including relationship $K_w = K_a K_b$
 4. Explain the concept of photochemistry and study Beer-Lamberts law and also able to describe and explain photo physical process.

CH (Pr): 3.2-Lab. Course in Chemistry –III (Sem III)

4 hrs per week, Total 54 hrs, Duration of Exam-4hrs

Marks for Pract-40, Marks for IA-10

1. Students can able to learn regarding errors, types of errors, accuracy, precision, significant figures and standard deviation.
2. Enable to understand the applications of experiments like Methods of determination of Viscosity, Surface tension, degree of dissociation of KCl by Landsberger's method.
3. Students can able to enhance their skill towards determination of distribution of acetic acid/ benzoic acid between water and toluene. Determination of enthalpy of ionization of acetic acid by calorimetric method. Determination of heat of solution of KNO_3 by solubility method.

Semester- IV CH: 4.1-CHEMISTRY-IV (Sem-IV)

5 hrs per week, Total 60 hrs, Duration of Exam-3hrs

Marks for theory-80, Marks for IA-20

1. To enable the students to know the importance of nuclear reactions in order to meet the adequate energy crisis and health hazardous.
2. To enable the students to understand the importance of inorganic polymer in their day to day life.
3. To enable the students to know the impact of industrialization on environment.
4. To enable the students to design some technique or measure that can minimize the environmental issued. Water pollutants: sources & adverse effects of sewage, infectious agents, organic chemicals , inorganic minerals, sediments, oil & detergents. Definition and determinations of D.O., B.O.D & C. O. D . Preliminary, primary and secondary treatment of sewage or industrial effluents .Pesticides and their adverse effects.
5. To understand the carbonyl compounds and their reactions:
6. To understand the Carboxylic acids and their derivatives. Relative Strengths of carboxylic acids.
7. To learn methods of preparation of amines and their reactions. Basicity of amines. Synthetic applications of Diazonium salts.

8. Discuss synthesis and application of Grignard's reagent in preparation of alkanes, alcohols, aldehydes and ketones, esters, ethers.
9. Students can understand the process of adsorptions in every day particles. Applications of adsorptions in different aspects of chemical analysis are been studied. Adsorption isotherms – area occupied by molecules, surface area calculation can be understood. Kinetics involved in acid catalysis also been studied. Enzymes and their effect on rate of reactions with their kinetics
10. Phase equilibrium Basic terms involved in the Phase equilibria, explanation with Industrial applications.
11. Study of different phases of water and Sulphur systems.
12. Understanding the alloy preparation by phase diagram studies.
13. Concept of Eutectic and freezing mixtures and their applications.
14. Emulsions, micro emulsions or micellar emulsions, electro kinetic effects, colloidal electrolytes or association colloids, surface active agents or surfactants, solubilization of surfactant solutions.

CH (Pr): 4.2-Lab. Course in Chemistry –IV (Sem IV)

4 hrs per week, Total 54 hrs, Duration of Exam-4hrs

Marks for Pract-40, Marks for IA-10

1. Explanation regarding solubility, solubility product, common ion effect and applications of these in physico-chemical principles of separation of cations into groups in qualitative analysis of in-organic salts.
2. Semi-micro qualitative analysis of mixtures of two simple inorganic salts containing two anions and two cations.
3. Determination of dissolved oxygen present in water by Winkler's method.
4. Determination of C.O.D in polluted water.

V – Semester CH: 5.1-CHEMISTRY-V

3 hrs per week, Total 40 hrs, Duration of Exam-3hrs

Marks for theory-80, Marks for IA-20

Semester- V (Paper- II)

1. To enable the students to distinguish between double salts and complex salts, their behavior in solid solution state.
2. To enable the students to understand the existence of coordination compounds despite the satisfaction of their normal valency.
3. To enable the students to know how an organic compound can be incorporated in the organo-transition of metal complexes, metal clusters and etc...
4. To enable the students to understand the synthetic importance of heterocyclic compounds which are widely used in medicine
5. To enable the students to make familiar with the different types of reactions that take place under photochemical conditions.
6. To enable the students to understand the importance of natural products.

Semester- V (Paper- II)

1. To enable the students to understand the procedure to be followed in the gravimetric estimations.
2. To enable the students to understand the significance and applications of glass, cement and nano materials.
3. To enable the students to understand the scope of Ultraviolet and Infrared Spectroscopy.
4. To enable the students to be familiar with dyes and colors used in day to day life.

CH (Pr): 5.3-Lab. Course in Chemistry –V (Sem V Paper-I)

Students can enable to learn Qualitative analysis of solid – solid organic mixtures Identification of nature and separation of mixture (in semi micro scale). Characterization of any one separated compound through Preliminary tests, Element test, Physical constant, Functional Group test and preparation of suitable derivative and its physical constant.

CH (Pr): 5.4-Lab. Course in Chemistry –V (Sem V Paper-II)

1. Students understand applications of conductometric titrations in the determination of solubility product, and equivalent conductance of strong electrolytes, precipitation titrations and dissociation constant of weak acids.
2. Students understand applications of potentiometric (acid-base and redox) titrations.

3. Students learn to demonstrate the determination pH of biological fluids using pH meter.
4. Students will learn to verify Beer-Lambert's law and determine the concentration of unknown solution of copper sulphate.
5. Determination of critical solution temperature of two partially miscible liquids (water and phenol).

VI – Semester CH: 6.1-CHEMISTRY-VII (Sem-VI, Paper-I)

Coordination Chemistry-II:

1. Study the Valence bond Theory of coordination compounds with reference to complex ions and its limitations.
2. Crystal field theory with reference to octahedral, tetrahedral and square planar complexes, calculation of crystal field stabilization energy, explanation of color and magnetic properties of metal complexes,
3. Determination of magnetic susceptibility by Guoy method, stability constant, stepwise and overall formation constants, trends in stepwise constants, factors affecting the stability of metal complexes with reference to the nature of metal ion and ligand, chelates: definition, characteristics, factors influencing the stability of metal chelates and importance of chelates.

Bioinorganic Chemistry :

1. Essential and trace elements in biological processes, role of Na, K, Ca, Mg, Fe and Zn in biological systems.
2. Toxic effects of Hg, Cd, Pb and As, role of haemoglobin, myoglobin and chlorophyll in biological systems.

Non-aqueous solvents:

Solvent properties and typical reactions studied in liquid ammonia and liquid sulphur dioxide.

Carbohydrates:

1. To study the structure and constitution of Carbohydrates.
2. Ring Size determination and properties.
3. Structures of Disaccharides and polysaccharides
4. Biological importance.

Amino acids and proteins:

1. To learn Classification of amino acids, stereochemistry of amino acids.
2. Zwitter ion and explanation to isoelectric point.

3. Synthesis of amino acids from Gabriel phthalimide synthesis, Strecker's synthesis. ninhydrin reaction.
4. Peptides: definition and Bergman's synthesis of simple dipeptide. Proteins: biological importance, primary, secondary structure of proteins (α -helical, β -sheet) .

Vitamins and Hormones:

1. Biological significance, source and structure of Vitamin A, B1(thiamine), B2(riboflavin), B6(pyridoxine), α -tocopherol, K1 (phylloquinone), C (ascorbic acid).
2. Van Drop's synthesis of Vitamin A, synthesis of Vitamin C from D -glucose.
3. Hormones, functions and deficiency diseases of hormones, synthesis of adrenaline and thyroxine.

Electromotive force

1. Concept of Reversible and irreversible cells. EMF of chemical cell and its measurements by potentiometer, standard cell (weston standard cell).
2. Study of salt bridge and liquid junction potential.
3. Determination of pH of solution by hydrogen electrode, quinhydrone and glass electrode.
4. Applications of concentration cells – determination of solubility and potentiometric titrations (acid base). Calculation of K_a and redox titrations, determination of redox potential. Numerical problems.

Battery technology:

1. Primary and secondary cells, lead storage battery and its applications, Ni-Cd cells, Lithium battery.
2. Fuel cells and their applications.
3. Corrosion: types and factors influencing corrosion, theory of corrosion and methods of prevention.

CH: 6.2-CHEMISTRY-VIII (Sem-VI, Paper-II)

Analytical Chemistry:

1. To enable the students to be familiar with analytical chemistry this helps them in building skills.
2. To learn Chromatographic techniques. instrumentation and applications, gas chromatography: advantages, principle, instrumentation and applications.
3. Study the principle, instrumentation and applications of flamephotometry for the determination of Na and K.

4. Electrogravimetry: Study Theory and principles of electrolysis.
5. Learn Techniques of Gravimetric analysis.
6. Study the instrumentation and applications of Electro-gravimetric analysis.
7. Learn the estimation of Cu by Electrogravimetric method.
8. Study Theory and principles of thermogravimetry.
9. Study basic TG curve and its application.
10. Study principle and application of DTA.

Nuclear Magnetic resonance(NMR):

1. Students can enable learn Basic principles of PMR.
2. Nuclear shielding and deshielding, chemical shift and molecular structure, structure, spin-spin splitting and coupling constant, areas of signals.
3. Interpretation of PMR structure of simple organic molecules such as ethylbromide, ethanol, acetaldehyde, ethyl acetate, toluene, acetophenone and acetanilide.

Drugs:

1. Learn about requirement of an ideal drug.
2. Synthesis and therapeutic use of Analgesic and antipyretic: ibuprofen and diclofenac sodium, b) Antibacterial: sulphadiazine and sulphathiazole, c) Antimalarial: chloroquine, d) Antibiotic : chloramphenicol, e) Tranquilizers: mysoline and pentothal sodium, f) Local anesthetics: novacaine, g) Antihistamines : chlorpheniramine maleate.

Terpenes:

Classification, isoprene rule, special isoprene rule constitution and synthesis of citral and α -terpinol.

Physical Chemistry:

Macromolecules:

1. Study of different types of polymerizations, terms involved in the study of polymerization using monomers, degree of polymerization and functionality of the polymer.
2. To know all the polymers are macromolecules but macromolecules are not polymers Molecular weight of the polymers in terms of number average (M_n) and weight average (M_w).
3. Determination of molecular weight of polymers by osmotic pressure method and • viscosity method. Relation between number average and weight average in terms of polydispersity index.

Quantum Chemistry:

1. Study the concept of Black body radiation, Planck's theory, Photoelectric effect, Compton effect to know the dual behaviour of matter.
2. Learn spectral interpretation in terms of Lyman, Balmer, Paschen, Brackett and Pfund series for the study of hydrogen atom.
3. Study merits and demerits of Bohr's theory.
4. Wave nature of electron, atomic structure understanding and developing a mathematical model in terms of eigen values and eigen functions using Schrodinger wave equation.

CH (Pr): 6.3-Lab. Course in Chemistry –VII (Sem VI, Paper-I)

1. Students are able to determine quantitatively Cu^{+2} , Zn^{+2} , Ca^{+2} , Fe^{+2} / Fe^{+3} by volumetric methods.
2. Students are able to learn the techniques involved in gravimetric determinations of Barium, Aluminium, Iron and Lead.
3. Students will understand the preparations of some complexes and the stoichiometry involved.
4. Field industrial visits give insight to the students about experiential learning.

CH (Pr): 6.4-Lab.Course in Chemistry –VIII(Sem VI, Paper-II)

Separation of organic liquid binary mixture by distillation.

Characterization of any one separated compound through preliminary tests, element test, physical constant, functional group test and preparation of suitable derivative and its physical constant.

Physical Experiments

1. Students are able to understand principles and applications of conductometric titrations.
2. Students are able to understand principles and applications of potentiometric acid-base and redox titrations.
3. Students will be able to verify Beer-Lambert's law and determine the concentration of the unknown solution of Fe^{+3} using Colorimeter
4. To determine the percentage composition of unknown mixture of A and B liquids using Abbe's refractometer (formula and graphical method).
5. Determination pK_a of acetic acid by potentiometrically.



MATHEMATICS

PROGRAM SPECIFIC OUTCOME

A student can think in a critical manner .

- A student should be able to
 - i) Recall basic facts about mathematics
 - ii) Display knowledge of conventions such as notations, terminology, recognize basic geometrical facts and graphical displays .
 - iii) State important facts resulting from their studies .

- A student should get a relational understanding of mathematical concepts and concerned structures , and should be able to follow the patterns involved , mathematical reasoning.
- A student should get adequate exposure to global and local concerns that explore them many aspects of Mathematical Sciences.
- A student should be able to apply their skills and knowledge to translate information presented verbally into mathematical form , select and use appropriate mathematical formulate or technique in order to process the information and draw the relevant conclusion.
- A student should be made aware of history of mathematical and hence of its past, present and future role as part of our culture.

COURSE OUTCOME

B.Sc. First Year :

FIRST SEMESTER

Paper I : DIFFERENTIAL CALCULUS

Students will able to :

- Identify algebraic and order properties of real numbers.
- Identify and apply the function properties of real number system such as the Completeness property .
- To solve problems on inequalities and absolute Values .
- Verify the values of limit of a function at a point using the definition of a limit .
- To define continuity of a function at a point , analyze the properties of continuity
- Properties of continuous functions , Intermediate Value theorem and solve the problem.

- Students will be familiar with the techniques of differentiation of function with real variables (i.e., n^{th} derivative of functions).

Paper II : LINEAR ALGEBRA

Students will able to :

- Define Vector Space and solve examples , subspace, properties
- Define linear independence and dependence and solve problems .
- Use the concept of Base for vector spaces , dimension and linear transformation to solve problems.
- Acquire the knowledge of a Determinant of 4th order. Symmetric and skew symmetric determinants , reciprocal determinants .
- Ability to use Matrices row and column transformations .
- To define and find Rank of a matrix . Reduction to normal forms . solutions of system of linear equations .

SECOND SEMESTER :

Paper I : DIFFERENTIAL CALCULUS

Students will able to :

- Define Differentiation in polar co-ordinates . angle between the radius vector and the tangent angle of intersection of curves (polar form)
- Prove the Pedal equation and solve problems.
- Points of inflexion, Concavity and Convexity of curves curvatures of plane curve .
- Derive the formulæ of radius of curvature in Cartesian , Parametric & Polar forms . and solve problems of different forms .
- Centre of Curvature Evolutes & Involutés. Envelopes Asymptotes . and Examples.

Paper II : INTEGRAL CALCULUS AND GEOMETRY

Students will able to :

- Prove Reduction formula for integration $\cos x, \sin x, \cot x, \sec x, \tan x$.
- Define and explain Definite integrals and properties
- Explain application to area , volumes and surface of solid revolutions polar equation of conic in the form $\frac{l}{r} = 1 + e \cos \theta, \frac{l}{r} = 1 - e \cos \theta,$
- Equation of directrix. equation asymptote (for hyperbola) section of a sphere by a plane.

- **Geometry** :Define and identify Equation of a sphere , Section of a sphere by a plane .
- Solve the examples on Equation of a sphere through a circle , equation of a sphere with two given points as the ends of a diameter, Tangents planes ,
- Derive equation orthogonal spheres . and solve examples
- Define Equations of cone , Quadric cone ,Right circular cone. And solve the examples of each .
- Define Cylinder : Equation of a cylinder , Enveloping cylinder of a sphere. Right circular cylinder . and solve problems .

B.Sc. Second Year :

THIRD SEMESTER

Paper I : ALGEBRA AND NUMBER THEORY

Students will able to :

- Define Set theory (recap of union and intersection of sets)equivalence relation, functions and solve examples.
- Explain Countable and un-countable sets, Revision and assignment correction
- Define Group, examples properties of group ,sub-group definition and examples .integral power of n.
- Define cyclic groups, cosets types , permutation of group, some theorems on each concepts ,types of permutation
- Derive Lagrange's mean value theorem ,and solve examples .
- Define normal subgroup , index subgroup of group, factor group. Solve examples of each .
- Define homomorphism isomorphism examples ,theorems kernel of homomorphism
- To derive fundamental theorem on homomorphism
- Number theory , illustrate the division algorithm,
- Discuss properties integers, fermate's theorem solve problems.

Paper II : RINGS , INTEGRAL DOMAIN AND REAL ANALYSIS :

Students will able to :

- Define algebraic structure , Group ,Ring properties
- Types of rings std theorems properties and examples .
- Properties on rings ,modulo integer , subring and theorems .
- Units of a ring . Integral domain , field , Demoviers theorems
- Expansion of sine and cosine fuction using , Demoviers theorems . examples

- Real Analysis : Explain concepts of Real Valued functions of more than one variable. And define Limits and continuity solve problems.
- Memorize partial derivatives. Homogeneous functions and Euler's theorem. Calculate first and second partial derivatives .
- To know about Differentiability chain rule. Total differential , and problems
- Define Jacobians . Lagrange's mean value theorem for functions of two variables.
- Prove Taylor's and Maclaurin's theorem for two variables . solve problems
- Explain Maxima and Minima of functions of two and three variables. And examples
- Derive Lagrange's method of undetermined multipliers . and solve examples.
- Expand powers of sine and cosine in series of sine and cosine multiple angles.
- To establish relation between hyperbolic and circular functions.

FOURTH SEMESTER

Paper I : SEQUENCE AND SERIES

Students will able to :

- Define basic definition bounded and unbounded sequence
- Explain Supremum, Infimum convergence ,divergence, oscillatory sequences monotonically decreasing increasing sequence.and Examples.
- Algebra of convergent sequence, problems on monotonic sequence and convergent sequence.
- Sub-sequence,cauchy's sequence ,Cauchy's criterion for convergence of a sequence partial sum of a series , idea of an infinite series as an integral series of non negative terms .
- Necessary and sufficient condition for convergence P-series theorem, solve problems
- Proof of D'Alemberts theorem, ratio test, examples for each concepts.
- Examples on Different comparison test, Raabe's ratio test and problems
- Absolute convergence and conditional convergence of series
- Alternating series, uniform convergence, Revision and assignment correction.

Paper II : VECTOR CALCULUS AND DIFFERENTIAL EQUATIONS

Students will able to :

- Vector calculus , Understand basic concepts of vectors, scalars, dot product, cross product, vector function,
- Explain derivative of sum, triple product of vectors differential of vectors and examples
- Method for operators on vector function, properties of gradient curl and divergence and problems on each concepts

- Standard result on divergence and curl of vector and problems ,
- Define homogeneous function non homogeneous differential equation, reducible to homogeneous form.
- Definition of exact differential equation ,finding integrating factor ,linear differential equation
- Problems on Bernoulli's differential equation, solving first order and n^{th} degree differential equation
- Solvable for P,X,Y. finding P.I when R.H.S is of the forme $e^{ax}, \sin ax, \cos ax, x^n$
- Problems on when R.H.S is of the form $e^{ax}, x^n, \sin ax, \cos ax$, Revision and assignment correction.

B.Sc. Third Year :

FIFTH SEMESTER

Paper I : REAL ANALYSIS

Students will able to :

- Riemann Integration : Definition of lower and upper sum ,std theorems .
- Define R-lower and upper integrals –examples
- Theorems on R- integrability examples on finding lower and upper sum .
- Examples on R-integrable-some theorems
- Proof for Necessary and sufficient condition of integrability with examples
- Product and Division theorems on integrable Examples
- Derive First Mean Value Theorem of integral calculus and examples
- Second Mean Value Theorem and examples
- Fundamental Theorem of integral calculus and example
- Theorems on R-integrability using second definition . and examples
- To solve problems on improper integrals of first and second kind and apply comparison test to solve the problems .
- To solve problems on improper integrals using Abel's and Dirichlet's test.
- Evaluate integrals by using Beta and Gamma functions.
- To evaluate double and triple integrals .
- To apply Leibnitz's theorem to solve problems on integration.

Paper II : NUMERICAL ANALYSIS

Students will able to :

- How to find the roots of the equation by various methods .

- Define Basic concepts of operators Δ E ∇
- Find the difference of polynomial
- Solve problems using Newton forward formula and Newton backward formula
- To derive and solve problems on Simpson's $1/3^{\text{rd}}$, $3/8^{\text{th}}$ and trapezoidal rule.

Paper III : STATICS AND LAPLACE TRANSFORMS

Students will able to :

- Statics definition , resultant parallelogram of forces ,triangle law of forces ,theorem on resolved parts equilibrium of two forces .
- Moment resultant of forces ,sign of moment, couples, moment of couples, theorem on moment of couple and problems
- Theorem on resultant of force and couple ,resultant of co-planar couples and force, resultant of system of co-planar force acting on rigid body, catenary, common catenary.
- Intrinsic Catenary and problems, Revision and assignment correction
- Introduction of L.T, and integrals, basic definitions and problems on L.T
- Properties on L.T of some common functions.
- Derivatives of L.T, multiplication property, division ,periodic function of L.T, problems on each property
- Define Unit step function, unit impulse function, Inverse L.T, problems on convolution theorem, solution on first and second order differential equation

SIXTH SEMESTER

Paper I : DIFFERENTIAL EQUATIONS AND FOURIER TRANSFORMS

Students will able to :

Differential Equation:

- Define Order and Degree of differential equation
- Types of differential equation and working method to solve simultaneous differential equation
- Solve Miscellaneous examples on simultaneous differential equation
- Simultaneous differential equation with 3-variables & method to find it .

Total differentiation :

- Examples of the form $Pdx + Qdy + Rdz$
- Different kind of form related to total differentiation
- Solve Examples to total differentiation

Introduction to Partial Differential Equation :

- Definition to homogeneous PDE
- Standard results
- Simultaneous differential
- equations with two & more than two variables.
- Miscellaneous examples to elimination of arbitrary functions

Lagrange's Equations:

- Derivation of Lagrange's equation of the type $Pp+Qq=R$
- Examples to be solved using lagrange's equation

Partial differential equations of standard forms :

- Standard type I
- Standard type II Standard type III
- Standard type IV
- Miscellaneous examples to Standard type I,II,III & IV

Charpits Method :

- General equations of charpits method $pdx + Qdy + Rdz = 0$
- Miscellaneous examples to charpits method

Partial differential equation of second order :

- Examples to PDE of second order

Fourier Series :

- Introduction to fourier series

Fourier series with period 2π :

- Examples to period of the type 2π
- Examples on fourier series with period $2L$.
- Half range fourier series
- Fourier transform

Paper II : DYNAMICS AND MATHEMATICAL MODELING

Students will able to :

- To derive memorize and solve problems on radial , transverse , tangential and normal velocity and accelerations
- Define Projectile , impact and laws of impact
- Prove that the path of a projectile is a parabola
- Find the direct and oblique impact of smooth elastic spheres .
- Find the law of force if the orbit is given and vice versa.

Paper III : TOPOLOGY AND COMPLEX ANALYSIS

Students will able to :

- Introduction ,basic concepts of set theory and topology, types of topology ,examples
- Define closed set closure, neighborhood. limit points ,dense set ,separable sets and examples.
- Complex analysis: Necessary and Sufficient condition for analytical function and examples
- Explain Milne Thomson method to find the harmonic conjugate, complex integration.
- To know Properties of complex integration, some corollary on cauchy's integrable theorem, theorem
- Cauchy's integral formula and problems laurent's series and residue
- Residue theorem and contour integration, problems ,Revision and assignment correction

B.COM SECOND YEAR

B.Com III semester Commercial arithmetic

Students will able to :

- Basic definitions, ratio and proportion Problems on ratio and proportion,
- Types of proportion Finding third , fourth and mean proportion
- Introduction of time and work ,problems on time and work
- Students should know for finding Logarithms ,laws of logarithms ,characteristic and mantissa and problems
- Finding log of given value and finding antilog ,uses of anti-logarithm, profit and loss
- Problems on profit –loss, percentage, Revision and assignment correction

B.Com IV semester Commercial arithmetic II

Students will able to :

- Define time work and speed, formulas, problems on each concepts
- Explain about Insolvency and problems on insolvency, types on insolvency.
- Partnership ,examples, sharing profit and losses ,interest on capitals and types.
- Present, worth, discount ,problems on each concepts

COURSE OUTCOME

B.Sc. First Year : MATHEMATICS SYLLABUS UNDER (CBCS) wef 2020-21

FIRST SEMESTER

Paper I : DIFFERENTIAL CALCULUS-I

Students will able to :

- Identify algebraic and order properties of real numbers.
- Identify and apply the function properties of real number system such as the Completeness property .
- To solve problems on inequalities and absolute Values .
- Verify the values of limit of a function at a point using the definition of a limit .
- To define continuity of a function at a point , analyze the properties of continuity
- Properties of continuous functions , Intermediate Value theorem and solve the problem.
- Students will be familiar with the techniques of differentiation of function with real variables (i.e., n^{th} derivative of functions).

Paper II : ALGEBRA

Students will able to :

- Define Set theory (recap of union and intersection of sets)equivalence relation, functions and solve examples.
- Explain Countable and un-countable sets, Revision and assignment correction
- Acquire the knowledge of a Determinant of 4th order. Symmetric and skew symmetric determinants , reciprocal determinants .
- Ability to use Matrices row and column transformations .
- To define and find Rank of a matrix . Reduction to normal forms . solutions of system of linear equations .
- Theory of equations : To know sum and products of roots and relation between the roots and coefficients
- Explain Factor theorem and remainder theorem .
- Cubic and Bi-quadratic equations , solutions of the equations when Roots are in A.P , G.P and H.P.

SECOND SEMESTER (CBCS) wef 2020-21

Paper I : DIFFERENTIAL CALCULUS-II

Students will able to :

- Define Differentiation in polar co-ordinates . angle between the radius vector and the tangent angle of intersection of curves (polar form)
- Prove the Pedal equation and solve problems.
- Points of inflexion, Concavity and Convexity of curves curvatures of plane curve .
- Derive the formule of radius of curvature in Cartesian , Parametric & Polar forms . and solve problems of different forms .
- Centre of Curvature Evolutes & Involutcs. Envelopes Asymptotes . and Examples

Paper II : INTEGRAL CALCULUS AND GEOMETRY

Students will able to :

- Prove Reduction formula for integration $\cos x, \sin x, \cot x, \sec x, \tan x$.
- Define and explain Definit integrals and properties
- Explain application to area ,volumes and surface of solid revolutions polar equation of conic in the form $\frac{l}{r} = 1 + e \cos \theta, \frac{l}{r} = 1 - e \cos \theta,$
- Equation of directrix. equation asymptote (for hyperbola)section of a sphere by a plane.
- **Geometry** :Define and identify Equation of a sphere , Section of a sphere by a plane .
- Solve the examples on Equation of a sphere through a circle , equation of a sphere with two given points as the ends of a diameter, Tangents planes ,
- Derive equation orthogonal spheres . and solve examples
- Define Equations of cone , Quadric cone ,Right circular cone. And solve the examples of each .
- Define Cylinder : Equation of a cylinder , Enveloping cylinder of a sphere. Right circular cylinder . and solve problems.

DEPARTMENT OF ELECTRONICS-B.Sc.(PME)

PROGRAMME OUTCOMES

- ❖ The objective of the course is to impart comprehensive knowledge in theory and practical.
- ❖ B.Sc (PME) Course aims at inculcating essential skills in communication electronics and C-programming, as required by the I.T industries.
- ❖ Students can develop the basic programming skills to build utility programs and also develop the foundation for higher studies in the field of computer applications.
- ❖ The program aims to enable students for pursuing respectable career through self employment, Entrepreneurship and Professional career.
- ❖ The curriculum has been designed to cater to the ever changing demands of information and technology with necessary inputs from industries.
- ❖ Work as the Hardware Designers/ Engineers with the knowledge of networking concepts.

PROGRAMME SPECIFIC OUTCOMES

- To pursue further studies in Higher Education, after completing which one can opt teaching career, private and public sector employment and one can pursue research.
- The course provides thorough knowledge about the basics of synthesis and analysis of electronic circuits, both analog & digital and Communication electronics. This is useful to develop skilled man power in the various technological areas including software industries.
- The curriculum has been designed to cater to the ever changing demands of information and technology with necessary inputs from industries.
- B.Sc (PME) Course strives to create outstanding professionals in the areas of Antennas, microprocessor, microcontroller, computer and hardware.

COURSE OUTCOME

CLASS	COURSE NAME	COURSE OUTCOME
B.Sc I	ELE 1.1 Network Analysis	To study the fundamentals of KCL, KVL and network theorems and analysis. To develop the foundation for higher studies in the field of networking.
	ELE 1.2 Semiconductor diode and Rectifiers	To make students well familiar with rectifiers and semiconductor fundamentals.
	ELE 1.3 Regulated power supply.	To make students well familiar with regulated power supply fundamentals.

Sem	ELE 1.4 Measuring Instruments	To give the practical knowledge of design of instruments and also to make students competent in preparation of measuring instruments.
	ELE 1.5 Transistor and biasing circuits.	To give the practical knowledge of transistors and biasing circuits
B.Sc II Sem	ELE 2.1 Network parameter.	To study the fundamentals of Z, Y, and h-parameters and their inter conversions which is required for analysis of transistor circuits.
	ELE 2.2 Passive filters	To make students familiar with passive filters
	ELE 2.3 Amplifiers	To give the practical knowledge of amplifiers
	ELE 2.4 FET and Amplifiers	To understand comparative study of FET and JFET and also the implementation of amplifiers depending upon the field of applications.
	ELE 2.5 Feedback and Oscillators.	To understand the technique of feedback and its effect on gain of amplifiers and also to build different oscillator circuits.
B.Sc III Sem	ELE 3.1 Opto electronics	To make the students to understand construction, working and applications of different opto electronic devices, especially solar cells.
	ELE 3.2 Number System	To understand the basics of different number systems and their inter conversions, different digital codes used in digital system.
	ELE 3.3,3.4 & 3.5 Digital Electronics	To give the practical knowledge of digital electronics and its applications- Basic gates derived gates, logic families, digital ICs, Boolean algebra, simplification of logic circuits, combinational logic circuits and sequential logic circuits.
B.Sc IV Sem	ELE4.1 &4.2 Operational Amplifiers and applications	To understand the basics of operational amplifier, and its characteristics and different modes of operations. Implementation of op-amps in arithmetic and logic circuits.
	ELE 4.3 Active filters and applications	To study active filters and its applications in digital electronics, basic timing concepts using IC 555 timer and implementation of it in Multivibrators.
	ELE 4.4 Laplace Transform	To study circuit analysis using Laplace transformation and also poles and zeros of Network function.
	ELE 4.5 Network Synthesis.	To study the Synthesis of LC and RC Networks using Foster and Cauer types of circuit realization.
	ELE 5.1.1 Power Electronics	To study Construction, working and characteristics of power control devices and their applications.

B.Sc V Sem P-I	ELE 5.1.2 Modulation and Demodulation	To understand propagation of electromagnetic waves, need for modulation, types of modulation and Demodulation. Study of different modulator and demodulator circuits
	ELE 5.1.3 Transmitters and Receivers	To understand transmission of information used in different types of transmitters and also reception of information using different receivers.
	ELE 5.1.4 Antenna	To understand basics of Antenna and types of Antennas used in Communication Systems.
B.Sc V Sem P-II	ELE 5.2.1 & ELE 5.2.2 Microprocessor and its Programming	To study the Architecture of microprocessor. To understand its instruction set and to execute assembly language program using 8085 microprocessor.
	ELE 5.2.3 Interfacing	To understand the basics of interfacing and its use in different types of interfacing techniques.
	ELE 5.2.4 Microcontroller	To understand the basic block diagram of 8051 microcontroller and its instruction set, to execute assembly language program.
B.Sc VI Sem P-I	ELE 6.1.1 Transmission lines and OFC	To understand basics of transmission lines, types of transmission lines. Detailed study of optical fiber cable and its Importance in communication system.
	ELE 6.1.2 Television Receivers	To gain basic knowledge about Television receiver and study the monochrome and color television receiver in detail.
	ELE 6.1.3 Satellite and Mobile Communication.	To understand basics of Satellite, Earth station and types of multiple access methods used in Satellite communication and also mobile communication system
	ELE 6.1.4 Pulse and Digital Communication Systems.	To understand the basics of Sampling theorem used in different types of modulating techniques. Study of basics of digital communication system and its different techniques-advantages and disadvantages.
B.Sc VI Sem P-II	ELE 6.2 Computer Concepts and C-Programming.	To understand basics of computer and programming fundamentals. To understand the basic structure of C-language, Study of different statements used in C-language, functions and pointers. Execution of C-programs.

DEPARTMENT OF BOTANY

PROGRAMME OUTCOMES (PO) OF B.Sc. BOTANY

- PO1** - Botany has immense carrier potential in areas such as Cryptogams , Genetics, Physiology , Biotechnology, Pharmaceuticals, Plant breeding and Environmental Science.
- PO2** - Students get an excellent opportunity to enrich scientific knowledge on botanical and ecological dimension of the plant kingdom.
- PO3** - Gain introductory experience on various biochemical pathways and their role in living Systems.
- PO4** - Apply contextual knowledge on the importance of environmental principles, norms, biodiversity conservation practices and sustainable uses of plants.
- PO5** - Disseminate knowledge on various aspects of medicinal plants and appropriate considerations on human health problems.
- PO6** - Knowledge on conservation of natural bioresources and various other hotspots.

PROGRAMME SPECIFIC OUTCOMES (PSO) OF B.Sc. BOTANY

- PSO 1:** Through taxonomy, students were aware about the local and scientific names, economic importance including the uses.
- PSO 2:** Students are able to apply and associate the knowledge acquired from the allied subjects viz; Zoology and Chemistry, to perform interdisciplinary research.
- PSO 3:** Plant physiology aids the students to enhance knowledge on pathways of metabolisms, transport and translocation of water and solutes together with a better understanding of regulation of growth, development and influence of environment.
- PSO 4:** Students will be able to acquire vast intellectual knowledge on the living plants along with their relationships with their environment.
- PSO 5:** Study of floriculture and landscaping techniques aids the students to implement knowledge on the process of construction of gardens, lawn designs, topiary and on the frame work of their infrastructure facilities.
- PSO 6 :** It gives knowledge of plant cell and its molecular structure, Biotechnology, Principles of Heredity and variation of genes from one generation to the next generation.
- PSO7 :** Inculcate strong fundamentals on modern and classical aspects of Botany.
- PSO 8 :** To facilitate students for taking up and shaping a successful career in Botany.

Course Outcome

Semester I (CBCS)– Microbiology, Algae, Fungi, Lichens, Bryophytes, Pteridophytes and Gymnosperms.

Semester I aims at introducing lower plants and Microorganisms. It helps to acquire knowledge on evolution of thallophytes. Students can understand the distribution, structure, reproduction and life cycle patterns of lower life forms like algae, fungi and lichens and study the economic importance of lower organisms. They acquire knowledge on diversity among Bryophytes, Pteridophytes and Gymnosperms as well as their economic Importance. This course helps the students to understand about bacteria, Viruses and the use of microbes in industries for the welfare of mankind. Understand the life cycle patterns of Gymnosperms.

Semester II (CBCS) – Plant Ecology and Taxonomy of Angiosperms

This semester aims to learn the morphological, taxonomical and economic values of the plants. Students could identify the plant families of major flowering plants and their diagnostic features and acquire basic knowledge on the principles of phylogeny and biosystematics. Students could understand about *in situ* and *ex situ* conservation of plants. Other possible outcome of the course is to understand the economic value of forest and their importance to the society and to understand the principles of ecosystem. This semester also aims to acquire basic knowledge about community succession and to ensure knowledge on resource conservation.

Semester III –Anatomy and Embryology of Angiosperms

This semester aims to impart knowledge on the key aspects of reproductive systems of flowering plants. It also deals with the techniques of temporary microscopic slide preparations to study the histology and anatomy of plants. Imply the embryological and anatomical knowledge to differentiate the plant taxa. Gain hands on experience on herbarium preparation techniques.

Semester IV - Plant physiology and Phytochemistry

This semester deals with study of metabolism of plants. Examine physiological process that occur in plant life. Students can understand the nature of enzymes, mode and mechanism of enzyme action. Acquire knowledge on the biosynthesis of secondary metabolites and their uses. Detailed understanding of the physiological mechanisms involved in the uptake and transport of water. Apply the knowledge on physiological mechanisms of growth regulators in plants. students will also study about physiology of flowering and seed dormancy. Application of mineral nutrients and growth regulators for the development of plants.

Semester V – Paper I – Morphology and Taxonomy of Angiosperms

This semester helps the students to acquire knowledge on the classification and nomenclature of Angiosperms. Students learn about morphology of Angiosperms which is very essential to write technical description of plants and acquire basic knowledge on the principles of phylogeny and biosystematics. This course also helps to study binomial nomenclature. Recognize structural organization and morphological variations among the Angiospermic taxa. Understand the use of keys and manuals for identifying any unknown plants at family level

Semester V – Paper II – Plant Ecology and Economic Botany

Students could understand about *in situ* and *ex situ* conservation of plants. Other possible outcome of the course is to understand the economic value of forest and their importance to the society and to understand the principles of ecosystem. This semester also aims to acquire basic knowledge about community succession and to ensure knowledge on resource conservation. Students also study about phytogeographical regions of India, forest types of India and Karnataka. There is also scope to study ecological successions. Students acquire knowledge on plants with immense economic values. Understand the economic value of forest and their importance to the society. Create awareness for utilization of herbal medicines for home remedies. Understand the plant communities and ecological adaptations in the plants.

Semester VI – Paper I – Cell Biology and Genetics

There is scope to learn the cellular details, cell organelles, cell divisions and their significances. □study about DNA, RNA, genes and their interactions. Understand scientific principles behind nature and function of genes and their process of inheritance. Apply the acquired knowledge on character exchanges among the individuals due to linkage and crossing over. Students are able to understand gene expressions in prokaryotes and Eukaryotes.

Semester VI – Paper II – Evolution, Plant breeding and Plant biotechnology

This course helps the students to know about plant breeding techniques for crop improvement. Different breeding techniques used in the improvement of crop plants. Use of plant propagation techniques in producing clones. Understand the role and importance of biotechnological tools for the production of bioproducts. Study the basic skills and techniques related to gene cloning for the development of transgenic plants. Adoption of conservation strategies through micropropagation techniques and to protect RET listed plant species. Students are allowed to study about origin and evolution of organisms.

DEPARTMENT OF ZOOLOGY

B.Sc. ZOOLOGY

Zoology is one of the fascinating subject of Life Sciences. Students gain knowledge and skill in the fundamentals of animal sciences, understands the complex interactions among various living organisms. Analyse complex interactions among the various animals of different phyla, their distribution and their relationship with the environment. Apply the knowledge of internal structure of cell, its functions in control of various metabolic functions of organisms. Understands the complex evolutionary processes and behaviour of animals. Correlates the physiological processes of animals and relationship of organ systems. Understanding of environmental conservation processes and its importance, pollution control and biodiversity and protection of endangered species. Gain knowledge of Agro based Small Scale industries like sericulture, fish farming, vermicompost preparation. Understands about various concepts of genetics and its importance in human health. Apply ethical principles and commit to professional ethics and responsibilities in delivering his duties. Apply the knowledge and understanding of Zoology to one's own life and work. Develops empathy and love towards the animals.

Semester-I (CBCS)

NON CHORDATA

Non chordates are the animals without notochord. It includes nine phyla. The animals comes under these phyla are useful, non useful, many types are parasites both ecto and endo-parasites, vectors, edible animals, non edible, present both in water and on the land. The biggest group of animals i.e. phylum Arthropoda comes under this group. Different groups of invertebrate animals are studied in this course including Protozoa, Porifera, coelenterate, Platyhelminthes, Aschelminthes, Annelida, Arthropoda, Mollusca and Echinodermata. General characters and classification upto classes are studied. Some special features, organs, pathogenecity, life history and significance are studied here.

Semester-I Course outcome: (CBCS)

- On completion of the courses students will be able to learn diagnostic characteristics of different phyla protozoa, porifera, coelenterata, Platyhelminthes, Annelida, Arthropoda, Mollusca, and Echinodermata through brief studies of examples provides students with an in-depth knowledge of the diversity in form, structure and habits of invertebrates.
- The course encourages to study and learn basics of systematics and understand hierarchy of different categories. Students will be able to identify the invertebrates and classify them up to the class level with the basis of systematics.

- The course topics help to understand the basis of life processes in the non-chordates and recognize the economically important invertebrate fauna which play an important role ecological balance.
- Students will be able to recognize life functions of protozoa, porifera, coelenterata, Platyhelminthes, Annelida, Arthropoda, Mollusca and Echinodermata.
- To recognise the ecological role of phylum protozoa, porifera, coelenterata, Platyhelminthes, Annelida, Arthropoda, Mollusca, and Echinodermata.
- Able to appreciate the process of evolution (unicellular cells to complex, multicellular organisms).
- Imparts knowledge of beneficial and non-beneficial insects. Knowledge of how they interact with their environment, other species and humans. Classification of Insects. Role of insects in spread of diseases
- Study useful insects like honey bee orient students to understand lifecycle of them, know how they synthesize honey, the steps to enhance honey production. In future this study motivate to take up self employment through practising bee keeping.
- The academic curriculum also helps to financial support through the practice of vermicompost and honey and honey bee products.
- Study of this would enlighten the students about proper biodiversity.
- The topics included in the curriculum helps to interpret general evolutionary relationships among and between these animal groups.

Semester-II

CHORDATA

Phylum Chordata is one among the many phyla in the Kingdom Animalia. It includes all the organisms that possess a notochord, a flexible rod between the nerve cord and a digestive tract and a hollow nerve cord. All vertebrates, including humans belong to this phylum.

Course outcome:

- Provides students with an in-depth knowledge of the diversity in form, structure and habits of vertebrates. To understand the ecological role of different groups of chordates. To understand the diversity of chordates. Understand the nature and bionomics of vertebrates.
- Studies included in the syllabi helps the student to have an idea on the morphology and physiology of various vertebrates from Protochordates to Mammals. Gains knowledge of functional anatomy of vertebrates from fishes to mammals.
- Students learn about how fish adapt or change to better survive their environment. Students will learn about the role of the Fisheries Management Authority. Students able to understand about fish culture.

- Learn general characters and classification of different classes of vertebrates.
- Understand the vertebrate evolutionary tree. To understand the ecological role of different groups of chordates.
- Student should be able to describe unique characters, to recognize life functions, adaptations of vertebrates and obtain overview of economically important vertebrates.
- Study of snakes would provide information to make out difference between poisonous and non-poisonous snakes by looking from some distance. Based on marking of snake biting, it is easy to identify whether it is of poisonous snake or of non poisonous snake.
- To know the classification of Aves and Flight adaptation in birds.
- In this segment we teaches about the comparative structures of heart, aortic arches, urinogenital system, brain of different animals which give them a definite idea not only the structure but also the structural development of that organ and how they become modified according to their need and environment.
- Understand the evolution, hierarchy and classification of different classes of chordate.
- Identifies the evolutionary significance of skeletal system.

Semester-III

HISTOLOGY, EVOLUTION, PALEONTOLOGY AND BIOSTATISTICS

3.1 Histology

Histology is also known as microscopic anatomy or microanatomy it is the study of tissues and their arrangement in the organs. It is the study of cells, tissues and organs as seen with a microscope. Histology is a routine lab technique used to evaluate the morphology and structure of cells, tissues, and organs under the microscope.

Course outcome:

- This branch provides knowledge of basic terms in histology, information on cells types, helps students understand the composition and arrangement of cells and tissues in a normal organ system. Moreover, it correlates the structure to function by correlating the differentiation of tissue structure to their specific function. Variation in normal arrangement indicates a defect. So this provides students to differentiate normal and abnormal structure of organs.
- In this part we teaches about differentiation and organization of cells and maintenance of tissues. It helps to get a better idea about their structure and function. Identify the histological structure and function of various organs.
- The student will be able to understands all four types of tissues functions of various organs and to know the location.
- Study of different dye and stains help the student to get a practical knowledge of handling the tissues for microtomy studies. It helps them for laboratory preparations and expertise in

laboratory techniques. outline the processes involved in the preparation of tissue sections and explain the purpose of each of these processes. Identify a number of basic tissue-types from their microscopic appearance.

3.2 Evolution

Evolution is a gradual orderly change from one condition to another. It is the change in the characteristics of a species over several generations and relies on the process of natural selection. Evolution relies on there being genetic variation in a population which affects the physical characteristics (phenotype) of an organism. Evolution is a process that results in changes in the genetic material of a population over time. Evolution reflects the adaptations of organisms to their changing environments and can result in altered genes, novel traits, and new species. An example of macroevolution is the evolution of a new species.

Course outcome:

- The study is useful to understand the origin of species on earth and evolutionary history of man.
- The study of evolution enlighten the students about different forms of life existing in different environment. It explain the role of environment in diversity of life. Study of this enable the students to know the environment in the past.
- It explain causes and role of extinction in evolution.
- It gives knowledge of eras and evolution of species.
- Understanding evolution help us solve biological problems that impact our lives. There are excellent examples of this in the field of medicine. To stay one step ahead of pathogenic diseases, researchers must understand the evolutionary patterns of disease-causing organisms.
- Knowledge of organic evolution with special reference to man.
- Enhance the concept of nature and her resources and appreciating the process and product of organic evolution.

3.3 Paleontology

Paleontology is the study of the history of life on Earth as based on fossils. Paleontologists use fossil remains to understand different aspects of extinct and living organisms. Individual fossils may contain information about an organism's life and environment.

Course outcome:

Paleontology is highly relevant to the modern and future world. Students can learn how climate change has effected past organisms as well as how organisms have changed the physical world. We can also better understand the principles of extinction, evolutionary change, and biodiversity.

- This branch aims to understand the students about fossils, which are the remains of plants, animals, and other living things that have been replaced by rock material or whose impressions have been preserved in rock.

3.4 Biostatistics

Biostatistics is the study of data analysis and statistical reasoning applied practically to medicine and public health. It is a fundamental discipline at the core of modern health data science, and underpins most key public health research disciplines such as epidemiology and health services research. In this way, it helps to solve medical problems which have far-reaching positive impacts in society.

Course outcome:

- Statistics used in biology. What are the parameters, what are the methods of determination, and how it analyzed are to be taught here.
- The study of biostatistics program bridges the knowledge gap between current programs in public health, epidemiology and general statistics, producing professional biostatisticians that are equipped with the skills needed to cater to the increasingly diverse and specialised needs of health research.
- It provides an opportunity to deals with collection, classification and tabulation of numerical facts as the basis for explanation, description and comparison of biological data.
- Biostatistics teaches them to use the best data analysis methods in their research projects.
- Students gains knowledge about statistical methods like measures of central tendencies, Probability.
- Learns about hypothesis testing and inferential statistics. Learns the problem-solving methods.

Semester-IV

MOLECULAR CELL BIOLOGY AND DEVELOPMENTAL BIOLOGY

4.1 Molecular cell Biology

Molecular cell Biology is the study of cells and the macromolecules (DNA, RNA, protein, lipids and carbohydrates) that define their structure and function. It provides students with a solid foundation in cell biology, molecular biology, microbiology, biochemistry, and molecular genetics.

Course outcome:

- Molecular biology is providing the students to understand new insights into the nature of genes and proteins and the relationship between them, whereas time-honoured biochemical and physiological approaches can show how disease affects function at the level of cells, tissues, organs and individuals.
- Molecular Biology aims to understand the structure and function of living systems at the molecular level. The branch focuses mainly on DNA, RNA, Protein Synthesis and their regulatory mechanism. A molecular biologist aims to understand the functions of cells at molecular level.
- Molecular Biology provides to understand formations, actions and regulations of various parts of cells which can be used to efficiently target new drugs, diagnose disease, and understand the physiology of the cell.
- Molecular Biology helps students to understand the physical, chemical, biological, bioinformatics and medical techniques used to describe molecular structures.
- Molecular Biology make students to know the methods which have value in application to a wide variety of problems affecting the overall human condition. Disease prevention and treatment, generation of new protein products, and manipulation of plants and animals for desired phenotypic traits are all applications that are routinely addressed by the application of molecular biology methods.
- It gives the knowledge regarding the fundamental structure, biochemistry and function of the cell.
- Understanding ultra structure of prokaryotic, eukaryotic cells and the structure and functions of all the organelles in the cells.
- Studying the mechanism and complications of cell division.
- Knowledge regarding biology of cancer.
- Able to describe the function and the composition of the plasma membrane.
- Able to explain the principles of the cell theory.

4.2 DEVELOPMENTAL BIOLOGY

Developmental biology is the study of the process by which organisms grow and develop. Modern developmental biology studies the genetic control of cell growth, differentiation and "morphogenesis," which is the process that gives rise to tissues, organs and anatomy.

Course outcome:

- It helps to understand the molecular, genetic, cellular, and integrative aspects of building an organism. Knowledge of normal developmental processes can aid in the understanding of developmental abnormalities and other conditions such as cancer.
- Develop deeper understanding of what life is and how it functions at cellular level.
- Students gains knowledge about gametogenesis, cleavage mechanisms, gastrulation and role of hormones in metamorphosis and regeneration.
- Develop the basic concepts of development.
- Explain the fundamental concept of embryogenesis.
- Describe the developmental model systems- vertebrates.
- Understood the process of organogenesis of selected organs, development of extra embryonic membrane and the nature and physiology of placenta.
- Explain the theories of preformation, and concepts like growth, differentiation and reproduction.
- Understand the experimental procedures of embryology.
- After the successful completion of the course students will be able to list the types of characteristics that make an organism ideal for the study of developmental biology.
- Be familiar with the events that lead up to fertilization.
- Able to understand difference between specification and determination.
- Be able to describe the first four rounds of cell division in different groups.
- Be able to describe the stages and cellular mechanisms for gastrulation.

V SEMESTER: Paper I: Biochemistry and Physiology**Course outcome**

- The paper deals about learning the insights of the chemical reactions that make, break, run and repair the components that make up our body.
- It is the broadest of the basic sciences, includes many subspecialties such as bioorganic chemistry, physical biochemistry, neurochemistry, clinical biochemistry, molecular genetics, biochemical pharmacology, and immunochemistry.
- Recent advances in these areas have created yokes among chemical engineering, technology, and biochemistry.
- This academic paper helps to deal with the chemistry and function of very large molecules which are often categorized under the term molecular biology.

- The paper proves to be highly valuable commercially and that will come in useful for a range of well-paid jobs in an array of important industries.
- This topic supports the career at the juncture of biology and medicine.
- The paper also deals with helping to identify the causes of disease, figure out their transference from one generation to the other and identify their effect on the body.
- All these require tracking chemical alterations through normal bodily functions like respiration, muscle contraction, etc. which are studied under the topic of physiology under the present paper.
- Additionally, thousands of different diet patterns are built on some near invariable essentials such as minerals, proteins, carbohydrates, fats, and vitamins. The expertise in biochemist's job includes the investigation on their effect on the human body in cases of excess or scarcity of these essentials.

Jobs directly related to a Biochemistry degree include:

Research Fellow, Analytical chemist, Biomedical scientist, Pharma Associate, QA / AC Associate,

V SEMESTER: Paper II: Ethology and Applied Zoology

Course outcome

The paper mainly deals with two aspects, the behavior of animals and the consolidated industrial approach and entrepreneurship based on the second half of the topic which is applied zoology. Animal behaviour topic under this paper often provides the first clues or early warning signs of environmental degradation.

- The studies like changes in sexual and other behavior occur much sooner and at lower levels of environmental disruption than changes in reproductive outcomes and population size.
- Considering the animal populations, which are declining, it may be too late to take measures to save the environment.
- Studies of natural behavior in the field are vital to provide baseline data for future environmental monitoring.
- For example, the Environmental Protection Agency uses disruptions in swimming behavior of different fishes as an index of possible water pollution specifically pesticide pollution of water.
- Understanding of predator prey relationships can lead to the introduction of natural predators on prey species.

- Knowledge of honeybee foraging behaviour can be applied to mechanisms of pollination which in turn is important for forest propagation.
- An understanding of foraging behavior in animals can lead to an understanding of forest regeneration.
- Many animals serve as seed dispersers and are thus essential for the propagation of tree species and essential for habitat preservation. All this can be studied under the present paper.
- Further developments in fields like animal welfare will require input from animal behavior specialists.
- Improved conditions for farm animals, breeding of endangered species, proper care of companion animals all require a strong behavioral data base all of this falls under the ethology studies.

VI SEMESTER: Paper I: Ecology, Zoogeography and Wildlife Biology

Course outcome

The paper focuses on the works of Wildlife biologist which can be quite specialized and/or broad, depending on the scope of research or region of the world. While jobs might vary, but many tasks are common to most wildlife biologist careers, including:

- Research based on conservation and coordinate the wildlife assessment activities.
- Interact with other professionals belonging to relevant field, mainly environmental scientists, to monitor and preserve habitats and population's in-situ and ex-situ.
- Monitoring and documentation of animal behavior in the lab protected environments and field.
- The data/specimen collected and record-keeping is accurate and maintains the relevant safety procedures.
- Helps to identify the threat and based on which the discussion and implementation of habitat mitigation and take measures of remediation.
- Considering the increasing extinction of animals which would have an adverse impact on the environment.
- Wildlife conservation is the need of the hour, which is concerned with studying and protection of the animals and their habitat, and those students who are passionate about animals they can pursue with this career and conserve wildlife.

- This career made for the individuals who are passionate about animals, would want to study and protect them.
- The career opportunities in the field of wildlife conservation are prevalent in the Government agencies, NGOs, academics, wildlife photography, writing journals and so on.
- The students of wildlife conservation study about survey and research of biodiversity, conservation plans, history, environmental law etc.
- The job of wildlife conserver involves working to save the environment and animals as well, therefore it involves research work, development of plans for their conservation, spreading awareness etc. Working with an NGO and organizations, gaining experience from there will be advantageous for your profile.
- Wildlife Services, Animal Clinics, Conservation Organizations, Research sector, Zoos, Fisheries and aquaculture, TV Channels such as Discovery Channel, Animal Planet, National Geographic etc. Zoo Curators or Educators, Nature Reserves, Biological Laboratory Technician, Aquariums, Teachers and Researchers, Museums, Pharmaceutical Companies, Veterinary Hospital, Conservationist Animal Behaviourists and Rehabilitators

VI SEMESTER: Paper II: Genetics, Biotechnology and Nanotechnology

Course outcome

Genetics courses are quite popular in India. You can pursue the bachelor, master & a doctoral degree in this field. It is important for the study of microbiology, cell biology, Bio-Technology & biochemistry. Below are the few mentioned course outcome which are highly supportive for the aspirants of undergraduates who are willing to study the paper II as Genetics, Biotechnology and Nanotechnology

- The role of the geneticist is very crucial for various things such as cancer research, unborn defects, DNA samples & etc.
- A geneticist works in both medical & scientific fields in gaining a better understanding of mutation, reproduction & cell growth.
- There are a lot of career opportunities in the field of biology, biomedical and life Sciences.
- The job opportunity for a genetics degree holder is continuing to expand. The genetic employees are not sufficient now, that's why the demand of genetics continues to increase.
- Geneticists can work in various capacities for many different types of employers. Some Employment area where you work after studying genetics course:

- Hospitals, Military, DNA Forensics Department, Universities, Consultancies, Pharmaceutical Industry & Suppliers, Agricultural Firms, Research Institutes, Animal Breeding Industry,
- Some of the Job Profiles are: Assistant Professor, Genetics Laboratory Technician, Clinical Geneticist, Regulatory Process Manager, Biotech Sales Engineer, Consultant, Museum Educator, Nutritionist, Pharmaceuticals, Senior Scientific Officer, Channel Enablement Specialist, Data Specialist – Advanced Analytics and Technical Solution Manager for biological processes

Nanotechnology opens up an almost unlimited field of research activity. Especially in medicine, nanotechnology offers exciting opportunities.

- Novel diagnostic procedures and therapies promise wide-ranging development potential. For example, novel drugs can be developed.
- Supported by the progressive miniaturization in the electronics industry, interdisciplinary research teams are researching so-called nanobots.
- Prototypes already available today should continue to shrink below the size of blood cells and be able to move in the human organism.
- These nanobots could then transport drugs and dose them specifically to the disease centre.
- The development of long fibrous devices that can be introduced into the human organism would be the consequent continuation of minimally invasive surgery.

Considering all these advantages, the students are encouraged to take up the subject of B.Sc. with a combination of Zoology as it includes the above stated course outcome.

DEPARTMENT OF STATISTICS

SUBJECT TAUGHT: B.Sc.: OPTIOANL STATISTICS,

B.COM.: BUSINESS STATISTICS

PROGRAM OUTCOME:

- PO1:** To teach subject Statistics Course to the students in most intellectually challenging manner so as to inculcate ideas of ‘Statistical Thinking’ in their curriculum and in their practical life.
- PO2:** To teach subject Statistics with rigorous mathematical background and equip themselves as good communicators of data with strong theoretical basis & ideas for comparative data analysis and to derive true conclusions and inferences, and to avoid misinterpretations of results.
- PO3:** To teach and train students to understand Statistical Theory & Methods, Statistical Tools, Use of Statistical Softwares and its Applications not only in Statistical evaluations in their curriculum but also its applications in various other inter related disciplines.
- PO4:** To teach subject Statistics and adhere to the ‘Mission’ and ‘Vision’ of the college.
- PO5:** To teach subject Statistics to develop the individuals capabilities for taking ‘Decisions and Statistical Inference’ in an independent manner in their day to day life and in their field of working.

PROGRAM SPECIFIC OUTCOMES:

On successful completion of the degree course with Statistics as one of the Optional Subjects, the student should possess the following qualities during his/her studies in six semesters:

- PSO1:** The student should assimilate a substantial knowledge of Statistics to deal with practical life.
- PSO2:** The student should develop proper skill and critical analyses in understanding the hidden and silent features present in any study material with statistical thinking.
- PSO3:** The student should get a bird eye view of the entire huge data available to communicate in a summary manner to the stake holders.
- PSO4:** The student should improve himself/herself with greater confidence to enhance their level of investigations, communication, and presentation skills.
- PSO5:** They should be able to solve practical life problems using their knowledge learnt in degree classes.
- PSO6:** The student’s community are to be inspired by teachers to take up higher studies in Statistics and its other applied field so as to promote the knowledge of Statistics and its applications for innovative developments and growth in all fields.

PSO7: The main purpose of Study of Statistics course is to help in promoting probabilistic approach in decision making rather than a deterministic and static approach, with scientific thinking to solve the problems of society in general.

Curriculum Course Outcome during academic year 2020 – 2021:

The subject Statistics is taught to B.Sc. Students from this academic year 2020 – 2021 in the form of Discipline Specific Course (DSC) under Choice Based Credit System (CBCS). The course of study is spread over 6 (Six) semesters for B.Sc. and syllabi for the first two semesters is received from the Karantak University, Dharwad to which the college is affiliated. The title of the papers and course output required is as follows:

Discipline Specific Course (DSC) under CBCS

B.Sc. (Optional – Statistics Course)

Semester I: STATISTICS:STT:A: Descriptive Statistics and Elements of Probability.

<p>Course Object for the First Semester under CBCS</p>	<p>The course is designed to promote the Subject Statistics to the students who have offered Statistics and a Non Statistics course at their 12th Standard or Pre-university course to acquaint them to the new concepts and interpretations in subject introduced, which they have learnt partially in their secondary school levels. However in this course students are exposed to work out practical examples on their scientific calculators, and as well as they have to show and verify the results obtained by using R-programming and MS Excel on computers provided in the laboratory.</p>
<p>CO1:</p>	<p>Unit I: Basics: Learners are exposed to meaning and definition (singular & plural), functions and limitations of the subject. They will be able to differentiate quantitative (variable) and qualitative (attribute) characteristics, their scales of measurements, formation of frequency tables for uni-variate and bi-variate variable characteristics. Derivation of marginal and conditional distribution from bi-variate data prepared. Idea of cumulative frequency distribution is made. They will be able to draw suitable diagrams for raw data and graphs for the frequency distribution formed. Demonstration of diagrams and graphs using R-software is made during practicals.</p>
<p>CO2:</p>	<p>Unit II: Uni-variate data Analysis: Learners are exposed to basics of Statistics in the form of study of Descriptive Statistics to deal with Measures of central tendency (concentration measurement), Measures of dispersion (variation or scatterdness measurements), Measures of</p>

	<p>skewness (measurement of shapes) and Measurements of kurtosis (measurement of flatness or peakedness) of the frequency distributions formed earlier. Theoretical derivations and practical examples are provided to understand the concepts. The partition values like Quartiles, Deciles and Percentiles is taken to understand the division of raw data or a frequency distribution arranged in an ascending order to be divided in to equal number of parts. Merits and Demerits of each measure are studied. The practical problems are undertaken in practical hours, which are solved manually by use of scientific calculator, and the results are verified by use of R-Software application platforms as well as on Computers using MS Excel package.</p>
CO3:	<p>Unit III: Bi-variate data Analysis:</p> <p>In this students are familiarised to understand different types of correlation possible between two interrelated variables with examples, their linear measurements for variables by Prof. Karl Pearson, for attributes by Prof. Spearman, linear regression to study cause and effects relationship between two variables, theoretical and practical problems are considered. The concept and properties of correlation coefficients, regression coefficients, and regression lines are studied. Angle between two regressions lines is studied in relation to correlation coefficients etc., are studied and examples are taken up for it. The computations of these measures are done manually using scientific calculators, and results are verified by using R-Software and MS Excel package.</p>
CO4:	<p>Unit IV: Multivariate data Analysis:</p> <p>In this more practical approach is made to state the relationship between three or more variables by the study of Multiple and Partial correlations. Multiple linear regression models are considered. Theoretical examples are stated. The relation of a variable with joint effect of other variables on it, the relation between two variables when the linear effect of third variable is eliminated from them is mainly studied. The properties of primary and secondary subscripts, and residuals used by Prof. Yule are studied and are used in the derivation of Multiple Correlation Coefficient and Partial Correlation Coefficient formula in terms of total correlation coefficients. The computations of various measures studied are made manually using scientific calculators and results are verified by using R-software and MS Excel during practical hours.</p>

CO5:	<p>Unit V: Elements of Probability:</p> <p>Learners are exposed to the probability concepts with definitions, theorems, corollaries, examples, derivations so as to equip them to deal with uncertainty situation measurements in their future course studies. Three definitions of probability: Mathematical, Statistical and Axiomatic are studied. Axiomatic definition is used in proving the theorems where as Mathematical definition is used for solving the problems and interpretations are given using Statistical definitions.</p>
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Discipline Specific Course (DSC) under CBCS

B.Sc. (Optional – Statistics Course)

Semester II: STATISTICS:STT:B: Mathematical Expectation, Theoretical Distributions and Order Statistics

Course Object for the Second Semester under CBCS	<p>In this course students are exposed to next higher level of Statistics. They are introduced idea of random variable based on probability concepts, probability mass and density functions are considered, marginal and conditional distributions are studied, Idea of Mathematical Expectation is introduced to deal with determination of characteristics of theoretical probability distributions (discrete and continuous), Generating functions in the form of Moments, Cumulants and Probability are defined, The properties of each of these generating functions is made use to compute moments about origin and about mean. Important discrete and continuous distributions are taken up for study. The idea of order statistics is introduced to obtain ordered sampling distributions.</p>
CO1:	<p>Unit I: Random Variable and Mathematical Expectation:</p> <p>In this learners are exposed to the definition of a random variable (discrete and continuous), The different types of probability mass functions and density functions are constructed, idea of cumulative distribution functions is made. Standard transformation of variables is taken up, Addition and Multiplication theorems on Mathematical Expectations are obtained. Theoretical examples are taken up for understanding the concepts.</p> <p>Demonstration of R-software is made during practicals to understand the above concepts.</p>
CO2:	<p>Unit II: Generating functions and their applications:</p> <p>In this the characteristics of a raw data and frequency distribution data is obtained by computing moments about origin and about mean. Inter relationships</p>

	<p>between moments about origin and about mean is obtained. Generally Moment generating function and Cumulant generating functions are defined and their applications are made use of in computing moments and cumulants of a distribution. Chebyshev's inequality and Weak law of large numbers is studied in this particular topic.</p> <p>The practical problems are undertaken in practical hours, which are solved manually by use of scientific calculator, and the results are verified by use of R-Software application platforms as well as on Computers using MS Excel package.</p>
CO3:	<p>Unit III: Standard discrete distributions:</p> <p>The discrete variable considered under certain conditions follow a mathematical form and is judged to construct different discrete distributions such as: Bernoulli, Binomial, and Poisson, Negative binomial, Geometric and Hyper geometric distributions. The properties of these discrete distributions are studied. Generally mean, variance and recurrence relation for moments, additive property are given importance in the study.</p> <p>The fitting of the theoretical distributions to the observed data is made manually using scientific calculators, and results are verified by using R-Software and MS Excel package.</p>
CO4:	<p>Unit IV: Standard Uni-variate continuous distributions:</p> <p>In this learners are exposed to probability density functions of a continuous variable. Generally Rectangular, Gamma, Beta, Normal and Exponential distributions are studied. The mean, variance, recurrence relation for moments, the transformation of the variables (uni-variate and bi-variate) is taken up to obtain the new distributions. Cauchy distribution is studied to provide a counter example. Use of R-program is made for solving practical problems.</p>
CO5:	<p>Unit V: Order Statistics:</p> <p>Learners are exposed to the new way of learning by obtaining order statistic based on sample drawn from a continuous distribution. The sampling distribution of first order statistic, higher order statistic, the r^{th} order statistic is made. Joint distribution of an r^{th} order and s^{th} order statistic is obtained. Derivations are made, examples are solved to obtain the order statistic distributions based on samples drawn from a uniform and exponential distributions are taken up.</p>

Curriculum Course Outcome Academic Years 2016 – 2017 to 2019 – 2020:

The subject Statistics is taught to B.Sc. / B.A. / B.Com. Students under the Headings: Optional Statistics, Applied Statistics and Business Statistics. The course of study is spread over 6 (Six) semesters for B.Sc. and B.A. Courses, where as for B.Com. Students it is spread over 2 (Two) Semesters. The title of the papers and course output required is as follows:

Semester III: STTH:3: Exact Sampling Distributions & Theory of Estimation.

Course Object for the Third Semester	The course is designed to give an idea for the study of population characteristics (parameter) and sample characteristics (statistic). In this semester students are made familiar to construct the sampling distributions (Chi-square, Students – t statistics and Fisher’s – t variate, Snedecor’s F – variate); The characteristics of these sampling distributions are studied. Another important aspect of this semester is to introduce Statistical Inference which includes Point Estimation, and Interval estimation. Idea of estimators to estimate parameters of population, their characteristics, obtaining estimators by two important methods: maximum likelihood estimation and method of moment estimation is considered with their properties.
CO1:	In this basic concepts are introduced for sampling distributions and standard error computations. The idea of Central Limit Theorem is stated and derivations are made for it when the sample size obtained from the population is large.
CO2:	In this derivation of Chi-square distribution is made, properties of it are studied, Transformation of chi-square variates is considered. Sample mean and Sample variance distributions are studied.
CO3:	In this basic idea of formation of Students – t statistics is considered and its derivation is made which forms a land mark in the study of small sample tests. Fisher’s t – variate and its distribution, students‘t’ is a particular case of Fisher’s‘t’ variate is studied. Properties of Students t – distribution are studied. Another important Snedecors F – distribution is derived, properties are studied. Inter relationship between Students‘t’, Chi-square variate and F variate/distributions is mainly studied.
CO4:	In this students are given an idea about an estimator, estimate, properties of estimators are studied. Properties like unbiasedness, consistency, efficiency, and sufficiency is studied. Cramer – Rao inequality and its importance, Fisher information, minimum variance bound (MVB), minimum variance unbiased estimator (MVUE) etc., is studied. Method of maximum likelihood estimation and

	method of moment estimation is considered to obtain a good estimator. The whole part of study is regarded as point estimation.
CO5:	In this an interval is provided to the true parameter which can not be estimated exactly by a point estimation method. The confidence intervals are constructed for mean, difference of means (Large and Small sample), Confidence interval for proportion and difference of proportion is obtained for large sample. Confidence interval is obtained for variance and ratio of variances. All these constructions are based on the sampling distributions studied in the earlier part.

Semester IV: STTH:4: Testing of Statistical Hypothesis.

Course Object for the Fourth Semester	The course is designed to another face of statistical inference after the estimation procedure; the next step is to go for statistical testing of the parameters estimated. The test of significance, the test of hypothesis is introduced to test a simple hypothesis against a simple alternative. Similarly to test composite hypothesis, the likelihood ratio test is introduced. Non parametric tests are introduced for non normality assumption violation for the tests. Sequential testing is introduced alternative to fixed sample test procedures.
CO1:	Idea of hypothesis, simple, composite, null and alternative is provided. The basic ideas of critical region for testing, Type I and Type II errors committed in taking decisions, power of a test are provided. The applications of sample mean, sample variance, Chi-square distribution, Students t-distribution and Snedecor's F-distributions are studied here.
CO2:	The Neyman-Pearson Lemma is studied to test a simple hypothesis against a simple alternative, examples from standard distributions are taken to obtain critical regions for testing one sided and two sided alternatives. Idea of Most powerful test and Uniformly most powerful test is obtained.
CO3:	In this theory is developed to test a simple or composite hypothesis against a simple or composite hypothesis to test for mean in case of a normal distribution by using likelihood ratio which is based on principles of maximum likelihood. Monotone likelihood ratio property is studied for testing for one sided alternatives.
CO4:	The parametric tests are based on the normality assumption. If this is not satisfied, then one has to seek alternative methods for testing. One such method is non-parametric tests. Non parametric methods of sign test, Wilcoxon signed rank sum test, Median test, Wald-Wolfowitz Run test, Mann-Whitney-Wilcoxon test,

	Kolmogorov-Smirnov test etc., are considered to test hypotheses for one sample, two sample and paired sample problems.
CO5:	Apart from fixed sample testing problems, which waste most of the resources in the sample drawn from a population to arrive at a conclusion on a hypothesis tested, another method is devised by Prof. Abraham Wald to minimise sample size in taking decisions of acceptance or rejection of a null hypothesis known as Sequential Probability Ratio Tests. These are studied for testing mean, variance in case of normal distribution, mean in case of Bernoulli, Poisson, and exponential distributions, Operating Characteristic (OC) functions and Average Sample Number (ASN) functions are studied.

Semester V: STTH:5.1: ANOVA, Design of Experiments, Index Numbers & Simulation.

Course Object for the Fifth Semester Paper – I	The course is designed to test mean of several populations simultaneously. The new concept of Analysis of Variance (ANOVA) designed by Prof. R.A. Fisher is introduced. Here one way, two ways, two ways with interaction of classified data is studied. Based on the principles of experimentation suggested by Prof. R.A. Fisher, three designs Completely randomized design (CRD), Randomized block design (RBD) and Latin square design (LSD) are studied. The other concept of Factorial experiment is studied for 2^2 and 2^3 experiments tried with all possible treatment combination with two levels for each factor. The application of Statistics to the field of Economic is studied with Construction of Whole Sale Price and Quantity index numbers, and Construction of Consumer Price Index Numbers, Advantages and limitations index numbers constructed is studied. Idea of simulation is also introduced to generate random numbers from discrete and continuous distributions by formulation of random variate generator for some standard examples.
CO1:	The learners are able to write down mathematical models for a one way, two way classified data and also for a two way classified data with interaction. The assumptions for the model, splitting the total sum of squares into its various non-negative component parts, obtaining expectation of various sums of squares involved in the model is made possible under null hypothesis, and test procedure for testing equality of several sample means simultaneously based on F – test is made available through ANOVA tables. Theory is developed and Practical Problems are solved, statistical interpretation, conclusions and comments are made for the problems solved.

CO2:	In this learners are exposed to the construction of design of experiments based on the applications of three principles of experimentation: Randomization, Replication and Local control. Basic definitions required for it are taken. Completely randomized design (CRD), Randomized Block Design (RBD) and Latin Square Design (LSD) are studied with linear mathematical model, merits and demerits of each design and comparative merits and demerits are studied, and layout of various designs is discussed for their applications. Theoretical development and examples are solved with interpretations and conclusions.
CO3:	Learners are now exposed to the situation of complex experiments in the form of factorial experiments, where in treatments are applied in all possible combinations to study interaction effects among the factors. The Main effects, Interaction effects are studied for a 2^2 and 2^3 factorial experiments. The concept of Total confounding and Partial confounding is studied by sacrificing some unimportant treatment comparisons in the experiment.
CO4:	Learners in this are exposed to the construction of Price and Quantity index numbers through simple and weighted average method and simple and weighted aggregative method. Different types of weighted aggregative Price and Quantity index numbers are constructed and tested for Time Reversal Test and Factor Reversal Tests. Problems involved in the construction, Advantages and Disadvantages, Applications are discussed. Another concept of measuring standard of living of the class of people of a given region is studied through Cost of Living Index Number also now called as Consumer Price Index Number. Problems involved in construction of index numbers, Merits and Demerits are studied.
CO5:	Learners are now introduced to the concept of simulation which forms a basis for future topics to be studied. Random variate generator is obtained to generate random numbers from some standard discrete and continuous distributions. Monte-Carlo simulation technique is introduced and practical examples are considered for the same.

Semester V: STTH:5.2: Sampling Theory & Demography.

Course Object for the Fifth	In this course students are exposed to the concept of complete enumeration and part enumeration in the form of census and sample survey. Importance is given to sample survey to study the characteristics of the population in the form of Estimation of Population Mean and Population Proportion. Probability and Non-probability
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Semester Paper – II	<p>methods of sampling methods are studied. Importance is further given to probability sampling methods like Simple Random Sampling, Stratified Random Sampling and Systematic Random Sampling, theory part is developed for estimation of population means, and standard errors are provided for the estimates. Merits, Demerits are obtained for each sampling methods and are compared in an overall manner. The principles of sample survey, questionnaire formation, Schedule required for census work, sampling and non-sampling errors occurring in a sample survey are discussed. Another topic of Demography is introduced to study vital events occurring in the human population. Different measures of mortality, fertility, and growth rates are studied with merits and demerits, and interpretations. The construction of life table: Complete as well as Abridged life tables is considered with description for various columns involved in it. Stationery and Stable populations' concept is adopted.</p>
CO1:	<p>The basic principles of sample survey are taken up. Advantage of sample survey over census, need for survey, need for probability and non-probability sampling, preparation of a good questionnaire for survey work, sampling and non-sampling errors associated with survey work are discussed.</p>
CO2:	<p>Learner's are now exposed to the probability sampling, Simple random sampling according to with and without replacement is studied for estimation of population mean, sampling variance is obtained in this, merits and demerits of method is studied. Simple random sampling procedure for estimation of population proportion is studied, Theorems are studied, estimation of sample size to estimate population mean, population proportion is made with degree of accuracy stated, and confidence interval is provided for the estimated parameters.</p>
CO3:	<p>Learners are exposed to sample survey for a heterogeneous population divided in to various segments is made. Stratified random sampling definition, procedure of obtaining sample, Allocation methods: Proportional and Optimum are taken to draw sample from each stratum of the population, Sampling variance formula is obtained for each allocation methods, Comparison of methods is made to obtain more preferred method depending on the situations, merits and demerits studied.</p>
CO4:	<p>The learners are now exposed to the simplest and cheapest method of sampling which can be adopted more practically in the form of systematic random sampling is made. Estimation of population mean, Variance of estimate of Population mean in different form is obtained. Comparison of this method with other methods of sampling is made, Applications of systematic random sampling is given.</p>

CO5:	Learners are now exposed to the study of vital events in the form of mortality rates such as Crude death rate (CDR), Age specific death rate (ASDR), Standardised death rates (STDR) for comparison of mortality situations of two different regions. Birth rates are studied in form of Crude Birth Rate (CBR), General fertility rate (GFR), Age specific fertility rate (ASFR) and Total fertility rate (TFR) for comparison of fertility of two different regions, Growth of population is studied through Gross reproduction rate (GRR) and Net reproduction rate (NRR), In all these rate measures the merits and demerits of each rate is studied to improve upon the previous rates considered. Another concept of construction of life table is made by complete and abridged life tables to study the mortality conditions of a cohort of persons as they pass through the ages. Components of life table are discussed and complete and curate life expectations are computed with practical problems. Use of life tables in practical problems is discussed.
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Semester VI: STTH:6.1: Operations Research.

Course Object for the Sixth Semester Paper – I	In this course the learners are exposed to deal with complex Management and Industrial problems. Optimization techniques to deal with profit maximisation, cost minimization for production, assignment of job problems, transportation problems, inventory problems, and sequencing of jobs on machines problems, game theory to deal with uncertainties etc., through the methods of linear programming, converting verbal or oral problems of economic and business complexities into mathematical models and solving them to obtain optimal solutions under the various limited resources and constraints imposed through different techniques developed.
CO1:	In this learners are exposed to the history and development of Operation Research techniques through military operations in solving the strategic problems faced during second world war. Later developments to apply these techniques developed to solve complex economic and management problems faced by industry and commerce personnel. Basic definitions, linear programming program (LPP) technique, solution to LPP by graphical and simplex methods, Big M method, Primal and Dual problems and solutions by each way are studied.
CO2:	Learners are exposed to solve Transportation Problem of transporting a single homogeneous commodity that are initially stored or produced at various origins to the different destinations as per availability and requirements with cost minimization or time or distance minimization. Initial basic feasible solutions are obtained by

	<p>North West Corner Rule (NWCR), Matrix Minima Method (Lowest cost entry method), and Vogel's approximation method (VAM). MODI method is then applied to obtain the optimal solutions. Every method of obtaining initial basic feasible solutions is discussed for their merits and demerits. Problem of assigning the jobs to various machines or personnel according to the efficiency of working is studied on one to one basis of assignment by Hungarian method. Assignment problem is a particular case of transportation problem and is a particular case of linear programming problem is highlighted, and why methods of obtaining solutions are made different is highlighted.</p>
CO3:	<p>In this learners are exposed to the technique of solving the sequencing problem by Johnson and Bellman technique. Solving of 'n' jobs on two machines, solving of 'n' jobs on 3 machines reducible to two factious machines is studied. Definitions associated with it are taken up and practical problems are solved to obtain the minimum time required to complete all the jobs in the order of jobs sequence on machines and idle time for machines is evaluated. Practical problems are solved to understand the difficulties faced in sequencing of jobs by the computers used.</p>
CO4:	<p>In this learners are exposed to the formulation of a game problem in which every strategy followed by one player with other player leads to a pay-off and a pay-off matrix is formed. The solution is obtained to the game of strategies by various techniques such as 'maximin' and 'minimax' principles. Solution to pure and mixed strategies is taken up for 2×2, $m \times 2$, $2 \times n$ problems by saddle point technique, dominance rule and graphical methods etc,. Oddments method is followed to solve rectangular zero sum games and 3×3 game problems.</p>
CO5:	<p>In this learners are exposed to the problems of inventory stock to be kept by an industrial system to run its business. Basic definitions of different inventory costs, lead time, demand, buffer stock etc are highlighted, The economic order quantity (EOQ) is developed according to with and without shortages, idea of finite replenishment is adopted, Examples are taken up to study different aspects of cost involved in obtaining economic order quantity, time required and order to be placed etc,.</p>

Semester VI: STTH:6.2: Statistical Quality Management, Time Series, Econometrics & Reliability.

<p>Course Object for the Sixth Semester Paper – II</p>	<p>In this course learners are exposed to application of statistics to the field of production industries for their quality control measurements on products, to the field of economics in terms of study of time series data, and measurement of economic data by means of study of econometrics. The learners are also exposed to another new branch of study of reliability of items, their average life, average life of components when arranged in series and parallel system are studied. Class of life distributions and their properties are also studied.</p>
<p>CO1:</p>	<p>Basic idea of quality, quality assurance, the aims and objectives of statistical quality control, the role of chance and assignable causes on production process, product control and process control, importance of statistical control on variables and attributes is studied.</p>
<p>CO2:</p>	<p>In this learners are mainly exposed to the theoretical basis of construction of 3-sigma control limits based on Normal, Bernoulli and Poisson distributions are considered. Idea of Dr. Walter A. Shewhart's control chart is taken up to devise 3-sigma limits for variable and attribute charts is made. The chart for variables such as sample mean chart and sample range charts are developed. Lack of control is studied with pattern of points falling inside the control limits. The chart for attributes such as: Fraction defective chart (p-chart), Number of defectives chart (np-chart) and Number of defects per unit chart (C-chart), Number of defects per unit in variable sample size chart (U-chart) are studied. Importance is given to construction, derivation of limits, and interpretations of chart is made.</p>
<p>CO3:</p>	<p>In this learners are exposed to the different components of time series which affect the variable under study over a period of time is studied. Additive and Multiplicative models are taken up to study analysis of time series to isolate and study each component such as: Secular trend which occurs over a long period, Seasonal trend which occurs within one year, Cyclical trend which occurs in the form a cycle consisting of four phases of prosperity, decline, recession and recovery over a long period of 5 to 10 years, Irregular trend which occurs abruptly at any time without any cause but with sudden unexpected happenings. Measurement of trend is taken by fitting of line or curve by method of least squares to forecast future, measurement of seasonal variation is made by four different methods and methods are compared for the seasonal variation indices obtained. Use of time series and use of different components isolated is studied.</p>

CO4:	This is an application of Statistics to the field of economic measurements, estimation and projections. The use of economics theory, mathematical concepts and statistical tools are applied for a numerical measurement of economic phenomena. Simple linear regression model is studied with disturbance factor under certain assumptions. Method of least squares is used for the estimation of parameters involved in the model, linearity, unbiasedness; minimum variance property of estimators is studied. Next the extension of study is made to understand auto correlation between two points of time, heteroscedasticity with error variance terms, multicollinearity between two or more explanatory variables in a multi-linear model are studied, the use of econometrics, goals of econometrics; limitations of econometrics are noted in the study.
CO5:	This topic exposes the students to measure the reliability of a component and system of components arranged in series and parallel system. Basic definitions like failure time, failure distribution function, failure rate are discussed for some life length distributions studied. Generally exponential, Normal, Weibull, Pareto, Log-normal and Gamma distributions are considered for failure rate study. Class of life distributions, property of increasing failure rate (IFR), increasing failure rate average (IFRA), New better than used (NBU), New better than used in expectations (NBUE), Decreasing mean residual life (DMRL) is studied with their dual classes for properties and geometric characterization. System arrangement and Parallel arrangement of components is studied for reliability and mean life time for exponential and uniform distributions.

B.Com. (Business – Statistics Course)

PROGRAM OUTCOME:

PO1: The program is offered to the students who have not offered Statistics Course during their 12th or Pre-University Class levels and hence subject is taught to students to understand statistical concepts and to introduce applications of statistical methods, techniques and tools in business data processing and provide necessary interpretations and conclusions to the problems solved.

PO2: The students shall learn to solve some business and management problems with the elementary and basic statistical concepts and shall give interpretations and conclusions while taking business solutions under uncertainty situations in the competitive world.

PROGRAM SPECIFIC OUTCOMES:

Business Statistics is taught to the Third and Fourth Semester courses for Degree B.Com. Course. On successful completion of this Business Statistics Course the students should possess the following qualities in their academic career and in the professional field of working.

PSO1: The student should assimilate a substantial knowledge of Statistics to deal with practical life.

PSO2: The student should develop proper skill and critical analyses in understanding the hidden and silent features present in any study material with statistical thinking.

PSO3: The student should get a bird eye view of the entire huge data available to communicate in a summary manner to the stake holders.

PSO4: The student should improve himself/herself with greater confidence to enhance their level of investigations, communication, and presentation skills.

PSO5: They should be able to solve practical life problems using their knowledge learnt in degree classes.

PSO6: The students' community are to be inspired by teachers to take up higher studies in their respective field chosen so as to promote the knowledge of Statistics and its applications for innovative developments and growth in all fields of business competitions.

PSO7: The main purpose of Study of Business Statistics course is to help in promoting probabilistic approach in decision making rather than a deterministic and static approach, with scientific thinking to solve the problems of society in general.

B.Com. Semester III: 3.6: Business Statistics – I

Course Object for the Third Semester	In this learners are exposed to field of Statistics by giving definitions and meanings (singular & plural), importance, scope, functions and limitations to the business statistics. Here emphases are made in the collection of data by different methods: primary and secondary, classification of data, and then tabulation of collected data, presentation of data by diagrammatic and graphical presentations. Formation of a frequency distribution is given importance to summarize the data. The various measures of central tendency (location measures), measures of dispersion (scatterdness measures), measures of skewness (measures of shapes) and measures of kurtosis (measures of flatness and peakedness) of a frequency distributions are studied with various absolute and relative measurements and meaning and interpretations are provided for a given business problems.
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CO1:	In this learners are exposed to history of statistics, meaning, definitions, collection of data is made by different methods, idea of primary and secondary data, sources for it, role of questionnaire and schedules in collecting data, merits and demerits of each method of collection is studied.
CO2:	Once the data is collected, learners are exposed to classify the data and tabulate data for cross checking the details, Formation of a good statistical table is given importance and are constructed according to the two or three or four characteristics in the form of blank table, General purpose and Specific purpose tables are considered. Objectives, Distinctions and importance's in classification and tabulations of data are noted
CO3:	Here the learners are exposed to present the collected data in the form a diagrammatic representation for laymen and graphical presentation of frequency table data for research workers is made. Different types of one dimensional: bar diagram, component bar diagram, multiple bar diagram and percentage bar diagram, two dimensional: pie-diagram, and Histogram, Frequency polygon and frequency curve, O-give curves are drawn for the frequency distribution to display pattern of variation of business data collected.
CO4:	Here the students are exposed to the computation of measures of central tendency: Arithmetic mean, Median and Mode. Geometric mean and Harmonic means are also calculated. Students shall work out practical problems and shall provide meaning, interpretations and conclusions for the results obtained. Merits and demerits, importance of these averages are studied individually as well as on comparative basis.
CO5:	Once the idea of central tendency is obtained, students shall work out other characteristics of data by means measures of dispersion; The absolute and relative measures of range, quartile deviation, mean deviation and standard deviations are obtained. Relative measures are specially considered for comparison of variation between two frequency distributions. Coefficient of variation is specially studied for consistency property of data. The merits and demerits of various measures of dispersion are studied. Next the third characteristic of data: Skewness and fourth characteristic of data: Kurtosis is studied for shape of the curve and flatness or peakedness of curve respectively. Various absolute measures and relative measures of skewness are taken up to measure degree and direction of movement of curve from its symmetric nature

	<p>on right (positive) and left (negative) side of mode. Meaning and interpretations are made for zero, positive and negative skewness. Similarly flatness and peakedness of a curve around mode is studied in comparison with normal curve. Idea of Leptokurtic, Platykurtic and Platykurtic is obtained. These four characteristics are taken as sufficient to get a good picture of the business data collected for study. Many a times division of data in to various equal parts is studied by means four equal parts (Quartiles), ten equal parts (Deciles) and hundred equal parts (Percentiles) from the economic data point of view. These are necessary computations for any data collected from the field of work to get insight in to the data and give a meaningful interpretations and conclusions.</p>
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B.Com. Semester IV: 4.6: Business Statistics – II

<p>Course Object for the Fourth Semester</p>	<p>In this course the learners are exposed to the measurement of linear relationship between two variables and two attributes which are interrelated to one another by means Prof. Karl Pearson’s coefficient of correlation and Prof. Spearman’s rank correlation coefficient. Different types of correlations are studied. Cause and effect relationship is studied by linear regression, line of regression for prediction are taken up.</p> <p>The value of a variable is affected over a period of time is studied by time series analysis, components of time series are studied and measurement of important component, secular trend by method of least squares is made. Economic barometers of country in the form of index number of prices and quantities are studied. The cost of living of class of people is studied by consumer price index numbers, merits and demerits of indices obtained are made.</p> <p>The idea of sampling theory is introduced to study drawing of a sample from a population in the form of simple, stratified and systematic random sampling procedures, the merits and demerits of different sampling procedures is made.</p> <p>The topic of probability is introduced to study some basic concepts of evaluation of probability of occurrences of events, examples are considered for probability calculations.</p>
<p>CO1:</p>	<p>In this learners are exposed to types of correlation that exists between two variables in the form of zero, positive and negative. The numerical measurement is made by Prof. Karl Pearson’s coefficient of correlation. If measurement is not of desired level or attributes are considered, then rank correlation coefficient is obtained by Prof.</p>

	Spearman's method. Linear regression is studied to predict the value of unknown variable from the known value of a variable, when they are correlated. Properties of Correlation Coefficient and Regression lines, regression coefficients are studied.
CO2:	In this learners are exposed to another aspect of study of variable. Time series is an arrangement of a statistical data over a period of time and is influenced mainly by time factor is studied. Components affecting variable values are studied. Measurement of one of the component: Secular trend is made mainly through method of least squares.
CO3:	In this learners are exposed to the construction of price and quantity index numbers by two important methods: The average of relatives' method and an aggregative method. Important weighted aggregative price and quantity index numbers are studied. They are tested using time reversal test and factor reversal test to recommend for selection of best index number formula. Consumer price index number is studied to measure the standard of living of a class of people of a given geographical region. Problems involved in the construction, uses and limitations are studied for index numbers.
CO4:	In this learners are exposed to the sampling theory concept. The Census enumeration and Sample survey enumeration, Occurrence of sampling and non-sampling errors are studied. Important probability sampling methods such as: Simple random sampling, Stratified random sampling and Systematic random sampling etc., are studied with merits and demerits.
CO5:	The learners are exposed to the basic principles of probability by giving definitions of some important terms related to events, definition of probability, addition and conditional probability theorems are stated and are used in solving some problems on coin(s), dice(dices), playing card problems, a drawing marbles from box problems are studied to evaluate the chance of occurrence of events.

PROGRAMME OUTCOMES

- PO1. Scientific knowledge:** Apply the knowledge of mathematics, science, and computing to the solution of complex scientific problems.
- PO2. Problem analysis:** Identify, formulate, research literature, and analyze complex scientific problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and applied sciences.
- PO3. Design/development of solutions:** Design solutions for complex problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
- PO4. Conduct investigations of complex problems:** Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
- PO5. Modern tools usage:** Create, select, and apply appropriate techniques, resources, and modern computing and IT tools including prediction and modeling to complex scientific activities with an understanding of the limitations.
- PO6. The software engineer and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional practice.
- PO7. Environment and sustainability:** Understand the impact of the professional software engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
- PO8. Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the scientific practice.
- PO9. Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
- PO10. Communication:** Communicate effectively on complex activities with the scientific community and with the society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
- PO11. Project management:** Demonstrate knowledge understanding of the scientific and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

PO12. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change through scholarly activities.

PROGRAMME SPECIFIC OUTCOMES

The completion of this Under Graduate programme will

PSO1: Apply fundamental principles and methods of Computer Science to a wide range of applications.

PSO2: Design, correctly implement and document solutions to significant Computational problems.

PSO3: Impart an understanding of the basics of our discipline.

PSO4: Prepare for continued professional development.

PSO5: Develop proficiency in the practice of computing.

Course Outcome for B.Sc. (Computer Science)

B.Sc. Semester –I (CBCS(2020-21))

COMPUTER SCIENCE: CST: A

Problem solving techniques using ‘C’

CO1	Explain about the basic concepts of program development statements and its syntax.
CO2.	Explain the various types of arrays and its structure.
CO3	Discuss about the various types of Functions and String handling mechanisms.
CO4.	Explain the Concepts of structures and Unions.
CO5.	Illustrates the various operations performed on different types of files.

B.Sc. Semester – II (CBCS(2020-21))

COMPUTER SCIENCE:CST: B

Digital Logic & Computer Design

CO1	Convert different type of codes and number systems which are used in digital communication and computer systems.
CO2.	Employ the codes and number systems converting circuits and Compare different types of logic families which are the basic unit of different types of logic gates in the domain of economy, performance and efficiency.
CO3	Analyze different types of digital electronic circuit using various mapping and

	logical tools and know the techniques to prepare the most simplified circuit using various mapping and mathematical methods.
CO4.	Apply the fundamental knowledge of analog and digital electronics to get different types analog to digitalized signal and vice-versa converters in real world with different changing circumstances.
CO5.	Design different types of with and without memory element digital electronic circuits for particular operation, within the realm of economic, performance, efficiency, user friendly and environmental constraints.

B.Sc. Semester - III

Data Structures using C

CO1	To access how the choices of data structure & algorithm methods impact the performance of program.
CO2.	To solve problems based upon different data structure & also write programs.
CO3	Choose an appropriate data structure for a particular problem.
CO4.	Be capable to identify the appropriate data structure for given problem.
CO5.	Have practical knowledge on the application of data structures.

B.Sc. Semester - IV

Object Oriented Programming with C++

CO1	Explain the top-down and bottom-up programming approach and apply bottom up approach to solve real world problems.
CO2.	Explain the difference between static and dynamic binding. Apply both techniques to solve problems.
CO3	Describe the concept of inheritance and apply real world problems.
CO4.	Discuss the generic data type for the data type independent programming which relate it to reusability.
CO5.	Explain to design of handling large data set using File I/O.

B.Sc. Semester – V

Paper-I: Mathematical Foundation for Computer Science

CO1	Basic idea of Permutations and Combinations, and Probability Concepts.
CO2.	Calculate the number of samples needed to construct confidence levels on the mean and variance of a normal distribution.
CO3	Evaluate the probabilities and conditional probabilities.

CO4.	Understand the concept of Set Theory.
CO5.	Understand the concept of relations and functions.

Paper II: VISUAL BASIC

CO1	Explain the basic Concepts of Program building block control statements and the basic concepts of function and procedure.
CO2.	Describe the functionality and properties of GUI based ActiveX Control with example programs
CO3	Discuss about graphics handling related control and properties.
CO4.	Discuss about the fundamental functions and properties of Advanced ActiveX Control.
CO5.	Describe the concepts of database handling using DAO, ADO and RDO control with data report concepts.

B.Sc. Semester - VI

Paper I: JAVA PROGRAMMING

CO1	Explain about basic Java language syntax and semantics to write Java programs.
CO2.	Describe the concepts of variables, conditional and iterative execution methods etc.
CO3	Discuss the fundamentals of object-oriented programming in Java, including defining classes, objects, invoking methods
CO4.	Explain the various methodologies to handle the exception mechanisms and the principles of inheritance, packages and interfaces
CO5.	Demonstrate the programming concepts for applet and graphics.

Paper II: Database Management System

CO1	Describe the fundamentals of File processing and database processing system.
CO2.	Explain the various data model and its application.
CO3	Explain the various normal forms and its role in DBMS.
CO4.	Explain the fundamental concepts of SQL programs.
CO5.	Describe the concepts of function, procedure, package, trigger and exception handling.

DEPARTMENT OF BIOTECHNOLOGY

B.Sc. SEMESTER – I

CELL BIOLOGY AND GENETICS

PART A: CELL BIOLOGY

- After successful completion of the course the students will be able to:
- History, evolution of cell from prokaryotes to eukaryotes, structure of cell with respect to plant cell and animal cell.
- Students will understand various life events in cell such as cell division, cell synchrony, motility, muscle cells, nerve cells, gametogenesis, cell signaling mechanisms, chromosomes.
- Student curiosity will be created with topics like programmed cell death(apoptosis), aging mechanisms in cell.
- Students will learn fundamentals of cell and life processes.

PART B: GENETICS

- Students will have the knowledge to explain the key concepts of Mendelian Genetics and Principle of inheritance.
- The course provides comprehensive knowledge of History and scope of Genetics, Mendel's work on laws of Inheritance, and Interactions of Genes.
- The course also helps to understand Sex Determination in plants and animals, the concept of Linkage and Crossing over and Chromosome mapping.
- Students will gain an understanding of Chromosomal variations, aberrations and disorders, Extra chromosomal inheritance, and the concept of Mutations.
- Students will have the knowledge to explain the key concepts of Mendelian Genetics and Principle of inheritance.
- The course provides comprehensive knowledge of History and scope of Genetics, Mendel's work on laws of Inheritance, and Interactions of Genes.
- The course also helps to understand Sex Determination in plants and animals, the concept of Linkage and Crossing over and Chromosome mapping.
- Students will gain an understanding of Chromosomal variations, aberrations and disorders, Extra chromosomal inheritance, and the concept of Mutations.

B.Sc. SEMESTER II

BIOMOLECULES AND BIOCHEMICAL TECHNIQUES

After successful completion of this course the students will be able to:

- Understand the structure, properties, classification and functions of all the biomolecules such as carbohydrates, lipids, proteins.
- This course will provide information on enzyme structure, properties, classification and enzyme catalyzed reaction.
- Course will help you understand the importance of vitamins.
- Understanding of chemistry and functions of hormones.
- Students will gain knowledge on glycolysis, Krebs's cycle and ETS cycle.
- Comprehend the principle and applications of different analytical techniques.

B.Sc. SEMESTER – III

MICROBIOLOGY AND IMMUNOLOGY

PART A: MICROBIOLOGY

- History and scope of microbiology, primitive cells, study of bacteria, fungi, viruses, mycoplasma, rickettsia and its classifications.
- Students learn importance of sterilization and its applications.
- Students along with theoretical study, practically perform culture media preparations, grow microorganisms, study staining methods and identify the microorganisms with biochemical test.
- Preservation methods for microorganisms are also studied
- Viral and bacterial diseases studies gave detailed understandings of diseases with sources, pathogenesis, lab diagnosis, treatment and prevention.
- This course will aid students to acquire skills and hands on practical in microbiological laboratory. Practices applicable to microbiological research. Students will gain awareness about the microbes present in the environment and their impacts.

PART B: IMMUNOLOGY

- Students learn the defensive mechanisms, concepts in immune system such as active and passive immunity.
- Antigen-antibody concepts studied with salient features.

- Importance of vaccines, immunization schedules, diagnostics kits for disease identifications with antigen-antibody reaction studied.
- Understanding of allergens, hypersensitivity and its types. Type I, Type II, Type III, and Type IV.

B.Sc. SEMESTER – IV

MOLECULAR BIOLOGY

- After successful completion of the course the students will be able to:
- The course particularly aims at understanding detailed study of structure, synthesis, and functions of nucleic acids.
- Course on molecular biology will enrich knowledge base of biological processes through the investigations of the underlying molecular mechanisms of prokaryotes and eukaryotes.
- It helps in understanding the causes and mechanism of DNA damage and repair.
- Students will have the knowledge to explain Recombination in prokaryotes, detailed process of Transcription, Translation, and Regulation of gene expression in prokaryotes and eukaryotes.
- Students will gain an understanding of Gene organization and expression in mitochondria, chloroplast. Insertional elements and transposable elements.

B.Sc. SEMESTER V

PAPER I

PLANT BIOTECHNOLOGY AND ANIMAL BIOTECHNOLOGY

PART A: PLANT BIOTECHNOLOGY

- Upon successful completion of the course, students are able to learn everything about plant cell, tissue and organs, their regeneration capacity and various applied aspects about plant organs and how they could be exploited to get best out of them.
- Plant cell culture; Introduction, history, scope, advantages, application- students got the clear picture about the various types of PTC and their applications in different contexts. They learn the basic idea of PTC and role of plant growth regulators, besides the role of somaclonal variation in plant breeding, endosperm culture, haploid production embryo culture techniques in improvement of plants i.e., plant breeding.
- Production of large number of identical plants is possible through micropropagation, which comprises of collection of methods used to grow large numbers of plant cells, *in vitro*, in an aseptic and closely controlled environment. This technique is highly effective because almost all

plant cells are totipotent to regenerate an entire organism. Micropropagation, therefore has been regularly used to produce millions of genetically identical plantlets and also to produce disease-free plants by meristem culture technique.

- Students realized its significance in plant tissue culture industries for clonal propagation and also for secondary metabolite extraction.
- Student got hands on training in various techniques like PTC media preparation, inoculation, callus culture, organogenesis, seed culture, idea of micro propagation, synthetic seed production and suspension culture.
- Plant biotechnology and genetic engineering are rapid growing branches in the plant sciences. The knowledge of plant biology is accelerating as new molecular and genomic tools that enable the discovery of novel regulatory and structural genes that control or influence important agronomic traits are created

PART B: ANIMAL BIOTECHNOLOGY

- Introduction and scope to animal biotechnology.
- Basics laboratory set up, tissue culture media, techniques, growing of cell lines, instrument studies are studied.
- Concepts of understanding Nuclear transfer method, IVF technology, Transgenic animals, cloning, tissue engineering are studied.
- IPR an important area of patents, copyrights, trades used in life sciences studied.
- ABT has been practiced in one form or another way by farmers since the beginning of the domestication of animals. ... A transgenic animal is one that has integrated a gene or transgene which has been transferred, into the genome of a cell. This process of rearing such animals with special qualities helped human being to lead a quality life wit less expense.
- Student got hands on training in testing various soil parameters. They also got the clear idea of diverse beneficial microorganisms, process of making bio fertilizers, biopesticide formulations

B.Sc. SEMESTER V PAPER II

GENETIC ENGINEERING

After completion of this course students will be able to:

- Understand the detailed steps of recombinant DNA technology and tools used in genetic engineering.
- Students practically can understand the process of isolation of genomic DNA from plant,

animal and microbial source.

- Throws light on applications of genetic engineering including gene libraries, DNA sequencing, DNA mapping and human genome project, application in human health.
- Students will gain awareness on biosafety and rules and regulations of genetically modified organisms.

B.Sc. SEMESTER – VI

PAPER I

INDUSTRIAL AND ENVIRONMENTAL BIOTECHNOLOGY

PART A: INDUSTRIAL BIOTECHNOLOGY

- Introduction, history, scope and importance of industrial biotechnology studied.
- Fermenters designs, upstream and downstream processes studied. Product purity according to industry sector studied in quality control and R&D Department.
- Industrial production from pilot scale to large scale studied for various antibiotics productions, enzyme productions, organic acids production, microbial foods like single cell protein, microbial polysaccharides like xanthan gum, microbial alkaloids like PHB granules, tissue culture products such as, shikonin, capsaicin, and saffron production studied

PART B: ENVIRONMENTAL BIOTECHNOLOGY

- Understanding sewage and waste treatment working models.
- Pollutions such as air, water, and soil with sources, effects on environment and human health, solutions for problems studied.
- Biodegrading of pesticides, hydrocarbons and xenobiotics studied.
- Biomining, biogas, vermicomposting, Environmental protection act studied.
- Global warming, ozone depletion, greenhouse effect, acid rain and Eco farming studied.

B.Sc. SEMESTER VI

PAPER II

AGRICULTURAL AND MEDICAL BIOTECHNOLOGY

PART A: AGRICULTURAL BIOTECHNOLOGY

- Upon successful completion of the course, students are able to learn everything about agricultural biotechnology Importance of germplasm conservation, role of plant cell, tissue and organs culture in agriculture and horticulture.

- Students could learn the complete process of plant breeding and the various reasons behind that. And how the various plants and how they could be exploited to get best out of them using hybridization technique.
- The application of agricultural biotechnology can improve the quality of life by developing new strains of plants that give higher yields with fewer inputs, can be grown in a wider range of environments, give better options to preserve natural resources, provide more nutritious harvested products that keep much longer in storage and transport, and continue low-cost food supplies to consumers.
- Applied aspects of plant BT, commercial applications- major application of rDNA technology on plant cells to produce transgenic plants and production of various novel plant products. These aspects help in designing plants depending upon our requirements and also to harvest various products invaluable for our survival.
- Students got the knowledge of all theoretical part by taking class assignments. More importantly they could realize the advantages and disadvantages of chemical and biological fertilizers, pesticides and also the significance of symbiotic and free-living nitrogen fixing microbes.

PART B: MEDICAL BIOTECHNOLOGY

After completion of this course students will be able to:

- Understand importance of antibiotics and enzymes used in therapy.
- Comprehend the production of vaccines and therapeutic proteins and its importance.
- Students will gain knowledge on hybridoma technology, gene therapy and antisense technology.
- This course aims at understanding production on biopharmaceuticals in plants and animals.
- Introduction and applications of bioinformatics and nanotechnology.

Commerce Stream

DEPARTMENT OF COMMERCE (UG)

Programme Outcome:

1. This programme could provide industries, Banking Sectors Insurance companies, Service industries, Financing Companies, Transport Agencies, warehousing, taxation services etc., well trained professional to meet the requirements.
2. To inculcate the Knowledge of all core areas specifically Business environment skills, Communications skills, Personal Skills and Management skills.
3. After completing graduation, students can get skills regarding various aspects like Marketing manager, Selling manager, over all Administration abilities of the company
4. Analysis and interpretation of financial statements by using statistical and financial tools and drawing interferences.
5. Students can get through knowledge of finance and commerce.
6. To enhance the Entrepreneurial and Employability skills.
7. Preparation of Financial statements/reports manual and computerized accounting system using Tally.
8. To nurture the tax planning, Assessment and Tax Filing.
9. Human Resource concept, Planning, Management and Development.
10. After completing 3 years Bachelors in commerce program me, student would gain a through grounding in the fundamentals s of commerce and finance.

PROGRAMME SPECIFIC OUTCOME:

1. Enhance the students ability to apply management principles and functions to tackle the problems relating to both physical and human resources
2. Students understand theoretical concepts and practical approach of application of various laws relating to formation, management and smooth functioning of business organization.
3. Students are able to play role of businessmen, entrepreneur, managers, consultants which will help learners to possess knowledge and other soft skills with critical decision making.
4. Students have choices to pursue professional courses such as CA, M,COM, M,BA, CMA ICWA,CS etc...

COURSE	OUTCOMES
B.com I Semester (CBCS)	
Financial accounting I	On successful completion of this course the students are enabled with the knowledge in the practical application of accounting, learn principles and concepts of Accountancy, basic concepts of Partnership accounting, Company accounts, Joint ventures, Royalty accounts, Insolvency etc
Business Environment	To make students aware about Business and Business Environment. Familiarize with the nature of business environment and its components. ... The students will be able to demonstrate and develop conceptual framework of business environment and generate interest in international business.
Financial markets and Institutions	Students will be able to outline the structure and functions of the Indian financial system, developments of Indian financial system and evaluate the functioning of different financial institutions. Regulating money market, Capital Market and their Functions, organization and instruments.
Entrepreneurship and Small Enterprise Management	To acquaint students with concepts entrepreneurship and small business enterprises and to familiarize with entrepreneurial development process. To develop entrepreneurial awareness among students, to motivate to make their mind set for thinking entrepreneurship as career. To make the students to understand concepts of MSME startup,
B.com II Semester (CBCS)	
Financial accounting II	The objective of this course is to provide higher knowledge and exposure in the

	application of financial accounting, Principles and Methods to consignment, Hire purchase, and Installment system to various forms of Business organizations.
Business Correspondence and Reporting	To acquaint students with understanding of basic concepts of correspondence, developing effective business relationship among various entities and conceptual, interpretational and communication skills.
Fundamentals of Marketing	To enable students to understand basic components of marketing framework, marketing strategies, functions of marketing, approaches to marketing, concept of packaging, pricing policies and strategies and concepts of Direct marketing etc.,
Company law and secretarial practice	To make students understand concept relating to new company law influencing company secretary, appointment of company secretary, role of company secretary, stages in the formation of companies, Important documents to be maintained in the company, Secretarial duties during the meeting, Concepts of company meeting etc...,
Fundamentals of Accounting and Commerce II	To enable students to gain knowledge relating to basic concepts of accounting and trade among non commerce students, to understands concepts related to business environment, Industry, banking service, foreign trade, company accounts etc...,

B.com III Semester	
Corporate Accounting I	This course aims to enlighten the students on the accounting procedures followed by the company and skills about accounting standards will be developed, to make aware about the issue of shares, debentures, final accounts, internal reconstructions and profit prior to incorporation.
Principles of Marketing	Students would learn and gain idea about the marketing and its functions, process, market segmentations, product policy, marketing channels, promotions tools. To Examine the range of marketing decisions that an organization must make in order to sell its products and services they will also learn how to think like a marketer, discovering the focus of marketing has always been on the consumer.
Human Resource Management	To make students analyze the strategic issues and strategies required to select and develop manpower resources and to make students aware about sources of recruitment, selections, training methods, placement, wage policy and methods of promotions of human resource management.
Secretarial Practice	To familiarize the students with their fundamental concepts and functions to be performed by corporate secretaries and directors with their duties and responsibilities. To make students to understand about stages of formation of companies, company meetings, and important documents to be maintained by the company
<u>B.Com IV Sem</u> Corporate Accounting II	This course is designed to provide higher knowledge and exposure in the application of corporate accounting, principles and methods. To gain the knowledge of students about amalgamation, absorptions, external reconstructions, holding and subsidiary companies, and accounting procedure of banking accounts.

Fundamentals of Financial Management	To enable the students to understand the concepts, principles, functions of financial management of Business organizations and to acquire the knowledge of leverages, earning per share (EPS), working capital management, capital structures and capital budgeting
Law and practice of Banking	To familiarize the student with basics concepts and applications provisions of banking regulations act, structure of banking system in India, Negotiable Instruments act, concept of Know Your Customers (KYC) ,Technologies in modern Banking system.
Indian Financial System	Students will be able to outline the structure and functions of the Indian financial system, developments of Indian financial system and evaluate the functioning of different financial institutions. Regulating money market, Capital Market and their Functions, organization and instruments.

B.com V Semester	
Cost Accounting I	To keep the students conversant with the ever enlarging frontiers of cost accounting knowledge, cost concepts, elements of cost, cost sheets, difference between financial accounting and cost accounting, ascertainment of material and labor cost and students capability to apply theoretical knowledge in practical situation will be increased, to get knowledge of different methods and techniques of cost accounting, to impart knowledge about the concepts and principles applications of overheads.
Income Tax: Law and Practice-I	To develop an understanding of the basic concepts and principles of income tax law and develop necessary skills in determination of

	Residential status and computation of Income from salary, House property, Business, profession, allowable depreciation etc.,
Accounting Theory	To enable students to apply knowledge of accounting techniques, concepts, principles and theories to solve financial reporting problems and structured decision model to exercise judgment in the application of accounting standards
Principles and Practice of Auditing	This course is intended to acquaint the student with auditing standards and the general procedures required in conducting an audit. The purpose of an audit is to render an opinion as to the fair presentation of the financial statements.
Financial services	The students would be able to apply necessary skills in managing a financial service company. They will be able to apply financial concepts, theories and tools and will be in a position to evaluate the legal, ethical and economic environment related to financial services.
B.com VI Semester	
Cost Accounting II	To enable students to acquaint with the applications of cost accounting tools, methods in business decisions making process and enhance the practical knowledge of Reconciliations statements, contract costing, activity based costing process costing, and job costing.
Income Tax: Law and Practice-II	To develop an understanding of the concepts, principles and procedures of Income tax law and develops skills relating to income computation of capital gain, income from other sources, Set off and carry forward of

	losses, deduction u/s 80C to 80U, assessment of individuals, income tax authorities-their powers and duties, and filing of income tax returns.
Business Laws	Students will be able to appreciate the relevance of business law to individuals, businesses and the role of law in an economic, political and social context. Identify the fundamental legal principles behind contractual agreements. Examine how businesses can be held liable in tort for the actions of their employees. Understand the legal and fiscal structure of different forms of business organizations and their responsibilities as an employer.
Principles of Foreign Exchange	To develop the knowledge about the concept of foreign exchange and its markets. To learn different techniques and problems of forward rates, options and risk exposure. To teach a sense of responsibility and a capacity for foreign trade. To enable an awareness of the global environment in which foreign trade operations like Hedging, Arbitrage, Speculation etc.,
Principles of Management Accounting	To equip the students with the ability to analyze, interpret and use accounting information in managerial decision making. The student is expected to have a good working knowledge of the subject. This course provides the students an understanding of the application of accounting techniques for management like fund flow statements, cash flow statements, ratio analysis, LIFO and FIFO methods.

PG SECTION

P.G. DEPARTMENT OF CHEMISTRY

• **PROGRAMME OUTCOME**

- M.Sc Chemistry programme is a wide area of knowledge in basic sciences which provides basic platform for students to learn about various branches of chemistry.
- It enhances capability of students to practice various skills as experimentation towards chemical sciences to learn & practice various chemical reactions.
- It gives broader opportunity for students to find their future in Pharmaceutical/agro/polymer/food /textile/medicinal etc. in numerous industries.
- Programme provides platform to pursue higher studies such as Ph.D in specialized branches.
- Encourages students to practice their skills by industry based Project works.

• **PROGRAM SPECIFIC OUTCOME**

- Enriches an ability to employ critical thinking & efficient problem solving in the four basic areas of chemistry [Organic, Inorganic, physical & analytical].
- An ability to conduct experiments, analyze data and interpret results, observing responsible and ethical scientific conduct.
- Concerned about providing basic knowledge of various branches of chemistry.
- Encourages students to know about Research & development in the area of emerging challenges.
- Career opportunities in Multinational companies of Science & Technology.
- Whole cosmos rests on chemicals & their applications for the betterment of whole society & mankind.

• **COURSE OUTCOME:**

KARNATAK UNIVERSITY, DHARWAD SYLLABUS FOR M.Sc. CHEMISTRY
CHOICE BASED CREDIT SYSTEM [CBCS]

On completion of the course, students of the M.Sc Chemistry are able to,

M.Sc I SEMESTER

CHGT-1.1: INORGANIC CHEMISTRY

- Encourages students to know about basic concepts of structures and energetic of ionic crystals and covalent bonding.
- Concerned about coordination chemistry (In which MOT, CFSE, Orgel diagram and magnetic materials), stability of complexes and concepts of acids and basis with non-aqueous solvents.
- It enhanced idea about concept of solid state chemistry, band theory, conductors and semiconductors and insulators and its applications.

CHGT-1.2: ORGANIC CHEMISTRY

- Curriculum helps to gain the importance of chemical reactions & foundation for basic concepts.
- Students will learn the basic organic chemistry concepts & mechanisms involved.
- Enables to gain knowledge on substitution /elimination/bonding & basic stereochemistry & conformation analysis concepts.
- Provides the initial basic foundation for the students & helps to understand the fundamental concepts.

CHGT-1.3: PHYSICAL CHEMISTRY

- Students after learning quantum mechanics, thermodynamics, chemical kinetics and polymers helped them to relate importance of chemistry in day to day life.
- Thermodynamics and chemical kinetics helped them to understand how synthetic materials are manufactured in industries and maintenance of favorable conditions, economy of reaction and applications of materials.
- Polymer chapter helped them to realize importance of biodegradable polymers which results in reducing green house effect and global warming.

CHGT-1.4: ANALYTICAL CHEMISTRY

- Analytical chemistry helped the students to understand important of acid base reactions and their applications, how errors are formed during practical applications and how they are rectified.
- Types of chromatographic methods and their applications in qualitative analysis in obtaining purity of components.

- Solvent extraction helped them to understand the solubilities of compounds and recovery of compounds of used solutions.
- Concepts reveal the knowledge about various instrumentation techniques & their working phenomenon, have their own significance in the field of analysis.

CHG[Pr]-1.5: LAB COURSE IN INORGANIC CHEMISTRY

- Inorganic lab provides qualitative and quantitative analysis of metal ion such as **Cu, Ni, Fe** ions, by both volumetrically and gravimetrically.
- Concepts reveal the knowledge about preparation of some important copper, aluminum based complex preparation systematically and uses.
- Inorganic lab gave idea about some determination of **Lead, Tin** mixture by kinetic masking
- It provides good skills regarding analysis of metal ion by titration method using EDTA as titrant.

CHG[Pr]-1.6: LAB COURSE IN ORGANIC CHEMISTRY

- Helps the students to set up multistep organic synthesis reactions.
- Understands the concepts of aromatic electrophilic substitution reactions.
- Knowledge of oxidation, reduction & hydrolysis concepts.
- Hand in experience for the students to set up chemical reactions.

CHG[Pr]-1.7: LAB COURSE IN PHYSICAL CHEMISTRY

- Physical chemistry lab helped them to understand analytical methods like conductivity of materials , potential associated with materials.
- Kinetics and distribution helped us to understand solubility of compounds and factors affecting the synthesis of material reaction.
- Colorimetry helps them to study the properties associated with complexes which are having various medicinal properties.

CHG[Pr]-1.8: LAB COURSE IN ANALYTICAL CHEMISTRY

- Skills regarding bulk separation, purification & qualitative techniques of organic compounds.
- Hand in experience of identification of nature of binary mixtures & separation techniques.
- Knowledge regarding estimation experiments as a quantitative aspects helpful to identify the particular composition in accurate measure.

- Provides basic handling experience of instruments like potentiometer, colorimeter, conductometer.
- Impart the experience & knowledge in the field of analysis related activities.

M.Sc II SEMESTER

CHGT-2.1: INORGANIC CHEMISTRY

- Knowledge about chemistry of non-transition elements like borane, silicone and carbon compound.
- Chemistry of main group elements provides the knowledge about bonding in Nitrogen, Sulphur and Phosphorous compounds and also chemistry of halogens and xenon as treat like noble gas compounds.
- Information about symmetry and group theory in connection with symmetry of some important compounds like water, ammonia and chloroform etc. idea about reducible and irreducible compounds. Its applications.
- Development of rich in knowledge about organ metallic chemistry containing about bonding in metal with ligand and synthesis of fischer and schrock type and used of organ metallic compounds in hydro-formulation and hydrogenation.

CHGT-2.2: ORGANIC CHEMISTRY

- Enriches knowledge of electrophilic & nucleophilic substitution reactions of aliphatic/aromatic criteria.
- Complete knowledge on advanced stereochemistry concepts.
- Enables to understand the wide area such as chemistry of heterocycles, precursors for various bioactive lead molecules.
- Enriches the knowledge on carbohydrates, various types with correlations & configurations.

CHGT-2.3: PHYSICAL CHEMISTRY

- X-ray diffraction and microwave spectroscopy helped them to study the nature of solid and arrangement of particles in solid.
- Electrochemistry helped them to understand redox reactions and factors affecting redox reaction.
- Polymer chapter helped them to understand how melting temperature of polymers vary and how polymers can be recycled.

CHE-2.1 : OPEN ELECTIVE SUBJECT [COMPUTER APPLICATIONS & OFFICE AUTOMATION]

- Information regarding basics of computers, MS office, Visual Basic, Fortran.
- Enrichment of information technology aspects & software knowledge.
- Learning of Programming languages like C, C++, Java etc.
- Helpful for the technological development of students needed for today's competitive world.

CHG[Pr]-2.4: LAB COURSE IN INORGANIC CHEMISTRY

- Helpful for the analysis of semi-microanalysis qualitative analysis of a mixture containing three cations including less common cation (rare- earth) and less common anion.
- Information about ion exchange chromatography (**Zn** and **Mg**) as anion exchanger
- Helpful information about determination of **Fe** by **8-hydroxyquinoline** by solvent extraction method.
- It enhances capability of students to practice various skills as experimentation towards Semi-micro-analysis of five mixture containing three cation and two anion by qualitative method.

CHG[Pr]-2.5: LAB COURSE IN ORGANIC CHEMISTRY

- Hand in experience for Quantitative Estimation experiments.
- Students will understand the various functional groups & expertise the derivative preparations.
- Capability to carryout the organic synthesis to prepare various heterocyclic molecules followed by purification steps.

CHG[Pr]-2.6: LAB COURSE IN PHYSICAL CHEMISTRY

- pH meter, conductometry, potentiometry helped them in development of analytical techniques.
- Surface tension experiment will help them to study the properties associated with liquids.
- Kinetics and distribution helped them to understand chemical reactions and importance of chemical reactions in industrial manufacture.

M.Sc III SEMESTER

CHGT-3.1: INORGANIC CHEMISTRY

- To understand the basic of spectroscopy related to industrial aspect.
- The students are exposed to sophisticated study regarding IR spectroscopy, NQR. Raman and EPR spectroscopy which will be helpful in their future career.
- The bioinorganic aspect of the study is helpful in knowing the biological aspect of human metabolism.

CHGT-3.2: ORGANIC CHEMISTRY

- To understand basics of stereochemistry extended principles & knowledge.
- For enhanced learning of spectroscopy techniques like UV, FT-IR.
- Students will be able to learn Spectral characterization of organic compounds by ^1H & ^{13}C NMR & MASS spectroscopy techniques.
- Curriculum helpful for the project work skills & in the area Research & development in future due to knowledge gain of spectroscopy techniques.

CHGT-3.3: PHYSICAL CHEMISTRY

- Thorough updates the latest quantum chemistry research and methods in energy calculations of the molecules.
- Advanced study of atomic spectra to understand the analytical techniques for the determination of elemental composition.
- Enhanced group theory studies applied to spectroscopy to understand molecular structure.
- X-Ray, Electron and Neutron studies to provide the knowledge of structures of solid state materials indeed an essential tool for characterization of molecules.

CHET-3.1 : OPEN ELECTIVE SUBJECT [HUMAN RESOURCE DEVELOPMENT & PROFESSIONAL SKILLS]

- Curriculum imparts students with knowledge about interpersonal skills and soft skills.
- Students learn about organizational atmosphere and how to deal with it.
- Subject allows for personal development, social development and also psychological development.
- Course helpful and gives scope to enhance understanding ability of a person.

CHG[Pr]-3.4: LAB COURSE IN INORGANIC CHEMISTRY

- Estimation of elements from the complex prepared like tris thiourea complex
- Copper, sulphate estimation by gravimetric and volumetric analysis is major break for students to understand concept of gravimetric analysis
- Use of ion exchange resins in separation of ions in water treatment and different types of chromatography is well explained to enrich students.

CHG[Pr]-3.5: LAB COURSE IN ORGANIC CHEMISTRY

- Gives complete information about binary mixture analysis containing Acids, Bases, Phenols & Neutral compounds.
- Skills regarding bulk separation, purification & qualitative techniques of organic compounds.
- Hand in experience of identification of nature of binary mixtures & separation techniques.
- Knowledge of various functional group tests & their chemical reactions involved.

CHG[Pr]-3.6: LAB COURSE IN PHYSICAL CHEMISTRY

- Improves the ability of quantitative determination of different chemical compounds including binary and ternary mixtures.
- Skill developments in studying physical properties of solids and liquids.
- Proficiency in setting up reaction kinetics by varying different physical parameters that change the progress of the reactions.
- Expertise in instrumental methods of handling conductometer , potentiometer, colorimeter, pH Meter for analysis of chemicals.

M.Sc IV SEMESTER

CHGT-4.1: INORGANIC CHEMISTRY

- The theory course of atomic absorption spectroscopy is very important to know the impurities in water analysis.
- Determination of Aluminum and Magnesium by spectrophotometer using oxine as reagent will help in the major exposure to analytical chemistry to students
- Study of organ metallic chemistry helps the students to get good exposure to catalyst and synthesis of bioactive compounds.

- Instrumental methods like DSC differential scanning calorimetric, cyclic voltammeter, molecular luminescence have greater importance in research study for students in their future career.
- Solid state chemistry magnetic properties and optical properties are well designed for students in their research procurement in future.

CHGT-4.2: ORGANIC CHEMISTRY

- Students will be able to learn all types of Heterocyclic compounds & their use in Pharmaceutical/Medicinal chemistry.
- To understand the principles of photochemistry, pericyclic reactions & newer reagents in the field of organic synthesis.
- Helpful to understand the concepts of Medicinal chemistry, receptors, computer aided drug design.
- To know the various disease symptoms and treatment by lead compounds like sulfa drugs, Analgesics, antifertility drugs & antibiotics by QSAR studies.

CHGT-4.3: PHYSICAL CHEMISTRY

- The extra ordinary expansion of quantum mechanical calculations into all areas of chemistry.
- Catalysis is very useful concept to gain the knowledge of different parameters which controls the chemical reactions in industrial approach.
- Elaborated studies of Statistical Thermodynamics and Statistical Mechanics to understand the physio-chemical systems.
- Study of rotation and vibrational spectra to appreciate analytical industrial chemistry in characterization of molecules.

CHGP-4.4: PROJECT WORK [INORGANIC/ORGANIC/PHYSICAL CHEMISTRY]

- Fuel from waste plastic as an alternate to fossil fuel have got good response.
- This platform provides good exposure to students of research skills & training.
- In hand experience for students to carryout novel research experiments.
- Enhances spectral characterization techniques of lead compounds.
- Enriches knowledge towards pharmacological screening studies to find the bioactive molecules.

- Provides industrial training /Internship activities helpful for Research &Development growth.
- Provides knowledge to students the present scenario of research in chemical sciences.

CHG[Pr]-4.5: LAB COURSE IN INORGANIC CHEMISTRY

- Determination of iron using spectrophotometer and JOBs curve method gives physical aspect in inorganic study
- Use of salycylaldoime in estimation of aluminum and magnesium by gravimetric and volumetric is a special case where student learn the chemistry and mechanism involved.
- Use of cation and anion exchange resins study column chromatography will help students in designing for purification of compound in analytical field of chemistry.

CHG[Pr]-4.6: LAB COURSE IN ORGANIC CHEMISTRY

- Identification of structure of organic molecules based on spectra.
- Multistep organic synthesis techniques & purification methods like distillation & recrystallization.
- To understand various reaction mechanisms of addition, substitution, elimination, oxidation & hydrolysis reactions.

CHG[Pr]-4.7: LAB COURSE IN PHYSICAL CHEMISTRY

- Acquire the knowledge of properties of polymers for industrial applications.
- Spectroscopic techniques to ease the study of complexes and their structure determinations.
- Surface Tension, Viscosity , Calorimeter studies to improve the knowledge of chemical behavior of solids and liquids.
- Solubility studies to enhance the progress of reactions.

PG Department of Physics

M. Sc. Physics Course Outcome

Semester I

Course 1.1 Mathematical Methods in Physical Sciences: Physics a branch of Science that is more mathematized. Mathematics has become the language of Physics. This course provides knowledge of many newer mathematical formulations and solving complicated differential equations. Group theory helps in understanding the behavior of molecular vibrations and atomic nuclear structures. New topic Monte Carlo Methods introduced is another technique used by scientific community to study the behavior of physical systems. This method is useful only if the students enter into associated research field. In the course the pupil are learn different mathematical techniques to solve the physical problems.

Course 1.2 Classical Mechanics: This is most fundamental part of physics learning. Knowledge of motion of systems in the space is very much essential to design automobiles stating from bicycle to rocket, satellite and missiles. This course allows tounderstand the Newton's laws and its application to study the motion of a system. This course provides the information how the system moves in space under different types of fields. There are many approaches to study the moving systems. As the Newtonian mechanics was taught in graduation mote general mechanics like Lagrangian and Hamiltonian mechanics are introduced. Effect of rotation of earth about its own axis on the systems moving on the surface of earth and similar motions are understood. New topic – Rocket dynamics creates interest in students and provides the information how space missions are to be planned.

Course 1.3 Electronics (General): Present day all devices and instruments work with help of electronic devices. This course deals with working principle of electronic components and circuits. When everything in of this world has become fast digital, the students of physics must have the ideas behind the digital world. Optical fiber communication section tells why we could talk to a person at far away in real time. From this electronic course the students will gain the knowledge of electronic circuit, digital and fast communication.

Course 1.4 Condensed Matter Physics(General): All materials are regular arrangement of atoms and molecules in specific patter- Crystals. The patter determines many properties of the materials. Through this course students will understand

- a. The properties of materials by understanding the regular arrangement of the materials

- b. Properties of materials at different temperatures.
- c. How and why to classify the matter into different categories based on its use.

Like conductors, semiconductors and insulators; ferro-magnets, paramagnets and diamagnetsetc

Also the functioning of semiconductors , superconductors.

Semester II

Course 2.1 Quantum Mechanics I: All bigger materials are made of some elements in the form of atoms and molecules. The behavior of these atoms and molecules could not be explained by earlier Newton's mechanics. Quantum mechanics is very new concept developed in the beginning of 20th century. The students will understand the difficulties associated with Newtons mechanics to understand the behavior of micro-particles and how to overcome form such difficulties with help of new concepts by learning this basics of new concepts of quantum mechanics.

Course 2.2 Atomic and Molecular Physics (General): The study of behavior of light in the medium is known as optics. But how the light is produced? This course introduced to make students understand how the light is emitter by the atoms and molecules. Raman effect that won Nobel prize for India in 1930 is taught in the course. Lasers are the present day devices which are being used in all fields – industry, medicine, basic science. On studying this course, the students will understand working principle of lasers in detail.

Course 2.3 Nuclear and Particle Physics (General):Each atom contains the nucleus which is not smallest particle. In this course students are taught nucleus of an atom is composed of what? The subatomic particles, structure of the nucleus, forces acting in between to hold them in such small space. The course involves the basics of natural radioactivity and the applications.

Semester III

Couse 3.1 Quantum Mechanics II: There are many mathematical tools to understand the behavior of particles. Earlier taught QM concepts are re built using new mathematical tools which are helpful to understand the systems in much better sense. Students will get the knowledge of relativistic quantum particles.

Course 3.2 Condensed Matter PhysicsI:Deeper knowledge of crystal structure is provided. Through this course how the electric current, temperature are transported in crystals taught which is essential in device fabrication. Why the crystals show elastic properties are studied.

Course 3.3 Condensed Matter Physics II: Through this course students will understand how and why the material behave in electric and magnetic fields. These are need concepts in device fabrications.

Course 3.2 Nuclear and Particle Physics I: Students will learn the basic properties of atomic nucleus, nuclear forces and nuclear scattering. Also they will be able to understand the theory behind the nuclear detectors, accelerators and reactors.

Course 3.3 Nuclear and Particle Physics II: Construction and working of nuclear detector and accelerators in depth in the course along with application part of nuclear analysis such as XRF and PALT.

Semester IV

Course 4.1 Classical Electrodynamics: In this section electric and magnetic fields and their inter-relations are studied. Students will be able to understand the behavior of electromagnetic radiation in terms of Maxwell's theory, coaxial cables used in communication systems.

Course 4.2 Statistical Mechanics: This part of study is applicable to all fields of sciences. How a system of large number of systems woks and how the large systems are distributed in one big system is studied. Students are made to understand how the macro and micro particles behave collectively.

Course 4.3 Condensed Matter Physics III: In this course the behavior of different types of semiconductors is dealt staring from their structures, fabrication methods and application to fabricate diodes, transistors, sensors etc.

Course 4.4 Condensed Matter Physics IV: Today the world is being ruled by the word NANO. In this part the science behind the nano particles, the fabrication and characterization technique is taught along with instruments used in all sections of nanoscience.

Course 4.3 Nuclear and Particle Physics III: Students will be able to understand the shell model, collective model and nuclear reactions. In related to particles weak interactions of elementary particles is studied in depth.

Course 4.4 Nuclear and Particle Physics IV: A clear picture of nuclear fission and fusion will make students to under stands in better way. Also type of nuclear decay are understood in related to types of nuclear reactions.

DEPT OF PG STUDIES - COMMERCE

PROGRAMME OUTCOMES.

- To make the students understand the core concepts of commerce Relating to many areas like finance, Accounts, Marketing, security Analysis, Business Research Methods, and GST.
- To make the students ready for Corporate Challenges and to give them Exposure to different opportunities in the field of Commerce and industry.
- To inculcate professional ethics and standards.
- To make them realize the importance of tough competition in the commerce field and prepare them to face it confidently.
- To teach the theoretical concepts of the discipline effectively and applying them practically in the business environment.
- To teach the students better ways of communicating methods and techniques.

PROGRAMME SPECIFIC OUTCOMES.

After the completion of the PG STUDIES in Commerce, a student should be able to

- Compete for Teaching and Nonteaching jobs.
- pursue a career in Corporate world both in public and private sector.
- To handle independently the jobs related to commerce and management.

M.COM COURSE LEARNING OUTCOMES

M.COM FIRST SEMESTER

PAPER 1.1: - MARKETING MANAGEMENT

- This subject imparts students with fundamentals of marketing and tools of modern marketing and also acknowledges with the concepts, environment under which a business has to function and plan marketing strategy.
- Thorough knowledge about modern marketing will prepare students for this competitive market. And make them ready to work in this dynamic market.
- It also provides knowledge about preparing marketing strategies, conducting market survey, sales promotion tools and techniques, customer satisfaction, new product development and adoption of recent or modern methods of advertising.

PAPER 1.2- FINANCIAL MANAGEMENT

- The subject aims to provide a thorough knowledge and in-depth understanding of the financial matters related to business and industry.
- The course helps the students to get exposure in taking important financial decisions and analysing the investment decisions.
- Students are prepared to work as financial analysts in financial institution banks and other corporate houses.

PAPER 1.3 – ORGANIZATIONAL BEHAVIOUR

- The subject aims at imparting the knowledge about Employee Behaviour in an Organization.
- Students study the behaviour of an individual and different models used to explain individual behaviour related to motivation, rewards and groups as part of the social and technical system in work place and explain group dynamics and skills required for working in group.
- To identify various Leadership styles and role of leaders in decision making process, explain organizational culture and describe its dimensions and to examine various organizational designs.

PAPER 1.4:- STRATEGIC MANAGEMENT

- This subject aims to provide conceptual knowledge of strategic management process in business and development skills of analysis, implementation and evaluation of corporate level strategies amongst the students.
- It also provides knowledge about corporate governance, strategy, and ethics in strategic management.
- Students are exposed to external environment get to know the different tool and techniques which prepares

PAPER 1.5:- SECURITY ANALYSIS AND PORTFOLIO MANAGEMENT

- To impart knowledge about stock market & portfolio analysis
- To educate the students in preparing security analysis and undertake practical selection of portfolio
- To explore into the world of Financial Market, Stock Market and give in-depth knowledge to become financial professional

M.COM SECOND SEMESTER

PAPER 2.1: - FINANCIAL REPORTING AND ACCOUNTING STANDARDS

- Students will be able to comprehend the theory and practices of reporting Standards
- Students will be able to understand the importance of accounting standards and its implications in preparing Financial Reports.
- Students will be able to analyze the financial statements based on the knowledge of accounting standards

PAPER 2.2: - CORPORATE RESTRUCTURING

- To impart the basics of mergers and acquisition and overall corporate restructuring practices
- To give insights on various types of mergers and acquisition followed by company
- To enhance the knowledge by giving practical exposure on CR strategies

PAPER: -2.3 BUSINESS RESEARCH METHODS

- The course is designed to develop an understanding the quantitative research concepts and their application in business and equip students with necessary skills to apply research methods in business.
- It provides knowledge regarding how to write detailed project reports
- Students will also get familiar with various data collection processing and presentation of data.

PAPER 2.4: - STRATEGIC HUMAN RESOURCES MANAGEMENT

- This course will help students to think strategically and integrate the activities of hr with the organizational goals.
- Students will get to know about how organisations make strategic planning with respect to humanresource, how do they plan compensation strategically, and how the performance is evaluated and awards and rewardsis set.
- Students also get introduced to global human resource management concepts which enhance their HRM knowledge base.

PAPER 2.5 ECONOMIC ANALYSIS OF BUSINESS

- The course is designed to equip the students with an in-depth understanding of various economic concept and their applications in business and industry

- Study helps the students to take important economic decisions in the capacity of a manager in a firm like pricing, production distribution.
- The course is helpful in solving economic problems of a firm and industry like the utilization of firm's economic resources which are limited.

PAPER 2.6:-FUNDAMENTALS OF COMPUTER:

- Students will have the knowledge of computer hardware and software.
- Students will have the knowledge of computer network
- Understand the Dynamics of an office environment

M.COM THIRD SEMESTER

PAPER 3.1: -ACCOUNTING INFORMATION SYSTEM

- Students will benefit from concepts called budget analysing, financial statements tax returns
- Students will be able to examine with financial statements expense report and accounting records.
- Students will take advantage of Technical side of accounting like controls, data processing, integrity maintenance and security

PAPER 3.2: - MULTINATIONAL BUSINESS FINANCE

- The course aims to provide an understanding of concepts and techniques of financial management of MNC'S and to develop the skills of their applications in the management of finance.
- Study helps the students to take decision regarding various investment avenues and to know various sources of finance.
- The course is helpful in knowing different hedging techniques in order to reduce forex risk exposure.

PAPER 3.3: - CORPORATE ACCOUNTING

- Students shall develop competency in the functional areas of accounting
- Students shall develop the ability to identify and evaluate accounting problems and arrive at reasonable conclusions.
- Students shall develop the ability to utilize financial and other authoritative databases and effectively present findings in written format.

PAPER 3.4: - ACCOUNTING FOR SPECIALISED INSTITUTIONS

- The subject AFSI deals with a detailed understanding of accounting principles which are applicable to special institutions like educational institutions.
- It provides specialisation in accounting concepts and preparation of financial statements to reflect the performance of an organisation
- The completion of the course prepares the students to take responsible task of accounting and financing. They are absorbed as accounting specialists in both public and private sector enterprises.

PAPER 3.5: - CORPORATE TAX PLANNING I

- To give overview on income tax framework in India
- To impart detailed direct tax provision and rules related to corporates
- To enhance the knowledge on corporate taxation to become tax professional

PAPER C4:- INTRODUCTION TO ENTREPRENEURSHIP (OPTIONAL ELECTIVE COURSE)

- This course enables the aspiring entrepreneurs in converting their business ideas into successful business venture and providing basic knowledge for effectively managing their start-ups.
- This course attempts to facilitate better understanding of concepts related to entrepreneurship like entrepreneurial personality traits, business opportunity identification, small business management incubation, government efforts towards supporting entrepreneurial ecosystem, institution and support systems to facilitate entrepreneurship.
- Students get through knowledge about incepting, and conducting business so its acts as a driving force to students to take up the challenge of becoming an entrepreneur

M.COM FOURTH SEMESTER

PAPER 4.1: E-COMMERCE

It enables the student to: -

- Analyse the impact of e-commerce on Business models and strategy
- Major types of e-commerce
- Identify the key security threats in in e-Commerce environment

PAPER 4.2 : CORPORATE GOVERNANCE:

- To impart knowledge of wide range of definitions of Corporate Governance, identify recent issues addressed by corporate governance structures.
- To study about drivers of corporate governance such as capital market, shareholders and rating agencies.
- To focus on the Corporate Governance models and Committees framed in Corporate sectors for smooth flow of activities.

PAPER 4.3 :- CONTEMPORARY ISSUES ACCOUNTING

- The subject provides a detailed understanding of contemporary issues in accounting like environmental accounting and social accounting which are very relevant in current situation.
- It equips them to handle the responsibilities connected to corporate social activities
- Its gives a platform to works in the field of social welfare and environmental conservation.

PAPER 4.4:- CORPORATE TAX PLANNING II (GST & CUSTOMS)

- To give overview on indirect tax framework with special focus on gst in India
- To impart detailed gst provision and rules related to corporates
- To impart detailed customs provision and give practical exposure of gst in various industries

PROJECT REPORT AND VIVA-VOCE: -They are made to prepare the projects on the topics of their specialization based on the primary and secondary data. This enables the students to understand the research methodology and its practical implications in the future.