2023-24

2.6.1 Programme Outcomes (POs) and Course Outcomes (Cos) for all Programmes Offered by the institution are stated and displayed on website

S. No	Description
1	Program Outcomes of all the Programs (POs)
2	Program Specific Outcomes of all the Programs (PSOs)
3	Course Outcomes of all the Programs (COs)
4	Mechanism for communication of COs
5	Creation of Awareness about COs
6	Syllabus of a Course having COs

2.6.1

PROGRAMME OUTCOMES FOR ALL PROGRAMMES

ST. ANN'S COLLEGE FOR WOMEN
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Email: st_anns_coll@yahoo.co.in Website: www.stannscollegeforwomen.org

B. Sc- Bachelor of Science

Programme Outcomes

PO1: Essential Domain Knowledge

Comprehensive discipline knowledge and understanding, the ability to engage with different methods and to apply their knowledge in practice including in interdisciplinary contexts.

PO2: Creative and critical thinking and Problem-solving abilities

Be effective problem solver, able to apply critical and evidence-based thinking to conceive innovative responses to future challenges.

PO3: Communication skills and Teamwork

Be able to convey ideas and information effectively to contribute in a positive and collaborative manner to achieving common goals.

PO4: Digital Capabilities

Demonstrate preparedness for living, learning and working in a digital society.

PO5: Social Responsibilities, Ethical and Environmental Competency

Be responsible and effective Global environment whose ethical values and practices are consistent with their roles as responsible members of society.

PO6: Employability and Research related Skills

Demonstrate entrepreneurial skills and explore opportunities of establishing enterprises in the field of science. Be able to develop and design research related skills.

PO7: Life-long Learning

Exhibit life-long learning skills, self and field-based learning skills in the broad context of technological changes.

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B. Com -Bachelor of Commerce

Programme Outcomes

PO1: Essential Domain Knowledge:

Comprehensive discipline knowledge and understanding, the ability to engage with different methods and to apply their knowledge in practice including in interdisciplinary contexts.

PO2: Creative and critical thinking and Problem-solving abilities

Be effective problem solver, able to apply critical and evidence-based thinking to conceive innovative responses to future challenges.

PO3: Communication skills and Teamwork

Be able to convey ideas and information effectively to contribute in a positive and collaborative manner to achieving common goals.

PO4: Digital Capabilities

Demonstrate preparedness for living, learning and working in a digital society.

PO5: Social Responsibilities, Ethical and Environmental Competency

Be responsible and effective Global environment whose ethical values and practices are consistent with their roles as responsible members of society.

PO6: Employability and Research related Skills

Demonstrate entrepreneurial skills and explore opportunities of establishing enterprises in the field of science. Be able to develop and design research related skills.

PO7: Life-long Learning:

Exhibit life-long learning skills, self and field-based learning skills in the broad context of technological changes.

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BCA - Bachelor of Computer Applications

Programme Outcomes

PO1: Essential Domain Knowledge

Comprehensive discipline knowledge and understanding, the ability to engage with different methods and to apply their knowledge in practice including in interdisciplinary contexts.

PO2: Creative and critical thinking and Problem-solving abilities

Be effective problem solver, able to apply critical and evidence-based thinking to conceive innovative responses to future challenges.

PO3: Communication skills and Teamwork

Be able to convey ideas and information effectively to contribute in a positive and collaborative manner to achieving common goals.

PO4: Digital Capabilities

Demonstrate preparedness for living, learning and working in a digital society.

PO5: Social Responsibilities, Ethical and Environmental Competency

Be responsible and effective Global environment whose ethical values and practices are consistent with their roles as responsible members of society.

PO6: Employability and Research related Skills:

Demonstrate entrepreneurial skills and explore opportunities of establishing enterprises in the field of science. Be able to develop and design research related skills.

PO7: Life-long Learning

Exhibit life-long learning skills, self and field-based learning skills in the broad context of technological changes.

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MCA -Master of Computer Applications

Programme Outcomes

PO1: Apply the knowledge of mathematical foundations required for problem solving and the concerned analytical skills to analyze the problem at hand.

PO2: Identify, analyze, design and investigate the complex problems from the programmer's perspective and formulate a solution using the technical skills obtained all through the programme.

PO3: Design and conduct experiments, as well as analyze and interpret data, draw conclusions.

PO4: Apply current and emerging technologies for the problems at hand to create models at different stages of software development process and convert that into code as well as testcases. This process gives a chance forgetting better exposure to the modern

PO5: Communicate effectively, present technical information both verbally and written in the form of are porter mail.

PO6: understand the context based professional, ethical, legal, security and social issues and responsibilities.

PO7: Use research, experiment, contemporary issues to solve industrial problems.

PO8: inculcate the habit of lifelong learning so as to match the cutting-edge needs of the industry from time to time.

PO11: identify opportunities based on the society needs and convert that into an innovative idea so that the same can be converted into an enterprise.

PO12:Understand,management and computing principles with computing knowledge to manage projects in multi disciplinary environments.

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MBA -Master of Business Administration

Programme Outcomes

PO1: Remember and illustrate domain knowledge of advanced concepts, principles, theories and models of Business Management and allied domains.

PO2: Critically examine, interpret and analyse the implications of various Acts, Codes, laws, policies, procedures of business and takes judicious decisions.

PO3: Identify and analyse complex real world problems of business management and provide effective solutions using appropriate theoretical tools and techniques.

PO4: Demonstrate ability to undertake research and real-time projects relating to corporate business and management with the help of statistical tools/quantitative techniques and research methodology and draw valid inferences.

PO5: Demonstrate ability to use various ICT tools in collecting, managing and using information and quantitative data in business related operations.

PO6: Explore and create opportunities of business and entrepreneurship and avail of them to establish enterprises.

PO7: Provide effective leadership and works with team spirit and dignity in the organisational activities.

PO8: Positively responds to demands of social responsibility through willing participation in activities of social help with ethical behaviour, honesty and integrity.

PO9: Appreciate cross cultural aspects of business and management and demonstrates global perspective in understanding and responding to the emerging issues/challenges in the field of business management.

PO10: Evaluate the impact of business decisions and activities on the environment and works for sustainable development.

PO11: Demonstrate appreciable level of effective communications skills of speaking to all stakeholders and reporting to appropriate authorities skills of maintaining cordial relations.

PO12: Show inclination to learn life-long by updating knowledge relevant to business management and related activities.

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2.6.1

PROGRAMME SPECIFIC OUTCOMES FOR ALL PROGRAMMES

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B. Sc - Mathematics, Physics, Computer Science (M.P. Cs)

Programme Specific Outcomes

PSO 1: Understand the concepts of vector spaces, group theory, quantum mechanics, optical, thermal, electrical, mechanical properties of a materials, probability, algorithm design, data base.

PSO 2: Analyse the concepts of mathematics, physics and computers science able to relate them in numerical programming of models of physical systems

PSO 3: Ability to interlink the skills developed and acquires an aptitude to address the problems in simulations of material properties, web and mobile app development

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B. Sc - Mathematics, Statistics, Computer Science (M.S. Cs)

Programme Specific Outcomes

PSO 1: Understand the concepts of vector spaces, group theory, probability, distributions, sampling techniques, algorithm design, data base design and web design.

PSO 2: Analyse the concepts of mathematics, statistics and computers science able to use them in algorithm design and data science.

PSO 3: Acquire the skills to use various sampling techniques, statistical inference, data analysis in MS-Excel, implementation of numerical algorithms by using various programming languages.

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B. Sc - Mathematics, Physics, Chemistry (M.P.C)

Programme Specific Outcomes

PSO1: Understand the theoretical concepts of physical and chemical properties of materials and the role of mathematics in dealing with them in a quantitative way.

PSO2: Analyse the concepts of mathematics, physics and chemistry and understand the relation among them like physical chemistry, mathematical modelling of physics and chemistry problems. Skills needed to handle instruments and adopt lab procedures to study physical chemical properties of materials.

PSO3: Ability to interlink the skills and knowledge in mathematics, physics and chemistry and develop an aptitude to address the problems in biophysics, stock market analysis

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B. Sc – Microbiology, Botany, Chemistry (M.B.C)

Programme Specific Outcomes

PSO 1: Developing deeper understanding of key concepts of Microbiology, Botany, Chemistry at biochemical, molecular and cellular level, physiology and reproduction at organismal level, and microbial word, useful and harmful microorganisms.

PSO 2: Ability to develop theoretical and practical knowledge in handling the microbes with chemicals in labs and using them as model organism.

PSO 3: Imparting knowledge regarding r-DNA technology, E-Coli bacteria and its uses in r-DNA chemicals using in different biological techniques

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B. Sc - Botany, Biotechnology, Chemistry (B.B.C)

Programme Specific Outcomes

PSO 1 : The program Biotechnology, Botany and chemistry has been introduced to prepare the students for a career which finds application and provides solution to some of the major contemporary problems on the earth i.e., providing food for growing population, designing advanced medical treatment options for increasing –evolving diseases, to find solution to deteriorating environment caused due to over exploitation / misuse of natural resources etc.,

PSO 2 : In this program the knowledge about the subject chemistry comes in to play when structures of biomolecules and their interactive relations to the environment are to be understood.

PSO 3 : Finally the subject biotechnology amalgamates the various disciplines of sciences and offers ethically acceptable knowledge to bring about sustainable solutions for a variety of problems related to Agriculture, Environment, Quality of human life. These problems are solved with responsibility using appropriate tools while keeping in mind safety factor of Environment and society.

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B.COM (General)

Programme Specific Outcomes

PSO 1: To understand the nature, scope and concepts of Accounting, Business Operations and Management.

PSO 2: To analyse the relationship between Accounting, Auditing and Taxation.

PSO 3: To understand the application of Corporate Accounting Principles and Practices in real time business situations.

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B.COM (Computer Applications)

Programme Specific Outcomes

PSO1: To understand the nature, scope and concepts of Accounting, Business Operations and Management.

PSO2: To enable the students to understand the concepts of computer software and its applications in business operations.

PSO3: To equip the students with business analytics and e-commerce skills.

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BCA – Bachelor of Computer Applications

Programme Specific Outcomes

PSO1: Apply the knowledge of fundamentals concepts, procedures in Problem Solving.

PSO2: Demonstrate develop programming skills, networking skills, learn applications, packages, programming languages and modern techniques of IT

PSO3: Work with latest computing technologies and pursue careers in IT industry / Teaching and allied areas

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MCA –Master of Computer Applications

Programme Specific Outcomes

PSO1: Design, develop, test and maintain web, mobile and cross-platform software applications using modern tools, technologies, skills and computing models. All these applications so developed may ultimately be moved on to the cloud.

PSO2: Apply security mechanisms for computer applications.

PSO3: Work with latest computing technologies and pursue careers in IT industry/consultancy/research and development, teaching and allied areas.

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MBA –Master of Business Administration

Programme Specific Outcomes

PSO1: Able to Identify, understand and analyse professional issues in contexts of HR /Market / Finance and operations.

PSO2: Apply decision-making techniques, using both quantitative and qualitative analysis to propose solutions for real life issues.

PSO3: Analyse and evaluate ethical problems that occur at all levels of business decision making.

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2.6.1

COURSE OUTCOMES FOR ALL PROGRAMMES

Course Outcomes of all Courses

English				
Semester	**Course Code**	**Course Name**	**Course Outcomes**	
I	EHG1SK	A Course in Communication and Soft Skills	CO1	Apply grammatical rules and become proficient in the use of English
			CO2	Outline and interpret the critical ideas, values and themes of different writers of different genres.
			CO3	Gain articulating the right sounds and intonation of English
			CO4	Demonstrate with the practical, emotional, intellectual and creative aspects of language by integrating knowledge and skill.
			CO5	Functions on understanding ideas for yourself, applying knowledge to new situations and using novel examples to explain a concept.
II	ENG2SK	A Course in Communication and Soft Skills	CO1	Apply grammatical rules and become proficient in the use of English
			CO2	Outline and interpret the critical ideas, values and themes of different writers of different genres.
			CO3	Gain articulating the right sounds and intonation of English
			CO4	Demonstrate with the practical, emotional, intellectual and creative aspects of language by integrating knowledge and skill.
			CO5	Functions on understanding ideas for yourself, applying knowledge to new situations and using novel examples to explain a concept.
III	ENG3S	A Course in Communication and Soft Skills	CO1	Apply grammatical rules and become proficient in the use of English
			CO2	Outline and interpret the critical ideas, values and themes of different writers of different genres.
			CO3	Gain articulating the right sounds and intonation of English
			CO4	Demonstrate with the practical, emotional, intellectual and creative aspects of language by integrating knowledge and skill.

			CO5	Functions on understanding ideas for yourself, applying knowledge to new situations and using novel examples to explain a concept.
Sanskrit				
I	1105-1	Poetry, Prose, Grammar Sanskrit-I	CO1	इतिहासस्य प्रसस्त्यम् जानन्ति। नित्य नूतन धर्मानुसरणन्ति। नैतिका मूल्यान् अधिगचन्ति।
			CO2	मानाव धर्मान्, सामाजिका परिणामान् अधिगचन्ति।
			CO3	नीतिकथां द्वारा मानाव विचक्षणा ग्नानं अधिगम्यन्ते।
			CO4	भाषा परिग्नानम् अधिगचन्ति।
II	1105-2	Poetry, Prose, Grammar Sanskrit-II	CO1	वामसगौरव रक्षणं, नायकत्वलक्षणं आध्यात्मिकमूल्यान् विद्यार्धिनाह अधिगम्यन्ते।
			CO2	इथिहासानं प्रआसस्त्यं, युवकानं परिणामक्रमे व्यक्तित्व विकासं विद्यार्धिनः अभिजानन्ति।
			CO3	धर्मिक मूल्यान, राजाधर्मान, धात्रुत्व भवान् विद्यार्द्थिना अवलम्बन्ति।
			CO4	भाषा परिग्नानं अभिजानन्ति।
III	1105-3	Poetry, Prose, Grammar Sanskrit-III	CO1	नैतिका मूल्यान्, धर्मीक चिन्तनं गणनं लभते। प्राचीन नाटका विषाये ग्नान सम्पादनं।
			CO2	आत्मविश्वासं, व्याक्तिगतसमर्द्यं महत्वां ग्नायते ।
			CO3	आत्मविश्वासं, व्याक्तिगतसमर्द्यं महत्वां ग्नायते ।
			CO4	सातिविका भावान् ग्नान सम्पादनं।
			CO5	प्राचीन सास्त्रकारणं परिचयः ग्नायते ।
Telugu				
I	1103-1K	ప్రాచీన తెలుగు కవిత్వం	CO1	ప్రాచీన తెలుగు సాహిత్యం యొక్క ప్రాచీనతను, విశిష్టతను గుర్తిస్తారు. తెలుగు సాహిత్యంలో ఆదికవి నన్నయ కాలంనాటి భాషా సంస్కృతులను, ఇతిహాసకాలం నాటి రాజనీతి విషయాల పట్ల పరిజ్ఞానాన్ని సంపాదించగలరు.
			CO2	శివకవుల కాలంనాటి మతపరిస్థితులను, భాషా విశేషాలను గ్రహిస్తారు. తెలుగు నుడికారం, సామెతలు, లోకోక్తులు మొదలైన భాషాంశాల పట్ల పరిజ్ఞానాన్ని పొందగలరు.
			CO3	తిక్కన భారతంనాటి మత, ధార్మిక పరిస్థితులను, తిక్కన కవితాశిల్పాన్ని, నాటకీయతను అవగాహన చేసుకోగలరు.

			CO4	ఎన్నిన సూక్తివైచిత్రిని, ఇతిహాస కవిత్వంలోని విభిన్న రీతులపట్ల అభిరుచిని పొందగలరు. శ్రీనాథుని కాలం నాటి కవితావిశేషాలను, మొల్ల కవితా విశిష్టతను గుర్తించగలరు.
			CO5	తెలుగు పద్యం స్వరూప స్వభావాలను, సాహిత్యాభిరుచిని పెంపొందించుకుంటారు. ప్రాచీన కావ్య భాషలోని వ్యాకరణాంశాలను అధ్యయనం చేయడం ద్వారా భాషా సామర్థ్యాన్ని రచనల మెళకువలను గ్రహించగలరు.
II	1103-2k	ఆధునిక తెలుగు సాహిత్యం	CO1	ఆంగ్లభాష ప్రభావం కారణంగా తెలుగులో వచ్చిన ఆధునిక సాహిత్యాన్ని, దాని విశిష్టతను గుర్తిస్తారు.
			CO2	సమకాలీన ఆధునిక సాహిత్య ప్రక్రియలైన వచన కవిత్వం, కథ, నవల, నాటకం, విమర్శలపై అవగాహన పొందుతారు.
			CO3	భావకవిత, అభ్యుదయ కవితాలక్ష్యాలను గూర్చిన జ్ఞానాన్ని పొందుతారు. అస్తిత్వవాద ఉద్యమాలపుట్టుకను, ఆవశ్యకతను గుర్తిస్తారు.
			CO4	కథాసాహిత్యం ద్వారా సామాజిక చైతన్యాన్ని పొందుతారు. సిద్ధాంతాల ద్వారా కాకుండా, వాస్తవ పరిస్థితులను తెలుసుకోవడం ద్వారా సిద్ధాంతాన్ని సమీక్షించగలరు.
			CO5	ఆధునిక తెలుగు కల్పనాసాహిత్యం ద్వారా సామాజిక, సాంస్కృతిక, రాజకీయ చైతన్యాన్ని పొందుతారు.
III	2103-3k	సృజనాత్మక రచన	CO1	తెలుగు సాహిత్య అభ్యసన ద్వారా నేర్చుకున్న నైపుణ్యాలను, సృజనాత్మక నైపుణ్యాలుగా మార్చుకోగలరు.
			CO2	విద్యార్థులు భాషాతత్వాన్ని, భాష యొక్క ఆవశ్యకతను, భాష యొక్క ప్రాధాన్యాన్ని గుర్తిస్తారు. మనిషి వ్యక్తిగత జీవనానికి, సామాజికవ్యవస్థ పటిష్టతకు భాష ప్రధానమని తెలుసుకుంటారు. తెలుగుభాషలోని కీలకాంశాలైన 'వర్ణం - పదం - వాక్యా'ల ప్రాధాన్యాన్ని గుర్తిస్తూ, వాగ్రూప- లిఖితరూప వ్యక్తీకరణ ద్వారా భాషానైపుణ్యాలను మెరుగుపరచుకోగలరు.
			CO3	భాషానైపుణ్యాలను అలవరచుకోవడంతో పాటు వినియో గించడం నేర్చుకుంటారు. రచనా, భాషణానైపుణ్యాలను సృజనాత్మక రూపంలో వ్యక్తీకరించ గలరు.

			CO4	ప్రాచీన పద్యరచనతో పాటు ఆధునిక కవిత, కథ, వ్యాసం, మొదలైన సాహిత్య ప్రక్రియల నిర్మాణాలకు సంబంధించిన సిద్ధాంత విషయాలను నేర్పడంతో పాటు వారిలో రచనా నైపుణ్యాలను పెంపొందించుకోగలరు.
			CO5	సృజన రంగం, ప్రసారమాధ్యమ రంగాల్లో ఉపాధి అవకాశాలను అందిపుచ్చుకోగలరు. అనువాద రంగంలో నైపుణ్యం సంపాదించగలరు.
Mathematics				
I	UG-102	Differential Equations	CO1	Students can develop a solid understanding of the fundamental concepts of differential equations, including the definitions of differential equations, order, linearity, and solutions.
			CO2	Students can be able to convert non exact homogeneous equations to exact differential equations by using integrating factors.
			CO3	Students were capable to analyse the methods of finding solutions of differential equations of the first order but not of the first degree.
			CO4	Students can solve higher-order linear differential equations, both homogeneous and non-homogeneous, with constant coefficients.
			CO5	Students can understand on the concepts and apply appropriate methods for solving differential equations.
II	UG-102	Three-Dimensional Analytical Solid Geometry	CO1	Students can be able to understand and analyse the concepts on planes.
			CO2	Students may be able to understand and analyze the concepts on lines.
			CO3	Students may be able to understand and analyze the concepts on sphere and cone
			CO4	Students can be able to understand and analyze the properties of planes, lines, spheres and cones.
			CO5	Students can be able to analyze the concepts and express the problems geometrically and then to get the solution
III	UG-102	Abstract algebra	CO1	Students can able to Basic concepts from abstract algebra, especially the notion of a group.Acquire the basic knowledge and structure of groups, subgroups and cyclic groups.
			CO2	Students can Get the significance of the notation of normal subgroups. Get the behaviour of permutations and operations on them.

			CO3	Students can Study the homomorphisms and isomorphisms with applications.
			CO4	Students can able to Understand the Group theory and to prove the theorems.
			CO5	Students can able to Understand the applications of Numerical Analysis in various fields.
IV	UG-102	Real Analysis	CO1	Students can Get a clear idea about the real numbers and real valued functions.
			CO2	Students may Obtain the skills of analyzing the concepts and applying appropriate methods for testing convergence of a sequence or series.
			CO3	Students may able to Test the continuity and differentiability of the function
			CO4	Students can able to Test the Riemann integration of a function.
			CO5	Students can learn and know the geometrical interpretation of mean value theorems.
V	UG-102	Linear Algebra	CO1	Students must understand the concepts of vector spaces, subspaces, basises, dimension and their properties
			CO2	Students must understand the concepts of linear transformations and their properties
			CO3	Students must understand the concepts of Characteristic equations, Characteristic Values & Vectors of square matrix and their properties
			CO4	Students must analyze and apply Cayley- Hamilton theorem to problems for finding the inverse of a matrix and higher powers of matrices without using routine methods
			CO5	Students must analyze and apply tensor analysis in some of the physics Related Formulas
VI	UG-102	Numerical Methods	CO1	Students can able to Understand the subject of various numerical methods that are used to obtain approximate solutions
			CO2	Students can able to learn various finite difference concepts and interpolation methods.
			CO3	Students can able to analyze and Work out numerical differentiation and integration whenever and wherever routine methods are not applicable.
			CO4	Students can able to Find numerical solutions of ordinary differential equations by using various numerical methods.
			CO5	Students can able to Analyze and evaluate the accuracy of numerical methods

VII	UG-102	Special Functions	CO1	Students must understand the Beta and Gamma functions, their properties and relation between these two functions, understand the orthogonal properties of Chebyshev polynomials and recurrence relations.
			CO2	Students must find power series solutions of ordinary differential equations.
			CO3	Students must be able to solve Hermite equations and write the Hermite Polynomial of order (degree) n, also find the generating function for Hermite Polynomials, study the orthogonal properties of Hermite Polynomials and recurrence relations
			CO4	Students must be able to solve Legendre equation and write the Legendre equation of the first kind, also find the generating function for the Legendre polynomial, Understand the orthogonal properties of Legendre polynomials
			CO5	Students must be able to solve Bessel equation and write the Bessel equation of the first kind of order n, also find the generating function for Bessel function and understand the orthogonal properties of Bessel equation.
VIII	UG-102	Project	CO1	Analyze and interpret and take appropriate decisions in solving real life problems using statistical tools.
			CO2	Use different Statistical packages for graphical interface, data analysis and interpretation
			CO3	Write a systematic Statistical project report.
Physics				
I	PHY1SK	Mechanics, waves and oscillations	CO1	Explain Newton's laws of motion and motion of variable mass system and its application to rocket motion and the concepts of impact parameter, scattering cross section.
			CO2	Apply the rotational kinematic relations, the principle and working of gyroscope and it applications and the processional motion of a freely rotating symmetric top.
			CO3	Interpret the general characteristics of central forces and the application of Kepler's laws to describe the motion of planets and satellite in circular orbit through the study of law of Gravitation.
			CO4	Examine phenomena of simple harmonic motion and the distinction between un damped,damped and forced oscillations and the concepts of resonance and quality factor with reference to damped harmonic oscillator.

			CO5	Discuss the coupled oscillations and solve them to obtain normal modes of oscillation and their frequencies in simple mechanical systems. Acquire the knowledge on Ultrasonic waves, their production and detection and their applications in different fields.
	PHY1SK	Mechanics, Waves and Oscillations (Lab)	CO1	Outline the operations of basic measuring instruments.
			CO2	Measure viscosity of liquid by the flow method and surface tension by capillary rise method.
			CO3	Apply the knowledge of Elastic constants to measure young's modulus of material of a rod by uniform bending methods.
			CO4	Verify the concept of acceleration due to gravity using simple pendulum by method of errors.
			CO5	Determine the rigidity modulus of material of a wire using torsional pendulum
II	PHY2SK	Wave Optics	CO1	Explain the phenomenon of interference of light and its formation in (i) Lloyd's single mirror due to division of wave front and (ii) Thin films, Newton's rings and Michelson interferometer due to division of amplitude.
			CO2	Distinguish between Fresnel's diffraction and Fraunhoffer diffraction and observe the diffraction patterns in the case of single slit and the diffraction grating.
			CO3	Describe the construction and working of zone plate and make the comparison of zone plate with convex lens.
			CO4	Explain the various methods of production of plane, circularly and polarized light and their detection and the concept of optical activity.
			CO5	Comprehend the basic principle of laser, the working of He-Ne laser and Ruby lasers and their applications in different fields.
			CO6	Explain about the different aberrations in lenses and discuss the methods of minimizing them.
	PHY2SK	Wave Optics (Lab)	CO1	Gain hands-on experience of using various optical instruments like spectrometer,polarimeter and making finer measurements of wavelength of light using Newton Rings experiment, diffraction grating etc.

			CO2	Know the techniques involved in measuring the resolving power of telescope and dispersive power of the material of the prism.
			CO3	Be familiar with the determination of refractive index of liquid by Boy's method and the determination of thickness of a thin wire by wedge method.
			CO4	Determine the wavelength of diffraction grating-Minimum deviation method
III	PHY3SK	Heat and Thermodynamics	CO1	Explain the basic aspects of kinetic theory of gases, Maxwell-Boltzmanndistribution law, equipartition of energies, mean free path of molecular collisions and the transport phenomenon in ideal gases
			CO2	Describe on the basic concepts of thermodynamics, the first and the second lawof thermodynamics, the basic principles of refrigeration, the concept of entropy, the thermodynamic potentials and their physical interpretations.
			CO3	Explain the working of Carnot's ideal heat engine, Carnot cycle and its efficiency
			CO4	Develop critical understanding of concept of Thermodynamic potentials, the formulation of Maxwell's equations and its applications.
			CO5	Differentiate between principles and methods to produce low temperature and liquefyair and also understand the practical applications of substances at low temperatures.
			CO6	Examine the nature of black body radiations and the basic theories.
	PHY3SK	Heat and Thermodynamics (Lab)	CO1	Determination of Stefan's constant
			CO2	Determination of coefficient of thermal conductivity
			CO3	Variation of thermo-emf ofa thermocouple with temperature difference at its two junctions
			CO4	Calibration of a thermocouple and Specific heat of a liquid.
IV	PHY4SKA	Electricity, Magnetism & Electronics	CO1	Apply Gauss's law to get relations connecting dielectric parameters and their applications.
			CO2	Derive expressions for the magnetic field at a point due to current carrying conductors using Biot-Savart Law.
			CO3	Distinguish self and mutual inductance phenomena and their real -time applications
			CO4	Compute Maxwell's electromagnetic wave equations and their role in communications

			CO5	Summarize the basic concepts of semiconductors and digital electronics and their applications
	PHY4SKA	Electricity, Magnetism & Electronics (Lab)	CO1	Describe the resonance condition in LCR series and parallel circuits.
			CO2	Study the variation of magnetic field along the axis of a circular coil carrying current using Stewart and Gee's apparatus.
			CO3	Summarize the operation of PN junction diode, Zener diode and a transistor and their V -I characteristics.
			CO4	Verify De Morgan's Theorems, Half and Full Adders.
			CO5	Summarize the basic concepts of semiconductors, and digital electronics and their applications
IV	PHY4SKB	Modern physics	CO1	Develop an understanding on the concepts of Atomic and Modern Physics, basicelementary quantum mechanics and nuclear physics.
			CO2	Develop critical understanding of concept of Matter waves and Uncertainty principle
			CO3	Get familiarized with the principles of quantum mechanics and the formulation ofSchrodinger wave equation and its applications & Examine the basic properties of nuclei, characteristics of Nuclear forces, salientfeatures of Nuclear models and different nuclear radiation detectors.
			CO4	Classify Elementary particles based on their mass, charge, spin, half life and interaction.
			CO5	Get familiarized with the nano materials, their unique properties and applications.
			CO6	Increase the awareness and appreciation of superconductors and their practical applications
	PHY4SKB	Modern physics (Lab)	CO1	Determine Planck's constant from photocell characteristics.
			CO2	Verify inverse square law of light using photovoltaic cell
			CO3	Determine energy gap of a semiconductor using junction diode.
			CO4	Determine energy gap of a semiconductor using thermistor.
			CO5	Measure charge of an electron and e/m value of an electron by Thomson method.
			CO1	Identify various methods and techniques used to produce low temperatures in the Laboratory.
			CO2	Explain refrigeration and air conditioning.

V	PHY5SKC	Low Temperature Physics & Refrigeration	CO3	Demonstrate skills through hands on experience about refrigeration components and their accessories in a Refrigerator.
			CO4	Describe the classification, properties of refrigerants and their effects on environment.
			CO5	Outline the applications of Low Temperature Physics and refrigeration
	PHY5SKC	Low Temperature Physics & Refrigeration (Lab)	CO1	List out, identify and handle equipment used in low temperature lab.
			CO2	Describe the procedures of preparation of Freezing Mixtures.
			CO3	Demonstrate skills on developing various Freezing mixtures and materials.
			CO4	Explain the various methodologies of creating very low temperatures.
			CO5	Outline the applications of low temperature physics in day-to-day life.
V	PHY5SKD	Solar Energy and Applications	CO1	Explain the sun's structure, forms of energy coming from the sun and its measurement.
			CO2	Acquire a critical knowledge on the working of thermal and photovoltaic collectors.
			CO3	Demonstrate skills related to on solar cells and its applications.
			CO4	Explain testing procedures and fault analysis of thermal collectors and PV modules.
			CO5	Comprehend applications of thermal collectors and PV modules.
	PHY5SKD	Solar Energy and Applications (Lab)	CO1	List out and identify various components of solar thermal collectors and systems, solar photovoltaic modules and systems.
			CO2	Learn the procedures for measurement of direct, global and diffuse solar radiation. I-V characteristics and efficiency analysis of solar cells and modules.
			CO3	Demonstrate skills acquired in evaluating the performance of solar cell/ module in connecting them approximately to get required power output.
			CO4	Acquire skills in identification and elimination of the damaged panels without affecting the output power/array.
			CO5	Perform procedures and techniques related to general maintenance solar thermal and photovoltaic modules.

VI		PROJECT	CO1	Analyze and interpret and take appropriate decisions in solving real life problems using statistical tools.
			CO2	Use different Statistical packages for graphical interface, data analysis and interpretation
			CO3	Write a systematic Statistical project report.
Statistics				
I	UG-102	Descriptive Statistics	CO1	knowledge of Statistics and its scope and importance in various areas such as Medical, Engineering, Agricultural and Social Sciences etc.
			CO2	knowledge of various types of data, their organization and evaluation of summary measures such as measures of central tendency and dispersion etc.
			CO3	knowledge of other types of data reflecting quality characteristics including concepts of independence and association between two attributes,
			CO4	Insights into preliminary exploration of different types of data.
			CO5	Knowledge of correlation, regression analysis, regression diagnostics, partial and multiple correlations.
	UG-102	Descriptive Statistics - Practicals	CO1	Interpret Graphical and Diagrammatic data presentation which makes it easier for a common man to understand the given data.
			CO2	Determine Various measures of Central Tendency and Dispersion and interpret the results.
			CO3	Interpret problem solving skills using Moments
			CO4	Apply the Karl Pearson's coefficient of Skewness and Bowley's Coefficient of Skewness for the given data and compare the results.
			CO5	Apply the Curve fitting Methods to analyze the given Bivariate data.
			CO6	To Apply and Solve the given Bivariate data using Correlation and Regression methods.
			CO7	Apply association and Contingency Techniques for Qualitative data using Attributes and compare the results
II	UG-102	Probability Theory and Distributions	CO1	Ability to distinguish between random and non-random experiments,
			CO2	Knowledge to conceptualize the probabilities of events including frequentist and axiomatic approach. Simultaneously, they will learn the notion of conditional probability including the concept of Baye's Theorem.

			CO3	Knowledge related to concept of discrete and continuous random variables and their probability distributions including expectation and moments.
			CO4	Knowledge of important discrete and continuous distributions such as Binomial, Poisson, Geometric, Negative Binomial and Hyper-geometric, Normal, uniform, exponential, beta and gamma distributions.
			CO5	Acumen to apply standard discrete and continuous probability distributions to different situations.
	UG-102	Probability Theory and Distributions - Practicals	CO1	Identify different types of Real-Life Problems
			CO2	Apply and analyze the Discrete Probability distributions – Binomial, Poisson, Negative Binomial and Geometric – to the real-life situations to draw valid conclusions.
			CO3	Interpret Continuous Probability distributions – Normal and Exponential – in day-to-day life to draw valid inferences.
III	UG-102	Statistical Inference	CO1	Concept of law large numbers and their uses
			CO2	Concept of central limit theorem and its uses in statistics
			CO3	Concept of random sample from a distribution, sampling distribution of a statistic, standard error of important estimates such as mean and proportions.
			CO4	Knowledge about important inferential aspects such as point estimation, test of hypotheses and associated concepts.
			CO5	Knowledge about inferences from Binomial, Poisson and Normal distributions as illustrations.
			CO6	Concept about non-parametric method and some important non-parametric tests.
	UG-102	Statistical Inference - Practicals	CO1	Apply Large Sample Tests to solve different real-life situations.
			CO2	Apply Small Sample Tests to solve different real-life situations.
			CO3	Distinguish between Parametric and Non-Parametric tests and apply them for the real-life data problems.
IV	UG-102	Sampling Techniques and Designs of Experiments	CO1	Introduced to various statistical sampling schemes such as simple, stratified and systematic sampling.
			CO2	An idea of conducting the sample surveys and selecting appropriate sampling techniques.
			CO3	Knowledge about comparing various sampling techniques.
			CO4	Carry out one way and two-way Analysis of Variance.

			CO5	Understand the basic terms used in design of experiments.
			CO6	Use appropriate experimental designs to analyze the experimental data.
	UG-102	Sampling Techniques and Designs Of Experiments - Practicals	CO1	Design and Implement Surveys with the random sampling designs – Simple, Stratified and Systematic.
			CO2	Compute and interpret the results of ANOVA and F-test.
			CO3	Apply the Basic Designs of Experiments – CRD, RBD and LSD – to analyze real life situations.
			CO4	Demonstrate how to analyze and interpret the results of the full Factorial Designs.
V	UG-102	Applied Statistics	CO1	Time series data, its applications to various fields and components of time series.
			CO2	Fitting and plotting of various growth curves such as modified exponential, Gompertz and logistic curve and also Fitting of trend by Moving Average method.
			CO3	Measurement of Seasonal Indices by Ratio-to-Trend, Ratio-to-Moving Average and Link Relative methods.
			CO4	Interpret and use a range of index numbers commonly used in the business sector.
			CO5	Perform calculations involving simple and weighted index numbers.
			CO6	Measuring of consumer price index and perform calculations.
			CO7	Construction and implementation of life tables, Population growth curves, population estimates and projections.
	UG-102	Applied Statistics - Practicals	CO1	Apply various Trend methods to solve the different Time Series data in real life situations.
			CO2	Discuss and Analyze the economy and Standard of living in different countries using Index Numbers.
			CO3	Interpret the Methods of predicting Birth and Death Rates.
			CO4	Construct the Life Tables for living beings from different age groups.
VI	UG-102	Operations Research - I	CO1	To know the scope of Operations Research.
			CO2	To link the OR techniques with business environment and life sciences.
			CO3	To convert real life problems into mathematical models.
			CO4	To find a solution to the problem in different cases.

			CO5	To inculcate logical thinking to find a solution to the problem.
	UG-102	Operations Research – I - Practicals	CO1	To construct a linear programming problems to the given data.
			CO2	Apply Graphical Method, Simplex Method, Big-M method and Two-Phase Simplex Methods to solve Optimization Problems.
			CO3	To determine IBFS and OS to the given Linear Programming Problems.
			CO4	Demonstrate how to apply the Principle of Duality to solve the Operations Research Problems.
			CO5	Interpret the Problems based on Post-Optimal Analysis.
VII	UG-102	Operations Research – II	CO1	To solve the problems in logistics.
			CO2	To find a solution for the problems having space constraints
			CO3	To minimize the total elapsed time in an industry by efficient allocation of jobs to the suitable persons.
			CO4	To find a solution for an adequate usage of human resources
			CO5	To find the most plausible solutions in industries and agriculture when a random environment exists.
	UG-102	Operations Research – II - Practicals	CO1	Apply and analyze various types of Deterministic Models – Transportation Problem and Assignment Problem.
			CO2	Maximize the Profits or Minimize the Cost of and Industry by efficient allocation of Jobs to the suitable Persons.
			CO3	Minimise the Total elapsed time of the projects by using CPM and PERT Models.
			CO4	Solve and interpret the simple models of Game Theory.
			CO5	Demonstrate how to apply the Linear Programming Method for Solving the Games.
VIII	UG-102	Project	CO1	Analyze and interpret and take appropriate decisions in solving real life problems using statistical tools.
			CO2	Use different Statistical packages for graphical interface, data analysis and interpretation
			CO3	Write a systematic Statistical project report.
Microbiology				
I	MCB1SK	Introduction to microbiology and microbial Diversity	CO1	Explain the evolution of the microbiology field and the scientific discoveries relating to each field.

			CO2	Summarize the techniques used to stain and observe the microorganisms under microscope
			CO3	Discuss the History, milestones of Microbiology
			CO4	Demonstrate different isolation, preservation techniques
			CO5	Analyse the Ultrastructure of Prokaryotic cell
	MCB1SK	Introduction to microbiology and microbial Diversity	CO1	Demonstrate the basic instruments & their operation
			CO2	Examine the process of staining techniques
			CO3	Preparation of different types of culture media.
			CO4	Isolation of bacteria by using pure culture techniques.
			CO5	Examine the Gram positive and Gram-negative Bacteria.
II	MCB2SK	Microbial physiology and Biochemistry	CO1	Evaluate the roles of different biomolecules in a microbial cell
			CO2	Analysis the Biomolecule separation techniques: chromatography, gel electrophoresis, spectrophotometry
			CO3	Illustrate, differentiate and contrast between the structures of DNA and also discuss the DNA replication process
			CO4	Explain the different metabolic pathways used by the microorganisms
			CO5	Describe the properties, structure, function of enzymes
	MCB2SK	Microbial physiology and Biochemistry	CO1	Qualitative Analysis of Carbohydrates & amino acids
			CO2	Estimation of DNA & RNA by diphenyl & oricinol method
			CO3	Estimation of reducing sugar- anthrone method
			CO4	Determination of Pk & Pi activity of amino acids
			CO5	Demonstration of immobilization of enzyme activity
III	MCB3SK	Medical Microbiology and immunology	CO1	Differentiate between different types pathogenic organisms, and explain in details pathogenicity, diagnosis of pathogenic organisms
			CO2	Interpret the possible suggested preventive and treatment methods
			CO3	Explain various chemotherapeutic agents and their mode of actions and general account of various communicable diseases and their preventive methods

			CO4	Illustrate the basic concepts of different types of immunity and different cells and organs involved in combating pathogens
			CO5	Demonstrate the different types of antigen-antibody interactions and their application in diagnosing different infections
	MCB3SK	Medical Microbiology and immunology	CO1	Identification of human blood groups
			CO2	Estimation of blood haemoglobin
			CO3	Demonstration on separation on serum from blood sample
			CO4	Isolation and identify the bacterial floral by skin swab method
			CO5	Analyze the antibiotic resistance
IV	MCB4SKA	Industrial Microbiology	CO1	Summarize the importance of industrially used microbes and screening techniques used, various methods stain improvement for microbial products
			CO2	Demonstrate the various types of fermentation process design of fermenter
			CO3	Apply the industrial micro-organisms involved in various industries
			CO4	Analyze the given pharmaceutical products for its sterility, Microbiological determine the potency of the products like antibiotics and vitamins
			CO5	Explain the importance of sterilization in Fermentation process and deferent sterilization methods`
	MCB4SKAP	Industrial Microbiology	CO1	Formulate the Production of ethanol
			CO2	Isolation of amylase producing microorganisms from soil
			CO3	Estimation of ethanol
			CO4	Demonstration of Fermentor
			CO5	Analyze the growth curve of industrially microorganisms
IV	MCB4SKB	Molecular Biology & Microbial Genetics	CO1	Design experiments to perform DNA & RNA as Genetic material
			CO2	Summarize the chemical reactions leading to DNA damage
			CO3	Determine the modes of genetic recombination in bacteria
			CO4	Explain the Structure, regulation of Lacoperon with gene expression in bacteria

			CO5	Discuss the concept of Molecular biology types of RNA & protein synthesis in prokaryotes & Eukaryotes
	MCB4SKB	Molecular Biology & Microbial Genetics	CO1	Demonstrate the different types of DNA & RNA
			CO2	Isolation & Identify the genomic DNA from E.coli
			CO3	Estimation of DNA using UV spectrophotometer
			CO4	Detect the Mutations in bacteria by UV light
			CO5	Analyse the proteins by Gel Electrophoresis
V	MCB5SKA	Food agricultural & environmental microbiology	CO1	Explain the parameters that induce spoilage and process of intoxication in food borne diseases
			CO2	Analysis the Methods of food preservation
			CO3	Develop knowledge on Role of microorganisms in production of fermented foods and probiotics
			CO4	Apply Skills in isolation of *Rhizobium* & other microflora from rhizosphere & rhizoplane
			CO5	Outlines of Role of microorganisms in degradation of solid/liquid wastes
	MCB5SKAP	Food agricultural & environmental microbiology	CO1	Isolate & identify of bacteria and fungi from spoiled fruits & vegetables
			CO2	Determination of microbiological quality of milk sample by MBRT
			CO3	Identification of Rhizosphere microflora from the soil
			CO4	Analysis of potable water presumptive, confirmed, completed test by MPN method
			CO5	Study of air flora by Petri plate exposure method
V	MCB5SKB	Management of human microbial disease and diagnosis	CO1	Illustrate the data obtained from biochemical analyses of samples such as whole blood, serum, urine etc. with clinical symptoms and possible pathologies
			CO2	Apply the Methods & transport of clinical samples to Laboratory, storage
			CO3	Analyse the infected blood samples by using Gram Staining procedures
			CO4	Demonstrate different types of antigen-antibody interactions and their application in diagnosing different infections
			CO5	Determine the Drug Resistance in Bacteria

	MCB5SKBP	Management of human microbial disease and diagnosis	CO1	Examine the clinical samples of Urine, puss, sputum
			CO2	Demonstration of permanent slides of different parasites
			CO3	Estimation of Haemoglobin
			CO4	Determination of ESR & PCV
			CO5	Isolate & identify the bacteria in pure culture
VI		Project	CO1	Explore career alternative prior to graduation.
			CO2	Develop work habits and attitudes necessary for job success.
			CO3	Assess interests and abilities in their field of study.
Biotechnology				
I	BTY1SK	Bio molecules and analytical techniques	CO1	Explain the basics structure, properties and functions of bio molecules.
			CO2	Identify the properties of bio molecules using bio analytical techniques.
			CO3	Demonstrate the working principals, and applications of different separation technique especially chromatographic, electrophoretic and centrifugation techniques.
			CO4	Apply various analytical technique and using them in research area.
			CO5	Analyse the applications and limitations of different bio statistical methods
	BTY1SKP	Bio molecules and analytical techniques-Lab	CO1	Acquire knowledge in qualitative/quantitative estimation of Biomolecules
			CO2	Assay of protease activity
			CO3	Separation of molecules by chromatography/ electrophoresis
			CO4	Estimation of nucleic acids DNA, RNA
			CO5	Find values of mean, median mode
II	BTY2SK	Microbiology Cell & Molecular biology	CO1	Discuss the concepts of microbiology, cell and molecular biology
			CO2	Distinguish between different types of microbes, classification and their characterizations
			CO3	Explain structure and function of prokaryotic and eukaryotic cell organelles, cell Division.
			CO4	Summarize the basics of molecular biology including DNA replication, transcription, translation and regulation of gene expression
			CO5	Analyse the functional aspects of the cell at molecular level.

	BTY2SK	Microbiology Cell & Molecular biology - Lab	CO1	Identify the bacteria from soil
			CO2	Examine the process of staining techniques
			CO3	Demonstrate the basic instruments and their operations
			CO4	Identify the phases mitotic/meiotic cell divisions
			CO5	Isolation of DNA from bacteria
III	BTY3SK	Immunology&rDNA technology	CO1	Explain the concepts of immunology and recombinant DNA technology
			CO2	Outline the basics of immunology dealing cells and organs of the immune system, types of immune responses, antigen antibody interactions
			CO3	Apply the steps involved in recombinant DNA technology.
			CO4	Determine the isolation of plasmids, cloning of gene and transformation into Suitable bacteria for selection of recombinant clones
			CO5	Demonstrate knowledge of various biological databases and computational tools.
	BTY3SKP	Immunology&rDNA technology -Lab	CO1	Determination of Blood groups
			CO2	Perform the different serological tests
			CO3	Isolation of plasmid DNA
			CO4	Determination of process of Blotting
			CO5	Determination of process of PCR
IV	BTY4SKA	Plant& Animal Biotechnology	CO1	Demonstrate the basic knowledge about plant tissue culture and animal tissue culture.
			CO2	Describe the safety issues of GM crops and products in the society.
			CO3	Explain Animal cell culture and different type of cell culture and application of cell Culture.
			CO4	Assume artificial embryo transfer and nuclear transfer methods and applications.
			CO5	Influence the intellectual property rights, biosafety of genetically engineered products.
	BTY4SKAP	Plant& Animal Biotechnology-Lab	CO1	Formulate the plant tissue culture media
			CO2	Determination of plant cell culture, methods
			CO3	Demonstration of Animal tissue culture
			CO4	Find out cell count by hemacytometer
			CO5	Measure ELISA

IV	BTY4SKB	Environmental& Industrial biotechnology	CO1	Explain about environmental pollution- sources, effects and control Measures of environmental pollution
			CO2	Demonstrate the treatment of wastewater and solid waste management
			CO3	Find the basic concept and issues of environmental pollution biotechnological treatment to clean up polluted environments and to create valuable resources for the human society.
			CO4	Illustrate knowledge about applications of Vermicomposting
			CO5	Summarize The use of bio fertilizer and to train the students for self-Employment.
	BTY4SKBP	Environmental& Industrial biotechnology -Lab	CO1	Determine the purity of potable water
			CO2	Measure the hardness & alkalinity of water sample
			CO3	Identify microorganisms from soil
			CO4	Formulate the production of alcohol
			CO5	Estimate of citric acid
V	BTY5SKE	Apiculture	CO1	Discuss the basic concepts of Apiculture
			CO2	Classify the different species and races of honey bees.
			CO3	Find the importance of health and hygiene in Bee keeping
			CO4	Find the importance of health and hygiene in Bee keeping
			CO5	Determine prospects of Api culture as self-employment venture.
	BTY5SKEP	Apiculture-Lab	CO1	Demonstrate the maintain the Bees hives
			CO2	Perform the maintain bee boxes
			CO3	Find the tools required in Bee keeping
			CO4	Determine the methodology of extraction honey
			CO5	Prepare the extraction of honey & Bee wax
V	BTY5SKF	Pearl culture	CO1	Explain the basic concepts of Pearl culture
			CO2	Apply the knowledge regarding the Anatomical and Physiological aspects of fresh water oysters.
			CO3	Develop the various types of implantation methods and pearl culture surgery techniques
			CO4	Assume skill on production of pearl and its marketing for economic gain
			CO5	Choose self-employment, prospects, of pearl industry .

	BTY5SKFP	Pearl culture -lab	CO1	Execute pearl culture activities
			CO2	Explain the techniques of surgical operations
			CO3	Designed pearl culture techniques
			CO4	Develop of pearls & marketing of pearls
			CO5	Perform pearl harvesting
VI		PROJECT	CO1	Explore career alternative prior to graduation
			CO2	Develop work habits and attitudes necessary for job success
			CO3	Assess interests and abilities in their field of study
Botany				
I	BOT 1 SK	Fundamentals of microbes & non vascular plants	CO1	Explain origin of life on the earth
			CO2	Illustrate diversity among the viruses and prokaryotic organisms and categorize them.
			CO3	Classify fungi, lichens, algae and bryophytes based on their structure, reproduction and life cycles.
			CO4	Analyze and ascertain the plant disease symptoms due to viruses, bacteria and fungi
			CO5	Recall and explain the evolutionary trends among amphibians of plant kingdom for their shift to land habitat.
	BOT 1 SK	Fundamentals of microbes & non vascular plants	CO1	Demonstrate the techniques of use of lab equipment, preparing slides and identify the material and draw diagrams exactly as it appears
			CO2	Observe and identify microbes and lower groups of plants on their own.
			CO3	Demonstrate the techniques of inoculation, preparation of media etc.
			CO4	4.Identify the material in the permanent slides etc.
II	BOT 2 SK	Basics of vascular plants Phyto geography	CO1	Classify and compare Pteridophytes and Gymnosperms based on their morphology, reproduction and life cycles
			CO2	Justify evolutionary trends in tracheophytes to adapt for land habitat
			CO3	Explain the process of fossilization and compare the characteristics of the extinct and extant plants.
			CO4	Critically understand various taxonomical aids for identification of Angiosperms
			CO5	CO5- Analyze the morphology of the most common Angiosperm plants of their localities and recognize their families.

			CO6	Evaluate the ecological, ethnic and economic value of different tracheophytes and summarize their goods and services for human welfare.
			CO7	Locate different Phyto geographical regions of the world and India and can analyze their floristic wealth.
	BOT 2 SK	Basics of vascular plants Phyto geography	CO1	Demonstrate the techniques of Section cutting, preparing slides, identifying of the material and drawing exact figures
			CO2	Compare and contrast the morphological. and reproductive features of vascular plants
			CO3	Identify the local angiosperms of the families prescribed to their genus and species level and prepare herbarium
			CO4	Exhibit skills of preparing slides, the given twigs in the lab and drawing figures of plant twigs,flowers and floral diagrams as they are
			CO5	Prepare and preserve specimens of local wild plants using herbarium techniques
III	BOT 3 SK	Anatomy Embryology of Angiosperms plant ecology & biodiversity	CO1	Understand on the organization of tissues and tissue systems in plants
			CO2	Illustrate and interpret various aspects of embryology
			CO3	Discuss the basic concept of plant ecology, and evaluate the effects of environmental and biotic factors on plant communities
			CO4	Appraise various qualitative and quantative parameters to study the population and community ecology
			CO5	Correlate the importance of Biodiversity and consequences due to its loss
			CO6	Enlist the endemic /endangered flora and fauna from two biodiversity hotspots in India and assess strategies for their conservation
	BOT 3 SK	Anatomy Embryology of Angiosperms plant ecology & biodiversity	CO1	Get familiarized with techniques of Section making, staining and microscopic study of vegetative, anatomical and reproductive structures of plants
			CO2	Observe externally and under microscope, identify and draw exact diagrams of the material in the lab
			CO3	Demonstrate application of methods in plant ecology and conservation of biodiversity and communities of plants.
IV	BOT 4 SKA	Plant physiology & Metabolism	CO1	Comprise the importance of water in plant life and mechanism for transport of water and solutes in plants
			CO2	Evaluate the role of minerals in plant nutrition and their deficiency symptoms

			CO3	Interpret the role of enzymes in plant metabolism
			CO4	Critically understand the light reaction and carbon assimilation processes responsible for synthesis of food in plant
			CO5	Analyze the biochemical reactions in relation to Nitrogen and lipid metabolism
			CO6	Evaluate the physiological factors that regulate growth and development in plants
			CO7	Examine the role of light on flowering and explain physiology of plants under stress condition
	BOT 4 SKA	Plant physiology & Metabolism	CO1	Conduct lab and field experiments pertaining to plant physiology that is biophysical and biochemical processes using related glassware, equipment, chemical and plant material.
			CO2	Estimate the quantities and qualitative expressions using experimental results and calculations.
			CO3	Demonstrate the factors responsible for growth and development in plants.
IVB	BOT 4 SKB	Cell biology, Genetics Plant breeding	CO1	Distinguish prokaryotic and eukaryotic cells and design the model of a cell.
			CO2	Explain the organization of a eukaryotic chromosome and the structure of genetic material.
			CO3	Demonstrate techniques to observe the cell and its components under microscope.
			CO4	Discuss the basics of -genetics, its variations and interpret inheritance of traits in living beings
			CO5	Elucidate the role of extra- chromosomal genetic material for inheritance of characters
			CO6	Evaluate the structure, function and regulation of genetic material
			CO7	Understand the application of principles and modern techniques in plant breeding.
			CO8	Explain the procedures of selection and hybridization for improvement of crops L2
	BOT 4 SKB	Cell biology, Genetics&Plant breeding	CO1	Show the understanding of techniques of demonstrating Mitosis and Meiosis in the laboratory and identify different stages of cell division.
			CO2	Identify and explain with diagram the cellular parts of a cell from a model or picture and prepare models.
			CO3	Solve the problems related to crosses and gene interactions
			CO4	Demonstrate plant breeding techniques such as emasculation and bagging.

VA	BOT 5 SKE	Plant Tissue culture	CO1	comprise the basic knowledge and applications of plant tissue culture.
			CO2	Identify various facilities required to set up a plant tissue culture laboratory
			CO3	Acquire a critical knowledge on sterilization techniques related to plant Tissue culture
			CO4	Demonstrate skills of callus culture through hands on experiment.
			CO5	Understand the biotransformation technique for production of secondary metabolites.
	BOT 5 SKE	Plant Tissue culture	CO1	List out, identify &handle various equipment in plant tissue culture
			CO2	Learn the procedures of preparation of media
			CO3	Demonstrate skills on inoculation, establishing callus culture and micro propagation
			CO4	Acquire skills in observing and measuring callus growth
			CO5	Perform some techniques related to plant transformation for secondary metabolite production
VB	BOT 5 SKF	Mushroom Cultivation	CO1	Understand the structure and life of a mushroom and discriminate edible and poisonous mushrooms.
			CO2	Identify the basic infrastructure to establish a mushroom culture unit.
			CO3	Demonstrate skills preparation of compost and spawn.
			CO4	Acquire a critical knowledge on cultivation of some edible mushrooms
			CO5	Explain the methods of storage, preparation of value-added products and marketing.
	BOT 5 SKF	Mushroom Cultivation	CO1	Identify and discriminate different mushrooms based on morphology
			CO2	Understand facilities required for mushroom cultivation
			CO3	Demonstrate skills on preparation of spawn, compost and casing material
			CO4	Exhibit various skills on various cultivation practices for an edible mushroom.
VIII		PROJECT	CO1	Explore career alternative prior to graduation
			CO2	Develop work habits and attitudes necessary for job success
			CO3	Assess interests and abilities in their field of study

ST. ANN'S COLLEGE FOR WOMEN

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Chemistry				
I	CHE1S	Inorganic and physical chemistry	CO1	Explain the evolution of the various definitions, concepts related to p-block elements.
			CO2	Summarize the insulators, conductors and semiconductors.
			CO3	Discuss about applications of distribution law for various ideal and true solutions.
			CO4	Demonstrate the experimental skills using common effect and solubility product principles in qualitative analysis.
			CO5	Analyse the experimental methods for determining molar mass of non-volatile solute.
	CHE1Sp & 1312-1	Qualitative & Inorganic analysis	CO1	Understand the basic concepts of qualitative analysis of inorganic mixtures like common ion effect & solubility products
			CO2	Use glassware , equipment & chemicals
			CO3	Follow experimental procedures in the laboratories
			CO4	Apply the concepts related to qualitative analysis of double salt mixture & report
II	CHE2SK	Organic and general chemistry	CO1	Recapitulate the conformations of alkane and cycloalkanes
			CO2	Analyze the electrophilic and nucleophilic addition mechanism of alkenes and alkynes
			CO3	Illustrate aromaticity and huckells rule for benzenoid and non-benzenoid substance
			CO4	Discover projects on colloidal substance and use adsorption principles
			CO5	Apply concepts of stereochemistry of carbon compounds
	CHE2SP K & 1312-2K	Volumetric analysis	CO1	Use glassware , equipment & chemicals
			CO2	Follow experimental procedures in the laboratories
			CO3	Understand & explain volumetric analysis based on fundamental concept of ionic equllibria
			CO4	Identify & learn the concepts of primary & secondary standard solutions
			CO5	Falicatate the learner to make standard solution of various molar solutions & differentiate them
III	CHE3SK	Organic chemistry and Spectroscopy	CO1	Identification of alcohols, phenols and their reactivity
			CO2	Apply the synthetic application of carbonyl compounds
			CO3	Illustrate reactions involving H, OH And COH groups in carboxylic acids and their derivatives

			CO4	Explain selection rules of vibrational and rotational spectroscopy for bond properties of organic compounds
			CO5	Apply IR spectral analysis of different functional groups.
	CHE3SK & 2312-3K	Organic preparation & IR spectral analysis	CO1	Use glassware , equipment & chemicals
			CO2	Follow experimental procedures in the laboratories
			CO3	Engage in safe laboratory practices by handling laboratory equipment & chemical reagents appropriately
			CO4	Eliminate chemicals in a safe & responsible manner
			CO5	Perform laboratory techniques including reflux , distillation , recrystallisation & vaccum filtrations
			CO6	Create & carry out workup & separation procedures
			CO7	Critically evaluate data collected & determine the purity & percent yield of products
IVA	CHE4SKA	Inorganic, organic and physical chemistry	CO1	Explain the preparation &reactions of organometallic compounds and job opportunities in petroleum industries
			CO2	Classification of carbohydrates determination of structure of glucose and fructose
			CO3	Explain the synthesis of proteins and its employability in food corporation of India
			CO4	Distinguish nitro hydrocarbons and undertake project work in pharmaceutical companies and industries
			CO5	Interpret concepts of thermodynamics and photochemistry & explore job opportunities in public &private sectors of energy resources & oceanography (aquaculture)
	CHE4SP KA & 2312-41K	Organic qualitative analysis	CO1	Use glassware , equipment & chemicals
			CO2	Follow experimental procedures in the laboratories
			CO3	Determine melting & boiling points of organic compounds
			CO4	Understand concepts of different organic reactions
			CO5	Apply the concept of organic reactions In the given compound & identify & report given organic substances
IVB	CHE4SKB	Inorganic & physical chemistry	CO1	Recall theories of coordination compounds
			CO2	Identify bioinorganic compounds & apply in study of macromolecules like haemoglobin & chlorophyll

			CO3	Apply the concept of phase rule & develop problem solving skills for different component systems & freezing mixtures
			CO4	Explain effects of dilutions & conductances & relate applications of electrochemical sciences
			CO5	Critically understand the kinetics of chemical reactions and impact of environmental factors on concept of enzyme catalysis able for lifelong learning in diagnostic laboratories
	CHE4SPKB & 2312-42K	Conductometry & potentiometric tightremetry	CO1	Use glassware , equipment & chemicals
			CO2	Follow experimental procedures in the laboratories
			CO3	Apply concept of electrochemistry in experiments
			CO4	Demonstrate electroanalytical methods & techniques
			CO5	Create the ability measuring the potential in electrochemical cell containing analyte
V	CHE5SKG	Environmental chemistry	CO1	Distinguish types of pollution, its causes & its preventive measures
			CO2	Explore factors for photochemical smog & ozone layer depletion
			CO3	Identify the hazards of water pollution & factors of COD & BOD & Enrich with knowledge for career opportunities in water treatment plants
			CO4	Analyze the occurrence of Heavy metals & chemicals toxicology & treatment in living organisms
			CO5	Create An Awareness on Environment in Different Ecosystems & Sustainability of Biodiversity
	CHE5SPKG & 3312-57K	Volumetric analysis	CO1	Use glassware , equipment & chemicals
			CO2	Follow experimental procedures in the laboratories
			CO3	Understand & explain the volumetric analysis based on fundamental concepts learnt in ionic equilibria
			CO4	Learn & identify the concepts of a standard solutions , primary & secondary standards
			CO5	Facilitate the learner to make solutions of various molar concentrations . this may include : the concept of the mole ; converting moles to grams ; converting grams to moles ; defining concentrations ; dilution of solutions ; making different molar concentrations
V	CHE5SKH	Green chemistry	CO1	Explain & apply theoretical knowledge of green chemistry & interpret sonication method for green synthesis of organic reactions

			CO2	Analyze supercritical CO2 & its applications, selection of solvents & create impact of green chemistry on environment & society
			CO3	Undertake project work on green synthesis assisted by microwave & ultrasound techniques & explore jobs related to green chemistry in public & private sectors
			CO4	Explore the job opportunities by using green catalyse such as alumina, silica, enzymes etc
			CO5	Vertical mobility of concepts of nanotechnologies in green chemistry & application of nanomaterials and integrate this life long experience in jobs
	CHE5SKH & 3312-58K	Analysis of organic compounds	CO1	Use glassware , equipment & chemicals
			CO2	Follow experimental procedures in the laboratories
			CO3	Acquire knowledge on structural elucidation of organic compounds
			CO4	Understand the various chromatography methods in separation & identification of organic compounds
			CO5	Demonstrare the knowledge gained in solvent extraction for seperatethe organic compounds
VI		Projects	CO1	Analyze & interpret and take appropriate decisions in solving real life problems using statistical tools
			CO2	Use different statistical packages for graphical interface, data analysis & interpretation
			CO3	Write a systematic project report.
Computer Science				
I	C1	Problem solving in c	CO1	Understand the basic terminology used in computer programming
			CO2	Write, compile and debug programs in Clanguage.
			CO3	Use different data types in a computer program
			CO4	Design programs involving decision structures, loops and functions
			CO5	Understand the dynamics of memory by the use of pointers and Structures.
			CO6	Apply different operations in File handling.
		Problem solving in c lab	CO1	Write, compile and debug programs in C language.
			CO2	Implement different data types in a computer program
			CO3	Design programs involving decision structures, loops and functions
			CO4	Write simple programs on pointers and Structures.
			CO5	Write operations in File handling.

II	C2	Data Structures	CO1	Identify data structures suitable to solve problems
			CO2	Developing algorithms
			CO3	Identifying the use of Time and Space Complexity.
			CO4	Implementing different sorting & searching techniques.
		Data Structures lab	CO1	Implement data structures suitable for liner & non liner structures.
			CO2	Design a program on linear Data structures.
			CO3	Write simple programs on different sorting & searching techniques.
III	C3	Data Base Management System	CO1	Gain knowledge of Database, DBMS and SQL
			CO2	Learn SQL as best analysis tool for extract data in different ways
			CO3	Create a small database using SQL.
			CO4	Able to construct SQL queries to Store, Retrieve data in database
			CO5	Model database using ER Diagrams and design database schemas based on the model
		Data Base Management System lab	CO1	Create a small database using SQL.
			CO2	Write commands on SQL queries to Store, Retrieve data in database
			CO3	Draw the ER Diagrams and design database schemas based on the model
IV	C4	Object Oriented Programming through Java	CO1	Understand the concept and underlying principles of Object-Oriented Programming
			CO2	Understand how object-oriented concepts are incorporated into the Java programming language
			CO3	Develop problem-solving and programming skills using OOP concept
			CO4	Understand the benefits of a well-structured program
			CO5	Develop the ability to solve real-world problems through software development in high-level programming language like Java
			CO6	Develop efficient Java applets and applications using OOP concept
		Object Oriented Programming Through Java lab	CO1	Develop problem-solving and programming skills using OOP concept
			CO2	Design a well-structured program .

			CO3	Develop the ability to solve real-world problems through software development in high-level programming language like Java
			CO4	Develop efficient Java applets and applications using OOP concept
IV	C5	Operating System	CO1	Understand the main components and Structure of Operating System& their functions
			CO2	Analyze various ways of Process Management & CPU Scheduling Algorithms
			CO3	Evaluate various device and resources like Memory, Time and CPU Management techniques in distributed systems.
			CO4	Apply different methods for Preventing Deadlocks in a Computer System.
		Operating System lab	CO1	Design Process Management & CPU Scheduling Techniques.
			CO2	Write CPU Management techniques in distributed systems.
			CO3	Apply different techniques for Preventing Deadlocks in a Computer System.
V	C6	Web Interface Designing Technologies	CO1	To understand the web architecture and web services.
			CO2	To practice latest web technologies and tools by conducting experiments
			CO3	To design interactive web pages using HTML and Style sheets.
			CO4	To study the framework and building blocks of Integrated Development Environment
			CO5	To provide solutions by identifying and formulating IT related problems.
		Web Interface Designing Technologies lab	CO1	To Write latest web technologies and tools by conducting experiments
			CO2	To design interactive web pages using HTML and Style sheets.
			CO3	To framework and building blocks of Integrated Development Environment
	C7	Web Application designing With PHP &MySQL	CO1	To understand the web architecture and web services.
			CO2	To practice latest web technologies and tools by conducting experiments
			CO3	To design interactive web pages using HTML and Style sheets.
			CO4	To study the framework and building blocks of Integrated Development Environment

		Web Application designing With PHP &MySQL lab	CO1	Write a simple program in PHP
			CO2	Write simple programs on handle and validate data using PHP
			CO3	Write programs to create dynamic &interactive web-based applications using PHP & MYSQL.
VI		PROJECTS	CO1	Analyze and interpret and take appropriate decisions in solving real life problems using statistical tools.
			CO2	Use different Statistical packages for graphical interface, data analysis and interpretation
			CO3	Write a systematic Statistical project report.
B. Com (General & Computer Applications)				
I	BCO1S-1K	FUNDAMENTALS OF ACCOUNTING	CO1	Identify transactions and events that need to be recorded in the books of accounts
			CO2	Equip with the knowledge of accounting process and preparation of final accounts of sole trader.
			CO3	Develop the skill of recording financial transactions and preparation of reports in accordance with GAAP.
			CO4	Analyse the difference between cash book and pass book in terms of balance and make reconciliation.
			CO5	Critically examine the balance sheets of a sole trader for different accounting periods
			CO6	Design new accounting formulas & principles for business organizations.
I	BCO1S-2K	Business Organization and Management	CO1	Understand different forms of business organizations.
			CO2	Comprehend the nature of Joint Stock Company and formalities to promote a Company
			CO3	Describe the Social Responsibility of Business towards the society.
			CO4	Critically examine the various organizations of the business firms And judge the best among them
			CO5	Design and plant register business firm. Prepare different Documents to register a company at his own
			CO6	Articulate new models of business organizations.
I	BCO1S-3K		CO1	Understand the concept of business environment

		Business Environment	CO2	Define Internal and External elements affecting business environment.
			CO3	Explain the economic trends and its effect on Government policies..
			CO4	Critically examine the recent developments in economic and Business policies of the Government
			CO5	Evaluate and judge the best business policies in Indian business environment
			CO6	Develop the new ideas for creating good business environment
II	BCO2S-1K	Financial Accounting	CO1	Understand the concept of consignment and learn the accounting treatment of the various aspects of consignment.
			CO2	Analyze the accounting process and preparation of accounts In consignment and joint venture.
			CO3	Distinguish Joint Venture and Partnership and to learn the Methods of maintaining records under Joint Venture
			CO4	Determine the use full life and value of the depreciable assets And maintenance of Reserves in business entities
			CO5	Design an accounting system for models of Businesses a this own using the principles of existing accounting system
II	BCO2S-2K	Business Economics	CO1	Describe the nature of economics in dealing with the issues of scarcity of resources.
			CO2	Analyze supply and demand analysis and its impact on Consumer behaviour.
			CO3	Evaluate the factors, such as production and costs affecting Firms behaviour.
			CO4	Use economic analysis to evaluate controversial issues and policies.
			CO5	Apply economic models for managerial problems, identify their relationships, and formulate the decision-making tools to be applied for business.
II	BCO2S-3K	Banking Theory and Practice	CO1	Understand the basic concepts of banks and functions of commercial banks.

			CO2	Demonstrate an awareness of law and practice in a banking context.
			CO3	Engage in critical analysis of the practice of banking law
			CO4	Organize information as it relates to the regulation of banking Products and services
			CO5	Critically examine the current scenario of Indian Banking system.
III	BCO3S-1K	AdvancedAccounting	CO1	Understand the concept of Non-profit organizations and its accounting process
			CO2	Comprehend the concept of single-entry system and Preparation of statement of affairs
			CO3	Familiarize with the legal formalities at the time of Dissolution of the firm
			CO4	Prepare financial statements for partnership firm on Dissolution of the firm.
			CO5	Employ critical thinking skills to understand the difference between the dissolution of the firm and dissolution of partnership
III	BCO3S-2K	Business Statistics	CO1	Understand the importance of Statistics in real life
			CO2	Formulate complete, concise, and correct mathematical proofs.
			CO3	Frame problems using multiple mathematical and statistical tools, measuring relationships by using standard techniques
			CO4	Build and assess data-based models
			CO5	Learn and apply the statistical tools in day life.
III	BCO3S-3K	Marketing	CO1	Develop an idea about marketing and marketing environment.
			CO2	Understand the consumer behavior and market Segmentation process
			CO3	Comprehend the product life cycle and product line decisions.
			CO4	Know the process of packaging and labeling to attract the customers.
			CO5	Formulate new marketing strategies for a specific new product.

III		Programming with C & C++	CO1	Develop programming skills
			CO2	Declaration of variables and constants use of operators and expressions
			CO3	Learn the syntax and semantics of programming language
			CO4	Be familiar with programming environment of C and C++
			CO5	Ability to work with textual information (characters and strings) & arrays.
IV	BCO4S-1K	Corporate Accounting	CO1	Understand the Accounting treatment of Share Capital and aware of process of bookbuilding
			CO2	Demonstrate the procedure for issue of bonus shares and buy back of shares.
			CO3	Comprehend the important provisions of Companies Act,2013andprepare final accounts of accompany with Adjustments.
			CO4	Participate in the preparation of consolidated accounts for a Corporate group
			CO5	Understand analysis of complex issues, formulation of well-reasoned arguments and reaching better conclusions.
IV	BCO4S-2K	CostandManagement Accounting	CO1	Understand various costing methods and management techniques.
			CO2	Apply Cost and Management accounting methods for both Manufacturing and service industry
			CO3	Prepare cost sheet, quotations, and tenders to organization For different works...
			CO4	Analyze cost-volume-profit techniques to determine optimal Managerial decisions
			CO5	Compare and contrast the financial statements of firms and Interpret the results.
IV	BCO4S-3K	Income Tax	CO1	Acquire the complete knowledge of the tax evasion, tax avoidance and tax planning.
			CO2	Understand the provisions and compute income tax for various sources.
			CO3	Grasp amendments made from time to time in Finance Act.
			CO4	Compute total income and define tax complicacies and

				structure.
			CO5	Prepare and File IT returns of individual at his own. Compare and contrast the financial statements of firms and interpret the results.
IV	BCO4S-4K	Business Law	CO1	Understand the legal environment of business and laws of business.
			CO2	Highlight the security aspects in the present cyber-crime scenario.
			CO3	Apply basic legal knowledge to business transactions.
			CO4	Understand the various provisions of Company Law
			CO5	.Engage critical thinking to predict outcomes and recommend appropriate action on issues relating to business associations And legal issues...
			CO6	Integrate concept of business law with foreign trade.
IV	BCO4S-5K	Auditing	CO1	Understanding the meaning and necessity of audit in modern era
			CO2	Comprehend the role of auditor in avoiding the corporate frauds.
			CO3	Identify the steps involved in performing audit process
			CO4	Determine the appropriate audit report for a given audit situation
			CO5	Apply auditing practices to different types of business entities.
			CO6	Plan an audit by considering concepts of evidence, risk and materiality
IV		Database Management system	CO1	Understand the role of a database management system in an organization
			CO2	Understand basic database concepts, including the an organization.
			CO3	Understand and successfully apply logical database design principles, including E-R Diagrams and database normalization.
			CO4	To design and build a simple database system and demonstrate competence with the fundamental tasks involved with modeling, designing and implementing a DBMS.

			CO5	Understand Functional Dependency and Functional Decompostion.
IV	BCO4S-6K	Goods and Service Taxes	CO1	Understand the basic principles underlying the Indirect Taxation Statutes.
			CO2	Examine the method of tax credit. Input and Output Tax credit and Cross Utilization of Input Tax Credit..
			CO3	Identify and analyze the procedural aspects under different Applicable statutes related to GST.
			CO4	Compute the assessable value of transactions related to goods and services for levy and determination of duty liability.
			CO5	Develop various GST Returns and reports for business Transactions in Tally
VI	BCO6S-18A	Management counting And Practice	CO1	Understand the nature and scope of management accounting and differentiate management accounting, financial Accounting and cost accounting.
			CO2	Compute ratios and draw inferences
			CO3	Analyze the performance of the organization by preparing Funds flow statement and cash flow statements
			CO4	Prepare cash budget, fixed budget and flexible budget.
VI	BCO6S-19A	Cos tcontrol techniques	CO1	Differentiate cost control, cost reduction concepts and identify effective techniques.
			CO2	Allocate over heads on the basis of Activity Based Costing
			CO3	Evaluate techniques of cost audit and rules for cost record.
			CO4	Appraise the application of marginal costing techniques to evaluate performances, fix selling price, make or buy decisions
VI	BCO6S-20B	Life insurance with practice	CO1	Understand the Features of Life Insurance ,schemes and policies and insurance companies in India
			CO2	Analyze various schemes and policies related to Life Insurance sector
			CO3	Choose suitable insurance policy for given situation and Respective persons
			CO4	Acquire Insurance Agency skills and other administrative skills

			CO5	Acquire skill of settlement of claims under various circumstances
VI	BCO6S-21B	General insurance Procedure and practice	CO1	Understand the Features of General Insurance and Insurance Companies in India
			CO2	Analyze various schemes and policies related to General Insurance sector
			CO3	Choose suitable insurance policy under Health, Fire, Motor, And Marine Insurances
			CO4	Acquire General Insurance Agency skills and administrative skills
			CO5	.Apply skill for settlement of claims under various circumstances
VI	BCO6S-16C	DIGITALMARKETING	CO1	.Analyze online Micro and Macro Environment
			CO2	Design and create website
			CO3	Discuss search engine marketing
			CO4	Create blogs, videos, and share
VI	BCO6S-17C	Service Marketing	CO1	Discuss the reasons for growth of service sector
			CO2	Examine the marketing strategies of Banking Services, insurance and education services.
			CO3	Review conflict handling and customer Responses in services marketing
			CO4	Describe segmentation strategies in service marketing
BCA				
I	C1	Computer Fundamentals and Office Tools	CO1	Describe the usage of computers and why computers are essential components in business and society.
			CO2	Identify categories of programs, system software and applications. Organize and work with files and folders.
			CO3	Compose, format and edit a word document and working with macros
			CO4	Create work sheets and using various functions.
			CO5	Make presentations and inserting multimedia in them

	C1-P	Computer Fundamentals and Office Tools-LAB	CO1	Compose, format and edit a word document and working with macros
			CO2	Compose, format and edit a word document and working with macros
			CO3	Make presentations and inserting multimedia in them
	C2	Programming in C	CO1	Understand the basic terminology used in computer programming
			CO2	Write, compile and debug programs in Clanguage.
			CO3	Use different data types in a computer program
			CO4	Design programs involving decision structures, loops and functions
			CO5	Understand the dynamics of memory by the use of pointers and Structures.
			CO6	Apply different operations in File handling.
	C2-P	Programming in C-LAB	CO1	Write, compile and debug programs in C language.
			CO2	Use different data types in a computer program
			CO3	Design programs involving decision structures, loops and functions
			CO4	Understand the dynamics of memory by the use of pointers and Structures.
			CO5	Apply different operations in File handling.
	C3	Numerical and Statistical Methods	CO1	Skill to choose and apply appropriate numerical methods to obtain appropriate solutions to difficult mathematical problems.
			CO2	Ability to apply various statistical techniques such as Measures of Central Tendency and Dispersion
			CO3	Skill to execute programs of various Numerical Methods and Statistical techniques for solving mathematical problems.
	C3-P	Numerical and Statistical Methods-LAB	CO1	Skill to choose and apply appropriate numerical methods to obtain appropriate solutions to difficult mathematical problems.
			CO2	Ability to apply various statistical techniques such as Measures of Central Tendency and Dispersion
			CO3	Skill to execute programs of various Numerical Methods and Statistical techniques for solving mathematical problems.
	C4	Data Structures	CO1	Identify data structures suitable to solve problems

II			CO2	Developing algorithms
			CO3	Identifying the use of Time and Space Complexity.
			CO4	Implementing different sorting & searching techniques.
	C4-P	Data Structures LAB	CO1	understand a systematic approach to organizing, writing and debugging C programs
			CO2	Ability to implement linear and non-linear data structure operations using C programs
			CO3	Ability to solve problems implementing appropriate data structure
			CO4	Ability to implement sorting and searching algorithms using relevant data structures
	C5	Object Oriented Analysis and Design	CO1	Have Knowledge in evolution and foundations of OO Model and its elements
			CO2	Identify relationship between classes and objects
			CO3	Know importance of classification and can identify classes and objects
			CO4	Have basic knowledge of UML.
			CO5	Knowledge in syntax and semantics of UML.
	C5-P	Object Oriented Analysis and Design LAB	CO1	Model the Use case and Class diagrams for the given application.
			CO2	Develop the sequence and collaboration diagrams for the given application.
			CO3	Build Activity diagram and State Chart diagrams for the given application
	C6	Data Base Management System	CO1	Gain knowledge of Database, DBMS and SQL
			CO2	Learn SQL as best analysis tool for extract data in different ways
			CO3	Create a small database using SQL.
			CO4	Able to construct SQL queries to Store, Retrieve data in database
			CO5	Model database using ER Diagrams and design database schemas based on the model
	C6-P	Data Base Management System LAB	CO1	Create a small database using SQL.
			CO2	Able to construct SQL queries to Store, Retrieve data in database
			CO3	Model database using ER Diagrams and design database schemas based on the model

III	C7	Accounting and Financial Management	CO1	Company Setup &Configurations.
			CO2	Recording Financial Transactions
			CO3	Financial Reports
	C7-P	Accounting and Financial Management-LAB	CO1	Company Setup &Configurations.
			CO2	Recording Financial Transactions
			CO3	Financial Reports
	C8	Object Oriented Programming through Java	CO1	Understand the concept and underlying principles of Object-Oriented Programming
			CO2	Understand how object-oriented concepts are incorporated into the Java programming language
			CO3	Develop problem-solving and programming skills using OOP concept
			CO4	Understand the benefits of a well-structured program
			CO5	Develop the ability to solve real-world problems through software development in high-level programming language like Java
			CO6	Develop efficient Java applets and applications using OOP concept
	C8-P	Object Oriented Programming through Java LAB	CO1	Develop problem-solving and programming skills using OOP concept
			CO2	Understand the benefits of a well structured program
			CO3	Develop the ability to solve real-world problems through software development in high-level programming language like Java
			CO4	Develop efficient Java applets and applications using OOP concept
	C9	Operating Systems	CO1	Understand the main components and Structure of Operating System& their functions
			CO2	Analyze various ways of Process Management & CPU Scheduling Algorithms
			CO3	Evaluate various device and resources like Memory, Time and CPU Management techniques in distributed systems.
			CO4	Apply different methods for Preventing Deadlocks in a Computer System.
	C9-P	Operating Systems LAB	CO1	Experiment with Unix commands and shell programming

			CO2	Build 'C' program for process and file system management using system calls
			CO3	Choose the best CPU scheduling algorithm for a given problem instance
			CO4	Develop algorithm for deadlock avoidance, detection and file allocation strategies
IV	C10	Cyber Laws	CO1	Critically evaluate ongoing developments in law relating to information technologies.
			CO2	Display an understanding of how these developments relate to one another
			CO3	Examine areas of doctrinal and political debate surrounding rules and theories
			CO4	Evaluate those rules and theories in terms of internal coherence and practical outcomes
			CO5	Draw on the analysis and evaluation contained in primary and secondary sources
	C10-P	Cyber Laws-LAB	CO1	Extensive knowledge regarding jurisdictional issues in IT Act
			CO2	Various important national and international cyber laws.
			CO3	Understands the scope of Cyber Law
			CO4	The students is able to understand the basic concept of International Technology
	C11	Data Mining and Data Ware Housing	CO1	Examine the types of the data to be mined and present a general classification of tasks and primitives to integrate a data mining system
			CO2	Apply preprocessing statistical methods for any given raw data
			CO3	Discover interesting patterns from large amounts of data to analyze and extract patterns to solve problems, make predictions of outcomes
			CO4	Comprehend the roles that data mining plays in various fields and manipulate different data mining techniques
			CO5	Select and apply proper data mining algorithms to build analytical applications
			CO6	Evaluate and implement a wide range of emerging and newly-adopted methodologies and technologies to facilitate the knowledge discovery.
	C11-P	Data Mining and Data Ware Housing-LAB	CO1	How to select data and technique for the mining
			CO2	How to use Algorithms for data mining
			CO3	How to analyze data
			CO4	How to compare techniques based on result

	C12	Web Programming	CO1	To understand the web architecture and web services.
			CO2	To practice latest web technologies and tools by conducting experiments
			CO3	To design interactive web pages using HTML and Style sheets.
			CO4	To study the framework and building blocks of Integrated Development Environment
			CO5	To provide solutions by identifying and formulating IT related problems.
	C12-P	Web Programming-LAB	CO1	To practice latest web technologies and tools by conducting experiments
			CO2	To design interactive web pages using HTML and Style sheets.
			CO3	To study the framework and building blocks of Integrated Development Environment
			CO4	To provide solutions by identifying and formulating IT related problems.
	C13	Design of Object-Oriented Applications	CO1	Have Knowledge in micro and macroprocess
			CO2	Have Knowledge in management planning, quality assurance and metrics along with documentation of object-oriented development
			CO3	Have Knowledge in system architecture.
			CO4	Basic knowledge in AI and Data Acquisition
			CO5	Knowledge in applications of Object-Oriented Design
	C13-P	Design of Object-Oriented Applications-LAB	CO1	Construct various UML models (including use case diagrams, class diagrams, interaction diagrams, state chart diagrams, activity diagrams, and implementation diagrams) using the appropriate notation.
			CO2	Recognize the difference between various object relationships: inheritance, association, whole-part, and dependency relationships.
			CO3	Show the role and function of each UML model in developing object-oriented software.
	C14	Data Analytics Using R	CO1	Data-Visualization tools and techniques offer executives and other knowledge workers new approaches

			CO2	Data visualization is a general term that describes any effort to help people understand the significance of data by placing it in a visual context.
			CO3	Patterns, trends and correlations that might go undetected in text-based data can be exposed and recognized easier with data visualization software
			CO4	It isn't just the attraction of the huge range of statistical analyses afforded by R that attracts data people to R. The language has also developed a rich ecosystem of charts, plots and visualizations over the years
	C14-P	Data Analytics Using R-LAB	CO1	Data-Visualization tools and techniques offer executives and other knowledge workers new approaches
			CO2	Data visualization is a general term that describes any effort to help people understand the significance of data by placing it in a visual context.
			CO3	Patterns, trends and correlations that might go undetected in text-based data can be exposed and recognized easier with data visualization software
			CO4	It isn't just the attraction of the huge range of statistical analyses afforded by R that attracts data people to R. The language has also developed a rich ecosystem of charts, plots and visualizations over the years
	C15	Object Oriented Software Engineering	CO1	Explore the basic concepts of software engineering
			CO2	Choose appropriate life cycle model for a project
			CO3	Implement the phases of the traditional software development process
			CO4	Design various test cases for a software product
			CO5	Analyze different architectural views
	C15-P	Object Oriented Software Engineering-LAB	CO1	Explore the basic concepts of software engineering
			CO2	Choose appropriate life cycle model for a project
			CO3	Implement the phases of the traditional software development process
			CO4	Design various test cases for a software product

			CO5	Analyze different architectural views
V	SEC1	Machine Learning Using Python	CO1	Identify the characteristics of machine learning
			CO2	Summarize the Model building and evaluation approaches
			CO3	Apply Bayesian learning and regression algorithms for real-world Problems.
			CO4	Apply supervised learning algorithms to solve the real-world Problems
			CO5	Apply unsupervised learning algorithms for the real-world data
	SEC-1P	Machine Learning Using Python-LAB	CO1	Identify the characteristics of machine learning
			CO2	Summarize the Model building and evaluation approaches
			CO3	Apply Bayesian learning and regression algorithms for real-world Problems.
			CO4	Apply supervised learning algorithms to solve the real-world Problems
			CO5	Apply unsupervised learning algorithms for the real-world data
	SEC2	Digital Imaging	CO1	Gain knowledge about Types of Graphics, Types of Objects, Types of video editing tools
			CO2	Show their skills in editing and altering photographs for through a basic understanding of the tool box.
			CO3	. Gain knowledge in using the layers
			CO4	Gain knowledge in using the selection tools, repair tools
			CO5	Gain knowledge in using selection tools, applying filters and can show their skills
	SEC-2P	Digital Imaging-LAB	CO1	Gain knowledge about Types of Graphics, Types of Objects, Types of video editing tools
			CO2	Show their skills in editing and altering photographs for through a basic understanding of the tool box.
			CO3	. Gain knowledge in using the layers
			CO4	Gain knowledge in using the selection tools, repair tools
			CO5	Gain knowledge in using selection tools, applying filters and can show their skills

	SEC3	Cyber Security and Malware Analysis	CO1	Understand the computer networks, networking tools and cyber security
			CO2	Learn about NIST Cyber Security Framework
			CO3	Understand the OWASP Vulnerabilities
			CO4	Implement various Malware analysis tools
			CO5	Understand about Information Technology act 2000
	SEC-3P	Cyber Security and Malware Analysis-LAB	CO1	Understand the computer networks, networking tools and cyber security
			CO2	Learn about NIST Cyber Security Framework
			CO3	Understand the OWASP Vulnerabilities
			CO4	Implement various Malware analysis tools
			CO5	Understand about Information Technology act 2000
	SEC4	Internet Of Things	CO1	Able to understand various applications of IOT in real world and industry domain·
			CO2	Able to realize the revolution of Internet in Mobile Devices, Cloud & Sensor Networks·
			CO3	Able to understand building blocks of Internet of Things and characteristics.
			CO4	Able to design and develop IOT devices
	SEC-4P	INTERNET OF THINGS-LAB	CO1	Able to understand various applications of IOT in real world and industry domain·
			CO2	Able to realize the revolution of Internet in Mobile Devices, Cloud & Sensor Networks·
			CO3	Able to understand building blocks of Internet of Things and characteristics.
			CO4	Able to design and develop IOT devices
	SEC5	Mobile Application Development	CO1	Identify basic terms, tools and software related to android systems
			CO2	Describe components of IDE, understand features of android development tools
			CO3	Describe the layouts and controls
			CO4	Explain the significance of displays using the given view
			CO5	Explain the features of services and able to publish android Application

			CO6	Developing interesting Android applications using MIT App Inventor
	SEC-5P	MOBILE APPLICATION DEVELOPMENT-LAB	CO1	Identify basic terms, tools and software related to android systems
			CO2	Describe components of IDE, understand features of android development tools
			CO3	Describe the layouts and controls
			CO4	Explain the significance of displays using the given view
			CO5	Explain the features of services and able to publish android Application
			CO6	Developing interesting Android applications using MIT App Inventor
	SEC6	PC HARDWARE AND NETWORKING	CO1	Identify the computer peripherals, software and hardware devices
			CO2	Describe the basics of networks and networking tools
			CO3	Describe the Network Addressing and sub-netting
			CO4	Explains the Networks protocols and management
			CO5	Identifies Basic Network administrator roles
	SEC-6P	PC HARDWARE AND NETWORKING-LAB	CO1	Identify the computer peripherals, software and hardware devices
			CO2	Describe the basics of networks and networking tools
			CO3	Describe the Network Addressing and sub-netting
			CO4	Explains the Networks protocols and management
			CO5	Identifies Basic Network administrator roles
VI		Semester Internship	CO1	Gain knowledge about Types of Graphics, Types of Objects, Types of video editing tools
			CO2	Gain knowledge in using selection tools, applying filters and can show their skills
			CO3	Show their skills in editing and altering photographs for through a basic understanding of the tool box.
MCA				
I	MCA	**MCA-101** Data Structures with C++	CO1	Illustrate the implementation of linked lists and Recursion
			CO2	Analyse search algorithms and hashing technique

			CO3	Apply Stacks and Queues for real world tasks
			CO4	Make use of trees and Graphs in solving Complex problems
	MCA	**MCA-106** Data Structures Lab	CO1	Understand the concept of array storage and examine the concept of row-major and column-major order.
			CO2	List and illustrate the implementation of basic data structure using an array.
			CO3	Compare various searching techniques using arrays.
			CO4	Use linear and non-linear data structures like stacks, queues, linked list, tree, etc.
			CO5	Design and formulate different sorting algorithms
	MCA	**MCA -102**Database Management Systems	CO1	Explain about database, different operations, queries performed for management system problems
			CO2	Demonstrate the significance of ER-diagram in DBMS
			CO3	Make use of different normalizations for database size reduction and removal of redundancy
			CO4	Apply PL/SQL, SQL injection, procedures etc
	MCA	**MCA-107** Database Management Systems Lab	CO1	Get practical knowledge on designing and creating relational database systems
			CO2	Implement basic SQL DDL Queries
			CO3	Implement basic SQL DML Queries
			CO4	Understand various advanced queries execution such as relational constraints, joins, set operations, aggregate functions, trigger, view and embedded SQL.
			CO5	To design and implement database applications on their own.
	MCA	**MCA-103**ProbabilityandStatistics	CO1	Show confidence in manipulating and drawing conclusions from data and provide them with a critical frame work for evaluating study designs and results
			CO2	Explain the basic notions of probability laws and develop them to the stage where one can begin to use
			CO3	Explain the basic notions of probability laws and develop them to the stage where one can begin to use

			CO4	Summarize the study of stochastic processes
	MCA	**MCA-104** Operating Systems	CO1	Explain what is an operating system and the role it plays
			CO2	Infer high level understanding of the structure of operating systems, applications, and the relationship between t hem
			CO3	How to gather knowledge of the services provided by operating systems
			CO4	Compare the exposure to some details majors concepts.
	MCA	**MCA-105** Computer Organization	CO1	Explain the key concepts that are likely to be included in the design of any modern computer system
			CO2	Make use of the basic metrics by which new and existing computer systems may be evaluated
			CO3	Outline the impact that languages, their compilers and underlying operating systems have on the design of computer systems
			CO4	How to evaluate the impact that peripherals, their interconnection and underlying data operations have on the design ofcomputersystems
II	MCA	**MCA-201**SoftwareEngineering	CO1	Describe software engineering layered technology and process framework
			CO2	Evaluate the different process models and choose the best model for their project
			CO3	Understand the different development practices and its advantages
			CO4	Explain software testing approaches, software tactics and metrics for process and project domains
			CO5	Analyse estimation techniques, quality management and formal methods
	MCA	**MCA-202**Programmingand Problem Solving Using Python	CO1	Demonstrate understanding of modern version control tools.
			CO2	Exhibit facility with a Linux command line environment.
			CO3	Demonstrate understanding of the role of testing in scientific computing, and Write unit tests in Python.
			CO4	Use command line tools to write and edit code.
			CO5	Develop publication-ready graphics from a dataset.

	MCA	**MCA-206** Python Programming Lab	CO1	Write, test, and debug simple Python programs
			CO2	Apply the concept of conditionals and loops in Python programs.
			CO3	Develop the Python programs step-wise by defining functions and calling them.
			CO4	Develop the programs in basic C constructs
			CO5	Read and write data from/to files in Python.
	MCA	**MCA-203** Computer Networks	CO1	Analyse basic taxonomy and terminology of the computer networking area.
			CO2	Describe the configuration and design of a small network
			CO3	Explain about research areas and future internets research fields
			CO4	Learn components and rules of communications
			CO5	Construct and implement layer protocols within an environment
	MCA	**MCA-204** Web Technologies	CO1	Explain the technologies used in web applications.
			CO2	DemonstrateHTML5, CSS, Java Script coding for web applications
			CO3	Design creative websites using object-based scripting concepts
			CO4	Learn to access data base through Java programs, using Java Data Base Connectivity (JDBC)
			CO5	Create dynamic webpages, using Servlets andJSP
	MCA	**MCA-207** Web Technologies Lab	CO1	List various tags in html and use these, apply Cascaded style sheet to create web page.
			CO2	Design and explain the basic concept of XML and create XML documents and Schema.
			CO3	Compare Servlet and JSP concepts and **apply** JSP concepts to create dynamic webpages by reducing the code complexity and store data in database.
			CO4	**Explain** usage of web servers and **use** this to **develop** webpage and store data in database in JSP on Web server.
			CO5	**Develop** solution to **complex problems** using appropriate method, technologies, framework, web services and content management.

	MCA	**MCA-205** Artificial Intelligence	CO1	Understand the history, development and various applications of artificial intelligence
			CO2	Illustrate knowledge base system
			CO3	Solve different problems using AI algorithm
			CO4	Analyse how uncertainty is being tackled in the knowledge representation and reasoning process
			CO5	Classify the expert systems
III	MCA	**MCA-301** Data Mining and Big Data	CO1	Explain Data Ware house fundamentals, Data Mining Principles
			CO2	Demonstrate appropriate data mining algorithms to solve real world problems
			CO3	Compare different data mining techniques like classification, prediction, clustering and association rule mining.
			CO4	Construct big data associated applications in intelligent business and scientific computing
			CO5	Infer fundamental enabling techniques and scalable algorithms like Hadoop, Map Reduce in big dataanalytics
	MCA	**MCA -306** Data Mining and Big Data Lab	CO1	Understand and implement the basics of data structures like Linked list, stack, queue, set and map in Java.
			CO2	Demonstrate the knowledge of big data analytics and implement different file management task in Hadoop.
			CO3	Understand Map Reduce Paradigm and develop data applications using variety of systems.
			CO4	Analyze and perform different operations on data using Pig Latin scripts.
	MCA	**MCA-302** Cryptography and Network Security	CO1	Find the factors driving the need for network security,
			CO2	Identify and classify particular examples of attacks,
			CO3	Compare symmetric and a symmetric encryption system and their vulnerability to attacks
			CO4	Summarize the use of hash functions and explain the characteristics of one-way and collision-free functions
			CO5	Illustratetheeffectivenessofpasswordsinaccesscontrolandtheinfluenceofhuman behaviour.

	MCA	**MCA- 307** Cryptography &Network Security Lab	CO1	Discuss the basics of network security and cryptography.
			CO2	Explain the various standards Symmetric Encryption algorithms used to provide confidentiality.
			CO3	Explain the various standards Asymmetric Encryption algorithms to achieve authentication.
			CO4	Demonstrate encryption techniques to secure data in transit across network.
	MCA	**MCA-303** Cloud Computing	CO1	Distinguish different types of Distributed Computing models and identify different cloud computing models and services provided by cloud providers.
			CO2	Demonstrate virtualization of clusters and data centres
			CO3	Apply and design Cloud Resource Management and scheduling algorithms
			CO4	Explain Storage models and security aspects of Cloud
			CO5	Illustrate Cloud Applications and Paradigms
	MCA	**MCA-304** Machine Learning	CO1	How to make a computer program learn from experience
			CO2	Illustrate the significance of concept learning
			CO3	Representation of decisions and decision making explicitly
			CO4	Construct finite and infinite Hypothesis spaces for computational learning
			CO5	Apply Inductive and Analytical learning in developing learning tasks
	MCA	**MCA-305.2** Open source Technologies	CO1	To implement PHP script using Decisions and Loops.
			CO2	To develop PHP applications using Strings, Arrays and Functions
			CO3	To design object-oriented programming (OOP) principals for PHP and use HTML form elements that work with any server-side Language.
IV	MCA	**MCA – 401** Project Work	CO1	To Prepare abstract for given project by identifying the requirements and prospective solution.
			CO2	To Develop latest information related to the project from various sources to analyze the project.
			CO3	To Choose the materials for the project as per specifications and efficient test for developing the project.

			CO4	To Illustrate effective team work after efficient testing, elaborate the completed task and compile the project.
			CO5	To Prepare a good report of the project as per the guidelines and present to the panel of experts.
MBA				
I	Bus1.1 (R22)	Management process	CO1	By the end of the course, students will be able to understand the basic concepts in Management-Levels, Skills, Role, Functions & Principles of Management.
			CO2	By the end of the course, students will be able to analyse the theoretical concepts - Forecasting – Techniques of Forecasting. Decision making, MBO.
			CO3	By the end of the course, students will be able to investigate the Functions & Responsibilities of Managers
			CO4	By the end of the course, students will be able to evaluate the role of managers in Business Environment of the organization-, key elements in Organizational Behaviour, Challenges & Opportunities for OB.
			CO5	By the end of the course, students will be able to explain the principles of human behaviour in an organization through Communication, Motivation, Group Dynamics, Leadership & Organizational Design.
	Bus1.2 (R22)	Quantitative Techniques for Managerial decisions	CO1	By the end of the course, students will be able to understand various statistical andmathematical techniques for business decisions.
			CO2	By the end of the course, students will be able to analyse the benefits as well as thelimits of quantitative analysis in a real-world context.
			CO3	By the end of the course, students will be able to investigate the probabilisticdistributions in solving problems.
			CO4	By the end of the course, students will be able to evaluate the hypothesis testing forlarge and small samples.
			CO5	By the end of the course, students will be able to explain the linear programmingproblems by

				graphical and simplex methods.
	Bus1.3.2 (R22)	Managerial Economics	CO1	By the end of the course, students will be able to understand the Role and Responsibilities of Managerial Economist in decision making.
			CO2	By the end of the course, students will be able to analyse the Consumer Equilibrium under Ordinal and Cardinal Utility Theories- Indifference Curve Analysis - Income Substitution and Price Effects - Demand Analysis - Law of Demand
			CO3	By the end of the course, students will be able to investigate the Total Product, Marginal and Average Product Curves, their derivation and interrelationships - The law of Diminishing Marginal Returns in Production
			CO4	By the end of the course, students will be able to evaluate the Pricing and output decisions of firm under different market structures - Perfect Competitions pure monopoly, Oligopoly
			CO5	By the end of the course, students will be able to explain the Pricing Practices of Firms
	Bus1.4 (R22)	Environment Management	CO1	By the end of the course, students will be able to understand how the economy isaffected by internal and external factors and how this in turn affects the business.
			CO2	By the end of the course, students will be able to analyze the consumption affects onbusiness and economy.
			CO3	By the end of the course, students will be able to investigate the factors of theEconomic, Political, Legal and Global environment of business.
			CO4	By the end of the course, students will be able to evaluate the Political and LegalEnvironment of Business.
			CO5	By the end of the course, students will be able to explain the Global Environment ofBusiness- Foreign collaborations in the Indian business, International economic institutions.
			CO1	By the end of the course, students will be able to understand the Business communication- essential elements of effective communication –

	Bus1.5 (R22)	Managerial Skill Development		communication barriers – overcoming communication barriers.
			CO2	By the end of the course, students will be able to analyse the Media of Communication-: Verbal & non-verbal. Oral communication: Forms
			CO3	By the end of the course, students will be able to investigate the Channels of Communication- steps to improve the effectiveness of formal and informal communication – 7C's of Communication
			CO4	By the end of the course, students will be able to evaluate the Listening process importance in business communication
			CO5	By the end of the course, students will be able to explain the Procedure and guidelines for effective report writing & essential skills of negotiation.
	Bus1.6 (R22)	Accounting for Managers	CO1	By the end of the course, students will be able to understand the Introduction to Accounting.
			CO2	By the end of the course, students will be able to analyse the Preparation of Financial statements- Income statement and Balance sheet – Bank Reconciliation Statement.
			CO3	By the end of the course, students will be able to investigate the Analysis of Financial Statements-- Financial Ratio analysis – Funds Flow and Cash Flow Analysis.
			CO4	By the end of the course, students will be able to evaluate the Management Accounting.
			CO5	By the end of the course, students will be able to explain the Contemporary Developments in fundamental of accounting.
	Bus1.7 (R22)	IT for Managers	CO1	By the end of the course, students will be able to understand the Basic Computer Architecture-Input Output devices- Storage devices-Hardware and software-Networks.
			CO2	By the end of the course, students will be able to analyse the Creation of Document- format document-Text Editing and saving-Organising information with tables and outlines- Mail merge.
			CO3	By the end of the course, students will be able to investigate the Use of templates and slide designs,

				Slide master, Animation Timings, Action buttons, Rehearse Narration, Slideshow.
			CO4	By the end of the course, students will be able to evaluate the Data Types, Variables, Constants, Input / Output, Operators (Arithmetic, relational, logical, bitwise.
			CO5	By the end of the course, students will be able to explain the Security Threats and Attacks, Malicious Software, Hacking & Security Mechanisms.
II	Bus 2.1 (R22)	Entrepreneurship Development	CO1	By the end of the course, students will be able to understand the Entrepreneurship-Characteristics-Entrepreneur Vs Intrapreneur- Management Vs Entrepreneurship
			CO2	By the end of the course, students will be able to analyse the Steps in assessingbusiness potential of an idea- Opportunity Recognition
			CO3	By the end of the course, students will be able to investigate the Project preparationand Financing Ventures
			CO 4	By the end of the course, students will be able to evaluate the Institutions SupportingSmall Business Enterprises
			CO5	By the end of the course, students will be able to explain the Build a StartupManagement Team.
	Bus2.2 (R22)	Research Methodology & Business Analytics	CO1	By the end of the course, students will be able to understand the Nature and Scope of Research Methodology
			CO2	By the end of the course, students will be able to analyse the Qualitative andQuantitative Research
			CO3	By the end of the course, students will be able to investigate the Characteristics of a good sample, Types of sampling- Probability Sampling Types, On-Probability

			CO4	By the end of the course, students will be able to evaluate Multivariate Data analysis
			CO5	By the end of the course, students will be able to explain Automated Data AnalysisUsing SPSS.
	Bus2.3 (R22)	Organizational Behaviour	CO1	By the end of the course, students will be able to understand the basic concepts in Management-Levels, Skills, Role, and Functions & Principles of Management.
			CO2	By the end of the course, students will be able to analyse the theoretical concepts - Forecasting – Techniques of Forecasting. Decision making, MBO.
			CO3	By the end of the course, students will be able to investigate the Functions & Responsibilities of Managers
			CO4	By the end of the course, students will be able to evaluate the role of managers in Business Environment of the organization-, key elements in Organizational Behaviour, Challenges & Opportunities for OB.
			CO5	By the end of the course, students will be able to explain the principles of human behaviour in an organization through Communication, Motivation, Group Dynamics, and Leadership & Organizational Design.
	Bus2.4(R22)	Human Resource management	CO1	By the end of the course, students will be able to understand the concept and importance of Human Resource Management in organizations
			CO2	By the end of the course, students will be able to analyse the various functions of HRM, such as recruitment, selection, training and development, performance management, compensation and benefits, and employee relations
			CO3	By the end of the course, students will be able to investigate the internal and external factors that impact human resource planning and Effective Coaching and Mentoring Skills
			CO4	By the end of the course, students will be able to evaluate the training needs and design effective training programs and Career Development
			CO5	By the end of the course, students will be able to

				explain the concepts of Quality ofWork Life (QWL) and Grievance handling Procedure
	Bus2.5(R22)	Financial Management	CO1	By the end of the course, students will be able to understand the Financial Managementand the goals of the firm
			CO2	By the end of the course, students will be able to Analyse Investment Decisions Traditional Techniques and Discounted Cash Flow Methods
			CO3	By the end of the course, students will be able to investigate the Capital Structure Theories – Net Income approach – Net operating income approach
			CO4	By the end of the course, students will be able to evaluate Dividend Theories –Traditional position
			CO5	By the end of the course, students will be able to explain Concepts of working capital –Determinants of working capital – Optimum level of current assets
	Bus2.6 (R22)	Marketing Management	CO1	By the end of the course, students will be able to understand the Concepts ofMarketing; Marketing Management Tasks; Marketing Environment
			CO2	By the end of the course, students will be able to analyse Marketing Information System and Marketing Research
			CO3	By the end of the course, students will be able to investigate the Development ofMarketing Offerings Strategy
			CO4	By the end of the course, students will be able to evaluate Pricing Strategies and Programs Networks – Channels of Distribution.
			CO5	By the end of the course, students will be able to explain the Designing and Managing Marketing Communications.
	Bus2.7 (R22)	Production & Operations Management	CO1	By the end of the course, students will be able to understand the Evolution of Operations Management
			CO2	By the end of the course, students will be able to analyse the Location Decision Factorsand Planning methods (Numerical); Layout planning – Planning and Principles of Layout, Classification of Plant Layout
			CO3	By the end of the course, students will be able to investigate the Supply Chain Management –

				Framework, principles, electronic supply chain management.
			CO4	By the end of the course, students will be able to evaluate Inventory Management and Work study
			CO5	By the end of the course, students will be able to explain the Quality, Maintenance and Project Management.
III	Bus3.1 (R22)	Strategic Management & Business Policy	CO1	By the end of the course, students will be able to understand the Strategic Management
			CO2	By the end of the course, students will be able to analyse corporate, business and functional level strategy; Intended, Deliberate, Realized, Unrealized and Emergent strategies
			CO3	By the end of the course, students will be able to investigate the Strategic tools for analysis and appraisal of External Environment
			CO4	By the end of the course, students will be able to evaluate strengths and weakness of afirm - Resource Based Theory of the firm
			CO5	By the end of the course, students will be able to explain the strategies for competitiveadvantage
	Bus3.2 (R22)	DSS & MIS	CO1	By the end of the course, students will be able to understand the MIS operating infunctional areas of an organization.
			CO2	By the end of the course, students will be able to analyse the Decision Making Process – Relationship between Decision- Making and MIS.
			CO3	By the end of the course, students will be able to investigate the System Life Cycle Design - Prototype Approach - Detailed Study on Life Cycle System.
			CO4	By the end of the course, students will be able to evaluate the Decision Support System: Definitions
			CO5	By the end of the course, students will be able to explain the Database ManagementSystem.
	Bus3.3 (R22)	Business Ethcs & Corporate Governance	CO1	By the end of the course, students will be able to understand the Meaning anddefinition of Ethics – Ethical Theories

			CO2	By the end of the course, students will be able to analyse the Ethical corporate behavior – Ethical decision making – Conflicts in decision making from the legal and moral points ofview.
			CO3	By the end of the course, students will be able to investigate the Corporate Social Responsibility activities
			CO4	By the end of the course, students will be able to evaluate the Meaning and definition of corporate governance – Corporate management structure for corporate governance
			CO5	By the end of the course, students will be able to explain the Corporate governancerequirements in the ever changing global scenario. Global practices.
	Bus3.4F (R22)	International Financial Management	CO1	By the end of the course, students will be able to understand the Finance function in anInternational Context. Additional dimensions in achieving the wealth maximization goal
			CO2	By the end of the course, students will be able to analyse the Foreign Exchange Markets
			CO3	By the end of the course, students will be able to investigate the International CapitalMarkets
			CO4	By the end of the course, students will be able to evaluate the International CapitalStructure and Cost of Capital.
			CO5	By the end of the course, students will be able to explain the International Cash Management, techniques
	3.4 HR	Management of Industrial Relations	CO1	By the end of the course, students will be able to understand the, Evolution and growth of Industrial Relations in India
			CO2	By the end of the course, students will be able to analyse Evaluation of Worker's Participation in Management, and Conditions for success of Worker's Participation in Management
			CO3	By the end of the course, students will be able to

				investigate the Grievance procedure, Machinery available for redressal of Grievances
			CO4	By the end of the course, students will be able to evaluate Prevention and settlement of Industrial Disputes in India, Industrial Disputes act
			CO5	By the end of the course, students will be able to explain the Labour laws in Fundamental Rights.
	Bus3.5F (R22)	Security Analysis & Investment Management	CO1	By the end of the course, students will be able to understand the Investment Process
			CO2	By the end of the course, students will be able to analyse the Valuation of fixed incomeSecurities
			CO3	By the end of the course, students will be able to investigate the Approaches to Security Analysis: Fundamental Analysis
			CO4	By the end of the course, students will be able to evaluate the Portfolio Return andPortfolio Risk
			CO5	By the end of the course, students will be able to explain the Portfolio Evaluation &Revision.
	3.5HR	Management Training & Development	CO1	By the end of the course, students will be able to understand the HRD objectives andphilosophy
			CO2	By the end of the course, students will be able to analyse the Observing and AssessingHRD needs, Planning and Designing HRD Needs
			CO3	By the end of the course, students will be able to investigate the Reviewing andEvaluating HRD
			CO4	By the end of the course, students will be able to evaluate the HRD managers in MNC
			CO5	By the end of the course, students will be able to explain the Designing HRD model- Global Restrictions on certain Countries by the hiring Country
IV	Bus4.1 (R22)	Business Analytics	CO1	By the end of the course, students will be able to understand the Introduction to Business Analytics
			CO2	By the end of the course, students will be able to analyse the Business Analytics Cycle Information and Database Architecture and Data Gathering Process
			CO3	By the end of the course, students will be able to investigate the Business Applicationsof Big Data

			CO4	By the end of the course, students will be able to evaluate the Encourage an aptitude for business improvement, innovation and entrepreneurial action
			CO5	By the end of the course, students will be able to explain the Reading R data sets and creating variables
	Bus4.2 (R22)	Knowledge management	CO1	By the end of the course, students will be able to understand the concepts of Knowledge Economy
			CO2	By the end of the course, students will be able to analyse the Information Technology& Knowledge Management
			CO3	By the end of the course, students will be able to investigate the Future of Knowledge Management & Industry Perspective
			CO4	By the end of the course, students will be able to evaluate the Knowledge Management Process
			CO5	By the end of the course, students will be able to explain the Implementation of Knowledge Management and Study of Road Blocks to the implementation of knowledge management
	Bus4.3 (R22)	Global Business	CO1	By the end of the course, students will be able to understand the International business environment
			CO2	By the end of the course, students will be able to analyse the Evaluating and selecting the country for global business and modes of entry into global business
			CO3	By the end of the course, students will be able to investigate the Trends in internationalinvestments
			CO4	By the end of the course, students will be able to evaluate the Trade restrictions and economic development
			CO5	By the end of the course, students will be able to explain the Global Business Operations strategies
	Bus 4.4 HR (R22)	International Human Resource Management	CO1	By the end of the course, students will be able to understand the concepts of Human Resource Management
			CO2	By the end of the course, students will be able to analyse the International recruitmentand selection - Training and development of expatriates
			CO3	By the end of the course, students will be able to investigate the Repatriation -Processof repatriation,

				job related adjustments, organisational development
			CO4	By the end of the course, students will be able to evaluate Employer-EmployeeRelation in MNCs
			CO5	By the end of the course, students will be able to explain Cross Cultural Management
	Bus4.5.F (R22)	Management of Financial Services	CO1	By the end of the course, students will be able to understand the Financial Services
			CO2	By the end of the course, students will be able to analyse the Merchant Bankingguidelines
			CO3	By the end of the course, students will be able to investigate the Mutual Funds policiesand Forfeiting – Securitization.
			CO4	By the end of the course, students will be able to evaluate the Venture CapitalInstitutions in India
			CO5	By the end of the course, students will be able to explain the Lease Financing
	Bus4.5 H (R22)	Performance & Compensation Management	CO1	By the end of the course, students will be able to understand the Introduction to Performance Management
			CO2	By the end of the course, students will be able to analyse the Introduction toCompensation Management
			CO3	By the end of the course, students will be able to investigate the Performance LinkedCompensation
			CO4	By the end of the course, students will be able to evaluate the InternationalCompensation Management.
			CO5	By the end of the course, students will be able to explain the Compensation Administration
	Bus 4.6 F		CO1	By the end of the course, students will be able to understand the concepts of IncomeTax Act, 1961
			CO2	By the end of the course, students will be able to analyse the Computation of income ofa company under Income from House Properties

	(R22)	Corporate Taxation	CO3	By the end of the course, students will be able to investigate the Set-off and set-off and carry forward of losses
			CO4	By the end of the course, students will be able to evaluate the Assessment of Company Assessed
			CO5	By the end of the course, students will be able to explain the Tax planning
	Bus 4.6 H (R22)	HRD Strategy & Systems	CO1	By the end of the course, students will be able to understand the HRD objectives and philosophy
			CO2	By the end of the course, students will be able to analyse the Observing and Assessing HRD needs, Planning and Designing HRD Needs
			CO3	By the end of the course, students will be able to investigate the Reviewing and Evaluating HRD
			CO4	By the end of the course, students will be able to evaluate the HRD managers in MNC
			CO5	By the end of the course, students will be able to explain the Designing HRD model-Global Restrictions on certain Countries by the hiring Country

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2.6.1

CURRICURAL PLAN

ST. ANN'S COLLEGE FOR WOMEN

(A Catholic Christian Minority Institution)

(Affiliated to Acharya Nagarjuna University,

Recognized Under Section 2(f) of UGC Act 1956-New Delhi)

Amaravathi Road, Gorantla, Guntur – 522034 (A.P).

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DEPARTMENT OF STATISTICS
2023-2024
CURRICULAR PLAN

Name of the Faculty :Mrs. G. Vijaya Lakshmi		Academic Year : 2023-24
Department :Statistics	Programme : B.Sc - MSCs	Year / Semester :II Year / III Sem
Course : Statistical Inference	Course Code :STT3SK	Hours Allotted :44

Course Outcomes : Thestudentswillacquire

- Conceptoflaw of largenumbersandthe its uses.
- Conceptofcentrallimittheoremanditsuses instatistics.
- Conceptofrandomsamplefromadistribution,samplingdistributionofastatistic,standarderrorofimportantestimatessuchasmeanandproportions.
- Knowledgeaboutimportantinferentialaspectssuchaspointestimation,testofhypothesesandassociated concepts.
- Knowledge about inferences from Binomial, Poisson and Normaldistributionsasillustrations.
- Conceptaboutnon-parametricmethodandsomeimportantnon-parametrictests

Unit	Hours Allotted	Month & Week	Topics to be Covered	Methodology Adopted	CIA	Remarks
UNIT I	08 Hrs.	Aug 3rd and 4th	**Exact Sampling Distributions:** Concepts of Population, Sample, Parameter, statistic, Sampling distribution, Standard error. convergence in probability and convergence in distribution, law of large numbers, central limit theorem (statements only). Studentís t- distribution, F – Distribution, χ^2- Distribution: Definitions, properties and the applications.	Lecture Method	Slip Test & Assignment	
UNIT II	08 Hrs.	Sep 1st and 2nd	**Theory of Estimation:**Estimation of a parameter, criteria of a good estimator unbiasedness,consistency,efficiency,& sufficiency and .Statement of Neyman's factorizationtheorem.Estimation of parameters by the method of moments and maximum likelihood (M.L), properties of MLEs. Binomial, Poisson & Normal Population parameter,Estimate by MLE method Confidence Intervals.	Lecture Method	Slip Test & Assignment	

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UNIT III	08 Hrs.	Sep 3rd and 4th	**Testing of Hypothesis:**Concepts of statistical hypotheses, null and alternative hypothesis,critical region, two types of errors, level of significance and power of a test. One and two tailed tests. Neyman-Pearsonís lemma. Examples in case of Binomial, Poisson, Exponential and Normal distributions	Lecture Method	Slip Test & Assign ment	
UNIT IV	12 Hrs.	Oct 1st2nd &4th	**Large sample Tests:** Large sample test for single mean and difference of two means,confidence intervals for mean(s) .Large sample test for single proportion, difference of proportions .standard deviation(s) and correlation coefficient(s). **Small Sample tests:** T-test for single mean, difference of means and paired t-test. χ^2-test for goodness of fit and independence of attributes.F-test for equality of variances.	Lecture Method	Slip Test & Assign ment	
UNIT V	08 Hrs.	Nov 1st and 2nd	**Non -parametric tests**-Advantages and disadvantages, comparison with parametric tests. Measurement scale-nominal, ordinal, interval and ratio. One sample runtest, signtest and Wilcoxon-signed rank tests (single and paired samples). Two independent sample tests: Median test,Wilcoxon–Mann-Whitney U test, Wald Wolfo Witz run test.	Lecture Method	Slip Test & Assign ment	

Signature of the Faculty

Head of the Department

Head i/c Dept. of Statistics
St. Ann's College for Women
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DEPARTMENT OF STATISTICS
2023-2024
CURRICULAR PLAN

Name of the Faculty :Mrs. G. Vijaya Lakshmi		Academic Year : 2023-24
Department :Statistics	Programme :B.Sc - MSCs	Year / Semester :III Year / V Sem
Course :Operations Research - I	Course Code :STT5SKA	Hours Allotted :50

Course Outcomes :

- After learning this course, the student will be able
- To know the scope of Operations Research
- To link the OR techniques with business environment and life sciences
- To convert real life problems into mathematical models
- To find a solution to the problem in different cases
- To inculcate logical thinking to find a solution to the problem

Unit	Hours Allotted	Month & Week	Topics to be Covered	Methodology Adopted	CIA	Remarks
UNIT I	16 Hrs.	Sep 1st 2nd3rd , 4th and	**Introduction of OR**:Origin and development of OR – Nature and features of OR –Scientific Method in OR – Modelling in OR – Advantages and limitations of Models-General Solution methods of OR models – Applications of Operation Research. Linear programming problem (LPP) - Mathematical formulation of the problem - illustrations on Mathematical formulation of Linear programming of problem. Graphical solution of linear programming problems. Some exceptional cases - Alternative solutions, Unbounded solutions, non-existing feasible solutions by Graphical method.	Lecture Method	Slip Test & Assignment	
UNIT II	08 Hrs.	Oct 1st& 2nd	**General linear programming Problem (GLP):** Definition and Matrix form of GLP problem, Slack variable, Surplus variable, unrestricted Variable, Standard form of LPP and Canonical form of LPP. Definitions of Solution, Basic Solution, Degenerate Solution, Basic feasible Solution and Optimum Basic Feasible Solution. Introduction to Simplex method and Computational procedure of simplex algorithm. Solving LPP by Simplex method (Maximization case and Minimization case)	Lecture Method	Slip Test & Assignment	
UNIT III	08 Hrs.	Oct4th & Nov 1st	**Artificial variable technique:** Big-M method and Two-phase simplex method,	Lecture	Slip Test &	

			Degeneracy in LPP and method to resolve degeneracy. Alternative solution, Unbounded solution, Non existing feasible solution and Solution of simultaneous equations by Simplex method.	Method	Assign ment	
UNIT IV	08 Hrs.	Nov 2nd& 3rd	**Duality in Linear Programming:** Concept of duality -Definition of Primal and Dual Problems, General rules for converting any primal into its Dual, Economic interpretation of duality, Relation between the solution of Primal and Dual problem(statements only). Using duality to solve primal problem. Dual Simplex Method.	Lecture Method	Slip Test & Assign ment	
UNIT V	10 Hrs.	Nov 4th& Dec 1st ,2nd	**Post Optimal Analysis:** Changes in cost Vector C, Changes in the Requirement Vector band changes in the Coefficient Matrix A. Structural Changes in a LPP	Lecture Method	Slip Test & Assign ment	

Signature of the Faculty

Head of the Department

Head of Dept. of Statistics
St. Ann's College for Women
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DEPARTMENT OF STATISTICS
2023-2024
CURRICULAR PLAN

Name of the Faculty :Dr. J. Pratapa Reddy		Academic Year : 2023-24
Department : Statistics	Programme : B.Sc - MSCs	Year / Semester : III Year / V Sem
Course : Operations Research - II	Course Code : STT5SKB	Hours Allotted :51

Course Outcomes : After learning this course, the student will be able

- To solve the problems in logistics
- To find a solution for the problems having space constraints
- To minimize the total elapsed time in an industry by efficient allocation of jobs to the suitable persons.
- To find a solution for an adequate usage of human resources
- To find the most plausible solutions in industries and agriculture when a random environment exists.

Unit	Hours Allotted	Month & Week	Topics to be Covered	Methodology Adopted	CIA	Remarks
UNIT I	12 Hrs.	Sep 1st,2nd& 3rd	**Transportation Problem:** Introduction, Mathematical formulation of Transportation problem. Definition of Initial Basic feasible solution of Transportation problem- North-West corner rule, Lowest cost entry method, Vogel's approximation method. Method of finding optimal solution-MODI method(U-V method). Degeneracy in transportation problem, Resolution of degeneracy, Unbalanced transportation problem. Maximization TP. Transshipment Problem.	Lecture Method	Slip Test & Assignment	
UNIT II	08 Hrs.	Sep 4th& Oct 1st	**Assignment Problem:** Introduction, Mathematical formulation of Assignment problem, Reduction theorem (statement only), Hungarian Method for solving Assignment problem, Unbalanced Assignment problem. The Traveling salesman problem, Formulation of Traveling salesman problem as an Assignment problem and Solution procedure.	Lecture Method	Slip Test & Assignment	
UNIT III	12Hrs.	Oct 2nd ,3rd&4tha nd Nov	**Sequencing problem:** Introduction and assumptions of sequencing problem, Sequencing of n jobs and one machine problem. Johnson's algorithm for n jobs and two machines problem problems with n-jobs on two machines, Gantt chart, algorithm for n jobs on three machines problem- problems with n- jobs on	Lecture	Slip Test &	

		1st	three machines, algorithm for n jobs on m machines problem, problems with n-jobs on m-machines. Graphical method for two jobs on m– machines.	Method	Assign ment	
UNIT IV	08 Hrs.	Dec 1st and 2nd	**Network Scheduling:** Basic Components of a network, nodes and arcs, events and activities– Rules of Network construction – Time calculations in networks - Critical Path method (CPM) and PERT.	Lecture Method	Slip Test & Assign ment	
UNIT V	11 Hrs.	Nov 2nd,3rd&4th	**Game Theory :** Two-person zero-sum games. Pure and Mixed strategies. Maxmin and Minimax Principles - Saddle point and its existence. Games without Saddle point-Mixed strategies. Solution of 2 x 2 rectangular games. Graphical method of solving 2 x n and m x 2 games. Dominance Property. Matrix oddment method for n x n games. Only formulation of Linear Programming Problem for m x n games.	Lecture Method	Slip Test & Assign ment	

Signature of the Faculty

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DEPARTMENT OF STATISTICS
2023-2024

CURRICULAR PLAN

Name of the Faculty : Mrs. G. Vijaya Lakshmi		Academic Year : 2023-24
Department : Statistics	Programme : B.Sc - MSCs	Year / Semester : II Year / IV Sem
Course : Sampling Techniques & Design of Experiments	Course Code : STT4SKA	Hours Allotted : 44

Course Outcomes : The students shall get

- Introduced to various statistical sampling schemes such as simple, stratified and systematic sampling.
- An idea of conducting the sample surveys and selecting appropriate sampling techniques.
- Knowledge about comparing various sampling techniques.
- Carryout one way and two way Analysis of Variance.
- Understand the basic terms used in design of experiments.
- Use appropriate experimental designs to analyze the experimental data.

Unit	Hours Allotted	Month & Week	Topics to be Covered	Methodology Adopted	CIA	Remarks
UNIT I	14 Hrs.	Jan 4th& Feb 1st ,2nd& 3rd	**Simple Random Sampling (with and without replacement):** Notations and terminology, various probabilities of selection. Random numbers tables and its uses. Methods of selecting simple random sample, lottery method, method based on random numbers. Estimates of population total mean and their variances and standard errors, determination of sample size, simple random sampling of attributes.	Lecture Method	Slip Test & Assignment	
UNIT II	05Hrs.	Feb 4th& Mar 1st	**Stratified random sampling:**Stratified random sampling, Advantages and Disadvantages of Stratified Random sampling Estimation of population mean, and its variance. Stratified random sampling with proportional and optimum allocations. Comparison between proportional and optimum allocations with SRSWOR.Systematic sampling: Systematic sampling definition when N=nk and merits and demerits of systematic sampling-estimate of mean and its variance. Comparison of systematic sampling with Stratified and SRSWOR.	Lecture Method	Slip Test & Assignment	

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UNIT III	09 Hrs.	Dec 3rd& 4th ,Jan 1st	**Analysis of variance:** Analysis of variance (ANOVA) – Definition and assumptions. One-way with equal and unequal classification ,Two way classification. **Design of Experiments :**Definition ,Principles of design of experiments, CRD: Layout, advantages and disadvantage and Statistical analysis of Completely Randomized Design(C.R.D).	Lecture Method	Slip Test & Assign ment	
UNIT I	08 Hrs	Jan 2nd& 3rd	Randomized Block Design (R.B.D) and Latin Square Design (L.S.D) with their layouts and Analysis .,Missing plot technique in RBD and LSD. Efficiency of RBD over CRD, Efficiency of LSD over RBD and CRD.	Lecture Method	Slip Test & Assign ment	
UNIT V	08 Hrs.	Mar 2nd& 3rd	**Factorial experiments:** Main effects and interaction effects of 2^2 and 2^3 factorial experiments and their Statistical analysis Yate's procedure to find factorial effect totals.	Lecture Method	Slip Test & Assign ment	

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DEPARTMENT OF STATISTICS
2023-2024
CURRICULAR PLAN

Name of the Faculty :Dr. J. Pratapa Reddy		Academic Year : 2023-24
Department : Statistics	Programme :B.Sc – MSCs	Year / Semester : II Year / IV Sem
Course : Applied Statistics	Course Code : STT4SKB	Hours Allotted :48

Course Outcomes : After completion of this course ,the students will know about

- Time series data ,its applications to various fields and components of time series,
- Fitting and plotting of various growth curves such as modified exponential, Gompertz and logistic curve,
- Fitting of trend by Moving Average method,
- Measurement of Seasonal Indices by Ratio-to-Trend , Ratio-to-Moving average and Link Relative methods,
- Applications to real data by means of laboratory assignments.
- Interpret and use arrange of Iindex numbers commonly used in the business sector
- Perform calculations involving simple and weighted index numbers
- Understand the basic structure of the consumer price index and perform calculations involving its use
- Variousdatacollectionmethodsenablingtohaveabetterinsightinpolicymaking,planningand systematicimplementation,
- Construction and implementation of life tables,
- Population growth curves, population estimates and projections,
- Real data implementation of various demographic concepts as outlined abovethroughpracticalassignments.

Unit	Hours Allotted	Month & Week	Topics to be Covered	Methodology Adopted	CIA	Remarks
UNIT I	10 Hrs.	Dec 4th , Jan 1st& 2nd	**Time Series:** Time Series and its components with illustrations, additive, multiplicative models .Trend: Estimation of trend by freehand curve method ,method of semi averages. Determination of trend by least squares (Linear trend, parabolistic trend only), moving averages method.	Lecture Method	Slip Test & Assign ment	
UNIT II	07 Hrs.	Jan 4th&Feb 1st	**Seasonal Component** :Determination of seasonal indices by simple averages method, ratio to moving average ,Ratio to trend and Link relative methods, Deseasonalization.	Lecture Method	Slip Test & Assign ment	
			Growth curves:			

UNIT III	10 Hrs.	Feb 2nd,3rd& 4th	Modified exponential curve, Logistic curve and Grompertz curve, fitting of growth curves partial sums Detrending. Effect of elimination of trend on other components of the time series	Lecture Method	Slip Test & Assign ment	
UNIT IV	12 Hrs.	March 1st ,2nd ,3rd& 4th	**Index numbers:** Concept, construction, problems involved in the construction of index numbers ,uses and limitations .Simple and weighted index numbers .Laspeyers ,Paaches and Fishers index numbers ,Criterion of a good index number ,Fisher s ideal index numbers .Cost of living index number and whole sale price index number.	Lecture Method	Slip Test & Assign ment	
UNIT V	09 Hrs.	March 4th& April 1st& 2nd	**Vital Statistics:** Introduction, definition and uses of vital statistics, sources of vital statistics. Measures of different Mortality and Fertility rates, Measurement of population growth .Life tables: construction and uses of life tables.	Lecture Method	Slip Test & Assign ment	

Signature of the Faculty

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DEPARTMENT OF STATISTICS
2023-2024
CURRICULAR PLAN

		Academic Year : 2023-24
Department : Statistics	Programme :B.Sc –Stat(Hons)	Year / Semester :IYear / II Sem
Course :Descriptive Statistics – M1	Course Code :STT2SLA	Hours Allotted :36

LearningOutcomes : After completion of this course ,the students will know about

- Toacquaintwiththeroleofstatisticsindifferentfieldswithspecialreferencetobusinessand economics
- To review good practice in presentation and the form at most applicable to their own data.
- Tolearnthemeasuresofcentraltendencyoraveragesreducethedatatoasinglevaluewhichis highly useful for making comparative studies.
- To familiar with the measures of dispersion throw light on reliability of average and control of variability.
- To deal with the situation where there is uncertainty and to measure that uncertainty by using the probability, which is essential in all research areas.

Unit	Hours Allotted	Month & Week	Topics to be Covered	Methodology Adopted	CIA	Remarks
UNIT I	08 Hrs.	Jan 3rd&4th	**Statistical Description of Data:** Origin, history and definitions of Statistics. Importance, Scope and limitations Statistics. Function of Statistics – Collection, Presentation, Analysis and Interpretation. Collection of data - primary and secondary data and its methods. Classification of data – Quantitative, Qualitative, Temporal, Spatial. Presentation of data – Textual, Tabular – essential parts.	Lecture Method	Slip Test & Assignment	
UNIT II	08 Hrs.	Feb 1st & 2nd	**Measurement Scales** : Nominal, Ordinal, Ratio and Interval. Frequency distribution and types of frequency distributions, forming a frequency distribution. Diagrammatic representation of data – Historiagram, Bar, Multiple bar and Pie with simple problems. Graphical representation of data: Histogram, frequencypolygon and Ogives with simple problems.	Lecture Method	Slip Test & Assignment	
UNIT III	04 Hrs.	Feb 3rd	Arithmetic Mean – properties, methods. Median, Mode, Geometric Mean (GM), Harmonic Mean (HM). Calculation of mean, median, mode, GM and HM for grouped and ungrouped data. Median and Mode through graph. Empirical relation between mean, median and mode. Features of goodaverage.	Lecture Method	Slip Test & Assignment	

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UNIT IV	08Hrs.	Feb 4th&March 1st	Concept and problems – Range, Quartile Deviation, Mean Deviation and Standard Deviation, Variance. Central and Non – Central moments and their interrelationship. Sheppard's correction for moments. Skewness and its methods, kurtosis.	Lecture Method	Slip Test & Assignment	
UNIT V	08 Hrs.	March 2nd& 3rd	Basic Concepts of Probability, random experiments, trial, outcome, sample space, event, mutually exclusive and exhaustive events, equally likely and favourable outcomes. Mathematical, Statistical, axiomatic definitions of probability. Conditional Probability and independence of events, Addition and multiplication theorems of probability for 2 and for n events and simple problems. Boole's inequality, Bayes theorem and its applications in real life problems.	Lecture Method	Slip Test & Assignment	

Signature of the Faculty

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DEPARTMENT OF STATISTICS

2023-2024

CURRICULAR PLAN

Name of the Faculty :Mrs.G.Vijaya Lakshmi		Academic Year : 2023-24
Department : Statistics	Programme :B.Sc –Stat(Hons)	Year / Semester :IYear / II Sem
Course :Random Variables & M.E-M2	Course Code :STT2SLB	Hours Allotted :32

LearningOutcomes : After completion of this course ,the students will know about

- To acquaint with the role of statistics in dealing with the univariate random variables.
- To learn the extension of the uni variate data to bi variate data
- Tolearnthemeasureofrandomness mathematicallybyusing expectations
- To get the familiarity about the generating functions, law of large numbers and central limit theorem, further to apply in research and allied fiends.

Unit	Hours Allotted	Month & Week	Topics to be Covered	Methodology Adopted	CIA	Remarks
UNIT I	06Hrs.	Jan 3rd&4th	**Univariate Random Variables** Definition of random variable (r.v.), discrete and continuous random variables, functions of random variable. Probability mass function, Probability density function, Distribution function and itsproperties. Calculation of moments, coefficient of skewness and kurtosis for a given pmf and pdf.	Lecture Method	Slip Test & Assignment	
UNIT II	06 Hrs.	Jan 4th&Feb 1st	**Bivariate Random Variables** Bivariate random variable - meaning, joint, marginal and conditional Distributions, independence of random variables and simple problems.	Lecture Method	Slip Test & Assignment	
UNIT III	08 Hrs.	Feb 2nd&3rd	**Mathematical Expectation** Mathematical expectation of function a random variable. Moments and covariance using mathematical expectation with examples. Addition and Multiplication theorems on expectation. Properties of expectations, variance, covariance. Chebyshev and Cauchy - Schwartz inequalities and their applications	Lecture Method	Slip Test & Assignment	
UNIT IV	04Hrs.	Feb 4th	**Generating functions** Definitions of Moment Generating Function, Cumulant Generating Function, Characteristic Function and Probability Generating Function and their properties. Weak Law of Large Numbers (WLLN), Strong Law of Large Numbers (SLLN).	Lecture Method	Slip Test & Assignment	

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UNIT V	08 Hrs.	March 1st & 2nd	**Limit Theorems** Concept – Population, Sample, Parameter, statistic, Sampling distribution, Standard error. Convergence in probability and convergence in distribution, concept of Central limit theorem. Lindberg – Levy CLT and its applications, Statement of Lyapunov's CLT, relationship between CLT and WLLN	Lecture Method	Slip Test & Assign ment	

Signature of the Faculty

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DEPARTMENT OF STATISTICS
2023-2024
CURRICULAR PLAN

Name of the Faculty :Dr.J.Pratapa Reddy		Academic Year : 2023-24
Department : Statistics	Programme :B.Sc –Stat(Minor)	Year / Semester :IYear / II Sem
Course :Descriptive Statistics-Minor	Course Code :STT2SLC	Hours Allotted :44

LearningOutcomes : After completion of this course ,the students will know about

- Toacquaintwiththeroleofstatisticsindifferentfieldswithspecialreferencetobusinessand economics
- To review good practice in presentation and the form at most applicable to their own data.
- Tolearnthemeasuresofcentraltendencyoraveragesreducethedatatoasinglevaluewhichis highly useful for making comparative studies.
- To familiar with the measures of dispersion throw light on reliability of average and control of variability.
- To deal with the situation where there is uncertainty and to measure that uncertainty by using the probability, which is essential in all research areas.

Unit	Hours Allotted	Month & Week	Topics to be Covered	Methodology Adopted	CIA	Remarks
UNIT I	10 Hrs.	Jan 3rd&4th	Unit – 1: Statistical Description of Data Origin, history and definitions of Statistics. Importance, Scope and limitations Statistics. Function of Statistics – Collection, Presentation, Analysis and Interpretation. Collection of data - primary and secondary data and its methods. Classification of data – Quantitative, Qualitative, Temporal, Spatial. Presentation of data – Textual, Tabular – essential parts.	Lecture Method	Slip Test & Assignment	
UNIT II	07 Hrs.	Feb 1st,2nd& 3rd	Measurement Scales – Nominal, Ordinal, Ratio and Interval. Frequency distribution and types of frequency distributions, forming a frequency distribution. Diagrammatic representation of data – Historiagram, Bar, Multiple bar and Pie with simple problems. Graphical representation of data: Histogram, frequencypolygon and Ogives with simple problems.	Lecture Method	Slip Test & Assignment	
UNIT III	07 Hrs.	Feb 3rd& 4th	Arithmetic Mean – properties, methods. Median, Mode, Geometric Mean (GM), Harmonic Mean (HM). Calculation of mean, median, mode, GM and HM for grouped and ungrouped data. Median andMode through graph. Empirical relation between mean, media and mode. Features ofgood average.	Lecture Method	Slip Test & Assignment	

UNIT IV	09Hrs.	March 1st ,2nd&3rd	Concept and problems – Range, Quartile Deviation, Mean Deviation and Standard Deviation, Variance. Central and Non – Central moments and their interrelationship. Sheppard's correction for moments. Skewness and its methods, kurtosis.	Lecture Method	Slip Test & Assign ment	
UNIT V	11 Hrs.	March 4th& April 1st& 2nd	Basic Concepts of Probability, random experiments, trial, outcome, sample space, event, mutually exclusive and exhaustive events, equally likely and favourable outcomes. Mathematical, Statistical, axiomatic definitions of probability. Conditional Probability and independence of events, Addition and multiplication theorems of probability for 2 and for n events and simple problems. Boole's inequality, Bayes theorem and its applications in real life problems.	Lecture Method	Slip Test & Assign ment	

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DEPARTMENT OF STATISTICS
2023-2024
CURRICULAR PLAN

Name of the Faculty :Dr.J.Pratapa Reddy		Academic Year : 2023-24
Department : Statistics	Programme :B.Sc –AI(Hons)	Year / Semester :IYear / II Sem
Course :Statistical Methods & Probability Distributions	Course Code :AIE2SLB	Hours Allotted :38

LearningOutcomes : After completion of this course ,the students will know about

- know about correlation and regression techniques, the two very powerful tools in statistics
- studyconceptofcoefficientofdeterminationandinferenceonpartialandmultiplecorrelationandregression coefficients.
- knowledgeofimportantdiscretedistributionssuchasBinomial,Poisson,Geometric,NegativeBinomial andHypergeometricandtheirinterrelationsifany
- knowledgeofimportantcontinuousdistributionssuchasUniform,Normal,ExponentialandGammaand relationswithsomeotherdistributions,
- basicknowledge of complete enumeration and sample, sampling frame, sampling distribution,samplingandnon-samplingerrors,principalstepsinsamplesurveys,limitationsofsamplingetc.,

Unit	Hours Allotted	Month & Week	Topics to be Covered	Methodology Adopted	CIA	Remarks
UNIT I	07 Hrs.	Jan 3rd&4th	**Correlation Analysis** Meaning Measures of Correlation-Scatter diagram, Karl Pearson's and Spearman's rank correlation. Calculation of the correlation coefficient for bi-variate frequency distribution Multiple and Partial correlation(3 variables only)	Lecture Method	Slip Test & Assignment	
UNIT II	14 Hrs.	Feb 1st to 4th Week	**Curve fitting and Regression Analysis**: Principle of least squares, fitting of straight line, second degree polynomial or parabola, power and exponential curves. Regression: Introduction, Linear Regression- Regression coefficients and its properties, Angle between two lines of regression. Standard error of estimate (residual variance), Explained and Unexplained variation, coefficient of determination. Multiple Linear Regression(3 variables only) and Logistic Regression.	Lecture Method	Slip Test & Assignment	
UNIT III	04 Hrs.	March 1st	**Discrete Probability Distributions**: Uniform, Bernoulli, Binomial, Poisson, Geometric, Negative Binomial and Hyper-geometric distributions along with their characteristic properties, applications andlimiting/approximation cases.	Lecture Method	Slip Test & Assignment	

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UNIT IV	04Hrs.	March 2nd	**Continuous probability distributions**: Normal, Exponential, Uniform, Beta, Gamma, distributions along with their characteristic properties, applications and limiting/approximation cases.	Lecture Method	Slip Test & Assign ment	
UNIT V	09 Hrs.	March3rd 4th& April1st	**Basic concepts**: population and sample, census and sample survey, sampling frame, sampling distribution, standard error, sampling design, sampling and non-sampling errors, sample surveys, principles of sample survey, principal steps in sample survey, limitations of sampling, Sample survey versus complete enumeration survey. Types of sampling - Simple random sampling, stratified sampling, systematic sampling, and cluster sampling (only concept)	Lecture Method	Slip Test & Assign ment	

Signature of the Faculty

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2.6.1

CREATION OF AWARENESS ABOUT COs

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DEPARTMENT OF PHYSICS

Stated and Explained about the Course Outcomes (COs) to the Students.

Academic Year : 2023-2024		**Batch :** 2022-2025
Programe : I B Sc -MPCs	**Year** : II **Semester** : IV	**Course Title :** Electricity, Magnetism and Electronics **Course Code :**PHY4SKA
Course : Physics	**Name of the Lecturer** : Ch. Rama Rao	

Upon completion of the course the student will be able to,

S.No	COs Number	Course Outcomes(COs)
1.	CO1	Apply Gauss's law to get relations connecting dielectric parameters and their applications.
2.	CO2	Derive expressions for the magnetic field at a point due to current carrying conductors using Biot- Savart's Law.
3.	CO3	Distinguish self and mutual inductance phenomena and their real -time applications
4.	CO4	Compute Maxwell's electromagnetic wave equations and their role in communications
5.	CO5	Summarize the basic concepts of semiconductors and digital electronics and their applications

The above Course Outcomes (COs) are stated and explained to the Students in the classroom and signatures of the Students are taken as authentication and also displayed in the Departmental notice board.

I B Sc, MPCs			
S.No	**Register No**	**Name of the Student**	**Signature of the Student**
1	Y223158058	A. Vijaya Lakshmi	A. Vijaya Lakshmi
2	Y223158059	A. Poornima Purandhathi	A. Poornima Purandhathi
3	Y223158060	A. Madhu Bharathi	A. madhu Bharathi
4	Y223158061	B. Lavanya	B. Lavanya
5	Y223158062	B. Manasa	B. Manasa
6	Y223158064	Ch. Triveni	Ch. Triveni
7	Y223158065	Ch. Jhansi	Ch. Jhansi
8	Y223158066	D. Prathyusha	D. Prathyusha
9	Y223158067	G. Hari Priya	G. Hari Priya
10	Y223158068	G.Priyadharshini	G. Priyadharshini
11	Y223158069	G.Ruthamma	G. Ruthamma
12	Y223158070	J. Anusha	J. Anusha
13	Y223158071	K. Aaradhana	K. Aaradhana
14	Y223158072	K. Amulya	K. Amulya

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15	Y223158073	K. Hyndhavi	K. Hyndhavi
16	Y223158074	K. Sowmya	K. Sowmya
17	Y223158075	K. Anu	K. Anu
18	Y223158076	K. Rithika	K. Rithika
19	Y223158078	K. Vaidurya	K. Vaidurya.
20	Y223158079	K. Naga Malleswari	K. Naga Malleswari
21	Y223158080	M. Bindu	M. Bindu
22	Y223158081	M. Pravallika	M. Pravallika
23	Y223158082	M. Poojitha	M. Poojitha
24	Y223158083	M. Aruna Kumari	M. Aruna kumari
25	Y223158084	M. Lavanya	M. Lavanya
26	Y223158085	M. Divya Jyothi	M. Divya Jyothi
27	Y223158086	M. Hepsiba	M. Hepsiba
28	Y223158087	N. Swathi	N. Swathi
29	Y223158089	N. Pavithra	N. Pavithra
30	Y223158090	N. Myna	N. Myna
31	Y223158091	O. Sruthi	O. Sruthi
32	Y223158092	O. Uma Devi	O. Umadevi
33	Y223158093	P. Keerthi	P. Keerthi
34	Y223158094	P. Nandini	P. Nandini
35	Y223158095	P. Renuka	P. Renuka
36	Y223158097	P. Divya	P. Divya
37	Y223158098	P. Nazeera	P. Nazeera
38	Y223158099	P. Sumalatha	P. Sumalatha.
39	Y223158100	P. Nava Jyothi	P. Nava Jyothi
40	Y223158101	P. Sandhya	P. Sandhya
41	Y223158102	R. Shobha Devi	R. Shobha Devi
42	Y223158103	S. Sravanthi	S. Sravanthi
43	Y223158104	Sk. Jainabi	Sk. Jainabi
44	Y223158105	Sravanthi. B	B. Sravanthi
45	Y223158106	Sd. Zainab Anjum	Sd. Zainab Anjum
46	Y223158107	T. Navya	T. Navya
47	Y223158108	V. Guru Lakshmi	V. Guru Lakshmi

Signature of the Faculty

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