



## ST. ANN'S COLLEGE FOR WOMEN

(Affiliated to Acharya Nagarjuna University.)

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

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

Email: st\_anns\_coll@yahoo.co.in Website: www.stannscollegeforwomen.org

### Course Outcomes of all Courses

| English   |             |   |                 |  |
|-----------|-------------|---|-----------------|--|
| Seme ster | 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.       |



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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 । नित्यं नूतन धर्मानुसरन्ति ।  
नैतिका मूल्यान् अधिगच्छन्ति ।

CO2

मानाव धर्मान्, सामाजिका परिणामान् अधिगच्छन्ति ।

CO3

नीतिकां द्वाया मानाव विचक्षणा ग्नानं  
अधिगम्यन्ते ।

CO4

भाषा परिग्नानम् अधिगच्छन्ति ।

II

1105-2

Poetry, Prose,  
Grammar  
Sanskrit-II

CO1

वामसगौरव रक्षणं, नायकत्वलक्षणं आध्यात्मिकमूल्यान्  
विद्यार्थिनाह अधिगम्यन्ते ।

CO2

इतिहासानं प्रआसस्त्यं, युवकानं परिणामक्रमे व्यक्तित्व विकासं  
विद्यार्थिनः अभिजानन्ति ।

CO3

धर्मिक मूल्यान्, राजाधर्मान्, धात्रुत्व भवान् विद्यार्थिना  
अवलम्बन्ति ।

CO4

भाषा परिग्नानं अभिजानन्ति ।

III

1105-3

Poetry, Prose,  
Grammar  
Sanskrit-III

CO1

नैतिका मूल्यान्, धर्मिक चिन्तनं गणनं लभते ।  
प्राचीन नाटका विषाये ग्नान सम्पादनं ।

CO2

आत्मविश्वासं, व्यक्तिगतसमर्दयं महत्वां ग्नायते ।

CO3

आत्मविश्वासं, व्यक्तिगतसमर्दयं 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 కవితాశైలిని, నాటకీయతను అవగాహన  
చేసుకోగలరు.



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



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|                    |        |   |     |   |
|--------------------|--------|---|-----|---|
|                    |        |   | 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 అందిస్తున్నట్లుగా అనువాద రంగాల్లో నైపుణ్యం సంపాదించగలరు.   |
| <b>Mathematics</b> |        |   |     |   |
| 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.<br>Get the behaviour of permutations and operations on them.   |



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|    |        |                   |     |  |
|----|--------|-------------------|-----|--|
|    |        |                   | 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, bases, 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  |



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|                |        |                                   |     |  |
|----------------|--------|-----------------------------------|-----|--|
| <b>VII</b>     | 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.                     |
| <b>VIII</b>    | 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.   |
| <b>Physics</b> |        |                                   |     |  |
| <b>I</b>       | 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 its applications and the precessional 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.                                     |



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|    |        |   |     |  |
|----|--------|---|-----|--|
|    |        |   | CO5 | Discuss the coupled oscillations and solve them to obtain normal modes of oscillation and their frequencies in simple mechanical systems.<br>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 Fraunhofer 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.  |



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|     |         |                                      |     |   |
|-----|---------|--------------------------------------|-----|---|
|     |         |                                      | 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-Boltzmann distribution 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 law of 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 liquefy air 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 of a 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   |





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|    |         |  |         |   |
|----|---------|--|---------|---|
|    |         |  | 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  |
|    | CO2     | Develop critical understanding of concept of Matter waves and Uncertainty principle  |         |   |
|    | CO3     | Get familiarized with the principles of quantum mechanics and the formulation of Schrodinger wave equation and its applications & Examine the basic properties of nuclei, characteristics of Nuclear forces, salient features 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.   |



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|          |          |   |                               |   |
|----------|----------|---|-------------------------------|---|
| <b>V</b> | 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.   |
|          | <b>V</b> | PHY5SKD                                       | Solar Energy and Applications | CO1   |
| 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.  |



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|                   |           |                                     |                                      |  |   |
|-------------------|-----------|-------------------------------------|--------------------------------------|--|---|
| <b>VI</b>         |           | <b>PROJECT</b>                      | 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>Statistics</b> |           |                                     |                                      |  |   |
| <b>I</b>          | 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   |   |
|                   | <b>II</b> | 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. |



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|            |        |   |     |   |
|------------|--------|---|-----|---|
|            |        |   | 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.  |
| <b>III</b> | 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.   |
| <b>IV</b>  | 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.   |



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|     |        |   |  |   |
|-----|--------|---|--|---|
|     |        |   | 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.   |



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|                     |        |  |     |  |
|---------------------|--------|--|-----|--|
|                     |        |  | 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.   |
| <b>Microbiology</b> |        |  |     |  |
| I                   | MCB1SK | Introduction to microbiology and microbial Diversity | CO1 | Explain the evolution of the microbiology field and the scientific discoveries relating to each field.             |



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|     |        |  |     |   |
|-----|--------|--|-----|---|
|     |        |  | 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 & orcinol method  |
|     |        |  | CO3 | Estimation of reducing sugar- anthrone method   |
|     |        |  | CO4 | Determination of P <sub>k</sub> & P <sub>i</sub> 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 |



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|     |  |  | 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 flora 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 different 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  |





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|     |          |   |   |  |
|-----|----------|---|---|--|
|     |          |   | 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 <i>Rhizobium</i> & 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  |



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|                      |          |   |     |   |
|----------------------|----------|---|-----|---|
|                      | 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.   |
| <b>Biotechnology</b> |          |   |     |   |
| 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.  |



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|     |          |   |     |  |
|-----|----------|---|-----|--|
|     | 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  |



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|    |          |   |     |   |
|----|----------|---|-----|---|
| 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 .  |



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|               |          |  |     |  |
|---------------|----------|--|-----|--|
|               | 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   |
| <b>Botany</b> |          |  |     |  |
| 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.                     |



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|     |           |  |     |  |
|-----|-----------|--|-----|--|
|     |           |  | 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 quantitative 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   |



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|           |           |                                       |                                       |   |  |
|-----------|-----------|---------------------------------------|---------------------------------------|---|--|
|           |           |                                       | 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.   |  |



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|           |             |                      |         |  |
|-----------|-------------|----------------------|---------|--|
| <b>VA</b> | 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      |
| <b>VB</b> | 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.                  |
|           | <b>VIII</b> |                      | PROJECT | CO1  |
| CO2       |             |                      |         | Develop work habits and attitudes necessary for job success                                      |
| CO3       |             |                      |         | Assess interests and abilities in their field of study   |





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### Chemistry

|                    |                 |                                    |                               |  |
|--------------------|-----------------|------------------------------------|-------------------------------|--|
| <b>I</b>           | 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                                       |
|                    | <b>II</b>       | CHE2SK                             | Organic and general chemistry | CO1  |
| CO2                |                 |                                    |                               | Analyze the electrophilic and nucleophilic addition mechanism of alkenes and alkynes                                     |
| CO3                |                 |                                    |                               | Illustrate aromaticity and Huckel's 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 equilibrium                               |
|                    |                 |                                    | CO4                           | Identify & learn the concepts of primary & secondary standard solutions  |
|                    |                 |                                    | CO5                           | Familiarize the learner to make standard solution of various molar solutions & differentiate them                        |
| <b>III</b>         | 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                            |



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|-----|----------------------|--|-----|--|
|     |                      |  | 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  |



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|   |                           |   |                     |   |  |
|---|---------------------------|---|---------------------|---|--|
|   |                           |   | 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<br>&<br>2312-42K | Conductometry & potentiometric titrimetry | 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<br>&<br>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   |  |



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|                         |                          |                               |     |   |
|-------------------------|--------------------------|-------------------------------|-----|---|
|                         |                          |                               | CO2 | Analyze supercritical CO <sub>2</sub> & 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<br>&<br>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.  |
| <b>Computer Science</b> |                          |                               |     |   |
| I                       | C1                       | Problem solving in c          | CO1 | Understand the basic terminology used in computer programming   |
|                         |                          |                               | CO2 | Write, compile and debug programs in C language.  |
|                         |                          |                               | 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.  |



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|            |   |  |     |  |
|------------|---|--|-----|--|
| <b>II</b>  | 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.  |  |     |  |
| <b>III</b> | 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 |  |     |  |
| <b>IV</b>  | 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 .   |



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|     |  |   |  |  |
|-----|--|---|--|--|
|     |  |   | 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   |



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|    |  |   |     |   |
|----|--|---|-----|---|
|    |  | 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<br>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  |



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|    |          |                             |     |  |
|----|----------|-----------------------------|-----|--|
|    |          | 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<br>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<br>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.  |





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|     |          |                     |     |   |
|-----|----------|---------------------|-----|---|
|     |          |                     | 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<br>Products and services  |
|     |          |                     | CO5 | Critically examine the current scenario of Indian Banking system.   |
| III | BCO3S-1K | Advanced Accounting | CO1 | Understand the concept of Non-profit organizations and its accounting process   |
|     |          |                     | CO2 | Comprehend the concept of single-entry system and<br>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<br>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.  |



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|     |          |                              |     |   |
|-----|----------|------------------------------|-----|---|
| 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  |



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|    |          |                            |     |   |
|----|----------|----------------------------|-----|---|
|    |          |                            |     | 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<br>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. |



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|----|-----------|----------------------------------|-----|---|
|    |           |                                  | CO5 | Understand Functional Dependency and Functional Decomposition.  |
| 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   |



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|            |           |  |     |  |
|------------|-----------|--|-----|--|
|            |           |  | 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  |
| <b>BCA</b> |           |  |     |  |
| <b>I</b>   | 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  |



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|      |  |     |   |
|------|--|-----|---|
| 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 C language.  |
|      |  | 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   |



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|           |                                 |   |   |   |
|-----------|---------------------------------|---|---|---|
| <b>II</b> |                                 |   | 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 |   |



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|            |                       |  |   |  |
|------------|-----------------------|--|---|--|
| <b>III</b> | 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 |  |





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|           |       |                                       |   |  |
|-----------|-------|---------------------------------------|---|--|
|           |       |                                       | 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   |
| <b>IV</b> | 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 |  |



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|       |  |     |  |
|-------|--|-----|--|
| 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  |



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|  |       |  |     |  |
|--|-------|--|-----|--|
|  |       |  | 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   |



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|          |        |                                   |     |  |
|----------|--------|-----------------------------------|-----|--|
|          |        |                                   | CO5 | Analyze different architectural views  |
| <b>V</b> | 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                      |



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|  |        |   |     |  |
|--|--------|---|-----|--|
|  |        |   |     |  |
|  | 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               |



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|            |        |  |      |  |
|------------|--------|--|------|--|
|            |        |  | 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   |
|            | 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. |
| <b>MCA</b> |        |  |      |  |
| I          | MCA    | MCA-101 Data Structures with C++                     | CO1  | Illustrate the implementation of linked lists and Recursion  |
|            |        |  | CO2  | Analyse search algorithms and hashing technique  |



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|     |  |     |   |  |
|-----|--|-----|---|--|
|     |  |     | CO3   | Apply Stacks and Queues for real world tasks             |
|     |  |     | CO4   | Make use of trees and Graphs in solving Complex problems |
| MCA | MCA-106<br>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<br>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<br>Database<br>Management Systems<br>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<br>Probability and Statistics            | 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  |  |



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|           |     |   |   |   |
|-----------|-----|---|---|---|
| <b>II</b> | MCA | <b>MCA-104</b><br>Operating Systems                       | CO4   | Summarize the study of stochastic processes   |
|           |     |   | 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 them                   |
|           |     |   | CO3   | How to gather knowledge of the services provided by operating systems   |
|           |     |   | CO4   | Compare the exposure to some details majors concepts.   |
|           | MCA | <b>MCA-105</b><br>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 of computersystems |
|           | MCA | <b>MCA-201</b> 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       |     | <b>MCA-202</b> Programingand 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.  |





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|     |                                      |     |   |
|-----|--------------------------------------|-----|---|
| MCA | MCA-206<br>Python Programming<br>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<br>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 internet research fields  |
|     |                                      | CO4 | Learn components and rules of communications  |
|     |                                      | CO5 | Construct and implement layer protocols within an environment   |
| MCA | MCA-204<br>Web Technologies          | CO1 | Explain the technologies used in web applications.  |
|     |                                      | CO2 | Demonstrate HTML5, 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 and JSP   |
| MCA | MCA-207<br>Web Technologies<br>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 <b>apply</b> JSP concepts to create dynamic webpages by reducing the code complexity and store data in database. |
|     |                                      | CO4 | <b>Explain</b> usage of web servers and <b>use</b> this to <b>develop</b> webpage and store data in database in JSP on Web server.                    |
|     |                                      | CO5 | <b>Develop</b> solution to <b>complex problems</b> using appropriate method, technologies, framework, web services and content management.            |



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|            |     |   |   |   |
|------------|-----|---|---|---|
|            | MCA | <b>MCA-205</b><br>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   |
| <b>III</b> | MCA | <b>MCA-301</b><br>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 | <b>MCA -306</b><br>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 | <b>MCA-302</b><br>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   | Illustratetheeffectivenessofpasswordsinaccesscontro landtheinfluenceofhuman behaviour.                      |   |



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|     |   |   |  |   |
|-----|---|---|--|---|
|     | MCA   | <b>MCA- 307</b><br>Cryptography<br>&Network Security<br>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   | <b>MCA-303</b><br>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   | <b>MCA-304</b><br>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 | <b>MCA-305.2</b><br>Open source<br>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   | <b>MCA – 401</b><br>Project<br>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.  |



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|            |              |  |     |   |
|------------|--------------|--|-----|---|
|            |              |  | 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.  |
| <b>MBA</b> |              |  |     |   |
| <b>I</b>   | 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 and mathematical techniques for business decisions.   |
|            |              |  | CO2 | By the end of the course, students will be able to analyse the benefits as well as the limits of quantitative analysis in a real-world context.   |
|            |              |  | CO3 | By the end of the course, students will be able to investigate the probabilistic distributions in solving problems.   |
|            |              |  | CO4 | By the end of the course, students will be able to evaluate the hypothesis testing for large and small samples.   |
|            |              |  | CO5 | By the end of the course, students will be able to explain the linear programming problems by   |



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|                   |                           |     |  |                                |
|-------------------|---------------------------|-----|--|--------------------------------|
|                   |                           |     |  | graphical and simplex methods. |
| Bus1.3.2<br>(R22) | Managerial<br>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<br>(R22)   | Environment<br>Management | CO1 | By the end of the course, students will be able to understand how the economy is affected 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 on business and economy.  |                                |
|                   |                           | CO3 | By the end of the course, students will be able to investigate the factors of the Economic, Political, Legal and Global environment of business.   |                                |
|                   |                           | CO4 | By the end of the course, students will be able to evaluate the Political and Legal Environment of Business.   |                                |
|                   |                           | CO5 | By the end of the course, students will be able to explain the Global Environment of Business- 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 –  |                                |



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|              |                              |     |   |
|--------------|------------------------------|-----|---|
| 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,  |



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|           |                  |   |      |   |
|-----------|------------------|---|------|---|
|           |                  |   |      | 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.                         |
| <b>II</b> | Bus 2.1<br>(R22) | Entrepreneurship<br>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 assessing business potential of an idea- Opportunity Recognition                                |
|           |                  |   | CO3  | By the end of the course, students will be able to investigate the Project preparation and Financing Ventures   |
|           |                  |   | CO 4 | By the end of the course, students will be able to evaluate the Institutions Supporting Small Business Enterprises  |
|           |                  |   | CO5  | By the end of the course, students will be able to explain the Build a Startup Management Team.   |
|           | Bus2.2 (R22)     | Research<br>Methodology &<br>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 and Quantitative 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      |



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|-----|--------------|---------------------------|--|--|
|     |              |                           | 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 Analysis Using 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   |  |





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|              |                                    |     |  |   |
|--------------|------------------------------------|-----|--|---|
|              |                                    |     |  | explain the concepts of Quality of Work 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 Management and 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 of Marketing; 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 of Marketing 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 Factors and 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 –   |   |



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|------------|--------------|--|-----|--|
|            |              |  |     | 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.  |
| <b>III</b> | 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 a firm - Resource Based Theory of the firm   |
|            |              |  | CO5 | By the end of the course, students will be able to explain the strategies for competitive advantage  |
|            | Bus3.2 (R22) | DSS & MIS                              | CO1 | By the end of the course, students will be able to understand the MIS operating in functional 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 Management System.   |
|            | Bus3.3 (R22) | Business Ethics & Corporate Governance | CO1 | By the end of the course, students will be able to understand the Meaning and definition of Ethics – Ethical Theories  |



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|  |                  |  | 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 of view. |
|  |                  |  | 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 governance requirements in the ever changing global scenario. Global practices.                                    |
|  | Bus3.4F<br>(R22) | International<br>Financial<br>Management | CO1 | By the end of the course, students will be able to understand the Finance function in an International 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 Capital Markets  |
|  |                  |  | CO4 | By the end of the course, students will be able to evaluate the International Capital Structure 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<br>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  |



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|    |                  |   |     | 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<br>(R22) | Security Analysis &<br>Investment<br>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 income Securities  |
|    |                  |   | 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 and Portfolio Risk  |
|    |                  |   | CO5 | By the end of the course, students will be able to explain the Portfolio Evaluation & Revision.  |
|    | 3.5HR            | Management Training<br>& Development            | 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       |
| 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 Applications of Big Data   |



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|                  |   |     |  |   |
|------------------|---|-----|--|---|
|                  |   |     | 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 international investments   |   |
|                  |   | 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 recruitment and selection - Training and development of expatriates                             |   |
|                  |   | CO3 | By the end of the course, students will be able to investigate the Repatriation -Process of repatriation,  |   |



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|                   |   |     |  |  |
|-------------------|---|-----|--|--|
|                   |   |     |  | job related adjustments, organisational development  |
|                   |   |     | CO4  | By the end of the course, students will be able to evaluate Employer-Employee Relation in MNCs |
|                   |   |     | CO5  | By the end of the course, students will be able to explain Cross Cultural Management           |
| Bus4.5.F<br>(R22) | Management of<br>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 Banking guidelines   |  |
|                   |   | CO3 | By the end of the course, students will be able to investigate the Mutual Funds policies and Forfeiting – Securitization.            |  |
|                   |   | CO4 | By the end of the course, students will be able to evaluate the Venture Capital Institutions in India                                |  |
|                   |   | CO5 | By the end of the course, students will be able to explain the Lease Financing   |  |
| Bus4.5 H<br>(R22) | Performance &<br>Compensation<br>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 to Compensation Management                               |  |
|                   |   | CO3 | By the end of the course, students will be able to investigate the Performance Linked Compensation                                   |  |
|                   |   | CO4 | By the end of the course, students will be able to evaluate the International Compensation 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 Income Tax Act, 1961                                   |  |
|                   |   | CO2 | By the end of the course, students will be able to analyse the Computation of income of a company under Income from House Properties |  |



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|                    |                           |     |   |
|--------------------|---------------------------|-----|---|
| (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<br>(R22) | HRD Strategy &<br>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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### 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 multidisciplinary 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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### 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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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 - 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 - 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. 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 world, 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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### 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.