Established: 1999

# Annasaheb Dange College of Engineering and Technology

Ashta - 416301, Dist. : Sangli, Maharashtra

(An Empowered Autonomous Institute)

ADCET

## F.Y. B.Tech. – Computer Science and Engineering

## [Level 4.5, UG Certificate] Semester - I

| Sr. No. | Course Category | Course Type | Course Code | Course Name | L | T | P | S | Cr | Evaluation Scheme (Marks) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | Theory | | | Laboratory | |
| | | | | | | | | | | MSE | TA | ESE | CIA | ESE |
| 01 | BS | T1 | 3CSBS101 | Applied Mathematics - I | 3 | 1 | 0 | 2 | 4 | 40 | 20 | 40 | - | - |
| 02 | BS | LIT2 | 3CSBS102 | Applied Physics and Chemistry | 3 | 0 | 2 | 1 | 4 | 40 | 20 | 40 | 50 | - |
| 03 | ES | T1 | 3CSES103 | Engineering Graphics | 2 | 1 | 0 | 1 | 3 | 40 | 20 | 40 | - | - |
| 04 | ES | T1 | 3CSES104 | Data Communication | 3 | 0 | 0 | 1 | 3 | 40 | 20 | 40 | - | - |
| 05 | ES | L1 | 3CSES105 | Computer Programming | 2 | 0 | 4 | 2 | 4 | - | - | - | 50 | 50 |
| 06 | HS | L2 | 3CSHS106 | Professional Communication Skills | 0 | 0 | 4 | 1 | 2 | - | - | - | 50 | - |
| 07 | ES | L2 | 3CSES107 | Design Thinking | 0 | 0 | 2 | 1 | 1 | - | - | - | 50 | - |
| 08 | CC | L2 | 3BSCC*** | Liberal Learning Course - I | 0 | 0 | 2 | - | 1 | - | - | - | 50 | - |
| | | | | **Total** | 13 | 2 | 14 | 9 | 22 | | | | | |

**Legends:** L-Lecture, T-Tutorial, P-Practical, S-Self Study, Cr-Credits, MSE - Mid-Semester Examination. CIA-Continuous Internal Assessment, TA - Teachers Assessment, ESE-End-Semester Examination

| Minimum Passing Criteria | TA (Theory) : ≥ 8 / 20 | MSE + ESE (Theory) : ≥ 32 / 80 | TA (Theory) / CIE (Lab) : ≥ 20 / 50 | ESE (Lab) : ≥ 20/50 |
|---|---|---|---|---|

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ADCET

## F.Y. B.Tech. – Computer Science and Engineering

### [Level 4.5, UG Certificate] Semester - II

| Sr. No. | Course Category | Course Type | Course Code | Course Name | L | T | P | S | Cr | Evaluation Scheme (Marks) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | Theory | | | Laboratory | |
| | | | | | | | | | | MSE | TA | ESE | CIA | ESE |
| 01 | BS | T1 | 3CSBS109 | Applied Mathematics – II | 3 | 1 | 0 | 2 | 4 | 40 | 20 | 40 | - | - |
| 02 | BS | L2 | 3CSBS110 | Biology for Engineers | 1 | 0 | 2 | 1 | 2 | - | - | - | 50 | - |
| 03 | ES | LIT2 | 3CSES111 | Basic Electrical and Electronics Engineering | 2 | 0 | 2 | 1 | 3 | 40 | 20 | 40 | 50 | - |
| 04 | ES | T1 | 3CSES112 | Introduction to Emerging Technologies | 2 | 0 | 0 | 1 | 2 | 40 | 20 | 40 | - | - |
| 05 | ES | L1 | 3CSES113 | Python Programming | 2 | 0 | 2 | 2 | 3 | - | - | - | 50 | 50 |
| 06 | IKS | T2 | 3CSHS114 | Indian Knowledge Systems | 2 | 0 | 0 | 1 | 2 | - | 50 | - | - | - |
| 07 | PC | LIT2 | 3CSPC115 | Computer Networks | 2 | 0 | 2 | 1 | 3 | 40 | 20 | 40 | 50 | - |
| 08 | VS | L2 | 3CSVS116 | IDEA Lab Workshop | 1 | 0 | 2 | 1 | 2 | - | - | - | 50 | - |
| 09 | CC | L2 | 3BSCC*** | Liberal Learning Course- II | 0 | 0 | 2 | - | 1 | - | - | - | 50 | - |
| | | | | **Total** | 15 | 1 | 12 | 10 | 22 | | | | | |

**Legends:** L-Lecture, T-Tutorial, P-Practical, S-Self Study, Cr-Credits, MSE - Mid-Semester Examination. CIA-Continuous Internal Assessment, TA - Teachers Assessment, ESE-End-Semester Examination

| Minimum Passing Criteria | TA (Theory) : ≥ 8 / 20 | MSE + ESE (Theory) : ≥ 32 / 80 | TA (Theory) / CIE (Lab) : ≥ 20 / 50 | ESE (Lab) : ≥ 20/50 |
|---|---|---|---|---|

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**CC Bouquet:**

| | | |
|---|---|---|
| 3BSCC121 - Introduction to Yoga and Mindfulness | 3BSCC123 - Six-Sigma Happiness and Mind Mechanics | 3BSCC125 - Community Engagement through NSS |
| 3BSCC122 - Physical Fitness and Lifestyle Management | 3BSCC124 - Creativity through Visual Arts | 3BSCC126 - Cultural Exploration & Heritage |

Exit after **F.Y. B.Tech. – Computer Science and Engineering**

Additional Credits to qualify for UG Certificate

Students has to undergo an 8-week Internship in Network Domain in order to qualify for UG Certificate (Exit after F. Y. B. Tech – Computer Science and Engineering).

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Department of Computer Science and Engineering

Established: 1999

**Course Information:**

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Class, Semester** | FY. B.Tech, Semester - I | | | | | | **Category** | **BS** | |
| **Course Code, Course Title** | 3CSBS101, Applied Mathematics-I | | | | | | **Type** | **T1** | |
| **Prerequisites** | - | | | | | | | | |
| **Teaching Scheme (per week)** | **Lecture** | **Tutorial** | | **Practical** | | **Self Study** | | **Credits** | |
| | 3 | 1 | | - | | 2 | | 4 | |
| **Examination Scheme (Marks)** | **Theory** | **MSE** | **TA** | **ESE** | **Practical** | | **CIA** | **ESE** | |
| | | 40 | 20 | 40 | | | - | - | |

**Course Outcomes (COs) :**
Upon successful completion of this course, the student will be able to:

| | |
|---|---|
| CO1 | Test the consistency of systems of linear equations using Echelon form of matrix |
| CO2 | Determine Eigen values, Eigen vectors, powers and inverse of a square matrix using characteristic equation |
| CO3 | Calculate approximate root of algebraic and transcendental equations using numerical methods |
| CO4 | Use calculus concepts to solve problems on limits, continuity, and extrema using standard theorems. |
| CO5 | Apply integration methods to solve definite integrals using formulas and numerical techniques. |

**Syllabus:**

| Module | Contents | Lecture Hours |
|---|---|---|
| I | **Solution of System of Linear Equations:** Definition of system of linear equations, Classification of system of linear equations, Rank of matrix: Concept and computation using Echelon form and Normal form, Solution of system of linear equations using Rouché–Capelli Theorem and LU decomposition. | 08 |
| II | **Eigen Values and Eigen Vectors:** Definition of vectors in $R^3$, Linear Dependence and Independence of Vectors, Characteristic Equation of Matrix, Cayley-Hamilton theorem (statement only), Applications of Cayley-Hamilton theorem, Eigen Values and Properties, Eigen Vectors and Properties. | 07 |
| III | **Numerical Solution of algebraic and transcendental equation:** Introduction, Bisection method, Regula Falsi method, Secant method, Newton Raphson method. | 08 |
| IV | **Calculus:** Functions of single variable; Limit, continuity and differentiability; local maxima and minima for single variable, Rolle's theorem, Mean value theorems, Indeterminate forms and L'Hôpital's Rule | 08 |
| V | **Integral Calculus:** Review of Integration, Evaluation of Definite Integrals Using Numerical Methods- Trapezoidal Rule, Simpson's 1/3 Rule and 3/8 rule, Weddles rule. | 07 |
| VI | **Complex Number:** Definition of complex number, Polar and exponential form of complex number, De Moivre's Theorem and Simple Applications, Power and Roots of complex numbers, Applications in solving equations.<br>**Hyperbolic Functions:** Definitions, Identities of hyperbolic functions, Relation between Circular functions and hyperbolic functions, Inverse hyperbolic functions, | 07 |
| | **Total Lecture Hours** | 45 |

List of Tutorial with CO Mapping

| Sr.No | Title of Tutorial | CO Mapped |
|---|---|---|
| 1 | Rank of matrix and Solution of Homogeneous System of Linear Equations | CO1 |
| 2 | Solution of Non-Homogeneous System of Linear Equations | CO1 |
| 3 | Eigen Value, Eigen vectors and Properties | CO2 |
| 4 | Cayley-Hamilton theorem and Applications | CO2 |
| 5 | Solution of algebraic and Transcendental equation | CO3 |
| 6 | Limits, Continuity, and Differentiability of Single-Variable Functions | CO4 |

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| | | | | |
|---|---|---|---|---|
| 7 | Extrema, Mean Value Theorems, and Indeterminate Forms | | | CO4 |
| 8 | Evaluation of definite and indefinite integrals and applications | | | CO4 |
| 9 | Numerical solution of definite integrals | | | CO4 |
| 10 | De Moivre's Theorem, Applications and Hyperbolic functions | | | CO5 |
| **Total Tutorial Sessions** | | **15** | **Total Tutorial Hours** | **15** |

**Text Books**

1. N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, 8th Edition, Laxmi Publications ,2011.
2. H. K. Das , Advanced Engineering Mathematics , 22th Edition, S. Chand ,2018.
3. B. V. Ramana, Higher Engineering Mathematics, 6th Edition, Tata McGraw Hill Publ., 2010
4. Dr. B. S. Grewal , Numerical Methods , 9th Edition, Khanna Publishers ., 2010

**References:**

1. Dr. B. S. Grewal, Higher Engineering Mathematics , 44th Edition, Khanna Publishers ,2018.
2. N. P. Bali, Manish Goyal, Advanced Engineering Mathematics , 7th Edition, Infinity science press ,2010.
3. P. N. Wartikar and J. N. Wartikar, A text book of Applied Mathematics Vol-I, 9th Edition Pune Vidyarthi Griha Prakashan,1984
4. P. N. Wartikar and J. N. Wartikar, A text book of Applied Mathematics Vol-II, 7th Edition Pune Vidyarthi Griha Prakashan,1988.

**Online Learning Resources**

1. NPTEL Course on Engineering Mathematics-I, by Prof. Jitendra Kumar, IIT Kharagpur https://nptel.ac.in/courses/111105121
2. NPTEL Course on Numerical Methods, by Prof. Ameeya Kumar Nayak, Prof. Sanjeev Kumar, IIT Roorkee https://nptel.ac.in/courses/111107105
3. NPTEL Course on Matrix Analysis with Application, by Prof. S. K. Gupta , Prof. Sanjeev Kumar, IIT Roorkee https://nptel.ac.in/courses/111107112
4. NPTEL Course on Mathematics-III, by Prof. Durga C Dalal, Dr. M. Guru Prem Prasad, IIT Guwahati https://nptel.ac.in/courses/122103012

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Established: 1999

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Course Information:** | | | | | | | |
| **Class, Semester** | F.Y. B.Tech, Semester - I | | | | | **Category** | **BS** |
| **Course Code, Course Title** | **3CSBS102, Applied Physics & Chemistry** | | | | | **Type** | **LIT2** |
| **Prerequisites** | - | | | | | | |
| **Teaching Scheme (per week)** | **Lecture** | **Tutorial** | **Practical** | **Self Study** | | **Credits** | |
| | 3 | - | 2 | 1 | | 4 | |
| **Examination Scheme (Marks)** | **Theory** | **MSE** | **TA** | **ESE** | **Practical** | **CIA** | **ESE** |
| | | 40 | 20 | 40 | | 50 | - |

**Course Outcomes (COs) :**
Upon successful completion of this course, the student will be able to:

| | |
|---|---|
| CO1 | Describe the basic principles of nanotechnology for nanomaterial production using appropriate synthesis methods and microscopy techniques. |
| CO2 | Apply optics concepts to analyze lasers and fiber optic transmission in engineering contexts. |
| CO3 | Use principles of Quantum mechanics to calculate observables on known wave functions using fundamental quantum mechanical processes in nature. |
| CO4 | Explain the properties and applications of engineering materials for industrial and societal use based on their chemical compositions. |
| CO5 | Solve the domestic and industrial problems related to water quality parameters using theoretical knowledge and laboratory experiments. |
| CO6 | Compute the calorific values of fuels for domestic and industrial applications by considering environmental effects and principles of green chemistry. |

**Syllabus:**

| Module | Contents | Lecture Hours |
|---|---|---|
| I | **Laser and Fiber Optics:**<br>**Laser**: Introduction, Principle of laser, Pumping and Population inversion, Characteristics of laser, Ruby Laser, Applications of laser in Computer Science and Engineering.<br>**Optical fiber**: Introduction, Total internal reflection, Structure of optical fiber, Propagation mechanism of optical fiber, Numerical aperture, Acceptance angle, Skip distance, Attenuation, Types of optical fiber, Applications of optical fiber in Computer Science and Engineering. | 08 |
| II | **Nanophysics:**<br>Introduction, Nanotechnology, Nano-materials, Top-down and Bottom-up synthesis approach, Ball milling method, Sol-gel synthesis method, Carbon nanotubes, Properties and applications of carbon nanotubes, Scanning Electron Microscopy (SEM) and Atomic Force Microscopy (AFM), Properties and applications of Nano-materials in Computer Science and Engineering. | 08 |
| III | **Quantum Physics:**<br>Introduction, Matter waves, De-Broglie's hypothesis, Heisenberg's uncertainty principle and its application, wave function and its physical significance, properties of wave function, matter wave and its properties, time independent and dependent Schrodinger wave equation, Particle in a box (One dimension), Davission - Germer experiment, numericals. | 07 |
| IV | **Water Technology and Management:**<br>Introduction, impurities in natural water and it's removal, **Water Testing:** Acidity, alkalinity, chlorides and hardness of water (definition, causes and significance), Disinfection of water, WHO Standards, Scales and sludges: Introduction, Formation in boilers and removal methods.<br>**Treatment of hard water** by: Ion- exchange process, Zeolite process, Desalination of brackish water by Reverse Osmosis method, Numerical on temporary, permanent and total hardness of water. | 08 |

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| | | |
|---|---|---|
| V | **Energy Technology and Green Chemistry:**<br>**A) Batteries:** Introduction, Types of batteries, battery characteristics, Lithium- ion batteries (LIBs), Sodium- ion batteries (Instrumentation, advantages, disadvantages and applications).<br>**B) Fuels:** Introduction, classification, characteristics of good fuels, types of calorific value (higher and lower), Bomb calorimeter and Boy's calorimeter. Numericals on Bomb and Boy's calorimeter.<br>**C) Environment and Green Chemistry:** Definition, Twelve principles of green chemistry, Importance of green chemistry in research and industrial applications. | 07 |
| VI | **Advanced Materials for Engineering Applications:**<br>**A) Alloys:** Introduction, classification, purposes of making alloys. Ferrous alloys: Plain carbon steels (mild, medium and high). Nonferrous alloys: Aluminum alloy (Duralumin and Alnico), Nickel alloy (Nichrome), Tin alloys (Solders).<br>**B) Polymers**: Introduction, plastics, thermo-softening and thermosetting plastics, industrially important plastics like phenol-formaldehyde, urea-formaldehyde, Conducting polymers, Biodegradable polymers.<br>**C) Composites:** Introduction, Constituents, Fibre-reinforced plastics (FRP) and Glass reinforced plastics (GRP). | 07 |
| | **Total Lecture Hours** | 45 |

List of Experiments with CO Mapping

| S. No | Title / Topic of the Experiment | CO Mapped |
|---|---|---|
| 1 | Plane Diffraction Grating- Determine the wavelength of light using plane diffraction grating. | CO1 |
| 2 | Laurent's Half shade Polarimeter - Determination of specific rotation of optically active material. | CO1 |
| 3 | Laser - Determination of wavelength of He-Ne laser light using diffraction grating. | CO1 |
| 4 | Laser - Determination of divergence of He-Ne laser light. | CO1 |
| 5 | Numerical aperture of optical fiber: To calculate NA of optical fiber by laser diode. | CO1 |
| 6 | Inverse Square Law- Verify inverse square law. | CO1 |
| 7 | Band gap energy: To determine band gap energy of given semiconductor. | CO1 |
| 8 | Determination of alkalinity of water (Acid- Base Titration). | CO5 |
| 9 | Determination of chloride content of water by Mohr's method. (Precipitation Titration). | CO5 |
| 10 | Determination of total hardness of water by EDTA- method (Complexometric Titration). | CO5 |
| 11 | Estimation of copper in brass solution (Displacement Titration) | CO3 |
| 12 | Preparation of urea formaldehyde. | CO3 |
| 13 | Determination of pH of industrial waste water by pH-meter. | CO5 |
| 14 | Demonstration of $H_2$-$O_2$ fuel cell/ battery. | CO4 |
| **Total Practical Sessions** | **15** **Total Practical Hours** | **30** |

**Text Books:**

1. G Vijayakumari, Engineering Physics, 3rd Edition, Vikas Pub. House (P) Ltd, 2009
2. M.N.Avadhanulu & P. G. Kshirsagar, A Text Book of Engineering Physics, 12th Edition, S. Chand Publication., 2018
3. K.K.Chattopadhyay and A.N. Banerjee, Introduction to Nano Science and Nanotechnology, 3rd Edition, PHI Learning, 2009
4. S. S. Dara, A Text Book of Engineering Chemistry, 11th Edition, S. Chand & Co. Ltd., New Delhi, 2008.
5. Shashi Chawala, A Text book of Engineering Chemistry, 3rd Edition, Dhanpat Rai Publishing Co. New Delhi, 2007

**References:**

1. David Halliday, Robert Resnick & Jearl Walker, Fundamentals of Physics, 12th Edition, John Wiley & Sons, 2021
2. Resnick Halliday, Krane, Engineering Physics, 8th Edition, John Wiley & Sons Pub., 2008
3. Sulbha K. Kulkarni, Nanotechnology Principles and Practices, 4th Edition, Springer, 2007
4. Jain & Jain, Engineering Chemistry, 16th Edition, Dhanpat Rai Publishing Co., New Delhi, 2016
5. Wiley India, Engineering Chemistry, 1st Edition, Wiley India Pvt. Ltd., New Delhi., 2012

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| **Online Learning Resources:** | | |
|---|---|---|
| 1. For optics- https://nptel.ac.in/courses/122/107/122107035/ | | |
| 2. For Quantum Physics -https://nptel.ac.in/courses/122/106/122106034/ | | |
| 3. For Ultrasonic -- https://freevideolectures.com/course/3531/engineering-physics-i/8 | | |
| 4. For Solid State Physics -- https://nptel.ac.in/courses/115/105/115105099/ | | |
| 5. Water Technology-- https://youtu.be/dKWJzp_rrlE | | |
| 6. For lithium-ion batteries (LIBs): https://www.youtube.com/watch?v=DBLHaLhyo2w | | |
| 7. Composite materials-Wikipedia -: https://en.wikipedia.org/wiki/Composite_material | | |
| | | |
| **Experiments that may be performed through virtual labs:** | | |
| **S. No.** | **Experiment Name** | **Experiments Links** |
| 1. | Water analysis-Determination of Chemical parameters | https://inoc-amrt.vlabs.ac.in/exp/water-analysis-chemical-parameters/index.html |
| 2. | Demonstration of Photo-colorimeter | https://pcv-amrt.vlabs.ac.in/exp/spectrophotometry/index.html |
| 3. | Photoelectric Effect | https://mp-amrt.vlabs.ac.in/exp/photoelectric-effect/index.html |
| 4. | Numerical Aperture of Optical Fiber | https://lo-amrt.vlabs.ac.in/exp/numerical-aperture-optical-fiber/ |
| 5. | LASER Beam divergence and spot size | https://lo-amrt.vlabs.ac.in/exp/laser-beam-divergence/ |

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Established: 1999

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|---|---|---|---|---|---|---|---|---|
| **Course Information:** | | | | | | | | |
| **Class, Semester** | F.Y. B.Tech – Semester I | | | | | **Category** | ES | |
| **Course Code, Course Title** | **3CSES103, Engineering Graphics** | | | | | **Type** | **T1** | |
| **Prerequisites** | -- | | | | | | | |
| **Teaching Scheme (per week)** | **Lecture** | **Tutorial** | **Practical** | **Self Study** | **Credits** | | | |
| | 02 | 01 | -- | 01 | 03 | | | |
| **Examination Scheme (Marks)** | **Theory** | **MSE** | **TA** | **ESE** | **Practical** | **CIA** | **ESE** | |
| | | 40 | 20 | 40 | | -- | -- | |

**Course Outcomes (COs) :**
Upon successful completion of this course, the student will be able to:

| | |
|---|---|
| CO1 | **Construct** projections of straight lines in various positions with reference planes, by variation in inclination, grade, bearing, and initial conditions. |
| CO2 | **Complete** the projection of planes in various positions relative to reference planes, considering variations in initial conditions and inclination, to achieve an accurate shape in inclined positions. |
| CO3 | **Draw** the three orthographic views for a given three-dimensional pictorial view, concerning the direction of viewing in first-angle projection, explaining the sectional view, hidden object and dimensions. |
| CO4 | **Develop** a 3-dimensional isometric view converted from two or three orthogonal views to illuminate a 3D object. |

**Syllabus:**

| Module | Contents | Lecture Hours |
|---|---|---|
| I | **Projections of Lines and Projections of Planes**<br>**Projections of Lines:** Introduction to First angle and third angle methods of projection. Projections of points on regular and auxiliary reference planes. Projections of lines (horizontal, frontal, oblique and Profile lines) on regular and auxiliary reference planes. True length of a line, Point View of a line, angles made by the line with reference planes. Projections of intersecting lines, Parallel lines, perpendicular lines, and skew lines. Grade and Bearing of a line.<br>Projections of Planes: Projections on regular and on auxiliary reference planes. Types of planes (horizontal, frontal, oblique and Profile planes), Edge view and True shape of a Plane. Angles made by the plane with the principal reference planes. Projections of plane figures inclined to both planes. (Only regular polygon). | **08** |
| II | **Projections of Solids**<br>Projections of Prisms, Pyramids, Cylinders and Cones inclined to both reference planes. (Excluding Frustum and Sphere) | **07** |
| III | **Orthographic Projections**<br>Lines used, selection of views, spacing of views, dimensioning and sections. Drawing required views from given pictorial views (conversion of pictorial views into orthographic views), including sectional orthographic views. | **07** |
| IV | **Isometric Projections**<br>Introduction to isometric. Isometric scale, Isometric projections, and Isometric views/drawings. Circles in isometric view. Isometric views of simple solids and objects. | **08** |
| | **Total Lecture Hours** | **30** |

**Text Books**

1. W. J. Luzadder, Fundamentals of Engineering drawing, Revised Edition, Prentice Hall of India, 1999.
2. N. D. Bhatt, Machine Drawing, 15th Edition, Charotar Publishing House Pvt. Ltd.- Anand, 2007.
3. Jhole, Dhananjay, Engineering Drawing, Revised Edition, Tata McGraw-Hill, 2011.
4. M.L. Mathur, Engineering Drawing & Graphics, Revised Edition, Jain brothers, 1999.

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| References: |
|---|
| 1. K. Venugopal, Engineering Drawing and Graphics, 5th Edition, New Age Publication, 2004. |
| 2. R. K. Dhawan, A textbook of Engineering Drawing, Revised Edition, S. Chand and Co, 2008. |
| 3. N. B. Shaha and B. C. Rana, Engineering Drawing, 2nd Edition, Person Education, 2012. |
| 4. K. L. Narayana, Machine Drawing, New Age Publication |
| |
| **Online Learning Resources** |
| 1. NPTEL Course on *Engineering Drawing* , by Prof. P. S. Robi, IIT Guwahati https://nptel.ac.in/courses/112103019 |
| 2. NPTEL Course *on Engineering/ Architectural Graphics- Part I- Orthographic Projection*, by Prof. Avlokita Agarwal, IIT Roorkee https://nptel.ac.in/courses/124107157 |
| 3. NPTEL Course *on Engineering Graphics and Design*, by Prof. Naresh Datla, Prof. S. R. Kale, IIT Delhi https://nptel.ac.in/courses/112102304 |
| 4. NPTEL Course *on Engineering Drawing and computer graphics,* by Prof. Rajaram Lakkaraju, IIT Kharagpur. https://nptel.ac.in/courses/112105294 |
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|---|---|---|---|---|---|---|---|---|---|
| **Course Information:** | | | | | | | | | |
| **Class, Semester** | F.Y. B.Tech – Semester I | | | | | | **Category** | **ES** | |
| **Course Code, Course Title** | **3CSES104, Data Communication** | | | | | | **Type** | **T1** | |
| **Prerequisites** | -- | | | | | | | | |
| **Teaching Scheme (per week)** | **Lecture** | **Tutorial** | **Practical** | **Self Study** | **Credits** | | | | |
| | 03 | -- 00 | -- 00 | 01 | 03 | | | | |
| **Examination Scheme (Marks)** | **Theory** | **MSE** | **TA** | **ESE** | **Practical** | **CIA** | **ESE** | | |
| | | 40 | 20 | 40 | | -- | -- | | |

**Course Outcomes (COs) :**
Upon successful completion of this course, the student will be able to:

| | |
|---|---|
| CO1 | Explain the fundamental concepts of data communication using communication systems. |
| CO2 | Summarize the functions of each layer in the OSI and TCP/IP reference model using network parameters. |
| CO3 | Describe various transmission media for effective communication by using network & topology. |
| CO4 | Analyze the transmission methods for analog and digital communication using encoding techniques. |
| CO5 | Illustrate working of multiplexing and switching methods for serial and parallel communication using switching techniques. |

**Syllabus:**

| Module | Contents | Lecture Hours |
|---|---|---|
| I | **Communication Basics:** Data Communication definition, Components, Data representation, Data Flow.<br>**Networks**– Definition, Uses, Topologies, Categories.<br>**The Internet**–History, ISP hierarchy, Protocols & Standards–Protocols, Standards, Standards Organizations. | 08 |
| II | **Network Models:** Layered Tasks, The OSI model, Layers in the OSI model, TCP/IP protocol suit, Addressing. | 07 |
| III | **Transmission media:**<br>**Guided Media:** Twisted pair cable, Coaxial cable, Optical Fiber cable.<br>**Unguided Media:** Radio waves, Microwaves, Infrared.<br>**Application of Communication Systems:** Antenna, T.V., FAX, ISDN, Satellite. | 08 |
| IV | **Data and Signal:**<br>Analog & Digital data, Analog & Digital signals, Transmission Impairments, Data Rate Limits, and Performance (Bandwidth, Throughput, Latency, Bandwidth-delay product.) | 07 |
| V | **Data Encoding:**<br>**Digital-to-Digital conversion**–Line coding, Line Coding Schemes.<br>**Analog-to-Digital conversion**–Pulse code modulation, delta modulation.<br>**Digital-to-Analog conversion**–ASK, FSK, PSK.<br>**Analog-to-Analog conversion**–AM, FM, PM.<br>**Transmission Modes**- Synchronous, Asynchronous, Isochronous. | 08 |
| VI | **Multiplexing & Switching:**<br>**Multiplexing**–Frequency, Wavelength, Time-division.<br>**Switching**–Circuit switched, Datagram Networks, Virtual circuit network, Structure of switch. | 07 |
| | **Total Lecture Hours** | 45 |

**Text Books**


1. Behrouz A Forouzan, Data Communications and Networking, 6th Edition, Tata McGraw-Hill, 2022.
2. Andrew S. Tanenbaum, Computer Networks, 6th Edition, Prentice Hall, 2022.
3. Behrouz A. Forouzan, TCP/IP Protocol Suite, 4th Edition, Tata McGraw-Hill, 2011.
4. Georage Kennedy, Bernard Davis, Electronic Communication Systems, 4th Edition, Tata McGraw-Hill, 2015.


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| References: |
|---|
| 1. Erwin Kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006.<br>2. William Stallings, Data & computer communications, 9th Edition, Pearson Education, 2017.<br>3. Ajit Pal, Data communication and computer Networks, 1st Edition, PHI Learning, 2014.<br>4. W. Richard Stevens, TCP/IP Volume 1, 2, 3, 2nd Edition, Addison Wesley, 2005. |
| |
| **Online Learning Resources** |
| 1. NPTEL Course on *Data Communication*, by Prof. Ajit Pal, IIT Kharagpur.<br>https://nptel.ac.in/courses/106105082 |

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**Annasaheb Dange College of Engineering and Technology**
**Ashta - 416301, Dist. : Sangli, Maharashtra**
**(An Empowered Autonomous Institute)**
**Department of Computer Science and Engineering**

**Course Information:**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Class, Semester** | F.Y. B.Tech – Semester I | | | | | **Category** | **ES** |
| **Course Code, Course Title** | **3CSES105 Computer Programming** | | | | | **Type** | **L1** |
| **Prerequisites** | - | | | | | | |
| **Teaching Scheme (per week)** | **Lecture** | **Tutorial** | **Practical** | **Self Study** | **Credits** | | |
| | 02 | - | 04 | 02 | 04 | | |
| **Examination Scheme (Marks)** | **Theory** | **MSE** | **TA** | **ESE** | **Practical** | **CIA** | **ESE** |
| | | - | - | - | | 50 | 50 |

**Course Outcomes (COs) :**
Upon successful completion of this course, the student will be able to:

| | |
|---|---|
| CO1 | Write an algorithm and draw a flowchart to accurately solve various mathematical problems by using structured approach. |
| CO2 | Apply the fundamental concepts like data types, operators to solve mathematical problems by using the C language. |
| CO3 | Apply the decision and looping constructs to solve the problems related to decision, repetitive statements for real time problem statement using C |
| CO4 | Develop a C program to demonstrate the modular approach by using the concept of function, structure and pointer |
| CO5 | Write, Compile and debug C program for various problem statements by using structured approach. |

**Syllabus:**

| Module | Contents | Lecture Hours |
|---|---|---|
| I | **Basics of Programming**<br>The meaning of algorithms, Flowcharts, Pseudo codes, Writing algorithms and drawing flowcharts for simple exercises, Memory concepts, C Program development environment. | 03 |
| II | **C Fundamentals**<br>Importance of 'C' Language, History, Structure of 'C' Program, Sample 'C' Program, Constants, variables and data types, Enumeration. Operators and expressions, Managing input / output operations, Control statements-Decision making, Case control & Looping Constructs. | 07 |
| III | **Array**<br>The meaning of an array, one dimensional and two dimensional arrays, declaration and initialization of arrays, reading , writing and manipulation of above types of arrays, multidimensional arrays.<br>Strings-Declaring and initialing character array, reading and writing string to/from terminal, arithmetic operations on characters, putting strings together, string handling functions. | 05 |
| IV | **Functions**<br>Need of user defined functions, elements of User defined functions, defining functions, return values and their types, function calls, function declaration, methods of parameter passing, Scope rule of functions, user defined and library functions. | 04 |
| V | **Structure & Pointers**<br>Need of Structure, Defining a structure, declaring and accessing structure variables, structure initialization, copying and comparing structure variables, array of structures, structures and functions, Unions. Understanding pointers, accessing the address space of a variable, declaring and initialization pointer variables, accessing a variable through its pointer, pointer expressions, pointers and arrays, pointer and character strings, pointer and structure, Void pointer and generic pointer, null pointer, dangling pointer, pointer to a function, Calling A function through function pointer.<br>Dynamic memory allocation malloc() ,calloc() ,realloc(),free(),Core dump ,Memory leak. | 07 |

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| VI | **File Handling**: Defining and opening a file, closing a file, input/output operations on files, error handling during I/O operations, random access files, command line arguments, C preprocessor. | 04 |
|---|---|---|
| | **Total Lecture Hours** | 30 |

List of Experiments with CO Mapping

| S. No | Title / Topic of the Experiment | CO Mapped |
|---|---|---|
| 1 | Write an algorithm for given problem statement | CO1 |
| 2 | Draw a flowchart for given problem | CO1 |
| 3 | Program using different data types and operators in C | CO2 |
| 4 | Program using different operators and demonstration of operator precedence | CO2 |
| 5 | Program using if and if else construct | CO3 |
| 6 | Program using if else ladder and nested if else | CO3 |
| 7 | Program using switch case | CO3 |
| 8 | Program to demonstrate looping constructs (while and for loops) | CO3 |
| 9 | Program to demonstrate looping constructs (do while and nested loops) | CO3 |
| 10 | Program to demonstrate one dimensional array | CO3 |
| 11 | Program to demonstrate two-dimensional array | CO3 |
| 12 | Implement a program to demonstrate String handling functions | CO3 |
| 13 | Implement a program to demonstrate user defined functions | CO4 |
| 14 | Program to demonstrate concept of recursion (factorial, Fibonacci) | CO4 |
| 15 | Program to demonstrate concept of structures in C | CO4 |
| 16 | Program to demonstrate concept of array of structures in C | CO4 |
| 17 | Program to demonstrate pointers in C | CO4 |
| 18 | Program to demonstrate pointers arithmetic in C | CO4 |
| 19 | Program to demonstrate function pointer | CO4 |
| 20 | Implement a program to demonstrate file handling | CO5 |
| 21 | Program to demonstrate command line arguments | CO5 |
| **Total Practical Sessions** | **30** **Total Practical Hours** | **60** |

**Text Books**

1. ISRD Group , Programming and Problem Solving Using C Language , McGraw-Hill Publications ,2012.
2. Yashwant Kanetkar , Let Us C , 3rd Edition, BPB , 2011.
3. Harvey M. Deitel, Paul J. Deitel, Abbey Deitel , C How to Program ,2nd Edition, Pearson ,2009.
4. E. Balaguruswamy , Programming in ANSI C , 4th Edition, BPB Publications, 2008

**References:**

1. D. M. Ritchie, The 'C' Programming Language, 2nd Edition, Pearson ,1998.
2. Sidnal, C Programming Laboratory: Handbook for Beginners, 1st Edition, Wiley India Limited, 2012.
3. Yashwant Kanetkar, Understanding Pointers in C, 4th Edition, BPB Publications,2001.
4. Yashwant Kanetkar, Test Your C Skills, 5th Edition, BPB Publications, 2013

**Online Learning Resources**

1. NPTEL Course on Computer Programming By Dr. T. Sugirtha IIIT Tiruchirappalli https://nptel.ac.in/courses/111105035
2. Learn C Programming https://www.programiz.com/c-programming
3. C Programming Tutorials https://www.tutorialspoint.com/cprogramming/index.htm
4. C Programming Language https://www.geeksforgeeks.org/c-programming-language

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**Annasaheb Dange College of Engineering and Technology**
Ashta - 416301, Dist. : Sangli, Maharashtra
(An Empowered Autonomous Institute)
Department of Computer Science and Engineering

Established: 1999

**Course Information:**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Class, Semester** | FY. B.Tech, Semester - I | | | | | **Category** | **HS** |
| **Course Code, Course Title** | **3CSHS106 Professional Communication Skills** | | | | | **Type** | **L2** |
| **Prerequisites** | | | | | | | |
| **Teaching Scheme (per week)** | **Lecture** | **Tutorial** | **Practical** | **Self Study** | | **Credits** | |
| | - | -- | 04 | 01 | | 2 | |
| **Examination Scheme (Marks)** | **Theory** | **MSE** | **TA** | **ESE** | **Practical** | **CIA** | **ESE** |
| | | - | - | - | | 50 | - |

**Course Outcomes (COs) :**
Upon successful completion of this course, the student will be able to:

| | |
|---|---|
| CO1 | Demonstrate the Listening, Speaking, Reading and Writing (LSRW) skills considering the frame of English language rules accurately for effective and sound communication in academic and profession contexts. |
| CO2 | Exhibit their portfolio and career choices confidently, considering corporate expectations by using digital tools convincingly. |
| CO3 | Write letters, reports, Emails and Blogs proficiently by following required techniques that help in getting acquainted with professional correspondence. |
| CO4 | Attain professional skill while convincingly presenting on allotted topics using MS PowerPoint and AI techniques. |
| CO5 | Justify own role in communicative events in well-organized manner with balanced zeal. |

List of Experiments with CO Mapping

| S.No | Title / Topic of the Experiment | CO Mapped |
|---|---|---|
| 1 | Self - Introduction | CO1 |
| 2 | SWOT Analysis | CO1 |
| 3 | Basics of English Pronunciation | CO1 |
| 4 | Rapid Review of Grammar | CO1 |
| 5 | Diagnosing Listening and Speaking Skills | CO1 |
| 6 | Diagnosing Reading and Writing Skills | CO1 |
| 7 | Introduction to MS Office (Word, Excel, PPT) | CO1,4 |
| 8 | Presenting my career choices | CO1,2 |
| 9 | Preparing Portfolio | CO1,2 |
| 10 | Describing Technical Charts, Image, and Processes | CO1,4 |
| 11 | Using Language Learning Apps and Tools | CO1,4 |
| 12 | Presenting Portfolio | CO1,2 |
| 13 | Effective Presentation Skills | CO1,4 |
| 14 | Delivering Power Point Presentation | CO1,4,5 |
| 15 | Job Application and Resume Writing | CO1,3 |
| 16 | Email Writing | CO1,3 |
| 17 | Group Discussion | CO1,5 |
| 18 | Public Speaking | CO1,5 |
| 19 | Report Writing | CO1,3 |
| 20 | Organizing an Event | CO1,5 |
| 21 | Technical Writing | CO1,3 |
| 22 | Blog Writing | CO1,3 |
| 23 | Mock Interview | CO1,2,5 |
| 24 | Achievement Test | CO1 |
| **Total Practical Sessions** | **30** | **Total Practical Hours** | **60** |

**Text Books**

1. The Professional: Defining the New Standard of Excellence at Work Subroto Bagchi Penguin Books India Pvt. Ltd. Revised Edition 2011.

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|---|
| 2. Cambridge Guide to IELTS. Pauline Cullen, Amanda French, Cambridge University Press, Reprint, 2017. |
| 3. A Practical Course in Effective English Speaking Skills. J. K. Gangal, PHI Learning Private Limited, New Delhi, Print, 2012 |
| 4. English For Engineers. Dr. Shyamaji Dubey, Dr. Manish Kumar. Vikas Publication House Pvt. Ltd.New Delhi, Print, 2020. |
| 5. Personality Development and Soft Skills. Barun K. Mitra, Oxford University Press, New Delhi , 7th impression, 2012. |
| **References:** |
| 1. High-school English Grammar and Composition. Wren and Martin, S. Chand and Co., New Delhi, 1st edition, 2015. |
| 2. The Ace of Soft Skills. Ajai Chowdry, Bala Balchandran, Pearson Publication, Delhi, 8th edition, 2017. |
| 3. Effective Technical Communication. M. Ashraf Rizvi, McGraw Hill Education, Chennai,2nd edition, 2017. |
| 4. Business Communication. Hory Sankar Mukerjee, Oxford University Press, New Delhi , 2nd edition, 2013. |
| 5. Communicative English for Engineers and Professionals. Nitin Bhatnagar, Mamta Bhatnagar, Pearson Publication, Delhi, 1st edition, 2013. |
| **Online Learning Resources** |
| 1. **Software:** Pronunciation apps (e.g., ELSA Speak, Speak English), grammar checkers (e.g., Grammarly). |
| 2. **Online Platform** Coursera (for basic English courses), Duolingo, BBC Learning English. |

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| Established: 1999 | **Annasaheb Dange College of Engineering and Technology**<br>**Ashta - 416301, Dist. : Sangli, Maharashtra**<br>**(An Empowered Autonomous Institute)**<br>**Department of Computer Science and Engineering** | ADCET |
|---|---|---|

**Course Information:**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Class, Semester** | F.Y. B.Tech – Semester I | | | | | **Category** | **ES** |
| **Course Code, Course Title** | 3CSES107 - **Design Thinking** | | | | | **Type** | **L2** |
| **Prerequisites** | | | | | | | |
| **Teaching Scheme (per week)** | **Lecture** | **Tutorial** | **Practical** | **Self Study** | | **Credits** | |
| | 00 — | 00 — | 02 | 01 | | 01 | |
| **Examination Scheme (Marks)** | **Theory** | **MSE** | **TA** | **ESE** | **Practical** | **CIA** | **ESE** |
| | | -- | -- | -- | | 50 | -- |

**Course Outcomes (COs) :**

Upon successful completion of this course, the student will be able to:

| | |
|---|---|
| CO1 | Explain the principles and process of Design Thinking and its application in problem-solving. |
| CO2 | Identify and define real-world problems using user-centric observation and empathy techniques. |
| CO3 | Conduct user research through surveys, interviews, and persona building to derive user needs and insights. |
| CO4 | Apply ideation techniques to generate innovative and feasible solutions for identified problems. |
| CO5 | Develop and present prototypes and communicate their solutions effectively using charts, posters, and model presentations. |

**Syllabus:**

| Module | Contents |
|---|---|
| I | Introduction to Design Thinking, Design Thinking Process |
| II | Empathize Phase: Empathy and Ethics, User Perspective,<br>Activities – Empathy Map, Planning, Persona building. |
| III | Customer Journey Mapping, Observation of stakeholders, Defining and Conceptualization of problem |
| IV | Ideation, Activities – 5 Whys & 1 How, Story boarding, Brainstorming. |
| V | Prototype – Types, Mindsets, Tools. |
| VI | Testing – Scenario, Methods, Refinements & Recommendations. |

List of Experiments with CO Mapping

| S.No | Title / Topic of the Experiment | CO Mapped |
|---|---|---|
| 1 | **Introduction to Design Thinking**<br>**Activity:** Make a group of 2-4 students. Give each group a simple, relatable problem (e.g., "Long queues at the campus canteen" or "Difficulty in finding parking on campus").<br>Ask them to:<br>Empathize: Identify users and their pain points.<br>Define: Write a clear problem statement.<br>Ideate: Brainstorm possible solutions.<br>Sketch: Draw their proposed solution on chart paper.<br>Present: Each group will present their idea briefly. | CO1,CO2 |
| 2 | **Identification of Problems**<br>**Activity 1: Present case** study (in group) how companies like **Airbnb, Apple, IDEO, Netflix, Samsung, Toyota** used Design Thinking to drive innovation.<br><br>**Activity 2: User Interviews** – The student or group should walk around the campus or their locality to observe and identify **at least three (per student) real-life problems** faced by users (students, faculty, staff, and community). Conduct interviews to gather qualitative insights.<br>Steps:<br>1. **Observation:** Note down pain points using observation and informal interviews.<br>2. **Listing:** Write a list of problems identified. | CO1,CO2 |

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| | | |
|---|---|---|
| | 3. **Shortlisting:** Apply criteria like relevance, feasibility, user impact, and alignment with SDGs to shortlist **one problem** to work on for further Design Thinking phases. | |
| 3 | **Selection of Problems**<br>**Activity:**<br>Students will present (PPT) their selected problem, why they chose it, who the users are, and the evidence collected. | CO1,CO2 |
| 4 | **Designing of Empathy Map**<br>**Activity: Prepare Empathy Map** – Visualize what users say, do, think, and feel. | CO1,CO3 |
| 5 | **Customer Survey and Analysis**<br>**Activity:** Students create a structured survey (MCQ, likert scale, open ended questions etc.) using google forms and prepare charts (bar, pie etc) and do the analysis. | CO1,CO3 |
| 6 | **Persona Building**<br>**Activity:** Based on findings from **Observations and interviews, Customer Survey and Analysis** from previous experiments, identify pattern i.e. common characteristics, behaviors, needs, pain points, and goals among users and create persona template. | CO1,CO3 |
| 7 | **Customer Journey Map**<br>**Activity:** Select the persona created in the previous experiment, define the Scenario, List Stages/Phases of the Journey, Map User Actions, Identify User Emotions, Identify Touchpoints, Identify Pain Points and opportunities for Improvement. | CO1,CO3 |
| 8 | **Defining the problem**<br>**Activities:**<br>• **Observation of Stakeholders** – Note behaviors and pain points.<br>• **5 Whys Method (Drill Down)** – Uncover root causes behind a problem.<br>• **Root Cause Mapping** – Visual diagram connecting symptoms to core issues.<br>**Refine Problem Statement** – Create a focused, actionable problem definition. | CO1,CO3 |
| 9 | **Poster Presentation**<br>**Activity:** Use A2/A1 sheet and draw charts, diagrams, sketches, and minimal text to represent experiment no 1-8. | CO1,CO2,CO3 |
| 10 | **Ideation**<br>**Activities:**<br>• **SCAMPER Model** – Modify existing ideas by Substituting, Combining, Adapting, etc.<br>• **Brainstorming (Crazy 8 Method)** – Rapid sketching of 8 ideas in 8 minutes.<br>• **Mind Mapping** – Visually connect ideas around a central problem/theme.<br>Use the suitable and best one activity from above. | CO1,CO4 |
| 11 | **Prototype Building**<br>**Activities:**<br>• **Storyboarding** – Sketch out user scenarios and interactions.<br>• **Prototyping** – Build a working model or prototype or model. | CO1,CO5 |
| 12 | **Testing**<br>**Activities:**<br>• **Scenario-Based Testing** – Test ideas in realistic user scenarios.<br>**Peer Testing** – Get feedback from other participants or teams. | CO1,CO5 |
| 13 | **Refinement & Recommendation**<br>**Activities:**<br>• **Final Presentation** – Showcase prototype or working model.<br>• **Documentation of Learnings** – Reflect on the process, improvements, and impact (Make a report).<br>Apply for IPR/Incubation/Research Grant/Paper Publication. | CO1,CO5 |
| **Total Practical Sessions** | **15** | **Total Practical Hours** **30** |

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| Text Books |
|---|
| 1. E Balaguruswamy, Developing Thinking Skills (The way to Success), First Edition, Khanna Book Publishing Company, 2023 |
| 2. Tim Brown, Change by Design: How Design Thinking Transforms Organizations and Inspires Innovation, First Edition, Harvard Business Review, 2008 |
| 3. R T Krishnan & V Dabholkar, 8 steps to Innovation, First Edition, Collins Publishing, 2013 |
| **References:** |
| 1. Nigel Cross, Design Thinking, First Edition, Bloomsbury, 2011 |
| 2. Idris Mootee, Design Thinking for Strategic Innovation, First Edition, Wiley, 2013 |
| **Online Learning Resources** |
| 1. NPTEL_Design Thinking - A Primer https://youtu.be/AamBSYPJIcA?si=wJDNT4L9q1NB-6T9 |
| 2. Design Thinking and Innovation https://www.coursera.org/learn/designthinkingandinnovation |

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**Annasaheb Dange College of Engineering and Technology**
**Ashta - 416301, Dist. : Sangli, Maharashtra**
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**Department of Computer Science and Engineering**

ADCET

**Course Information:**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Class, Semester** | FY. B.Tech, Semester - II | | | | | **Category** | **BS** |
| **Course Code, Course Title** | 3CSBS109, Applied Mathematics-II | | | | | **Type** | **T1** |
| **Prerequisites** | 3CSBS101, Applied Mathematics-I | | | | | | |
| **Teaching Scheme (per week)** | **Lecture** | **Tutorial** | **Practical** | **Self Study** | **Credits** | | |
| | 3 | 1 | - | 2 | 4 | | |
| **Examination Scheme (Marks)** | **Theory** | **MSE** | **TA** | **ESE** | **Practical** | **CIA** | **ESE** |
| | | 40 | 20 | 40 | | - | - |

**Course Outcomes (COs) :**
Upon successful completion of this course, the student will be able to:

| | |
|---|---|
| CO1 | Determine equation of a curve and compute statistical measures to analyze data using statistical techniques |
| CO2 | Determine unknown values from tabulated data using finite difference and interpolation techniques. |
| CO3 | Apply the concepts of vector spaces over real numbers to solve problems using linear algebra concepts |
| CO4 | Calculate partial derivatives, Jacobians and extreme values of function of two variables using concept of partial differentiation |
| CO5 | Solve ordinary differential equation of order one and degree one using analytical method and numerical techniques. |

**Syllabus:**

| Module | Contents | Lecture Hours |
|---|---|---|
| I | **Curve fitting and Statistics:** Method of Least Squares, Fitting of Straight Line, Fitting of Parabola, Fitting of exponential curves, Lines of Regression. | 08 |
| II | **Finite Differences and Interpolation:** Finite differences, Newton's Interpolation formulae, Stirling formula, Lagrange's interpolation formula, Divided Difference | 07 |
| III | **Vector Space:** IntroductiontoVector spaces, subspaces and characterization, linear combination, span, basis and dimension, linear transformation, Row space, column space, null space and range of transformation. | 07 |
| IV | **Partial Differentiation and Applications:** Functions of several variables, partial derivatives of first order, Higher order partial derivatives, Homogeneous functions, Euler's Theorem on homogeneous function: statement and verification, Jacobians and Properties, Maxima and minima of functions of two variables. | 08 |
| V | **Ordinary Differential Equation of first order and first degree:** Exact differential equation, reducible to exact differential equation, Linear differential equation, reducible to linear differential equation, Applications of engineering (branch oriented) | 08 |
| VI | **Numerical Solution of Ordinary differential equation of First Order & First Degree:** Euler's method, Modified Euler's method, Runge–Kutta third order, Runge-Kutta Method of order four, Taylor Series method. | 07 |
| | **Total Lecture Hours** | 45 |

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| List of Tutorial with CO Mapping | | | | |
|---|---|---|---|---|
| **Sr.No** | **Title of Tutorial** | | | **CO Mapped** |
| 1 | Fitting of straight line and Second-degree parabola | | | CO1 |
| 2 | Fitting of exponential curves and lines of regression | | | CO1 |
| 3 | Interpolation with equal intervals | | | CO2 |
| 4 | Interpolation for unequal intervals | | | CO2 |
| 5 | Vector Spaces, Subspaces, Basis, and Linear Transformations | | | CO3 |
| 6 | Partial differentiations and Euler's theorem | | | CO4 |
| 7 | Jacobians and Maxima-Minima | | | CO4 |
| 8 | Exact and reducible to exact differential equations | | | CO5 |
| 9 | Linear and reducible to linear differential equation | | | CO5 |
| 10 | Numerical solution of ordinary differential equation | | | CO5 |
| **Total Tutorial Sessions** | | **15** | **Total Tutorial Hours** | **15** |

**Text Books**

1. N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, 8th Edition, Laxmi Publications, 2011
2. H. K. Das, Advanced Engineering Mathematics, 22th Edition, S. Chand, 2018.
3. B. V. Ramana, Higher Engineering Mathematics, 6th Edition, Tata McGraw Hill Publ., 2010
4. Dr. B. S. Grewal, Numerical Methods, 9th Edition, Khanna Publishers, 2010.

**References:**

1. Dr. B. S. Grewal, Higher Engineering Mathematics, 44th Edition, Khanna Publishers, 2018
2. N. P. Bali, Manish Goyal, Advanced Engineering Mathematics, 7th Edition, Infinity science press, 2010.
3. S. C. Gupta, V. K. Kapoor, Fundamental of Mathematical Statistics, 10th Edition, Sultan Chand and Sons Publisher, 2000.
4. Seymour Lipschutz, Marc Lars Lipson, Linear Algebra, 4th Edition, McGraw Hill, 2009.

**Online Learning Resources**

1. NPTEL Course on Engineering Mathematics-I, by Prof. Jitendra Kumar, IIT Kharagpur https://nptel.ac.in/courses/111105121
2. NPTEL Course on Numerical Methods, by Prof. Ameeya Kumar Nayak, Prof. Sanjeev Kumar, IIT Roorkee https://nptel.ac.in/courses/111107105
3. NPTEL Course Business Statistics, by Prof. Mukesh Kumar Barua, IIT Roorkee https://nptel.ac.in/courses/110107114
4. NPTEL Discrete Mathematics, by Dr. Sugata Gangopadhyay, Dr. Aditi Gangopadhyay, IIT Roorkee https://nptel.ac.in/courses/111107058

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**Department of Computer Science and Engineering**

Established: 1999

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Course Information:** | | | | | | | | | |
| **Class, Semester** | F.Y. B.Tech – Semester II | | | | | | **Category** | **BS** | |
| **Course Code, Course Title** | 3CSBS110, Biology for Engineers | | | | | | **Type** | **L2** | |
| **Prerequisites** | - | | | | | | | | |
| **Teaching Scheme (per week)** | **Lecture** | **Tutorial** | | **Practical** | | **Self Study** | | **Credits** | |
| | 1 | – 0 | | 2 | | 1 | | 2 | |
| **Examination Scheme (Marks)** | **Theory** | **MSE** | **TA** | **ESE** | **Practical** | | **CIA** | **ESE** | |
| | | – 0 | – 0 | – 0 | | | 50 | - | |

**Course Outcomes (COs) :**
Upon successful completion of this course, the student will be able to:

| | |
|---|---|
| CO1 | Demonstrate understanding of fundamental biological principles and cellular structures for practical applications. |
| CO2 | Explain basic biochemical and molecular processes relevant to modern engineering practices. |
| CO3 | Apply microbiology and biotechnology in computational and systems engineering projects effectively. |
| CO4 | Analyze how biological systems influence the development of neural networks and biomimetic designs. |
| CO5 | Evaluate environmental and health challenges from biological perspectives to create sustainable engineering solutions. |
| CO6 | Acquire practical skills in laboratory methods using experimental and computational simulation tools systematically. |

**Syllabus:**

| Module | Contents | Lecture Hours |
|---|---|---|
| I | **Introduction to Biology and Its Relevance for Engineers**<br>1. ***Course Overview & Importance of Biology in Engineering***: Introduction to interdisciplinary approaches.<br>2. ***Cell Theory & Structure***: Overview of prokaryotic versus eukaryotic cells, Transport Across Cell Membrane, Cell Division.<br>3. ***Interdisciplinary Integration***: How biological principles inform cutting-edge engineering designs. | 02 |
| II | **Microbiology and Biotechnology**<br>1. ***Introduction to Microorganisms***: Bacteria, viruses, fungi, and their characteristics.<br>2. ***Microbial Genetics & Evolution***: Gene transfer, mutations, and their impacts.<br>3. ***Techniques in Microbiology***: Isolation, culturing methods, and basic staining techniques. | 02 |
| III | **Systems Biology and Bioinformatics**<br>1. ***Principles of Systems Biology***: Understanding networks, feedback loops, and complex systems.<br>2. ***Introduction to Bioinformatics***: Tools and techniques for computational biology.<br>3. ***Genomics and Proteomics***: Overview of genomic data and proteomic analysis. | 03 |
| IV | **Genetics and Molecular Engineering**<br>1. ***DNA Structure and Function***: Detailed exploration of replication, transcription, and translation.<br>2. ***Genetic Engineering Techniques***: Overview of CRISPR, recombinant DNA, and related methodologies.<br>3. ***Ethical, Legal & Social Aspects***: Discussion on the implications of genetic modification. | 03 |
| V | **Biomimetics and Neural Networks**<br>1. ***Introduction to Biomimetics***: Nature-inspired designs in engineering.<br>2. ***Anatomy of the Human Brain***: Basic neurobiology and the organization of neural systems.<br>3. ***From Biology to AI***: Understanding how neural networks are modelled after natural | 03 |

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|---|---|---|
| | systems. | |
| VI | **Diseases, Health, and Sustainable Engineering**<br>1. ***Diseases and Disorders***: Infectious, chronic, cancer, Genetic and neurological, cardiovascular , auto immune and role of CSE and IOT.<br>2. ***Engineering Solutions in Health***: How biological insights contribute to healthcare technologies.<br>3. **Course Integration & Future Directions**: Discussion on emerging interdisciplinary trends in CSE and IoT. | 02 |
| | **Total Lecture Hours** | 15 |

List of Experiments with CO Mapping

| S.No | Title / Topic of the Experiment | CO Mapped |
|---|---|---|
| 1 | Study of simple, compound Microscope | CO1 |
| 2 | Study of nervous system using specimen, models, etc. | CO1 |
| 3 | Investigating the Effect of Light on Seed Germination | CO2 |
| 4 | DNA Extraction from Strawberries | CO2 |
| 5 | Observation of plant cell and Human Cheek Cells | CO3 |
| 6 | Creating Lotus Leaf-Inspired Hydrophobic Surfaces | CO3 |
| 7 | Building a Physical Model of an Artificial Neural Network | CO4 |
| 8 | Comparing Tree Branching Patterns with Neural Network Architectures | CO4 |
| 9 | Constructing a Simple Particulate Matter Sensor | CO5 |
| 10 | Simple DNA Extraction from a Banana | CO5 |
| 11 | Analyzing Insect Eye Structures to Improve Camera Algorithms | CO6 |
| 12 | Virtual Simulation of PCR (Polymerase Chain Reaction) | CO6 |
| **Total Practical Sessions** | **15** **Total Practical Hours** | **30** |

**Text Books**

1. Anthony J. Young, Biology for Engineers, 1st Edition, Engineering Press, 2015.
2. Lisa M. Johnson, Fundamentals of Biology, 3rd Edition, Academic Publishers, 2012.
3. Bruce Alberts et al., Essential Cell Biology, 2nd Edition, Garland Science, 2014.
4. Gerard J. Tortora, Microbiology: An Introduction, 11th Edition, Pearson, 2017.
5. Leland H. Hartwell, Genetics: From Genes to Genomes, 4th Edition, McGraw-Hill, 2011.

**References:**

1. Kavita Kumar, Biotechnology for Engineering, 2nd Edition, Tech Books Publishing, 2018.
2. Edda Klipp, Systems Biology: A Textbook, 2nd Edition, Wiley-VCH, 2016.
3. Arthur M. Lesk, Introduction to Bioinformatics, 2nd Edition, Oxford University Press, 2013.
4. Robert J. Fuller, Biomimetics in Engineering, 1st Edition, Springer, 2019.
5. Michael T. Solomon, Sustainable Engineering: Principles and Practice, 3rd Edition, CRC Press, 2020.

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**Annasaheb Dange College of Engineering and Technology**
Ashta - 416301, Dist. : Sangli, Maharashtra
(An Empowered Autonomous Institute)
Department of Computer Science and Engineering

Established: 1999

**Course Information:**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Class, Semester** | FY. B.Tech, Semester - II | | | | | **Category** | **ES** |
| **Course Code, Course Title** | **3CSES111, Basic Electrical and Electronics Engineering** | | | | | **Type** | **LIT2** |
| **Prerequisites** | - | | | | | | |
| **Teaching Scheme (per week)** | **Lecture** | **Tutorial** | **Practical** | **Self Study** | **Credits** | | |
| | 2 | - | 2 | 1 | 3 | | |
| **Examination Scheme (Marks)** | **Theory** | **MSE** | **TA** | **ESE** | **Practical** | **CIA** | **ESE** |
| | | 40 | 20 | 40 | | 50 | - |

**Course Outcomes (COs) :**
Upon successful completion of this course, the student will be able to:

| | |
|---|---|
| **CO1** | **Explain** the fundamental concepts and operation of DC/AC circuits, electrical installations, and basic machines using standard laws and theorems. |
| **CO2** | **Solve** DC and single-phase AC electrical circuits and apply appropriate wiring methods in electrical systems. |
| **CO3** | **Illustrate** the concepts of number systems, logic gates, and semiconductor devices along with their basic applications. |
| **CO4** | **Apply** the characteristics and behavior of diodes, transistors and logic gates in electronic circuits. |
| **CO5** | **Construct** basic combinational and sequential circuits using Boolean expressions, truth tables, and logic diagrams. |

**Syllabus:**

| Module | Contents | Lecture Hours |
|---|---|---|
| I | **DC Circuits:** Ohms's Law, Equivalent Resistance, Kirchhoff current Law, Kirchhoff voltage law, Mesh analysis, Nodal analysis. | 05 |
| II | **AC Circuits:** Representation of sinusoidal waveforms, peak, average & RMS values, real, reactive and apparent power, power triangle, Analysis of single-phase ac circuits. (R, L and C) | 05 |
| III | **Electrical Installation:** Protecting devices – HRC fuse MCB, earthing – plate and pipe wiring circuits – simple, stair case and godown wiring<br>**Electrical Machine:** Principle, Construction and working of DC machine and single-phase transformer, | 05 |
| IV | **Semiconductor devices and applications**: Introduction to PN junction and Zener diode, half wave and full wave rectifier, UPS, Bipolar junction transistors: input output characteristics, CE configuration, transistor as switch and transistor as an amplifier. | 05 |
| V | **Fundamentals of Digital Electronics:** Number Systems: Decimal, Binary, Octal, Hexadecimal. Boolean Algebra- theorems. Reducing Boolean Expressions. Logic Gates | 05 |
| VI | **Combinational and Sequential circuits:** Introduction to combinational circuits- Half adder, Full adder, Half Subtractor, Full Subtractor, 1-bit and 2-bit comparator. Introduction to sequential Circuits- Flip-Flops, Shift Registers. | 05 |
| | **Total Lecture Hours** | 30 |

List of Experiments with CO Mapping

| S.No | Title / Topic of the Experiment | CO Mapped |
|---|---|---|
| 1 | Experimental Verification of Kirchhoff's Laws. | CO2 |
| 2 | Experimental Verification of Superposition Theorem. | CO2 |
| 3 | Measurement of Power and Power Factor in a Single-phase Circuit. | CO1 |
| 4 | Load Test on Single Phase Transformer. | CO1 |
| 5 | Demonstration of wiring circuits. | CO2 |
| 6 | Experimental verification of Semiconductor Diode Characteristics | CO3 |
| 7 | Experimental verification of Zener Diode Characteristics | CO3 |
| 8 | Study of characteristics of Single-Phase Half-wave and Full-wave rectifiers. | CO3 |
| 9 | Verification of truth tables of basic logic gates | CO4 |

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| | | | |
|---|---|---|---|
| 10 | Implementation of basic logic gates using universal gates | | CO4 |
| 11 | Implementation of half adder and full adder. | | CO5 |
| 12 | Implementation of half subtractor and full subtractor. | | CO5 |
| **Total Practical Sessions** | **15** | **Total Practical Hours** | **30** |

**Text Books**

1. D. P. Kothari, I. J. Nagrath, Basic Electrical Engineering,4th,Tata McGraw Hill,2019
2. D. C. Kulshreshtha, Basic Electrical Engineering,2nd,McGraw Hill.,2020
3. D. P. Kothari, Basic Electrical & Electronics Engineering ,2nd,TMH New Delhi ,2020
4. D. Patranabi, Sensors and transducers ,2nd,PHI learning Pvt. Ltd.,2003
5. A. Anand Kumar , Fundamentals of Digital Circuits, 4th, PHI learning Pvt. Ltd., 2022

**References:**

1. Millman and Halkias , Integrated Electronics,2nd,McGraw Hill,2010
2. A.K. Thereja and B.L. Thereja, Electrical Technology volume II,24th,S. Chand & Co. Publications,2024
3. L. Bakshi and A. Bakshi, Basic Electrical Engineering,1st,Technical Publications, Pune,2005
4. Albert Malvin, David Bates, Electronic Principles ,7th,McGraw Hill Education, 2017
5. R. P. Jain , Modern Digital Electronics. 5th, Tata McGraw Hill, 2022

**Online Learning Resources**

1. Basic Electrical Circuits by Prof. Gajendranath Chowdary https://onlinecourses.nptel.ac.in/noc25_ee91/preview
2. Introduction to Semiconductor Devices by Prof. Naresh Kumar https://onlinecourses.nptel.ac.in/noc25_ee92/preview
3. Digital Circuits by Prof. Santanu Chattopadhyay https://onlinecourses.nptel.ac.in/noc25_ee125/preview

**Experiments that may be performed through virtual labs:**

| S.No | Experiment Name | Experiments Links |
|---|---|---|
| 1. | Experimental Verification of Kirchhoff's Laws. | https://bes-iitr.vlabs.ac.in/exp/kirchhoff-law/ |
| 2. | Load Test on Single Phase Transformer. | https://bes-iitr.vlabs.ac.in/exp/single-phase-transformer/ |
| 3. | Verification of logic gates | https://de-iitr.vlabs.ac.in/exp/truth-table-gates/ |

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Department of Computer Science and Engineering

Established: 1999

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Course Information:** | | | | | | | | |
| **Class, Semester** | F.Y. B.Tech – Semester II | | | | | | **Category** | **ES** |
| **Course Code, Course Title** | **3CSES112, Introduction to Emerging Technologies** | | | | | | **Type** | **TI** |
| **Prerequisites** | -- | | | | | | | |
| **Teaching Scheme (per week)** | **Lecture** | **Tutorial** | | **Practical** | | **Self Study** | **Credits** | |
| | 02 | -- 00 | | -- 00 | | 01 | 02 | |
| **Examination Scheme (Marks)** | **Theory** | **MSE** | **TA** | **ESE** | **Practical** | | **CIA** | **ESE** |
| | | 40 | 20 | 40 | | | -- | -- |

**Course Outcomes (COs) :**
Upon successful completion of this course, the student will be able to:

| | |
|---|---|
| CO1 | Describe the key characteristics of emerging technologies such as AI, IoT, AR/VR, Quantum Computing, and Blockchain |
| CO2 | Apply the concepts of AI, IoT, CPS, and Blockchain to real-world case studies to identify their disruptive impact on digital transformation initiatives |
| CO3 | Explain the role of robotics, additive manufacturing, and green technologies in supporting sustainability and ethical technology deployment |
| CO4 | Implement innovative solutions using autonomous systems and green technologies to address sustainability challenges |

**Syllabus:**

| Module | Contents | Lecture Hours |
|---|---|---|
| I | **Foundations of Emerging Technologies and Innovation Ecosystem**<br>Emerging technologies characteristics and disruptive impact, Indian innovation ecosystem: Digital India, Startup India, AIM, India Stack, National Education Policy and interdisciplinary learning, Case studies: Smart Cities, Aadhaar, UPI, Digital Health Mission. | 05 |
| II | **Artificial Intelligence, Machine Learning & Data Science**<br>AI basics: history, goals, types of AI (Narrow, General, Super AI), Machine learning: supervised, unsupervised, reinforcement learning, Introduction to data science: lifecycle, Big Data (5Vs), visualization, Human-centered AI and ethical concerns: bias, privacy, responsible AI. | 05 |
| III | **IoT, Cyber-Physical Systems, Edge Computing & Cybersecurity**<br>IoT: architecture, sensors, communication, cloud, Cyber-physical systems: smart grid, autonomous vehicles, industrial automation, Edge & fog computing: real-time applications and use cases, Cybersecurity basics: CIA triad, malware, phishing, digital hygiene. | 05 |
| IV | **AR/VR, Quantum Technologies and Blockchain**<br>AR/VR/XR: definitions, tools, applications in gaming, education, healthcare, Metaverse and immersive computing, Introduction to quantum computing: qubits, entanglement, potential impact. Quantum AI. Blockchain, Smart Contracts, DApps, DeFi, NFTs, | 05 |
| V | **Robotics, Autonomous Systems & Additive Manufacturing**<br>Robotics: types, sensors, actuators, applications in healthcare, defense, logistics, Autonomous systems: drones, driverless vehicles, swarm robotics, 3D/4D printing: additive manufacturing, materials, future directions, Design thinking for innovation in robotics & manufacturing. | 05 |
| VI | **Green Technologies, Sustainability & Tech Ethics**<br>Emerging technologies for solving climate/environmental challenges, Smart grids, clean energy systems, climate tech, e-waste, Sustainable design and SDGs: tech for social good, Tech ethics: inclusivity, equity, digital divide, societal impact. | 05 |
| | **Total Lecture Hours** | 30 |

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Established: 1999

**Course Information:**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Class, Semester** | F.Y. B.Tech – Semester II | | | | | **Category** | **ES** |
| **Course Code, Course Title** | **3CSES113-Python Programming** | | | | | **Type** | **L1** |
| **Prerequisites** | **3CSES105-Computer Programming** | | | | | | |
| **Teaching Scheme (per week)** | **Lecture** | **Tutorial** | **Practical** | **Self Study** | **Credits** | | |
| | 02 | – 00 | 02 | 02 | 03 | | |
| **Examination Scheme (Marks)** | **Theory** | **MSE** | **TA** | **ESE** | **Practical** | **CIA** | **ESE** |
| | | – | – | – | | 50 | 50 |

**Course Outcomes (COs) :**
Upon successful completion of this course, the student will be able to:

| | |
|---|---|
| CO1 | Apply basic Python programming constructs to develop and execute simple programs using IDE |
| CO2 | Develop modular and reusable code using functions and built-in or custom modules using IDE. |
| CO3 | Implement and manipulate Python built-in data structures such as strings, lists, tuples, dictionaries, and sets using IDE. |
| CO4 | Apply file handling techniques and implement exception handling mechanisms to build robust programs using IDE. |
| CO5 | Apply object-oriented programming concepts to design simple class-based applications using IDE. |

**Syllabus:**

| Module | Contents | Lecture Hours |
|---|---|---|
| I | **Introduction to Python Programming**<br>History and evolution of Python, Features and applications of Python, Installing Python and introduction to IDEs (IDLE, VS Code, etc.),Writing and executing first Python program, Understanding indentation and Syntax of fundamental concepts, Basic input and output functions, Comments, Strings, Loops. | 05 |
| II | **Functions**<br>Introduction to functions: Built-in vs. user-defined, Function definition and calling, return statement, Function arguments: default, keyword, variable-length arguments, Scope and lifetime of variables, Lambda functions, Higher order functions, filter(), map(), reduce() | 05 |
| III | **Strings, Lists, Tuples, and Dictionaries**<br>String operations and methods, String slicing and formatting, List operations, methods, and comprehensions, Tuple operations and immutability Dictionary operations and methods, Set operations | 05 |
| IV | **File and Exception Handling**<br>File types (text, binary), Modes of file opening: read, write, append , read+write , Reading entire file, line by line, using read(), readline(), readlines(), Writing data to files using write(), writelines(), Introduction to exception handling, Using try, except, else, finally, Raising user-defined exceptions. | 05 |
| V | **Python Standard Libraries and Modules**<br>Introduction to standard libraries in Python, Using math, random, datetime, os, sys, statistics, etc. Importing specific functions using from import, Installing and using external packages via pip, Creating and using custom modules, Writing reusable code using modules | 05 |
| VI | **Introduction to Object-Oriented Programming**<br>Introduction to OOP concepts: classes and objects, Defining classes, creating objects, Constructor (init method), self keyword, Basic understanding of encapsulation, inheritance, and polymorphism | 05 |
| | **Total Lecture Hours** | 30 |

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| List of Experiments with CO Mapping | | |
|---|---|---|
| **S.No** | **Title / Topic of the Experiment** | **CO Mapped** |
| 1 | Implement program using fundamental concepts like data types, operators. | CO1 |
| 2 | Implement a program based on control statements and loops | CO1 |
| 3 | Implement a programs to demonstrate the concept of user defined function | CO2 |
| 4 | Implement a programs to demonstrate the concept of Lambda functions,Higher order functions,filter(), map(), reduce() | CO2 |
| 5 | Implement a programs to demonstrate built in list operations | CO3 |
| 6 | Implement a programs to demonstrate tuple operations and immutability. | CO3 |
| 7 | Implement a programs to demonstrate built in Set operations | CO3 |
| 8 | Implement a programs to demonstrate built in dictionary operations | CO3 |
| 9 | Implement a program to read and write text files using different file modes | CO4 |
| 10 | Implement a Program to handle exceptions using try, except, else, and finally blocks. | CO4 |
| 11 | Implement a Program to demonstrate built-in modules math, random, datetime and demonstrates their functionalities. | CO2 |
| 12 | Implement a Program to demonstrate built-in modules os, sys, statistics and demonstrates their functionalities. | CO2 |
| 13 | Develop a object-oriented program to demonstrate class creation, constructors, and methods. | CO5 |
| 14 | Develop a object-oriented program to demonstrate OOP features like inheritance, Polymorphism | CO5 |
| **Total Practical Sessions** | **15** | **Total Practical Hours** **30** |

**Text Books**

1. Reema Thareja, Python Programming: Using Problem Solving Approach, 3rd Edition Oxford University Press, 2023
2. Y. Daniel Liang, Introduction to Programming Using Python, 3rd Edition, Pearson Education,2023

**References:**

1. Allen Downey , Think Python , 2nd Edition, O'Reilly ,2015.
2. Mark Summerfield, Programming in Python 3, 2nd Edition , Addison-Wesley,2023

**Online Learning Resources**

1. https://www.learnpython.org/
2. https://www.w3schools.com/python/default.asp

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**Annasaheb Dange College of Engineering and Technology**
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Department of Computer Science and Engineering
Established: 1999

**Course Information:**

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Class, Semester** | FY. B. Tech, Semester – II | | | | | | **Category** | | **IKS** |
| **Course Code, Course Title** | **3CSHS114 Indian Knowledge System** | | | | | | **Type** | | **T2** |
| **Prerequisites** | - | | | | | | | | |
| **Teaching Scheme (per week)** | **Lecture** | | **Tutorial** | | **Practical** | | **Self-Study** | | **Credits** |
| | 2 | | - | | - | | 1 | | 2 |
| **Examination Scheme (Marks)** | **Theory** | **MSE** | **TA** | **ESE** | **Practical** | | **CIA** | **ESE** | |
| | | - | 50 | - | | | - | - | |

**Course Outcomes (COs):** Upon successful completion of this course, the student will be able to:

| | |
|---|---|
| CO1 | Explain the historical context and evolution of the Indian Knowledge System (IKS) and its relevance to modern engineering. |
| CO2 | Analyze ancient Indian mathematical, astronomical, and technological methodologies and compare them with contemporary engineering practices. |
| CO3 | Apply concepts from Ayurveda and ancient biological sciences to modern problem-solving in healthcare and related fields. |
| CO4 | Evaluate traditional Indian architecture, materials, and construction principles as early forms of sustainable engineering design. |
| CO5 | Integrate philosophical and scientific logic from Indian thought into ethical decision-making and sustainable engineering practices. |

**Syllabus:**

| Module | Contents | Lecture Hours |
|---|---|---|
| I | **Introduction & Historical Context**<br>• Overview of the Indian Knowledge System: Philosophy and Scope<br>• Historical timelines and key epochs<br>• Geographical and cultural influences on ancient Indian science<br>• Interdisciplinary approaches in ancient India.<br>• Comparative analysis with other ancient civilizations | 05 |
| II | **Mathematics & Astronomy in Ancient India**<br>• Foundations of Vedic Mathematics and its modern applications<br>• Concepts of zero, decimal system, and number theory<br>• Astronomical instruments and observational techniques<br>• Calendrical systems and time measurement in ancient India<br>• Engineering parallels in algorithmic design and computational thinking | 05 |
| III | **Ayurveda and Life Sciences**<br>• Introduction to Ayurveda: Philosophy, doctrines, and methodologies<br>• Medicinal systems and their chemical/pharmacological principles<br>• Human physiology and surgical techniques in ancient texts (e.g., Sushruta Samhita)<br>• Integrating traditional knowledge with modern biomedical engineering<br>• Innovations in material sciences: Natural polymers and biocompatible materials | 05 |
| IV | **Architectural Knowledge & Engineering Innovations**<br>• Ancient Indian architecture: Principles, materials, and techniques<br>• Urban planning and infrastructure in historical Indian kingdoms<br>• Structural innovations: Temples, forts, and water management systems<br>• Engineering analysis of construction techniques from a modern perspective<br>• Case studies: Earthquake-resistant designs in ancient constructions | 05 |

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|---|---|---|
| V | **Philosophy, Science & Ethics**<br>• Indian philosophical schools and their perspectives on science<br>• The concept of Rta (cosmic order) and its engineering analogies<br>• Early scientific inquiry and epistemology in classical texts<br>• Ethics, sustainability, and social responsibility in engineering<br>• Integration of moral values and technical rigor in project design | 05 |
| VI | **Contemporary Relevance & Innovation**<br>• Bridging ancient wisdom with modern technology<br>• Case studies: Reviving lost techniques to inspire modern engineering solutions<br>• Workshops on innovation and design thinking using Indian Knowledge System principles<br>• Integration of cultural heritage in sustainable product design | 05 |
| | **Total Lecture Hours** | 30 |

**Text Books**

1. Indian Knowledge Systems: An Introduction by Dr. Vivek Ramaswamy, Oxford University Press,2nd, 2005.
2. Traditions of Indian Science: A Textbook by Dr. Shyam R. Jha, Cambridge University Press, 1st, 2010.
3. Contemporary Perspectives on Ancient Indian Wisdom by Dr. Arvind Sharma, Routledge, 1st, 2013.
4. Foundations of the Indian Knowledge System by Dr. Meera Nair, Sage Publications, 3rd, 2015.
5. Indian Thought and Science: Bridging the Past and Present by Dr. Ram Prasad, Springer, 2nd, 2008.

**References:**

1. Encyclopedia of Indian Intellectual Heritage by Dr. Anil Kumar, Oxford University Press, 1st,2012.
2. Indian Philosophy and Science: A Reference Guide by Dr. Lalit Singh, Cambridge University Press, 2nd, 2014.
3. The Vedic and Post-Vedic Traditions: A Reference Book by Dr. Pradeep Kumar, Routledge, 1st, 2003.
4. Handbook of Indian Knowledge Systems by Dr. Sunita Reddy, Sage Publications, 1st, 2016.
5. Traditional Indian Sciences: An Annotated Bibliography by Dr. Kavita Menon, Springer, 1st, 2020.

**Online Learning Resources**

**https:// https://onlinecourses.swayam2.ac.in/imb23_mg53/preview**

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**(An Empowered Autonomous Institute)**
**Department of Computer Science and Engineering**

**Course Information:**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Class, Semester** | F.Y. B.Tech – Semester II | | | | | **Category** | **PC** |
| **Course Code, Course Title** | 3CSPC115 -**Computer Networks** | | | | | **Type** | **LIT2** |
| **Prerequisites** | 3CSES104 Data Communication | | | | | | |
| **Teaching Scheme (per week)** | **Lecture** | **Tutorial** | **Practical** | **Self Study** | **Credits** | | |
| | 02 | - | 02 | 01 | 3 | | |
| **Examination Scheme (Marks)** | **Theory** | **MSE** | **TA** | **ESE** | **Practical** | **CIA** | **ESE** |
| | | 40 | 20 | 40 | | 50 | - |

**Course Outcomes (COs) :**
Upon successful completion of this course, the student will be able to:

| | |
|---|---|
| CO1 | Explain fundamental concepts of computer network using interconnection methodologies. |
| CO2 | Describe the functions of each layer in the OSI and TCP/IP reference model using network using various protocols. |
| CO3 | Apply error detection and correction mechanism for effective data transmission using various error control techniques. |
| CO4 | Analyze the challenges in using application layer protocols on the Internet. |
| CO5 | Develop network designs using subnetting based on given requirements and understand key network layer protocols used in the Internet. |

**Syllabus:**

| Module | Contents | Lecture Hours |
|---|---|---|
| I | **Basics of Computer Network**<br>Computer Networks Introduction: Definition, Application, Uses.<br>Interconnection Devices: Hub, Bridges (Filtering, Transparent Bridges, Spanning Tree), Switch, Router, Repeater, Gateway, etc. Backbone Networks, Virtual LANs, VPN. | 04 |
| II | **Data Link Layer**<br>Error Detection & Correction: - Introduction- Block coding. Linear block codes, cyclic codes, checksum<br>Data Link Control: - Framing, Flow & Error control, Noisy and Noiseless channels Protocols. HDLC protocol. Point to Point Protocol. | 06 |
| III | **Network Layer:**<br>Logical Addressing: IPv4 Addresses: IPv4-Address Space, Notation, classful, classless Addressing, NAT, IPv6 Addresses -Structures, Address Space.<br>Internet Protocol: IPv4, IPv6. Transition from IPv4 to IPv6 | 05 |
| IV | **Network Layer:**<br>Network Layer Design Issues, optimality principle.<br>Routing Protocols: Distance Vector Routing, Link State Routing, Flooding, Dijkstra Algorithm and Border Gateway Protocol. | 06 |
| V | **Transport layer**<br>Process-to-Process Delivery<br>UDP: Introduction, User Datagram, Services JIDP operation, Use of UDP<br>TCP: Services, Features, Segment, Connection, Flow control, Error Control<br>SCTP: Introduction, Services, Features, Packet Format | 05 |
| VI | **Application Layer**<br>Application Layer: DNS, FTP, WWW<br>DNS: Name space, Domain Name Space, Distribution of Name Space, DNS in the internet, Resolution. DNS message, Types of Records. FTP: Control connection and Data connection<br>WWW: Architecture Web Documents & HTTP<br>Network Security: cryptography, Message Confidentiality, message integrity, Message Authentication | 04 |
| | **Total Lecture Hours** | 30 |

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| List of Experiments with CO Mapping | | |
|---|---|---|
| **S. No** | **Title / Topic of the Experiment** | **CO Mapped** |
| 1 | Design types of Network cables and implement cross-wired & straight-through cable | CO1 |
| 2 | Configure Host IP, Subnet Mask and Default Gateway in LAN | CO5 |
| 3 | Use basic network and configuration commands | CO1 |
| 4 | Installation of Cisco Packet Tracer tool | CO1 |
| 5 | Configuring and working of networking control devices (Packet Tracer) | CO1 |
| 6 | Design a topology of Computer Networks (Packet Tracer) | CO1 |
| 7 | Design a LAN using Packet Tracer | CO1 |
| 8 | Implementation of CRC and Hamming Code | CO3 |
| 9 | Program to simulate Go-Back-N or Selective Repeat protocols | CO3 |
| 10 | TCP Socket program using Packet Tracer or Wireshark | CO5 |
| 11 | UDP Socket program using Packet Tracer or Wireshark | CO5 |
| 12 | DNS, SMTP, FTP, and WEB Server configuration (Packet Tracer) | CO4 |
| 13 | Send an email using SMTP over open server | CO4 |
| 14 | Install Wireshark & analyze HTTP, DNS packets | CO4 |
| 15 | Critically analyse ADCET network design | CO5 |
| **Total Practical Sessions** | **15** **Total Practical Hours** | **30** |

**Text Books**

1. Behrouz A Forouzan Data Communications and Networking , 6th Edition, Tata McGraw-Hill Publications ,2022.
2. Andrew S. Tanenbaum , Computer Networks , 5th Edition, Prentice Hall , 2011.
3. B A Forouzan , TCP/IP protocol suite, 4th Edition, TMG Hill ,2010.
4. Kurose, J.F. and Ross, K.W , Computer Networking: A Top-Down Approach Featuring the Internet , 3rd Edition, Addison Wesley , 2004

**References:**

1. William Stallings, Data & computer Communications, 8th Edition, Pearson Education ,2011.
2. Ajit Pal, Data communication and computer Networks, 1st Edition, PHI Learning, 2014.
3. Natalia Olifer and victor, Computer Networking, 4th Edition, Wiley India ,2009.

**Online Learning Resources**

1. NPTEL Course on Computer Networks By Dr. Karthik N, NIT Puducherry
   https://nptel.ac.in/courses
2. Computer Networks
   https://www.tutorialspoint.com/data communication computer network/index.htm
3. Wireshark Network Analysis — Official Documentation
   https://www.wireshark.org/docs/
4. Cisco Packet Tracer Official Download & Tutorials
   https://www.netacad.com/courses/packet-tracer

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Established: 1999

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|---|---|---|---|---|---|---|---|---|---|
| **Course Information:** | | | | | | | | | |
| **Class, Semester** | F.Y. B.Tech, Semester - II | | | | | | **Category** | **VS** | |
| **Course Code, Course Title** | **3CSVS116, IDEA Lab Workshop** | | | | | | **Type** | **L2** | |
| **Prerequisites** | -- | | | | | | | | |
| **Teaching Scheme (per week)** | **Lecture** | **Tutorial** | | **Practical** | **Self Study** | | **Credits** | | |
| | 1 | - | | 2 | 1 | | 2 | | |
| **Examination Scheme (Marks)** | **Theory** | **MSE** | **TA** | **ESE** | **Practical** | **CIA** | **ESE** | | |
| | | -- | -- | -- | | 50 | -- | | |

**Course Outcomes (COs) :**
Upon successful completion of this course, the student will be able to:

| | |
|---|---|
| 1 | Operate basic workshop tools for material processing and assembly |
| 2 | Make simple 2D and 3D designs using CAD software and prepare them using 3D printing, laser cutting, or CNC machining |
| 3 | Build basic electronic circuits using sensors, LEDs, motors, and microcontrollers |
| 4 | Apply fundamental programming concepts in embedded C (Arduino IDE) for controlling hardware and automating simple tasks. |
| 5 | Integrate mechanical parts and electronics to design and build working models or prototypes. |

**Syllabus:**

| Module | Contents | Lecture Hours |
|---|---|---|
| I | **Overview of IDEA Lab**<br>Introduction to the IDEA Lab: Vision, objectives,<br>**National Innovation Ecosystem** (IIC, Atal Innovation Mission, NISP), Importance of multi-disciplinary, project-based learning<br>Inspirational case studies from IDEA Labs, Safety protocols, Do & Don'ts in IDEA Lab. | 01 |
| II | **Fundamentals of Design & Prototyping**<br>**Design Thinking Basics**: Problem identification, ideation, prototyping, testing, and iteration,<br>**Introduction to CAD Software**: Concepts of 2D and 3D modeling for various applications,<br>File Formats for Fabrication: Understanding STL, DXF, G-Code, SVG, and their uses,<br>Tolerances, fits, and design constraints for manufacturing. | 02 |
| III | **Digital Fabrication Technologies**<br>**3D Printing**: Principles, types of 3D printers, materials, slicing software, and applications.<br>**Laser Cutting & Engraving**: Principles, types of lasers, materials, design considerations, and safety.<br>**CNC Router**: Introduction to CNC Router and Mini Desktop Lathe cum Milling operations, G-code fundamentals, material removal processes.<br>**3D Scanning**: Principles of 3D scanning, applications in reverse engineering and quality control.<br>**PCB Fabrication:** Introduction to PCB Milling Machine and PCB Prototype Machine for custom circuit boards. | 03 |
| IV | **Fundamentals of Embedded Systems & IoT**<br>**Basic Electrical and Electronic Concepts:** Voltage, current, resistance, Ohm's Law, and fundamental components (resistors, capacitors, diodes, LEDs, sensors, actuators), Measuring Instruments<br>**Overview of microcontrollers**: Overview of Arduino, ESP32, NodeMCU, and their applications in controlling hardware.<br>Circuit simulation using TinkerCAD or Proteus.<br>**IoT Basics**: Basic networking (Bluetooth/Wi-Fi/Ethernet), cloud integration | 03 |

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|---|---|---|
| V | **Programming for automation**<br>**Arduino IDE and Embedded C Programming**: Setup, basic syntax (setup(), loop()), digital and analog I/O control.<br>**Basic Control Systems:** Concepts of open-loop and closed-loop control with simple examples.<br>**Introduction to Python.** | 03 |
| VI | **Project Planning and IPR**<br>**Innovation Process:** From idea generation to concept validation. **Project Planning & Management:** Defining scope, setting timelines, budgeting, and resource allocation. **Documentation and Presentation:** Writing a concept note, creating innovation posters, and effective pitching techniques. **Intellectual Property Rights (IPR):** Basics of Patents, Copyrights, and Trademarks relevant to innovation. | 03 |
| | **Total Lecture Hours** | 15 |

List of Experiments with CO Mapping

| S.No | Title / Topic of the Experiment | CO Mapped |
|---|---|---|
| 1 | Introduction, Lab Safety & Tool Familiarization | 1 |
| 2 | Handa on practice of Mechanical Workshop Tools | 1 |
| 3 | 3D Printing of simple parts | 2 |
| 4 | Laser Cutting | 2 |
| 5 | CNC Routing/ Engraving | 2 |
| 6 | Basic Electronics circuit | 3 |
| 7 | PCB Design and Prototyping | 3 |
| 8 | Microcontroller Programming and Sensor Interfacing | 4 |
| 9 | Mini Project | 5 |
| **Total Practical Sessions** | **15** **Total Practical Hours** | **30** |

**Text Books**

1. Veeranna D.K., AICTE's Prescribed Textbook: Workshop / Manufacturing Practices (with Lab Manual), 1st Edition, Khanna Book Publishing Company, 2022
2. Saji T. Chacko, Susan S. Mathew, AICTE's Prescribed Textbook: Fundamentals of Electrical and Electronics Engineering (with Lab Manual), 1st Edition, Khanna Book Publishing Company, 2024
3. Mehta S.D., Electronic Product Design Volume - I (Basics of PCB Design), 1st Edition, S Chand & Company, 2011
4. Mehta-Gupta, Y.P.Mehta, Vishal Mehta, Workshop Calculation and Science, 1st Edition, Dhanpat Rai Publications, 2020

**References:**

1. A. K. Maini, Nakul Maini, All-in-One Electronics Simplified, 1st Edition, Khanna Book Publishing Company, 2021
2. J.G. Joshi, Electronics Measurements & Instrumentation, 1st Edition, Khanna Book Publishing Company, 2025
3. Dr. Sabrie Soloman, 3D Printing & Design, 1st Edition, Khanna Book Publishing Company, 2020
4. Kaushik Kumar, Hridayjit Kalita, Workshop/Manufacturing Practices, 5th Edition, S Chand & Company, 2011

**Online Learning Resources**

1. NPTEL Course on 3D Printing and Design for Educators, By Dr. Sharad K. Pradhan, NITTTR Bhopal https://onlinecourses.swayam2.ac.in/ntr24_ed17/preview
2. NPTEL Course on Electronic Systems Design: Hands-on Circuits and PCB Design with CAD Software, By Prof. Ankur Gupta, IIT Delhi https://onlinecourses.nptel.ac.in/noc24_ee127/preview

**Experiments that may be performed through virtual labs:**

| S. No | Experiment Name | Experiments Links |
|---|---|---|
| 1. | 3D Printing Virtual Simulation Lab | https://3dp-dei.vlabs.ac.in/ |
| 2. | Digital Fabrication of Flexible Circuit board | https://fab-coep.vlabs.ac.in/exp/digital-fabrication/ |
| 3. | Embedded System Design with 8051 and PIC Microcontroller | https://esd-coep.vlabs.ac.in/ |

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| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Course Information:** | | | | | | | | |
| **Class, Semester** | FY. B.Tech, Semester I/II | | | | | | **Category** | **CC** |
| **Course Code, Course Title** | 3BSCC121 **Introduction to Yoga and Mindfulness** | | | | | | **Type** | **L2** |
| **Teaching Scheme (per week)** | **Lecture** | **Tutorial** | **Practical** | **Self Study** | | **Credits** | | |
| | - | - | 02 | -0 | | 1 | | |
| **Examination Scheme (Marks)** | **Theory** | **MSE** | **TA** | **ESE** | **Practical** | **CIA** | **ESE** | |
| | | - | - | - | | 50 | - | |

**Course Outcomes (COs) :**
Upon successful completion of this course, the student will be able to:

| | |
|---|---|
| CO1 | **Describe** the significance and practical applications of yoga for holistic well-being under guided classroom sessions, ensuring coverage of physical, mental, and spiritual aspects. |
| CO2 | **Explain** the role of subtle energy systems (chakras, nadis) in health enhancement using yogic practices, showing linkage to at least two health benefits. |
| CO3 | **Compare** different paths of yoga (Bhakti, Jnana, Karma, Raja) through readings and discussions, citing at least one key practice and outcome for each.. |
| CO4 | **Demonstrate** the Eight Limbs of Yoga in practical sessions, reflecting personal integration of at least four limbs in daily habits or behavior. |
| CO5 | **Apply** yoga and mindfulness techniques in real-life stress situations to improve emotional resilience, showing measurable improvement in two or more psycho-somatic areas. |

**Practice Session**

| No | Contents | CO Mapped |
|---|---|---|
| 1 | **Introduction to Yoga Practice and Warming Up Exercises**<br>Overview of yoga philosophy and benefits. Practice basic stretching and warm-up routines. Introduction to breath awareness and mindfulness. | 1,5 |
| 2 | **Omkar ,Prathana and types of Asanas , Surya Namaskar.**<br>Practice of Chant Omkar and opening prayer for mental centering. Perform Surya Namaskar and learn its 10-step sequence. Explore basic asana types: standing, sitting, supine. | 1,4 |
| 3 | **Sleeping position Asanas**<br>Practice of Setubandhasana, Pavanmuktasanan, ChakraasaSetuBandhasana, Understand the effects on back, digestion, and spine. | 1, 2 |
| 4 | **Opposite sleeping position**<br>Practice of Bhujangasana, shalbasanan, Dhanurashan, Makrasanan<br>Focus on strengthening the back and improving posture. | 1, 2 |
| 5 | **Seating Position**<br>Practice of Padmaasna , Vajrasana , Gaumukhasan , Vakrasana<br>Learn their benefits for digestion and meditation readiness. | 1, 4 |
| 6 | **Standing Position**<br>Practice of Tadasana ,Vruksasana, Trikonaasan , Virasana. Emphasize balance, posture, and muscular endurance. | 1, 4 |
| 7 | **Meditation**<br>Guided practice of breath-based (Anapan) and insight (Vipassana) meditation.<br>Focus on observation without judgment. | 4, 5 |
| 8 | **Mantra meditation**<br>Practice chanting and internal repetition of mantras. Use traditional mantras for focus and mental calm. | 4, 5 |
| 9 | **Yognidra**<br>Perform deep relaxation technique (guided Yoga Nidra). Experience body awareness and mental stillness. | 4, 5 |
| 10 | **Pranayam 1**<br>Practice AnulomVilom (alternate nostril), Bhramari (humming bee), and Sheetali (cooling breath). Focus on breath control and emotional regulation. | 2, 5 |

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|---|---|---|
| 11 | **Pranayam 2**<br>Practice Sitkari and Kapalbhati. Learn their effects on metabolism, energy, and clarity. | 2, 5 |
| 12 | **Tratak**<br>Perform Tratak (candle gazing) for concentration. Understand through demonstration or video. | 4, 5 |
| | | |
| **Total Practical Sessions** | **15** **Total Practical Hours** | **30** |

**Text Books**

1. Yog Jeevan . Dr. ChakoteRiya1st Editon2016
2. Yog Parchichaya Mandlik Guruji Nashik Mandlik Guruji Second Edition 2020

**References:**

1. Yoga for Modern Age Vethathiri Edition 16th 2023
2. Maharishi, Simplified Physical Exercises Vethathiri Edition I 2014

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**(An Empowered Autonomous Institute)**
**Department of Computer Science and Engineering**
Established: 1999

**Course Information:**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Class, Semester** | FY. B.Tech, Semester I/II | | | | | **Category** | **CC** |
| **Course Code, Course Title** | 3BSCC122 **Physical Fitness and Lifestyle Management** | | | | | **Type** | **L2** |
| **Teaching Scheme (per week)** | **Lecture** | **Tutorial** | **Practical** | **Self Study** | | **Credits** | |
| | - | - | 02 | - | | 1 | |
| **Examination Scheme (Marks)** | **Theory** | **MSE** | **TA** | **ESE** | **Practical** | **CIA** | **ESE** |
| | | - | - | - | | 50 | - |

**Course Outcomes (COs) :**
Upon successful completion of this course, the student will be able to:

| | |
|---|---|
| CO1 | Explain the fundamentals of physical education and its role in developing holistic well-being. |
| CO2 | Demonstrate appropriate fitness practices and techniques to improve cardiovascular endurance, strength, and flexibility. |
| CO3 | Apply principles of wellness, including nutrition, sleep, and stress management, to maintain a healthy lifestyle. |
| CO4 | Integrate yoga, mindfulness, and relaxation techniques to promote mental well-being and emotional balance. |
| CO5 | Design a personalized lifestyle management plan based on fitness assessment, health goals, and behaviour change strategies. |

**Practice Session**

| No | Contents | CO Mapped |
|---|---|---|
| 1 | **Introduction to Physical Education** Understand the meaning and objectives of physical education. Learn its role in promoting health, fitness, and overall well-being. Explore career options and importance in daily life. | 1 |
| 2 | **General Warm up** Practice dynamic warm-up routines before workouts. Increase heart rate and blood circulation to muscles. Prevent injuries and improve workout performance. | 2 |
| 3 | **Limbering down exercises. Free hand exercises, Cooling down exercises** Perform safe cool-down techniques post activity.Reduce muscle soreness and stiffness.Bring heart rate back to normal gradually. | 2 |
| 4 | **Stretching exercises / Flexibility exercises** Improve range of motion in joints. Reduce muscle tension and prevent injuries. Learn static and dynamic stretching methods. | 2 |
| 5 | **Fitness Evaluation** 1 mile run and walk, Pushups , seat ups ,Seat and reach and BMI . Assess personal fitness using 1-mile run, push-ups, sit-ups, etc. Calculate BMI to understand body composition. Set personalized fitness goals based on results. | 5 |
| 6 | **Aerobic activities** Perform rhythmic activities to improve cardiovascular health. Engage in exercises like jogging, skipping, or dance aerobics. Enhance lung capacity and endurance. | 2 |
| 7 | **Sports and games** (, Cricket, Volleyball, basketball, Kho-Kho , Kabaddi, Athletics ) Play team games like Cricket, Volleyball, Kabaddi, etc. Develop teamwork, coordination, and sportsmanship. Improve motor skills and physical agility. | 2 |
| 8 | **Sports and games (Badminton, Table Tennis, Chess)** Participate in games like Table Tennis, Badminton, Chess. Improve reflexes, concentration, and decision-making. Promote mental sharpness and social interaction. | 4 |
| 9 | **Circuit Training, Strength Activities** Perform multiple exercises in a sequence (circuit). Focus on building muscular strength and stamina. Use minimal equipment for maximum benefit. | 2 |
| 10 | **Agility and Coordinative activities** Practice quick movement drills to improve reflexes. Enhance body coordination and balance. Develop speed and reaction time. | 2 |
| 11 | **Body weight exercises** Do exercises like push-ups, squats, lunges, and planks. Improve strength using your own body resistance. No need for gym equipment. | 2 |

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|---|---|---|
| 12 | **Functional training**<br>Mimic real-life movement patterns (bending, lifting, reaching). Improve daily functional strength and flexibility. Prevent posture-related problems. | 3 |
| | | |

| | | | |
|---|---|---|---|
| **Total Practical Sessions** | **15** | **Total Practical Hours** | **30** |

| |
|---|
| **Textbook** |
| 1. Test, Measurement and Evaluation in Sports and Physical Education*. 5th ed., Friends Publications, 2023. |
| 2. Rules of Games and Sports Updated version, Khel Shaitya Kendra, 2023. |
| **References:** |
| **1 Beashel, Paul, and John Taylor.** *Physical Education: Essential Issues.* Hodder Stoughton, 1997. |
| **2 Sodhi, H. S., and S. K. Sidhu.** *Physique and Selection of Sportsmen.* Punjab Publishing House, 1984. |

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Established: 1999

**Course Information:**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Class, Semester** | FY. B.Tech, Semester I/II | | | | | **Category** | **CC** |
| **Course Code, Course Title** | 3BSCC123 **Six Sigma Happiness and Mind Mechanics** | | | | | **Type** | **L2** |
| **Teaching Scheme (per week)** | **Lecture** | **Tutorial** | **Practical** | **Self Study** | | **Credits** | |
| | - | - | 02 | - | | 1 | |
| **Examination Scheme (Marks)** | **Theory** | **MSE** | **TA** | **ESE** | **Practical** | **CIA** | **ESE** |
| | | - | - | - | | 50 | - |

**Course Outcomes (COs) :**
Upon successful completion of this course, the student will be able to:

| | |
|---|---|
| CO1 | Analyze personal life patterns and decision-making processes using visual tools like life maps and time audits to improve self-awareness and productivity. |
| CO2 | Identify and modify recurring behavioral or emotional challenges using root cause analysis and habit-tracking techniques |
| CO3 | Apply reflective and psychological tools such as the Gratitude Journal, PERMA Wheel, and mindfulness meditation to enhance emotional well-being. |
| CO4 | Utilize creative thinking and visualization techniques such as mind mapping, personal development canvas, and flow activities to enhance planning and motivation. |
| CO5 | Formulate and monitor measurable personal goals using SMART criteria and Six Sigma strategies to construct a structured self-improvement and lifestyle plan. |

**Practice Session**

| No | Contents | CO Mapped |
|---|---|---|
| 1 | **Life Process Mapping**<br>Understand personal daily patterns. Identify meaningful and unproductive activities. Improve decision-making awareness. Build a visual blueprint of life routines. | 1 |
| 2 | **Time Audit Diary**<br>Track hourly usage of time. Identify time-wasters and focus zones. Increase productivity through reflection. Learn prioritization techniques. | 1,2 |
| 3 | **Root Cause Analysis**<br>Find root causes behind repeated problems. Use cause-effect diagrams (Fishbone). Develop problem-solving skills. Prevent recurring emotional or behavioral setbacks. | 1 |
| 4 | **Habit Tracker Creation**<br>Monitor progress of personal habits. Encourage accountability and consistency. Recognize triggers and patterns. Reinforce good habits using visual tools. | 3 |
| 5 | **Control Chart for Habits**<br>Apply Six Sigma's statistical approach to habits. Track habit frequency over time. Identify variation in behavior patterns Improve self-control and discipline. | 3 |
| 6 | **Gratitude Journal**<br>Practice daily reflection on positive moments. Enhance emotional well-being. Reduce stress and negativity. Cultivate a habit of appreciation. | 4 |
| 7 | **PERMA Wheel Self-Assessment.**<br>Evaluate happiness using 5 key pillars (Positive emotion, Engagement, Relationships, Meaning, Achievement). Identify strengths and gaps in life satisfaction. Build awareness of emotional and social well-being. Create a personalized improvement plan. | 4 |
| 8 | **Flow Activity Practice**<br>Engage in high-focus enjoyable activity. Understand the "flow" mental state. Boost intrinsic motivation. Reduce distractions and increase creativity. | 4 |
| 9 | **Mind Mapping the Brain**<br>Visually organize thoughts and plans. Stimulate right and left brain together. Enhance memory, planning, and clarity. Strengthen problem-solving and goal-setting. | 1, 5 |

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|---|---|---|
| 10 | **Guided Mindfulness Meditation**<br>Practice breath work and awareness techniques. Reduce anxiety and mental fatigue. Increase present-moment awareness. Build emotional balance. | 4 |
| 11 | **Personal Development Canvas**<br>Create a visual profile of strengths, values, and aspirations. Encourage strategic self-improvement. Connect life areas (career, personal, social). Track personal growth visually. | 5 |
| 12 | **SMART Goal Setting + Six Sigma**<br>Define Specific, Measurable, Achievable, Relevant, Time-bound goals. Integrate Six Sigma process for goal monitoring. Improve consistency in self-development. Align actions with purpose and metrics. | 5 |
| | | |

| | | | |
|---|---|---|---|
| **Total Practical Sessions** | **15** | **Total Practical Hours** | **30** |

**References:**

1 S. Radhakrishnan, An Idealist View Of Life, 2015, HarperCollins.
2. Yogi Kochhar, Six Sigma Happiness (English Edition).
3 An idealist way of Life – S Radhakrishnan

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Established: 1999

**Course Information:**

| | | | | | | |
|---|---|---|---|---|---|---|
| **Class, Semester** | FY. B.Tech, Semester I/II | | | | **Category** | **CC** |
| **Course Code, Course Title** | 3BSCC124 **Creativity through Visual Arts** | | | | **Type** | **L2** |
| **Teaching Scheme (per week)** | **Lecture** | **Tutorial** | **Practical** | **Self Study** | **Credits** | |
| | - | - | 02 | - | 1 | |

| **Examination Scheme (Marks)** | **Theory** | | | | **Practical** | | **ESE** |
|---|---|---|---|---|---|---|---|
| | **MSE** | **TA** | **ESE** | | **CIA** | | |
| | - | - | - | | 50 | | - |

**Course Outcomes (COs) :**
Upon successful completion of this course, the student will be able to:

| | |
|---|---|
| CO1 | **Identify** and apply the elements of art—line, shape, color, texture, and space—through various drawing and painting techniques. |
| CO2 | **Demonstrate** creativity and technical skills in using different mediums such as pastels, pen & ink, and water-based paints. |
| CO3 | **Create** original prints using simplified printmaking techniques such as relief, intaglio, and monoprint methods. |
| CO4 | **Design** visually appealing digital artwork such as posters, icons, and layouts using basic digital tools. |
| CO5 | **Analyze** and reflect on personal artwork and peer creations to improve visual communication and aesthetic understanding. |

**Practice Session**

| No | Contents | CO Mapped |
|---|---|---|
| 1 | **Fundamentals of Visual arts** Introduction to elements of art: line, shape, colour, texture, space. Practice drawing with pencil and charcoal using simple objects and shapes. Explore light and shade for 3D effects. | 1 |
| 2 | **Basic Graphic Design** Learn principles of alignment, contrast, hierarchy, and balance. Create a basic visual composition using text and image elements. Use sketching or digital tools for layout planning. | 2 |
| 3 | **Typography & Font Design** Study of typefaces: serif, sans-serif, script, decorative. Draw custom fonts and stylized letters. Create a short phrase using hand-drawn typography. | 2 |
| 4 | **Logo Design** Understand logo types: symbolic, text-based, combination marks. Design a logo for a fictional company or cultural event. Focus on clarity, colour choice, and relevance. | 4 |
| 5 | **Poster Design** Choose a theme: social message, event, awareness, culture. Develop layout and imagery using watercolor, pen & ink, or digital tools. Apply principles of visual hierarchy and focal point. | 4 |
| 6 | **Photography Task: Lines & Angles** Capture photographs focusing on geometric lines, angles, and symmetry. Submit 3–5 original photographs with a short description of each. Discuss visual impact and framing. | 1, 5 |
| 7 | **Digital Infographic Design** Choose a topic (e.g., Indian innovations, clean energy, internet safety). Create a digital infographic using free tools like Canva or PowerPoint. Combine icons, minimal text, and visuals to communicate clearly. | 4 |
| 8 | **Visual Metaphor Drawing** Select a concept (e.g., freedom, growth, technology) and represent it visually. Use drawing techniques to convey metaphor without text. Encourage creativity and symbolic thinking. | 3,5 |
| 9 | **Calligraphic strokes of Devnagari** Practice traditional and artistic Devanagari calligraphy. Use ink pens or brush pens to form characters. Create a short meaningful phrase in decorative calligraphy. | 2 |
| 10 | **Collage on Innovation in India** Use newspapers, magazines, or printed material. Prepare a collage on topics like ISRO, start-ups, or digital India. Emphasize arrangement, contrast, and theme clarity. | 3,5 |

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|---|---|---|
| 11 | **Modern Arts**<br>Introduction and fundamental of modern art, Study abstract and modern Indian Artists Create an abstract or modern art piece using acrylics, pastels, or digital tools. Focus on expression and experimentation. | 3,5 |
| 12 | **Geometric Pattern Design**<br>Create a detailed design using compass, ruler, or digital drawing. Highlight symmetry, color, and repetition | 1,2 |
| | | |

| | | | |
|---|---|---|---|
| **Total Practical Sessions** | **15** | **Total Practical Hours** | **30** |

**References:**


1. *The New Drawing on the Right Side of the Brain.* TarcherPerigee, 2012.
2. *Digital Illustration: A Master Class in Creative Image-making.* Rotovision, 2010.
3. *A History of Indian Painting: The Modern Period.* Abhinav Publications, 1994.
4. *Basics of Visual Art.* New Academic Publishing, 2015.


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**Course Information:**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Class, Semester** | FY. B.Tech, Semester I/II | | | | | **Category** | **CC** |
| **Course Code, Course Title** | 3BSCC125 **Community Engagement through NSS** | | | | | **Type** | **L2** |
| **Teaching Scheme (per week)** | **Lecture** | **Tutorial** | **Practical** | **Self Study** | | **Credits** | |
| | - | - | 02 | - | | 1 | |
| **Examination Scheme (Marks)** | **Theory** | **MSE** | **TA** | **ESE** | **Practical** | **CIA** | **ESE** |
| | | - | - | - | | 50 | - |

**Course Outcomes (COs) :**
Upon successful completion of this course, the student will be able to:

| | |
|---|---|
| CO1 | **Identify** the structure and needs of the local community through direct engagement and observation. |
| CO2 | **Analyze** community issues and participate in collaborative problem-solving activities. |
| CO3 | **Demonstrate** social and civic responsibility by applying engineering knowledge in real-world social contexts. |
| CO4 | **Develop** teamwork, leadership, and democratic values through community mobilization and shared responsibility. |
| CO5 | **Respond effectively** to emergencies and promote national integration, unity, and social harmony through participation in relevant campaigns and awareness programs. |

**Practice Session**

| No | Contents | CO Mapped |
|---|---|---|
| 1 | **Cleanliness Drive (Swachh Bharat Abhiyan)**<br>Conduct campus and neighbourhood cleaning. Raise awareness about hygiene and waste segregation. | 1,2,3 |
| 2 | **Tree Plantation**<br>Plant saplings in college or public areas. Educate the community on environmental benefits. | 1,3 |
| 3 | **Road Safety Campaign**<br>Conduct rallies, skits, or poster campaigns. Spread awareness about traffic rules and safe driving. | 2,3,5 |
| 4 | **Health Check-up Camp**<br>Organize basic health screening with medical professionals. Promote hygiene, nutrition, and disease prevention. | 1,2,5 |
| 5 | **Literacy Drive**<br>Teach basic reading and writing to underprivileged children or adults.<br>Distribute learning materials and encourage regular attendance. | 1,3,5 |
| 6 | **Voter Awareness Campaign (SVEEP)**<br>Inform citizens about voter rights and the election process. Promote ethical voting through posters and street plays. | 2,3,5 |
| 7 | **Plastic-Free Campus Initiative**<br>Educate peers on the harmful effects of plastic. Conduct collection drives and promote reusable alternatives. | 2,3 |
| 8 | **Cultural and Heritage Promotion**<br>Organize folk art, dance, and storytelling sessions. Engage the community in preserving local culture. | 3,5 |
| 9 | **Yoga and Wellness Sessions**<br>Conduct yoga and mindfulness sessions for students and locals. Promote physical and mental health through regular practice. | 3,4 |
| 10 | **Self-Defence Training for Girls**<br>Organize practical training on basic self-defence techniques. Empower girls with safety awareness and confidence. | 4,5 |
| 11 | **Social Contribution Orphanage/ Old age home visit**<br>Hold discussions or exhibitions on gender, caste, and social equality. Encourage inclusive behavior and respect for diversity. | 3,4,5 |
| 12 | **Digital Literacy Program**<br>Teach basic smartphone and internet use to the elderly or untrained groups. Promote safe and | 2,3,5 |

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| | | | |
|---|---|---|---|
| | productive use of digital tools | | |
| | | | |
| **Total Practical Sessions** | **15** | **Total Practical Hours** | **30** |

**References:**

1. NSS Course Manual, Published by NSS Cell, VTU Belagavi.
2. Government of Karnataka, NSS cell, activities reports and its manual.
3. Government of India, nss cell, Activities reports and its manual.

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**Annasaheb Dange College of Engineering and Technology**
Ashta - 416301, Dist. : Sangli, Maharashtra
(An Empowered Autonomous Institute)
Department of Computer Science and Engineering

Established: 1999

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|---|---|---|---|---|---|---|---|---|
| **Course Information:** | | | | | | | | |
| **Class, Semester** | FY. B.Tech, Semester I/II | | | | | | **Category** | CC |
| **Course Code, Course Title** | 3BSCC126 **Cultural Exploration & Heritage** | | | | | | **Type** | L2 |
| **Teaching Scheme (per week)** | **Lecture** | **Tutorial** | | **Practical** | **Self Study** | | **Credits** | |
| | - | - | | 02 | - | | 1 | |
| **Examination Scheme (Marks)** | **Theory** | **MSE** | **TA** | **ESE** | **Practical** | **CIA** | **ESE** | |
| | | - | - | - | | 50 | - | |

**Course Outcomes (COs) :**
Upon successful completion of this course, the student will be able to:

| | |
|---|---|
| CO1 | **Identify** and describe key elements of cultural heritage including tangible, intangible, and natural heritage with real-life examples. |
| CO2 | **Demonstrate** understanding of regional and national cultural practices through participation in experiential activities. |
| CO3 | **Analyze** the significance of preserving cultural heritage in the context of globalization and modernization. |
| CO4 | **Collaborate** in group projects to creatively document and present cultural themes using various mediums. |
| CO5 | **Reflect** critically on personal and collective cultural identities through journals, discussions, and presentations. |

**Practice Session**

| No | Contents | CO Mapped |
|---|---|---|
| 1 | **Introduction to Cultural Exploration and Heritage**<br>Understand the meaning of tangible, intangible, and natural heritage, Discuss real-life examples of cultural elements. Reflect on how culture shapes identity. | 1,5 |
| 2 | **Heritage Mapping/ Case Study on a Heritage Site**<br>Choose a local region or community. Identify and locate key cultural sites (temples, festivals, crafts). Create a visual or digital heritage map. Present findings in written or visual format | 1, 3, 4 |
| 3 | **Vaidik Tal Vadya Songs and Music tradition**<br>Introduction to Vedic Music, Demonstration of Vaidik Tal Vadya, Listening Session of Vedic Chants & Samagana, Group Singing of a Vedic Verse or Traditional Bhajan | 2, 5 |
| 4 | **Folk Dance**<br>Watch or participate in folk dance. Discuss the significance, costumes, and music of each. Compare cultural roots and evolution. | 2, 4 |
| 5 | **Traditional Music**<br>Dholki ,Tabala, Dhol ,LezimListen to selected regional or classical music samples. Identify the instruments, lyrics, and cultural setting. | 2, 4 |
| 6 | **Traditional Instrumental**<br>Taal, Tritaal, Tabala Observe or perform simple rhythms or melodies.<br>Explore the cultural and ceremonial use of instruments. | 1, 2 |
| 7 | **Singing**<br>Types of singing, Vocal Singing Introduction to music fundamentals | 2, 4 |
| 8 | **Drama**<br>Introduction, Types, Information about acting, Stage information, Present / performance on stage | 4, 5 |
| 9 | **Classical dance, Western dance**<br>Introduction toclassical, and western dance demonstrations. Different types | 2, 4 |
| 10 | **Karaoke Singing**<br>Introduction, Types, Basic music information | 2, 4 |
| 11 | **Short film**<br>Prepare short film , Present / performance on stage , Topic concern with Indian Cultural heritage | 3, 4, 5 |
| 12 | **Final Showcase**<br>Present all your work in a class exhibition. Explain the cultural significance of each project. Receive peer and teacher feedback. | 4, 5 |
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|---|---|---|---|
| **Total Practical Sessions** | 15 | **Total Practical Hours** | 30 |

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**Text Books**

1. Nrutasaurabha ManjiriShriramDev XII 2015
2. Indian Art and Culture, NitinSinghania McGraw Hill Education IV 2022
3. The Wonder That Was India Picador India Second2004
4. The National Culture of India National Book Trust (NBT), India Second2016

**References:**

1. Bhattacharyya, Haridas, editor. *The Cultural Heritage of India*. The Ramakrishna Mission Institute of Culture, multiple volumes, revised ed.
2. Singhania, Nitin. *Indian Art and Culture*. 4th ed., McGraw Hill Education, 2022.
3. Basham, A. L. *The Wonder That Was India*. Picador India, 2004.
4. Jokilehto, Jukka. *A History of Architectural Conservation*. 2nd ed., Routledge, 2017.

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