# BMS INSTITUTE OF TECHNOLOGY AND MANAGEMENT
## (Autonomous Institution Affiliated to VTU, Belagavi)
## Scheme of Teaching and Examinations-2022
Outcome-Based Education (OBE)and Choice Based Credit System (CBCS)
(Effective from the academic year 2022-23)

**II Semester (Mechanical Engineering Stream)**      **Dept ME**      **(Chemistry Cycle)**

| Sl. No | Course and Course Code | | Course Title | TD/PSB | Teaching Hours/Week | | | | Examination | | | | Credits |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Theory Lecture | Tutorial | Practical/ Drawing | SDA | Duration in hours | CIE Marks | SEE Marks | Total Marks | |
| | | | | | L | T | P | S | | | | | |
| 1 | *ASC(IC) | BMATM201 | Mathematics for MES-II | Maths | 2 | 2 | 2 | 0 | 03 | 50 | 50 | 100 | 04 |
| 2 | #ASC(IC) | BCHEM202 | Chemistry for MES | Chemistry | 2 | 2 | 2 | 0 | 03 | 50 | 50 | 100 | 04 |
| 3 | ESC | BCEDK203 | Computer-Aided Engineering Drawing | Civil/Mech Engg dept | 2 | 0 | 2 | 0 | 03 | 50 | 50 | 100 | 03 |
| 4 | ESC-II | BESCK204C | Introduction to Electronics Engineering | Respective Engg Dept | 3 | 0 | 0 | 0 | 03 | 50 | 50 | 100 | 03 |
| 5 | PLC-II | BPLCK205B | Introduction to Python Programming | Any Dept | 2 | 0 | 2 | 0 | 03 | 50 | 50 | 100 | 03 |
| 6 | AEC | BPWSK206 | Professional Writing Skills in English | Humanities | 1 | 0 | 0 | 0 | 01 | 50 | 50 | 100 | 01 |
| 7 | HSMS | BICOK207 | Indian Constitution | Humanities | 1 | 0 | 0 | 0 | 01 | 50 | 50 | 100 | 01 |
| 8 | AEC/SEC | BSFHK258 | Scientific Foundations for Health | Any Dept | 1 | 0 | 0 | 0 | 01 | 50 | 50 | 100 | 01 |
| | | | **TOTAL** | | **14** | **4** | **8** | **0** | **18** | **400** | **400** | **800** | **20** |

**SDA**-Skill Development Activities, **TD/PSB**- Teaching Department / Paper Setting Board, **ASC**-Applied Science Course, **ESC**- Engineering Science Courses, **ETC**- Emerging Technology Course, **AEC**- Ability Enhancement Course, **HSMS**-Humanity and Social Science and management Course, **SDC**- Skill Development Course, **CIE** -Continuous Internal Evaluation, **SEE**- Semester End Examination, **IC** – Integrated Course (Theory Course Integrated with Practical Course)

**\*-BMATM201** Shall have the 03 hours of theory examination(SEE), however, practical sessions question shall be included in the theory question papers. **\*\* The mathematics subject should be taught by a single faculty member per division, with no sharing of the course(subject)module-wise by different faculty members.**
**#-BCHEM202-** SEE shall have the 03 hours of theory examination and 02-03 hours of practical examination
**ESC or ETC of 03 credits Courses** shall have only a theory component (L:T :P:S=3:0:0:0) or if the nature the of course required practical learning syllabus shall be designed as an Integrated course (L:T:P:S= 2:0:2:0 )
**All 01 Credit-** courses shall have the SEE of 01 hours duration and the pattern of the question paper shall be MCQ

| (ESC-II) Engineering Science Courses-II | | L | T | P | (ETC-II) Emerging Technology Courses-II | | L | T | P |
|---|---|---|---|---|---|---|---|---|---|
| Code | Title | L | T | P | Code | Title | L | T | P |
| BESCK204A | Introduction to Civil Engineering | 3 | 0 | 0 | BETCK205A | Smart materials and Systems | 3 | 0 | 0 |
| BESCK204B | Introduction to Electrical Engineering | 3 | 0 | 0 | BETCK205B | Green Buildings | 3 | 0 | 0 |
| BESCK204C | Introduction to Electronics Engineering | 3 | 0 | 0 | BETCK205C | Introduction to Nano Technology | 3 | 0 | 0 |
| BESCK204D | Introduction to Mechanical Engineering | 3 | 0 | 0 | BETCK205D | Introduction to Sustainable Engineering | 3 | 0 | 0 |
| BESCK204E | Introduction to C Programming | 2 | 0 | 2 | BETCK205E | Renewable Energy Sources | 3 | 0 | 0 |
| | | | | | BETCK205F | Waste Management | 3 | 0 | 0 |
| | | | | | BETCK205G | Emerging Applications of Biosensors | 3 | 0 | 0 |
| | | | | | BETCK205H | Introduction to Internet of Things (IoT) | 3 | 0 | 0 |
| | | | | | BETCK205I | Introduction to Cyber Security | 3 | 0 | 0 |
| | | | | | **BETCK205J** | **Introduction to Embedded System** | **3** | **0** | **0** |
| (PLC-II) Programming Language Courses-II | | | | | | | | | |
| Code | Title | L | T | P | | | | | |
| BPLCK205A | Introduction to Web Programming | 2 | 0 | 2 | | | | | |
| BPLCK205B | Introduction to Python Programming | 2 | 0 | 2 | | | | | |
| BPLCK205C | Basics of JAVA programming | 2 | 0 | 2 | | | | | |
| BPLCK205D | Introduction to C++ Programming | 2 | 0 | 2 | | | | | |
| **The course BESCK205E, Introduction to C Programming, and all courses under PLC and ETC groups can be taught by faculty of ANY DEPARTMENT** | | | | | | | | | |

- 
- The student has to select one course from the ESC-II group.
- Mechanical Engineering stream Students shall opt for any one of the courses from the ESC-II group **except, BESCK204D -Introduction to Mechanical Engineering**
- The students have to opt for the courses from ESC group without repeating the course in either 1st or 2nd semester
  The students must select one course from either ETC-II or PLC-II group.
- If students study the subject from ETC-I in 1st semester he/she has to select the course from PLC-II in the 2nd semester and vice-versa

# BMS Institute of Technology & Management
## (An Autonomous Institute under VTU, Belagavi, Karnataka - 590018)
### Avalahalli, Doddaballapur Main Road, Bengaluru – 560064

**II Semester**

| Course Title: | **Mathematics for MES - II** | | | |
|---|---|---|---|---|
| Course Code: | **BMATM201** | | CIE Marks | 50 |
| Course Type (Theory/Practical/Integrated ) | Integrated | | SEE Marks | 50 |
| | | | Total Marks | 100 |
| Teaching Hours/Week (L:T:P:S) | 2:2:2 | | Exam Hours | 03 |
| Total Hours of Pedagogy | 40 hours Theory + 10-12 Lab slots | | Credits | 04 |

**Course objectives:** The goal of the course **MES - II** (**BMATM201**) is to

- **Familiarize** the importance of Integral calculus and Vector calculus essential for Mechanical engineering.
- **Analyze** Mechanical engineering problems by applying Partial Differential Equations.
- **Develop** the knowledge of solving Mechanical engineering problems numerically.

**Teaching-Learning Process**

**Pedagogy (General Instructions):**

These are sample Strategies, which teachers can use to accelerate the attainment of the various course outcomes.

1. In addition to the traditional lecture method, different types of innovative teaching methods may be adopted so that the delivered lessons shall develop students' theoretical and applied mathematical skills.
2. State the need for Mathematics with engineering studies and provide real-life examples.
3. Support and guide the students for self–study.
4. You will also be responsible for assigning homework, grading assignments and quizzes, and documenting students' progress.
5. Encourage the students to group learning to improve their creative and analytical skills.
6. Show short, related video lectures in the following ways:

   ● As an introduction to new topics (pre-lecture activity).

   ● As a revision of topics (post-lecture activity).

   ● As additional examples (post-lecture activity).

   ● As an additional material of challenging topics (pre-and post-lecture activity).

   ● As a model solution of some exercises (post-lecture activity).

| Module – 1 : Integral Calculus  (8 hours) |
|---|

**Introduction to Integral Calculus in Mechanical Engineering applications.**

**Multiple Integrals:** Evaluation of double and triple integrals, evaluation of double integrals by change of order of integration, changing into polar coordinates. Applications to find Area and Volume by double integral. Problems.

**Beta and Gamma functions:** Definitions, properties, relation between Beta and Gamma functions. Problems.

**Self-Study:** Volume by triple integration, Centre of gravity.

**Applications:** Applications to mathematical quantities (Area, Surface area, Volume), Analysis of probabilistic models.

**(RBT Levels: L1, L2 and L3)**

| Module – 2 : Vector Calculus (8 hours) |
|---|

**Introduction to Vector Calculus in Mechanical Engineering applications.**

**Vector Differentiation:** Scalar and vector fields. Gradient, directional derivative, curl and divergence - physical interpretation, solenoidal and irrotational vector fields. Problems.

**Vector Integration:** Line integrals, Surface integrals. Applications to work done by a force and flux. Statement of Green's theorem and Stokes' theorem. Problems.

**Self-Study:** Volume integral and Gauss divergence theorem.

**Applications:** Heat and mass transfer, oil refinery problems, environmental engineering, velocity and acceleration of moving particles, analysis of streamlines.

**(RBT Levels: L1, L2 and L3)**

| Module – 3 : Partial Differential Equations (PDEs) (8 hours) |
|---|

**Importance of partial differential equations for Mechanical Engineering application.** Formation of PDE's by elimination of arbitrary constants and functions. Solution of non-homogeneous PDE by direct integration. Homogeneous PDEs involving derivatives with respect to one  independent variable only. Solution of Lagrange's linear PDE. Derivation of one-dimensional heat equation and wave equation.

**Self-Study:** Solution of the one-dimensional heat equation and wave equation by the method of separation of variables.

**Applications:** Vibration of a rod/membrane.

**(RBT Levels: L1, L2 and L3)**

| Module – 4 : Numerical Methods -1 (8 hours) |
|---|

**Importance of numerical methods for discrete data in the field of Mechanical Engineering.**
Solution of algebraic and transcendental equations: Regula-Falsi and Newton-Raphson methods (only formulae). Problems.
Finite differences, Interpolation using Newton's forward and backward difference formulae, Newton's divided difference formula and Lagrange's interpolation formula (All formulae without proof). Problems.
**Numerical integration**: Trapezoidal, Simpson's $(1/3)^{rd}$ and $(3/8)^{th}$ rules (without proof). Problems.

**Self-Study:** Bisection method, Lagrange's inverse Interpolation.
**Applications:** Finding approximate solutions to solve mechanical engineering problems involving numerical data.
**(RBT Levels: L1, L2 and L3)**

| Module – 5 : Numerical Methods -2 (8 hours) |
|---|

**Introduction to various numerical techniques for handling Mechanical Engineering applications.**
**Numerical Solution of Ordinary Differential Equations (ODEs):**

Numerical solution of ordinary differential equations of first order and first degree - Taylor's series method, Modified Euler's method, Runge-Kutta method of fourth order and Milne's predictor-corrector formula (No derivation of formulae). Problems.

**Self-Study:** Adams-Bashforth method.
**Applications:** Finding approximate solutions to solve mechanical engineering problems.
**(RBT Levels: L1, L2 and L3)**

**List of Laboratory experiments (2 hours/week per batch/ batch strength 15)**

**10 lab sessions + 1 repetition class + 1 Lab Assessment**

| | |
|---|---|
| 1 | Program to compute surface area, volume and centre of gravity |
| 2 | Evaluation of improper integrals |
| 3 | Finding gradient, divergent, curl and their geometrical interpretation |
| 4 | Verification of Green's theorem |
| 5 | Solution of one-dimensional heat equation and wave equation |
| 6 | Solution of algebraic and transcendental equations by Regula-Falsi and Newton-Raphson methods |
| 7 | Interpolation/Extrapolation using Newton's forward and backward difference formulae |
| 8 | Computation of area under the curve using Trapezoidal, Simpson's $(1/3)^{rd}$ and $(3/8)^{th}$ rules |
| 9 | Solution of ODE of first order and first degree by Taylor's series and Modified Euler's methods |
| 10 | Solution of ODE of first order and first degree by Runge-Kutta $4^{th}$ order and Milne's predictor-corrector methods |

**Suggested software's:** MATHEMATICA/ MATLAB/ PYTHON/ SCILAB

**Course outcome (Course Skill Set)**
At the end of the course the student will be able to:

| CO1 | Apply the knowledge of multiple integrals to compute area and volume. |
|---|---|
| CO2 | Understand the applications of vector calculus with reference to solenoidal, irrotational vectors, line integral and surface integral. |
| CO3 | Demonstrate partial differential equations and their solutions for physical interpretations. |
| CO4 | Apply the knowledge of numerical methods in solving physical and engineering phenomena. |
| CO5 | Get familiarize with modern mathematical tools namely MATHEMATICA/ MATLAB/ PYTHON/ SCILAB |

**Suggested Learning Resources:**

**Books (Title of the Book/Name of the author/Name of the publisher/Edition and Year)**

**Text Books**

1. **B. S. Grewal**: "Higher Engineering Mathematics", Khanna Publishers, 44th Ed., 2021.
2. **E. Kreyszig**: "Advanced Engineering Mathematics", John Wiley & Sons, 10th Ed., 2018.

**Reference Books**

1. **V. Ramana:** "Higher Engineering Mathematics", McGraw Hill Education, 11th Ed., 2017.
2. **Srimanta Pal & Subodh C. Bhunia**: "Engineering Mathematics", Oxford University Press, 3rd Ed., 2016.
3. **N.P Bali and Manish Goyal**: "A Textbook of Engineering Mathematics", Laxmi Publications, 10th Ed., 2022.
4. **C. Ray Wylie, Louis C. Barrett:** "Advanced Engineering Mathematics", McGraw Hill Book Co., New York, 6th Ed., 2017.
5. **Gupta C.B, Sing S.R and Mukesh Kumar:** "Engineering Mathematic for Semester I and II", McGraw Hill Education (India) Pvt. Ltd, 2015.
6. **H.K. Dass and Er. Rajnish Verma:** "Higher Engineering Mathematics", S. Chand Publication, 3rd Ed., 2014.
1. **James Stewart: "**Calculus", Cengage Publications, 7th Ed., 2019.

**Web links and Video Lectures (e-Resources):**

- http://nptel.ac.in/courses.php?disciplineID=111
- http://www.class-central.com/subject/math(MOOCs)
- http://academicearth.org/
- VTU e-Shikshana Program
- VTU EDUSAT Program

**Activity-Based Learning (Suggested Activities in Class)/Practical-Based Learning**

- Quizzes
- Assignments
- Seminar

**COs and POs Mapping**

| COs | POs | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|
| | **1** | **2** | **3** | **4** | **5** | **6** | **7** |
| **CO1** | 3 | 2 | | | | | |
| **CO2** | 3 | 2 | | | | | |
| **CO3** | 3 | 2 | | | | | |
| **CO4** | 3 | 2 | | | | | |
| **CO5** | | | | | 3 | | |

**Level 3- Highly Mapped,          Level 2-Moderately Mapped,          Level 1-Low Mapped,     Level 0- Not Mapped**

| **DEPARTMENT OF CHEMISTRY** | | | |
|---|---|---|---|
| Choice Based Credit System (CBCS) | | | |
| SEMESTER – II | | | |
| **Engineering Chemistry** (2:2:2) 4 | | | |
| ME Stream | | | |
| (Effective from the academic year 2022-23) | | | |
| Course Title | Chemistry for ME Stream | | |
| Course Code | BCHEM202 | CIE Marks | 50 |
| Teaching Hours/Week (L:T:P) | 2:2:2 | SEE Marks | 50 |
| Total Number of Contact Hours | 40 hours Theory + 10 hours Lab | Exam Hours | 3 |

**Course Objectives:**

This course will enable students to:
1. To identify various sustainable technologies in engineering applications.
2. To develop problem solving, critical thinking and analytical reasoning towards scientific problems.
3. To distinguish the use of smart materials for latest development in material research.
4. To appraise the significance of engineering chemistry for industrial and domestic applications.

## Module – 1

**Preamble:** Relevance of chemistry in day today activities, Importance of materials in industrial, defence and research application and its economic implications. Influence of new materials for the technological development, study and use of environment friendly materials for healthier society.

**Electrode based Analytical Techniques**:

**Electrode system**: Introduction, types of electrodes. Construction and working of calomel electrode. Ion selective electrode – definition, construction and application of glass electrode. Determination of pH using glass electrode. Electrolyte Concentration cell – Definition, construction, derivation of Nernst equation and numerical problems.

**Analytical Techniques:** Introduction, working principle and instrumentation: pH metric determination of $pK_a$ of a weak acid, Potentiometric estimation of iron, Conductometric estimation of mixture of acids.

**Self-study:** Electrochemical and bio sensors application.

(8 Hours)

## Module – 2

**Conversion of Energy and Storage devices**:

**Batteries:** Introduction, components, classification of batteries – Primary, secondary and reserve batteries. Construction, working and applications of metal - air (Zn- air) battery and Li-ion Battery.

**Fuel Cells:** Introduction, difference between conventional cell and fuel cell, limitations & advantages. Construction & working of $H_2$-$O_2$ fuel cell.

**Supercapacitors:** Definition, classification and characteristics: Electrostatic Double Layer Capacitors, Pseudo Capacitors and Hybrid Capacitors.

* NOTE: Wherever the contact hours are not sufficient, tutorial hours can be converted to theory hours.

**Self-Study:** Characteristics of a battery: cell potential, current, capacity, electricity storage density, energy efficiency, cycle life and shelf life. Solid state battery (Li-polymer battery), Na-ion battery and Mg-ion batteries. Construction, working and applications of solid oxide fuel cell.

(8 Hours)

## Module – 3

**Corrosion Science:** Introduction to corrosion. Consequences of corrosion, Types of Corrosion: Chemical and electrochemical corrosion, differential metal corrosion, differential aeration corrosion (waterline and pitting corrosion). Factors affecting corrosion: Nature of metal, nature of corrosion product, ratio of anodic area to cathodic area, nature of environment (pH, temperature, conductivity). Corrosion testing by weight loss method and numerical problems. Corrosion control: Cathodic protection- Sacrificial anode method and Impressed current method. Protective metal coatings – Cathodic and Anodic coatings- Galvanization and Tinning.
**Electroplating**: Principle. Electroplating of Chromium- Hard and Decorative Cr plating.
**Electroless plating**: Principle. Electroless plating of copper. Difference between electroplating and electroless plating.
**Self-study:** Technological importance of metal plating. Electroless plating of Nickel.

(8 Hours)

## Module – 4

**Chemical Fuels and Energy applications:** Introduction, Characteristics of a good fuel, Calorific value- gross and net calorific values, determination of calorific value of a fuel using Bomb calorimeter, numerical problems. Petrol knocking: Mechanisms and adverse effects. Anti-knocking agents: Leaded and Unleaded petrol.
**Green Fuels:** Power alcohol: advantages and disadvantages. Biodiesel: Synthesis, advantages and disadvantages. Bio-gas: Synthesis, advantages and disadvantages.
**Solar energy**: Introduction, Types of solar energy conversion. Construction and working of Photovoltaic cells.
**Self-Study**: Recycling of fuel, Synthetic Petrol manufacturing. Knocking in Diesel engine, Octane number and Cetane number. Production of Solar grade Silicon from Quartz.

(8 Hours)

## Module – 5

**Smart Materials for Engineers**:
**Smart Materials:** Introduction – Types of smart materials, self-healing materials, shape memory alloys and uses of smart materials.
**Nanomaterials**: Introduction to Nanomaterials, classification and properties. Chemical synthesis of nanomaterials: top-down and bottom-up approach. Synthesis techniques: Sol-gel method, Chemical Vapour Deposition. Introduction, properties and applications – fullerene, graphene and carbon nanotubes.
**Self- Study**: Applications of nanomaterials in various industries. Carbon nanowires, and nanocomposites.                                                                                (8 Hours)

**Course outcomes:**
The students will be able to:

  CO1: Quantitative and qualitative analysis of materials by using different instruments.
  CO2: To identify various sustainable technologies in engineering applications.
  CO3: To develop problem solving, critical thinking and analytical reasoning towards scientific problems.
  CO4: To distinguish the use of smart materials for latest development in material research.

**PRACTICAL MODULE**

**A-** *Demonstration (any two) offline/virtual***:**
    A1. Synthesis of metal oxide nanoparticle.
    A2. Chemical structure drawing using software: ChemDraw/Avogadro/ChemSketch.
    A3. Estimation of hardness of water by EDTA method.
    A4. Determination of COD of waste water sample.

**B-** *Exercise (compulsorily any 3 to be conducted)***:**
    B1. Conductometric estimation of acid mixture.
    B2. Potentiometric estimation of FAS using $K_2Cr_2O_7$.
    B3. Determination of $pK_a$ of vinegar using pH meter.
    B4. Determination of rate of corrosion of mild steel by weight loss method.

**C-** *Structured Enquiry (compulsorily any 3 to be conducted)***:**
    C1. Estimation of Copper present in electroplating effluent by colorimeter.
    C2. Determination of viscosity of oil sample by Ostwald's viscometer.
    C3. Determination of percentage of iron in steel using external indicator method.
    C4. Estimation of Fluoride content using SPADNS by colorimetric estimation.

**D-** *Open ended Experiments (any two)***:**
    D1. Determination of percentage of CaO in cement.
    D2. Determination chloride content of water in Argentometry.
    D3. Analysis of mineral content and acidity of soil.
    D4. Determination of percentage of copper in Brass using redox titration.

**Books:**
    1. Wiley Engineering Chemistry, Wiley India Pvt. Ltd. New Delhi, 2013- 2nd Edition.
    2. Engineering Chemistry, Satyaprakash & Manisha Agrawal, Khanna Book Publishing, Delhi
    3. A Text Book of Engg. Chemistry, Shashi Chawla, Dhanpat Rai & Co. (P) Ltd.
    4. Essentials of Physical Chemistry, Bahl&Tuli, S.Chand Publishing
    5. Applied Chemistry, Sunita Rattan, Kataria 5. Engineering Chemistry, Baskar, Wiley
    6. Engineering Chemistry – I, D. Grour Krishana, Vikas Publishing
    7. A Text book of Engineering Chemistry, SS Dara & Dr. SS Umare, S Chand & Company Ltd., 12th Edition, 2011.
    8. A Text Book of Engineering Chemistry, R.V. Gadag and Nitthyananda Shetty, I.K. International Publishing house. 2nd Edition, 2016.
    9. Text Book of Polymer Science, F.W. Billmeyer, John Wiley & Sons, 4th Edition, 1999.
    10. Nanotechnology A Chemical Approach to Nanomaterials, G.A. Ozin & A.C. Arsenault, RSC Publishing, 2005.
    11. Corrosion Engineering, M.G. Fontana, N.D. Greene, McGraw Hill Publications, New York, 3rd Edition, 1996.
    12. Kirby W. Beard, Linden's Handbook of Batteries, Fifth Edition, McGraw Hill, 2019.

13. Takatoshi Tsujimura, OLED Display Fundamentals and Applications, Wiley–Blackwell , 2012

14. Max Lu, Francois Beguin, Elzbieta Frackowiak, Supercapacitors: Materials, Systems, and Applications, Wiley-VCH; 1st edition, 2013.

15. Dr. H. Panda, "Handbook on Electroplating with Manufacture of Electrochemicals", ASIA PACIFIC BUSINESS PRESS Inc., 2017.

16. National Research Council 1995. Expanding the Vision of Sensor Materials.

17. Washington, DC: The National Academies Press. https://doi.org/10.17226/4782.

18. Engineering Chemistry, Edited by Dr. Mahesh B and Dr. Roopashree B, Sunstar Publisher (2022) Bengaluru, ISBN 978-93-85155-70-3

19. High Performance Metallic Materials for Cost Sensitive Applications, F. H. Froes, et al. 2010

20. Instrumental Methods of Analysis, Dr. K. R. Mahadik and Dr. L. Sathiyanarayanan.

21. Polymer Science, V R Gowariker, 3rd Edition

22. Engineering Chemistry, P C Jain & Monica Jain, Dhanpat Rai Publication, 2015-16th Edition.

23. Nanostructured materials and nanotechnology, Hari Singh, Nalwa, academic press 2002- 1st Edition.

24. Nanotechnology Principles and Practices, Sulabha K Kulkarni, Capital Publishing Company, 2014-3rd Edition.

25. Principles of nanotechnology, Phanikumar, Scitech publications, 2010-2nd Edition.

26. Chemistry for Engineering Students, B. S. Jai Prakash, R. Venugopal, Sivakumaraiah & Pushpa Iyengar., Subash Publications, Bangalore.5th Edition, 2014

27. Chemistry of Engineering materials, Malini S, K S Anantha Raju, CBS publishers Pvt Ltd.,

28. Laboratory Manual Engg. Chemistry, Anupma Rajput, Dhanpat Rai & Co.

**Web links and Video Lectures (e-Resources):**
- Electrochemistry: https://nptel.ac.in/downloads/122101001/
- Chemistry of materials: https://nptel.ac.in/courses/104/103/104103019/
- https://www.youtube.com/watch?v=faESCxAWR9k
- https://www.youtube.com/watch?v=TBqXMWaxZYM&list=PLyhmwFtznRhuz8L1bb3X-9IbHrDMjHWWh
- https://www.youtube.com/watch?v=j5Hml6KN4TI
- https://www.youtube.com/watch?v=X9GHBdyYcyo
- https://www.youtube.com/watch?v=1xWBPZnEJk8
- https://www.youtube.com/watch?v=wRAo-M8xBHM.

**Activity Based Learning (Suggested Activities in Class)/ Practical Based learning:**
- https://www.vlab.co.in/broad-area-chemical-sciences
- https://demonstrations.wolfram.com/topics.php
- https://interestingengineering.com/science

| DEPARTMENT OF MECHANICAL ENGINEERING | | | |
|---|---|---|---|
| **Choice Based Credit System (CBCS)** | | | |
| SEMESTER – II | | | |
| **COMPUTER AIDED ENGINEERING DRAWING** (2:0:2) 3 | | | |
| B.E(Common to all branches) | | | |
| (Effective from the academic year 2022-23) | | | |
| Course Code | BCEDK203 | CIE Marks | 50 |
| Teaching Hours/Week (L: T:P) | 2: 0: 2 | SEE Marks | 50 |
| Total Number of Contact Hours | 40 | Exam Hours | 3 |

**Course Objectives:**

This course will enable students to:

1. Illustrate skills of visualizing points and lines to represent the same in two dimensions as per international standards, by manual and computational methods.
2. Apply orthographic projections of planes and simple three-dimensional objects.
3. Construct isometric projections of solids and development of lateral surfaces

## Module – 1

**Preamble:** Importance of Engineering Drawing, Industrial /defence application, research in the field of ME, Impact of the course on societal and sustainable solutions.

**Introduction to Engineering drawing**

Drawing Instruments and their uses, relevant BIS conventions and standards. Lettering, line conventions, dimensioning, material conventions, and free hand practicing. Co-ordinate system and reference planes HP, VP, RPP & LPP of 2D/3D environment. Selection of drawing sheet size and scale. Commands and creation of Lines, coordinate points, axes, poly-lines, square, rectangle, polygons, splines, circles, ellipse, text, move, copy, off-set, mirror, rotate, trim, extend, break, chamfer, fillet, curves, constraints viz., tangency, parallelism, inclination and perpendicularity.

Orthographic Projections: Planes of projection.

**Projections of points** in all the four quadrants.

**Projections of straight lines**

True length and True inclinations of a line, Apparent length and apparent inclinations of a line. Projection of straight line inclined to both the planes

(8 Hours)

## Module – 2

**Projections of plane surfaces**

Introduction to projection of plane surfaces, Projection of Triangular, Square, Rectangular, Pentagonal, Hexagonal and Circular planes inclined to horizontal and vertical planes.

(8 Hours)

## Module – 3

**Projections of solids**

Introduction to projections of Solids, Projections of right regular Prisms, Pyramids, Cones, Tetrahedron and Hexahedron (cube) inclined to both the planes.

(12 Hours)

| Module – 4 |
|---|

**Isometric Projection**

Introduction, Isometric scale, Isometric projection of simple plane figures, Isometric projection of hexahedron (cube), right regular prisms, pyramids, cylinders, cones, Hemisphere and spheres. Isometric projection of combination of two solids.

**Development of lateral surfaces**

Development of lateral surfaces of right regular prisms, cylinders, pyramids and cones resting with base on HP only.

(8 Hours)

| Module – 5 |
|---|

**Application problems and Multidisciplinary exercises (CIE only)**

Application of projection of lines, planes, solids; Problems on application of isometric projections and development of lateral surfaces.

**Free hand sketching**: True free hand, guided free hand, roads, buildings, utensils, hand tools and furniture etc.
**Graphs and charts**: Column chart, Pie chart, Line chart, Gantt chart etc using Microsoft excel or suitable software.

(4 Hours)

**Course Outcomes (COs):**

The students will be able to:

CO1: Illustrate competence in orthographic projections of points and lines.

CO2: Apply the concepts of orthographic projections of planes and solids pertaining to industrial drawings.

CO3: Construct isometric drawings of objects and development of lateral surfaces.

**Continuous Internal Evaluation (CIE)**

- CIE shall be evaluated for max. marks of 100 and later the same shall be scaled-down to 50 marks as detailed below:

- CIE component should comprise of Continuous evaluation of Drawing work of students based on below detailed weightage.

| Module | Max. Marks Weightage | Evaluation Weightage in marks | |
|---|---|---|---|
| | | **Computer display and print out (a)** | **Sketching (b)** |
| Module 1 | 35 | 15 | 20 |
| Module 2 | 35 | 15 | 20 |
| Module 3 | 60 | 20 | 40 |
| Module 4 | 70 | 30 | 40 |
| | 200 | 80 | 120 (Scaled down to 20 Marks) |
| **Total** | | **80** | **20** |
| Module 5 | 10 | 5 | 5 |
| **Consideration of Class work** | | **Total of Modules 1 to 4 [(a) + (b)] = 100 marks will be scaled down to 20 Marks + 10 marks for AAT from Module 5 = 30 marks** | |

- Two tests covering all the modules is to be conducted and evaluation to be based on SEE pattern, and average marks is to be scaled down to **20 Mark**s.
- The final CIE (50) = Class work marks (30) + Test marks (20)

**Question paper pattern:**
- Module 1 and Module 2 will have ONE question each. Student required to answer any ONE question.
- Module 3 will have TWO questions. Student required to answer any ONE question.
- Module 4 will have TWO questions. Student required to answer any ONE question.
- Module 5 is for understanding the application concepts and for practice using the necessary software. This module is not considered for SEE.

**Scheme of Evaluation:**

Each of the question will be distributed in to TWO segments. The first being **SKETCHING** to its actual scale in the sketch book followed by the second segment being **DRAFTING** using a relevant Graphics Software.

| Q. No | Question Paper Pattern | Marks for SKETCHING | Marks for DRAFTING | TOTAL MARKS |
|---|---|---|---|---|
| 1 | Module 1 and Module 2 | 5 | 25 | 30 |
| 2 | Module 3 | 10 | 30 | 40 |
| 3 | Module 4 | 5 | 25 | 30 |
| | Total | 20 | 80 | 100 |

**Textbooks:**
1. K.R. Gopalakrishna, *Engineering Graphics*, 32nd ed. Bangalore: Subhas Publications, 2013.
2. N.D. Bhatt, *Engineering Drawing*, 48th ed. Gujarat: V. M. Panchal Charutha Publishing House, 2005.

**References:**
1. A Primer on Computer Aided Engineering Drawing, 2nd edition, Published by VTU, Belagavi.
2. Luzadder Warren J., Duff John M Eastern, 2009, Fundamentals of Engineering Drawing with an Introduction to Interactive Computer Graphics for Design and Production, 7th edition, Best Publications.
3. Parthasarathy N. S., Vela Murali, Engineering Drawing, Oxford University Press, 2015.

**B.E ELECTRONICS AND COMMUNICATION ENGINEERING**
Choice Based Credit System (CBCS)
SEMESTER – II

**Introduction to Electronics Engineering (**3:0:0) 3
**ESC – I**
(Common to: CSE/ME/EEE/CIV/ISE/AIML)
(Effective from the academic year 2022-23)

| Course Code | BESCK204C | CIE Marks | 50 |
|---|---|---|---|
| Teaching Hours/Week (L: T:P:S) | 3:0:0 | SEE Marks | 50 |
| Total Number of Contact Hours | 40 | Exam Hours | 3 |

**Course Objectives:**

This course will enable students to:

1. To prepare students with fundamental knowledge/overview in the field of Electronics and Communication Engineering.
2. To equip students with a foundation in electronic engineering required for comprehending the operation and application of electronic circuits, logic design, embedded systems, and communication systems.
3. Professionalism & Learning Environment: To include in first-year engineering students an ethical and professional attitude by providing an academic environment inclusive of effective communication, teamwork, ability to relate engineering issues to a broader social context, and life-long learning needed for a successful professional career.

**Teaching-Learning Process**

These are sample Strategies, which teacher can use to accelerate the attainment of the various course outcomes and make Teaching-Learning effective.

1. Lecturer method (L) does not mean only the traditional lecture method, but a different type of teaching method may be adopted to develop the outcomes.
2. Arrange visits to nearby PSUs such as BHEL, BEL, ISRO, etc., and small-scale hardware Industries to give brief information about the electronics manufacturing industry.
3. Show Video/animation films to explain the functioning of various analog and digital circuits.
4. Encourage collaborative (Group) Learning the class
5. Ask at least three HOTS (Higher-order Thinking) question in the class, which promotes critical thinking
6. Adopt Problem Based Learning (PBL), which fosters students Analytical skills, develop thinking skills such as the ability to evaluate, generalize, and analyze information rather than simply recall it.
7. Topics will be introduced in multiple representations.
8. Show the different ways to solve the same problem and encourage the students to come up with their own creative ways to solve them.
9. Discuss how every concept can be applied to the real world – and when that's possible, it helps improve the student's understanding.

| **Module – 1** |
|---|
| **Power Supplies:** Block diagram, Half-wave rectifier, Full-wave rectifiers and filters, Voltageregulators, Ouput resistance and voltage regulation, Voltage multipliers. <br><br> Amplifiers: CE amplifier with and without feedback, Multi-stage amplifier, BJT as a switch, Cut-offand saturation modes. (Text 1) <br><br> (8 Hours) |
| **Module – 2** |
| **Oscillators:** Barkhausen criterion, sinusoidal and non-sinusoidal oscillators, Ladder network oscillators, Wein bridge oscillator, Multivibrtaors, Single-stage astable oscillator, Crystal controlled oscillator (Only Concepts ,working and waveforms. No mathematical derivations). <br><br> **Operational amplifiers:** Ideal op-amp: characteristics of ideal and practical op-amp; Practical op-amp circuits: Inverting and non -inverting amplifiers, voltage follower, summer, subtractor,integrator, differentiator. (Text 1) <br><br> (8 Hours) |
| **Module – 3** |
| **Boolean Algebra and Logic Circuits:** Binary numbers, Number Base Conversion octal & Hexa Decimal Numbers, Complements , Basic definitions, Axiomatic definition of Boolean algebra, BasicTheorems and properties of Boolean Algebra, Boolean Functions, Canonical and Standard Forms, other logic operations, Digital Logic Gates(Text2: 1.2, 1.3, 1.4, 1.5, 2.1, 2.2, 2.3, 2.4, 2.5, 2.6, 2.7) **Combinational logic:** Instruction, Design procedure, Adders-Half adders, Full adder (text 2: 4.1, 4.2, 4.3) <br><br> (8 Hours) |
| **Module – 4** |
| **Embedded Systems**: Definition, Embedded systems vs general computing systems, Classification of Embedded Systems, Major applications areas of Embedded Systems, Elements of an Embedded System, Core of the Embedded System, Microprocessor vs Microcontroller, RISC Vs CISC <br><br> **Sensors and Interfacing** Instrumentation and control systems, Transducers, Sensors, Actuators,LED, 7- Segment LED Display. (Text- 1). <br><br> (8 Hours) |
| **Module – 5** |
| **Applications of Electronic systems** <br><br> 1. Green tech application: Wind turbine for small power application <br> 2. Liquid level control system. <br> 3. pH neutralization system for wastewater treatment. <br> 4. RFID system. |

**Recap/Summary of the Course**                                                                                         (8 Hours)

Textbooks:
1. Mike Tooley, 'Electronic Circuits, Fundamentals & Applications', 4th Edition, Elsevier, 2015. DOI http://doi.org/10.4324/9781315737980. eBook ISBN9781315737980
2. Digital Logic and Computer Design, M. Morris Mano, PHI Learning, 2008 ISBN-978-81203- 0417-84
3. D P Kothari, I J Nagrath, 'Basic Electronics', 2nd edition, MC Graw Hill Education (India), Private Limited, 2018.

**II Semester**

| Course Title: | **Introduction to Python Programming** | | | |
|---|---|---|---|---|
| | **PLC-1** (Common to all Branches) | | | |
| | Effective from the academic year 2022-2023 | | | |
| Course Code: | **BPLCK205B** | CIE Marks | 50 | |
| Course Type (Theory/Practical/Integrated ) | Integrated | SEE Marks | 50 | |
| | | Total Marks | 100 | |
| Teaching Hours/Week (L:T:P: S) | 2:0:2:0 | Exam Hours | 03 | |
| Total Hours of Pedagogy | 40 hours | Credits | 03 | |

**Course objectives:**
- Learn the syntax and semantics of the Python programming language.
- Illustrate the process of structuring the data using lists, tuples
- Appraise the need for working with various documents like Excel, PDF, Word and Others.
- Demonstrate the use of built-in functions to navigate the file system.
- Implement the Object-Oriented Programming concepts in Python.

**Teaching-Learning Process**

**Pedagogy (General Instructions):**

These are sample Strategies, which teacher can use to accelerate the attainment of the various course outcomes and make Teaching –Learning more effective.

1. Use https://pythontutor.com/visualize.html#mode=edit in order to visualize the python code
2. Demonstrate and visualize basic data types (list, tuple, dictionary).
3. Chalk and talk online and videos.

| **Module-1 (8 hours)** |
|---|
| **Python Basics**: Entering Expressions into the Interactive Shell, The Integer, Floating-Point, and String Data Types, String Concatenation and Replication, Storing Values in Variables, Your First Program, Dissecting Your Program, **Flow control:** Boolean Values, Comparison Operators, Boolean Operators,Mixing Boolean and Comparison Operators, Elements of Flow Control, Program Execution, Flow Control Statements, Importing Modules,Ending a Program Early with sys.exit(), **Functions:** def Statements with Parameters, Return Values and return Statements,The None Value, Keyword Arguments and print(), Local and Global Scope, The global Statement, Exception Handling, A Short Program: Guess the Number <br> **Textbook 1: Chapters 1 – 3** |
| **Module-2 (8 hours)** |
| **Lists:** The List Data Type, Working with Lists, Augmented Assignment Operators, Methods, Example Program: Magic 8 Ball with a List, List-like Types: Strings and Tuples, References, <br><br> **Dictionaries and Structuring Data:** The Dictionary Data Type, Pretty Printing, Using Data Structures to Model Real-World Things, <br> **Textbook 1: Chapters 4 – 5** |
| **Module-3 (8 hours)** |
| **Manipulating Strings:** Working with Strings, Useful String Methods, Project: Password Locker, Project: Adding Bullets to Wiki Markup <br> **Reading and Writing Files:** Files and File Paths, The os.path Module, The File Reading/Writing Process, Saving Variables with the shelve Module,Saving Variables with the print.format() Function, Project: Generating Random Quiz Files, Project: Multiclipboard, <br> **Textbook 1: Chapters 6 , 8** <br><br> **Organizing Files:** The shutil Module, Walking a Directory Tree, Compressing Files with the zipfile Module, Project: Renaming Files with American-Style Dates to European-Style Dates,Project: Backing Up a Folder into a ZIP File, |

| **Module-4 (8 hours)** |
| --- |
| **Debugging:** Raising Exceptions, Getting the Traceback as a String, Assertions, Logging, IDLE‟s Debugger.<br>**Textbook 1: Chapters 9-10** |
| **Module-5 (8 hours)** |
| **Classes and objects:** Programmer-defined types, Attributes, Rectangles, Instances as return values, Objects are mutable, Copying,<br>**Classes and functions:** Time, Pure functions, Modifiers, Prototyping versus planning,<br>**Classes and methods:** Object-oriented features, Printing objects, Another example, A more complicated example, The init method, The str method, Operator overloading, Type-based dispatch, Polymorphism, Interface and implementation,<br><br>**Textbook 2: Chapters 15 – 17** |
| **Course outcome (Course Skill Set)**<br>At the end of the course the student will be able to: |

| CO1 | Demonstrate proficiency in handling loops and creation of functions. |
|---|---|
| CO2 | Identify the methods to create and manipulate lists, tuples and dictionaries. |
| CO3 | Develop programs for string processing and file organization |
| CO4 | Interpret the concepts of Object-Oriented Programming as used in Python. |
| CO5 | Apply the python concepts in real-time applications. |
|  | **Programming Exercises:**<br>1. a. Develop a program to read the student details like Name, USN, and Marks in three subjects. Display the student details, total marks and percentage with suitable messages.<br>b. Develop a program to read the name and year of birth of a person. Display whether the person is a senior citizen or not.<br>2. a. Develop a program to generate Fibonacci sequence of length (N). Read N from the console.<br>b. Write a function to calculate factorial of a number. Develop a program to compute binomial coefficient (Given N and R).<br>3. Read N numbers from the console and create a list. Develop a program to print mean, variance and standard deviation with suitable messages.<br>4. Read a multi-digit number (as chars) from the console. Develop a program to print the frequency of each digit with suitable message.<br>5. Develop a program to print 10 most frequently appearing words in a text file. [Hint: Use dictionary<br>6. Develop a program to sort the contents of a text file and write the sorted contents into a separate text file. [Hint: Use string methods strip(), len(), list methods sort(), append(), and file methods open(), readlines(), and write()].<br>7. Develop a program to backing Up a given Folder (Folder in a current working directory) into a ZIP File by using relevant modules and suitable methods.<br>8. Write a function named DivExp which takes TWO parameters a, b and returns a value c (c=a/b). Write suitable assertion for a>0 in function DivExp and raise an exception for when b=0. Develop a suitable program which reads two values from the console and calls a function DivExp.<br>9. Define a function which takes TWO objects representing complex numbers and returns new complex number with a addition of two complex numbers. Define a suitable class 'Complex' to represent the complex number. Develop a program to read N (N >=2) complex numbers and to compute the addition of N complex numbers.<br>10. Develop a program that uses class Student which prompts the user to enter marks in three subjects and calculates total marks, percentage and displays the score card details. [Hint: Use list to store the marks in three subjects and total marks. Use_init () method to initialize name, USN and the lists to store marks and total, Use getMarks() method to read marks into the list, and display() method to display the score card details. |

**Suggested Learning Resources:**

**Text Books**

1. Al Sweigart,**"Automate the Boring Stuff with Python",**1stEdition, No Starch Press, 2015. (Available under CC-BY-NC-SA license at https://automatetheboringstuff.com/)

   (Chapters 1 to 18, except 12) for lambda functions use this link:
     https://www.learnbyexample.org/python-lambda-function/

2. Allen B. Downey, **"Think Python: How to Think Like a Computer Scientist",** 2nd Edition, Green Tea Press, 2015. (Available under CC-BY-NC license at http://greenteapress.com/thinkpython2/thinkpython2.pdf
   (Chapters 13, 15, 16, 17, 18) (Download pdf/html files from the above link)

**Web links and Video Lectures (e-Resources):**

- https://www.learnbyexample.org/python/
- https://www.learnpython.org/
- https://pythontutor.com/visualize.html#mode=edit

**Activity Based Learning (Suggested Activities in Class)/ Practical Based learning**

Quizzes for list, tuple, string dictionary slicing operations using below link
https://github.com/sushantkhara/Data-Structures-And-Algorithms-with-Python/raw/main/Python%203%20_%20400%20exercises%20and%20solutions%20for%20beginners.pdf

| Department of Humanities and Social Sciences | | | |
|---|---|---|---|
| **Choice Based Credit System (CBCS)** | | | |
| SEMESTER –II | | | |
| **Professional Writing skills in English (1:0:0) 1** | | | |
| (Common to all Branches) | | | |
| (Effective from the academic year 2022-2023) | | | |
| Course Code | BPWSK206 | CIE Marks | 50 |
| Teaching Hours/Week (L: T:P) | 1:0:0 | SEE Marks | 50 |
| Total Number of Lecture Hours | 15 | Exam Hours | 01 |

**Course objectives:** This course will enable students to
1. Identify the Common Errors in Writing and Speaking English.
2. Improve their technical writing and Presentation skills for employment.
3. Acquire Employment and Workplace communication skills.
4. Learn about Techniques of Information Transfer through presentation in different level.

| Module – 1 |
|---|

**Preamble: Importance of English grammar, Vocabulary and Communication skills enhancing the employability skills of Engineering graduates.**

**Identifying Common Errors in Spoken and Written English:** Common Errors identification in Parts of Speech, Use of Verbs and Phrasal Verbs, Auxiliary Verbs and their forms, Subject Verb Agreement (identification of common errors), Words Confused\Misused, Error identification in Sequence of Tenses. **3 hours**

| Module – 2 |
|---|

**Nature and Style of Sensible Writing:** Organizing Principles of Paragraphs in Documents, Writing Introduction and Conclusion, Importance of proper Punctuation, Precise Writing, Techniques in Essay Writing, Sentence agreements and correction activities, Misplaced Modifiers, Word order, Errors due to the confusion of words. **3 hours**

| Module – 3 |
|---|

**Practises of Technical Reading and Writing:** Introduction to Technical Writing Process, Report Writing, Significance of Reports, Types of Reports. Introduction to Technical Proposal Writings, Types and characteristics. Scientific Writing Process. Grammar- Voices and Reported Speech, Spotting errors and Sentence Improvement. Cloze test and Theme Detection-Exercises. **3 hours**

| Module -4 |
|---|

**Professional Communication for Employment:** Listening comprehension, Types of Listening, Listening Barriers, Improving Listening Skills. Reading Comprehension, Tips for Effective Reading, Job Applications, Types of Official\employment\business Letters, Bio-Data vs Resume, Profile, CV writing, Emails, Blog writing and Memos. **3 hours**

| Module – 5 |
|---|

**Professional communication at Workplace:** Group Discission and Professional Interviews, Intra and interpersonal Communication Skills at Workplace, Non-Verbal Communication Skills and its importance in GD and Interview, Presentation skills and formal Presentations by Students, Strategies of Presentation skills. **3 hours**

**Course outcomes:** The students will be able to:

1. Understand and identify the Common Errors in Writing and Speaking.
2. Enhance Technical writing and Presentation skills.
3. Exhibit Employment and Workplace communication skills.
4. Analyze and apply various Techniques of Information Transfer through presentation indifferent levels.

**Textbooks:**

1. "Professional Writing Skills in English" published by Fillip Learning – Education (ILS), Bangalore – 2022.
2. "Functional English" (As per AICTE 2018 Model Curriculum) (ISBN-978-93-5350-047-4) Cengage learning India Pvt Limited [Latest Edition 2019]

**References**

1. Gajendra Singh Chauhan, Technical Communication, Cengage Learning India Pvt Limited, Latest Revised Edition, 2019
2. N.P. Sudharshana and C. Savitha, English for Engineers, Cambridge University Press ,2018.
3. Meenakshi Raman and Sangeetha Sharma, Technical Communication – Principles and Practice, Oxford University Press, Third Edition 2017.

| Department of Humanities and Social Sciences | | | |
|---|---|---|---|
| **Choice Based Credit System (CBCS)** | | | |
| SEMESTER – II | | | |
| **Indian Constitution (1:0:0) 1** | | | |
| (Common to all Branches) | | | |
| (Effective from the academic year 2022-2023) | | | |
| Course Code | **BICOK207** | CIE Marks | 50 |
| Teaching Hours/Week (L: T:P) | 1:0:0 | SEE Marks | 50 |
| Total Number of Lecture Hours | 15 | Exam Hours | 01 |

**Course objectives:** This course will enable students to

Familiarize with the basic structure of our Indian Constitution.

Understand the Concept of Fundamental Rights, Directive Principles of State Policy and Fundamental Duties.

Enhance their knowledge on administrative mechanism at the Union and State government.

Learn about elections, emergency provisions, amendments and Special constitutional provisions.

### Module – 1

**Preamble:** Significance and Scope of the course, Importance of the course in societal, political and economic growth of the nation.

**Introduction and Basic information about the Indian Constitution:**

Indian Constitution: Necessity of the Constitution, Societies before and after the Constitution adoption. Introduction to the Indian constitution, Making of the Constitution, Role of the Constituent Assembly. Salient Features. **3 Hours**

### Module – 2

**Preamble and Fundamental Rights:** Preamble of the Indian Constitution & Key concepts of the Preamble. Fundamental Rights (FR's) and its restriction and limitations in different Complex Situations. Case studies **3 Hours**

### Module – 3

**Directive Principles of State Policy and Fundamental Duties:**

Directive Principles of State Policy- Importance and its relevance. Fundamental Duties and their significance. Special Constitutional Provisions for Schedule Castes, Schedule Tribes & Other Backward Classes and Women & Children. **3 Hours**

### Module – 4

**Union and State Administration:**

The Union Executive-The President and The Vice President, The Prime Minister and The Council of Ministers, The Union Legislature -Lok Sabha & Rajya Sabha, Parliamentary Committees, Important Parliamentary Terminologies. The Union Judiciary- The Supreme Court of India and its jurisdiction. Judicial Review and Judicial Activism.

The State Executive-The Governors, The Chief Ministers and The Council of Ministers, The State Legislature- Legislative Assembly and Legislative Council, The State Judiciary- The State High Courts and its jurisdiction. **3 Hours**

### Module – 5

**Elections, Constitutional Amendments and Emergency Provisions:**

Elections-Electoral Process in India, Election Commission of India: Powers & Functions, Constitutional Amendments- methods and Important Constitutional Amendments ie 42nd, 44th, 61st,74th, 76th, 77th, 86th ,91st, 100, 101st, 118th, Emergency Provisions-types and its effect. **3 Hours**

**Course outcomes:** The students will be able to:
1. Understand the basic structure of our Indian Constitution.
2. Analyse the Concept of Fundamental Rights, Directive Principles of State Policy andFundamental Duties
3. Have knowledge on administrative mechanism at the Union and State government.
4. Understand the system of elections, emergency provisions, amendments and Specialconstitutional provisions.

**Textbooks**
1. "Constitution of India" (for Competitive Exams), Naidhruva Edutech Learning Solutions, Bengaluru. – 2022.
2. Durga Das Basu (DD Basu): "Introduction to the Constitution of India" (Students Edition.) Prentice –Hall, 2008.

**Reference Books:**
1. Shubham Singles, Charles E. Haries, and et al, "Constitution of India, Professional Ethics and Human Rights", Cengage Learning India, Latest Edition – 2019.
2. Merunandan K B, "The Constitution of India", Merugu Publication, Second Edition, Bengaluru.
3. Justice H N Nagamohan Dhas "Samvidhana Odu" - for Students & Youths, Sahayana, kerekon.

| Course Title: | Scientific Foundations of Health | | | |
|---|---|---|---|---|
| Course Code: | | **BSFHK258** | CIE Marks | 50 |
| Course Type (Theory/Practical/Integrated) | | Integrated | SEE Marks | 50 |
| | | | Total Marks | 100 |
| Teaching Hours/Week (L:T:P:S) | | 1:0:0:0 | Exam Hours | 01 Theory |
| Total Hours of Pedagogy | | 15 hours | Credits | 01 |

**Course objectives:**

The course Scientific Foundations of Health (22SFH18/28) will enable the students,

1. To know about Health and wellness (and its Beliefs) & It's balance for positive mindset.
2. To Build the healthy lifestyles for good health for their better future.
3. To Create a Healthy and caring relationships to meet the requirements of good/social/positive life.
4. To learn about Avoiding risks and harmful habits in their campus and outside the campus for their bright future.
5. To Prevent and fight against harmful diseases for good health through positive mindset

**Teaching-Learning Process** These are sample Strategies, which teacher can use to accelerate the attainment of the various course outcomes and make Teaching –Learning more effective: Teachers shall adopt suitable pedagogy for effective teaching - learning process. The pedagogy shall involve the combination of different methodologies which suit modern technological tools.

(i)     Direct instructional method ( Low/Old Technology),

(ii)    Flipped classrooms (High/advanced Technological tools),

(iii)   Blended learning (Combination of both),

(iv)    Enquiry and evaluation based learning,

(v)     Personalized learning,

(vi)    Problems based learning through discussion,

(vii)   Following the method of expeditionary learning Tools and techniques,

(viii)  Use of audio visual methods. Apart from conventional lecture methods, various types of innovative teaching techniques through videos, animation films may be adapted so that the delivered lesson can progress the students. In theoretical applied and practical skills.

| **Module-1** (**03 hours** ) |
|---|
| **Good Health & It's balance for positive mindset:** Health -Importance of Health, Influencing factors of Health, Health beliefs, Advantages of good health, Health & Behavior, Health & Society, Health & family, Health & Personality, Psychological disorders-Methods to improve good psychological health, Changing health habits for good health. |
| **Module-2  (3 hours)** |
| **Building of healthy lifestyles for better future:** Developing healthy diet for good health, Food & health, Nutritional guidelines for good health, Obesity & overweight disorders and its management, Eating disorders, Fitness components for health, Wellness and physical function, How to avoid exercise injuries. |
| **Module-3  (3 hours)** |
| **Creation of Healthy and caring relationships:** Building communication skills, Friends and friendship - Education, the value of relationship and communication skills, Relationships for Better or worsening of life, understanding of basic instincts of life (more than a biology), Changing health behaviors through social engineering. |
| **Module-4  (3 hours)** |
| **Avoiding risks and harmful habits:** Characteristics of health compromising behaviors, Recognizing and avoiding of addictions, How addiction develops, Types of addictions, influencing factors of addictions, Differences between addictive people and non addictive people & their behaviors. Effects of addictions Such as..., how to recovery from addictions. |
| **Module-5  (3 hours)** |
| **Preventing & fighting against diseases for good health:** How to protect from different types of infections, How to reduce risks for good health, Reducing risks & coping with chronic conditions, Management of chronic illness for Quality of life, Health & Wellness of youth :a challenge for upcoming future, Measuring of health & wealth status. |

**Course outcome (Course Skill Set)**

At the end of the course Scientific Foundations of Health (22SFH18/28) the student will be able to:

| | |
|---|---|
| CO1 | Understand about Health and wellness (and its Beliefs) & It's balance for positive mindset. |
| CO2 | Develop the healthy lifestyles for good health for their better future. |
| CO3 | Build a Healthy and caring relationships to meet the requirements of good/social/positive life. |
| CO4 | Study about avoiding risks and harmful habits in their campus and outside the campus for their bright future |
| CO5 | Learn to fight against harmful diseases for good health through positive mindset. |

**Suggested Learning Resources:**

**Textbook:**

1. **"Scientific Foundations of Health"** – Study Material Prepared by Dr. L Thimmesha, Published in VTU - University Website.
2. **"Scientific Foundations of Health"-** (ISBN-978-81-955465-6-5) published by Infinite Learning Solutions, Bangalore – 2022.
3. **Health Psychology - A Textbook,** FOURTH EDITION by Jane Ogden McGraw Hill Education (India) Private Limited - Open University Press.

**Reference Books:**

1. **Health Psychology (Second edition)** by Charles Abraham, Mark Conner, Fiona Jones and Daryl O'Connor – Published by Routledge 711 Third Avenue, New York, NY 10017.
2. **HEALTH PSYCHOLOGY (Ninth Edition)** by SHELLEY E. TAYLOR - University of California, Los Angeles, McGraw Hill Education (India) Private Limited - Open University Press.
3. **SWAYAM / NPTL/ MOOCS/ We blinks/ Internet sources/ YouTube videos** and other materials / notes.
4. **Scientific Foundations of Health (Health & Welness) - General Books** published for university and colleges references by popular authors and published by the reputed publisher.

**Activity Based Learning (Suggested Activities in Class)/ Practical Based learning**

- Contents related activities (Activity-based discussions)
- For active participation of students instruct the students to prepare Flowcharts and Handouts
- Organising Group wise discussions Connecting to placement activities
  Quizzes and Discussions, Seminars and assignments.