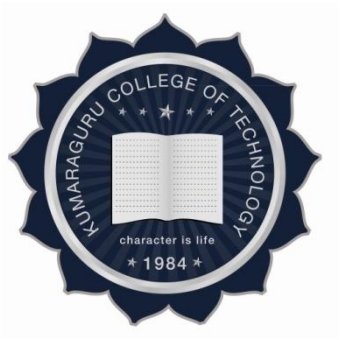
# KUMARAGURU COLLEGE OF TECHNOLOGY
# COIMBATORE – 641 049




# DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

# B.E COMPUTER SCIENCE AND ENGINEERING

## CURRICULUM & SYLLABUS

### R18 I-II SEMESTER

# KUMARAGURU COLLEGE OF TECHNOLOGY

## B.E COMPUTER SCIENCE AND ENGINEERING

## CURRICULUM (Regulation 2018)

| Semester I | | | | | | | | | | Pre-requisite |
|---|---|---|---|---|---|---|---|---|---|---|
| **S.No** | **Course code** | **Course Title** | **Course Mode** | **CT** | **L** | **T** | **P** | **J** | **C** | |
| 1 | U18MAI1201 | Linear Algebra and Calculus | Embedded - Theory & Lab | BS | 3 | 0 | 2 | 0 | 4 | |
| 2 | U18ENI1201 | Fundamentals of Communication -I | Embedded - Theory & Lab | HS | 2 | 0 | 2 | 0 | 3 | |
| 3 | U18PHI1201 | Engineering Physics | Embedded - Theory & Lab | BS | 3 | 0 | 2 | 0 | 4 | |
| 4 | U18CSI1201 | Structured Programming using C | Embedded - Theory & Lab | ES | 3 | 0 | 2 | 0 | 4 | |
| 5 | U18EEI1201 | Basic Electrical and Electronics Engineering | Embedded - Theory & Lab | ES | 3 | 0 | 2 | 0 | 4 | |
| 6 | U18INI1300 | Engineering Clinics-I | Embedded- Theory & Project | ES | 1 | 0 | 0 | 4 | 3 | |
| | | | | | | | | **Total Credits** | 22 | |
| | | | | | | | | **Total Contact Hours/week** | 29 | |

| Semester II | | | | | | | | | | Pre-requisite |
|---|---|---|---|---|---|---|---|---|---|---|
| **S.No** | **Course code** | **Course Title** | **Course Mode** | **CT** | **L** | **T** | **P** | **J** | **C** | |
| 1 | U18MAI2201 | Advanced Calculus and Laplace Transform | Embedded - Theory & Lab | BS | 3 | 0 | 2 | 0 | 4 | U18MAI1201 |
| 2 | U18ENI2201 | Fundamentals of Communication-II | Embedded - Theory & Lab | HS | 2 | 0 | 2 | 0 | 3 | |
| 3 | U18BTI2201 | Computational Biology | Embedded - Theory & Lab | BS | 3 | 0 | 2 | 0 | 4 | |
| 4 | U18CSI2201 | Problem Solving and Programming using Python | Embedded - Theory & Lab | ES | 2 | 0 | 2 | 0 | 3 | |
| 5 | U18CSI2202 | Digital and Microprocessor Systems | Embedded - Theory & Lab | PC | 3 | 0 | 2 | 0 | 4 | U18EEI1201 |
| 6 | U18INI2300 | Engineering Clinics-II | Embedded- Theory & Project | ES | 1 | 0 | 0 | 4 | 3 | |
| | | | | | | | | **Total Credits** | 21 | |
| | | | | | | | | **Total Contact Hours/week** | 28 | |

| Semester III | | | | | | | | | | Pre-requisite |
|---|---|---|---|---|---|---|---|---|---|---|
| **S.No** | **Course code** | **Course Title** | **Course Mode** | **CT** | **L** | **T** | **P** | **J** | **C** | |
| 1 | U18MAT3102 | Discrete Mathematics | Theory | BS | 3 | 1 | 0 | 0 | 4 | |
| 2 | U18CSI3201 | Data Structures | Embedded - Theory & Lab | PC | 3 | 0 | 2 | 0 | 4 | |
| 3 | U18CSI3202 | Object Oriented Programming | Embedded - Theory & Lab | PC | 3 | 0 | 2 | 0 | 4 | |
| 4 | U18CST3003 | Computer Architecture | Theory | PC | 3 | 0 | 0 | 0 | 3 | |
| 5 | U18CSI3204 | Database Management Systems | Embedded - Theory & Lab | PC | 3 | 0 | 2 | 0 | 4 | |
| 6 | U18INI3300 | Engineering Clinics-III | Embedded- Theory & Project | ES | 1 | 0 | 0 | 4 | 3 | |
| | | | | | | | | **Total Credits** | 22 | |
| | | | | | | | | **Total Contact Hours/week** | 27 | |

| Semester IV | | | | | | | | | | Pre-requisite |
|---|---|---|---|---|---|---|---|---|---|---|
| **S.No** | **Course code** | **Course Title** | **Course Mode** | **CT** | **L** | **T** | **P** | **J** | **C** | |
| 1 | U18MAI4201 | Probability and Statistics | Embedded - Theory & Lab | BS | 3 | 0 | 2 | 0 | 4 | |
| 2 | U18CST4001 | Design and Analysis of Algorithms | Theory | PC | 3 | 0 | 0 | 0 | 3 | U18CSI3201 |
| 3 | U18CSI4202 | Operating Systems | Embedded - Theory & Lab | PC | 3 | 0 | 2 | 0 | 4 | U18CSI3003 |
| 4 | U18CSI4203 | Software Engineering | Embedded - Theory & Lab | PC | 3 | 0 | 2 | 0 | 4 | U18CSI3204 |
| 5 | U18CST4004 | Theory of Computation | Theory | PC | 3 | 0 | 0 | 0 | 3 | U18MAT3102 |
| 6 | U18INI4300 | Engineering Clinics-IV | Embedded- Theory & Project | ES | 1 | 0 | 0 | 4 | 3 | |
| | | | | | | | | **Total Credits** | 21 | |
| | | | | | | | | **Total Contact Hours/week** | 26 | |

| Semester V | | | | | | | | | | Pre-requisite |
|---|---|---|---|---|---|---|---|---|---|---|
| **S.No** | **Course code** | **Course Title** | **Course Mode** | **CT** | **L** | **T** | **P** | **J** | **C** | |
| 1 | U18CSI5201 | Computer Networks | Embedded - Theory & Lab | PC | 3 | 0 | 2 | 0 | 4 | |
| 2 | U18CST5002 | Agile Software Development | Theory | PC | 3 | 0 | 0 | 0 | 3 | U18CST4203 |
| 3 | U18CSI5203 | No SQL Databases | Embedded - Theory & Lab | PC | 3 | 0 | 2 | 0 | 4 | U18CSI3204 |
| 4 | U18CST5004 | Social Media Marketing | Theory | HS | 3 | 0 | 0 | 0 | 3 | |
| 5 | U18INI5300 | Engineering Clinics-V | Embedded-Theory & Project | ES | 1 | 0 | 0 | 4 | 3 | |
| 6 | U18CSE---- | Programme Elective I | Theory | PE | 3 | 0 | 0 | 0 | 3 | |
| | | | | | | | | **Total Credits** | 20 | |
| | | | | | | | | **Total Contact Hours/week** | 24 | |

| Semester VI | | | | | | | | | | Pre-requisite |
|---|---|---|---|---|---|---|---|---|---|---|
| **S.No** | **Course code** | **Course Title** | **Course Mode** | **CT** | **L** | **T** | **P** | **J** | **C** | |
| 1 | U18CSI6201 | Internet and web programming | Embedded - Theory & Lab | PC | 3 | 0 | 2 | 0 | 4 | U18CSI5201 |
| 2 | U18CST6002 | Wireless Networks and Mobile Systems | Theory | PC | 3 | 0 | 0 | 0 | 3 | U18CSI5201 |
| 3 | U18CSI6203 | Data Warehousing and Data Mining | Embedded - Theory & Lab | PC | 3 | 0 | 2 | 0 | 4 | U18CSI5203 |
| 4 | U18OE----- | Open Elective | Theory | OE | 3 | 0 | 0 | 0 | 3 | |
| 5 | U18CSE---- | Programme Elective II | Theory | PE | 3 | 0 | 0 | 0 | 3 | |
| 6 | U18CSE---- | Programme Elective III | Theory | PE | 3 | 0 | 0 | 0 | 3 | |
| | | | | | | | | **Total Credits** | 20 | |
| | | | | | | | | **Total Contact Hours/week** | 22 | |

| Semester VII | | | | | | | | | | Pre-requisite |
|---|---|---|---|---|---|---|---|---|---|---|
| **S.No** | **Course code** | **Course Title** | **Course Mode** | **CT** | **L** | **T** | **P** | **J** | **C** | |
| 1 | U18CSI7201 | Cloud Computing | Embedded - Theory & Lab | PC | 3 | 0 | 2 | 0 | 4 | U18CST6003 |
| 2 | U18CST7002 | Machine Learning Techniques | Theory | PC | 3 | 0 | 0 | 0 | 3 | U18CSI6204 |
| 3 | U18CST7003 | Software Testing | Theory | PC | 3 | 0 | 0 | 0 | 3 | U18CST5002 |
| 4 | U18CSE---- | Professional Communication | Theory | PE | 3 | 0 | 0 | 0 | 3 | |
| 5 | U18CSP7704 | Engineering Project Phase-I | Project only Course | PW | 0 | 0 | 0 | 6 | 3 | |
| | | | | | | | | **Total Credits** | 16 | |
| | | | | | | | | **Total Contact Hours/week** | 20 | |

| Semester VIII | | | | | | | | | | Pre-requisite |
|---|---|---|---|---|---|---|---|---|---|---|
| **S.No** | **Course code** | **Course Title** | **Course Mode** | **CT** | **L** | **T** | **P** | **J** | **C** | |
| 1 | U18CSP8701 | Engineering Project Phase-II | Project only Course | PW | 0 | 0 | 0 | 24 | 12 | |
| | | | | | | | | **Total Credits** | 12 | |
| | | | | | | | | **Total Contact Hours/week** | 24 | |

| | |
|---|---|
| **Total Credits** | 154 |

**List of mandatory courses**

| S.No | Couse Code | Course Title | Course Mode | CT | Sem |
|---|---|---|---|---|---|
| 1 | U18VEP1501 | Human Excellence - Personal Values | Lab | HS | 1 |
| 2 | U18VEP2502 | Human Excellence- Inter Personal values | Lab | HS | 2 |
| 3 | U18VEP3503 | Human Excellence- Family Values | Lab | HS | 3 |
| 4 | U18CHT4000 | Environmental Science and Engineering | Theory | MC | 4 |
| 5 | U18VEP4504 | Human Excellence- Professional Values | Lab | HS | 4 |
| 6 | U18IST5000 | Indian Constitution | Theory | MC | 5 |
| 7 | U18VEP5505 | Human Excellence- Social Values | Lab | HS | 5 |
| 8 | U18VEP6506 | Human Excellence- National Values | Lab | HS | 6 |
| 9 | U18VEP7507 | Human Excellence- Global Values | Lab | HS | 7 |

| Programme Electives | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **S.No** | **Course code** | **Course Title** | **Course Mode** | **CT** | **L** | **T** | **P** | **J** | **C** |
| **Data Analytics** | | | | | | | | | |
| 1. | U18CSE0001 | Big Data Analytics | Theory | PE | 3 | 0 | 0 | 0 | 3 |
| 2. | U18CSE0002 | Data Visualization | Theory | PE | 3 | 0 | 0 | 0 | 3 |
| 3. | U18CSE0003 | Artificial Intelligence | Theory | PE | 3 | 0 | 0 | 0 | 3 |
| **Networking** | | | | | | | | | |
| 1. | U18CSE0004 | IoT Architecture and Protocols | Theory | PE | 3 | 0 | 0 | 0 | 3 |
| 2. | U18CSE0005 | Adhoc and Sensor Networks | Theory | PE | 3 | 0 | 0 | 0 | 3 |
| 3. | U18CSE0006 | Software Defined Networks | Theory | PE | 3 | 0 | 0 | 0 | 3 |
| **General** | | | | | | | | | |
| 1. | U18CSE0007 | Cryptography and Network Security | Theory | PE | 3 | 0 | 0 | 0 | 3 |
| 2. | U18CSE0008 | Principles of Compiler Design | Theory | PE | 3 | 0 | 0 | 0 | 3 |
| 3. | U18CSE0009 | Graphics and Multimedia | Theory | PE | 3 | 0 | 0 | 0 | 3 |
| 4. | U18CSE0010 | Information security | Theory | PE | 3 | 0 | 0 | 0 | 3 |

# Semester I

**U18MAI1201** **LINEAR ALGEBRA AND CALCULUS**
**(Common to All branches)**

| L | T | P | J | C |
|---|---|---|---|---|
| 3 | 0 | 2 | 0 | 4 |

**COURSE OUTCOMES**
**After successful completion of this course, the students should be able to:**

CO1: Identify eigenvalues and eigenvectors and apply Cayley Hamilton theorem.
CO2: Apply orthogonal diagonalisation to convert quadratic form to canonical form.
CO3: Solve first order ordinary differential equations and apply them to certain physical situations.
CO4: Solve higher order ordinary differential equations.
CO5: Evaluate the total derivative of a function, expand the given function as series and locate the maximum and minimum for multivariate function.
CO6: Determine Rank, Inverse, Eigenvalues, Eigenvectors of the given matrix, Maxima-Minima of the function and Solving Differential equations using MATLAB

**Pre-requisite:** Nil

**CO/PO Mapping**
**S-Strong, M-Medium, W-Weak**

| COs | Programme Outcomes(POs) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
| CO1 | S | S | | | M | | | | M | M | | M |
| CO2 | S | S | | | M | | | | M | M | | M |
| CO3 | S | S | | | M | | | | M | M | | M |
| CO4 | S | S | | | M | | | | M | M | | M |
| CO5 | S | S | | | M | | | | M | M | | M |
| CO6 | S | S | | | M | | | | M | M | | M |

**Course Assessment methods:**

**DIRECT**

1. Continuous Assessment Test I, II (Theory component)
2. Open Book Test; Cooperative Learning Report, Assignment; Journal Paper Review, Group Presentation, Project Report, Poster Preparation, Prototype or Product
3. Demonstration etc (as applicable) (Theory component)
4. Pre/Post - Experiment Test/Viva; Experimental Report for each Experiment (lab Component)
5. Model Examination (lab component)
6. End Semester Examination (Theory and lab components)

**INDIRECT**

1. Course-end survey

**THEORY COMPONENT**

**MATRICES** **6 Hours**

Rank of a matrix – Consistency of a system of linear equations - Rouche's theorem - Solution of a system of linear equations - Linearly dependent and independent vectors– Eigenvalues and Eigenvectors of a real matrix – Properties of eigenvalues and eigenvectors – Cayley Hamilton theorem (excluding proof)

**DIAGONALISATION OF A REAL SYMMETRIC MATRIX** **6 Hours**

Orthogonal matrices – Orthogonal transformation of a symmetric matrix to diagonal form – Reduction of quadratic form to canonical form by orthogonal transformation.

**FIRST ORDER ORDINARY DIFFERENTIAL EQUATIONS 11 Hours**

Leibnitz's equation – Bernoulli's equation – Equations of first order and higher degree - Clairauts form – Applications: Orthogonal trajectories.

**HIGHER ORDER LINEAR DIFFERENTIAL EQUATIONS 11 Hours**

Linear equations of second and higher order with constant coefficients – Euler's and Legendre's linear equations – Method of variation of parameters – First order Simultaneous linear equations with constant coefficients – Applications.

**FUNCTIONS OF SEVERAL VARIABLES 11 Hours**

Total derivative – Taylor's series expansion – Maxima and minima of functions of two variables – Constrained maxima and minima: Lagrange's multiplier method with single constraints – Jacobians.

**REFERENCES**


1. Grewal B.S., "Higher Engineering Mathematics", Khanna Publishers, New Delhi, 41st Edition, 2011.
2. Ramana B.V., "Higher Engineering Mathematics", Tata McGraw Hill Co. Ltd., New Delhi, 11th Reprint, 2010.
3. Kreyzig E., "Advanced Engineering Mathematics", Tenth Edition, John Wiley and sons, 2011.
4. Veerarajan T., Engineering Mathematics (for First Year), Tata McGraw Hill Pub. Co. Ltd., New Delhi, Revised Edition, 2007
5. Kandasamy P., Thilagavathy K., and Gunavathy K., "Engineering Mathematics", S. Chand & Co., New Delhi, (Reprint) 2008
6. Venkataraman M.K., "Engineering Mathematics", The National Pub. Co., Chennai,2003
7. Weir, MD, Hass J, Giordano FR: Thomas' Calculus, Pearson education 12th Edition, 2015
8. P.Bali., Dr. Manish Goyal., Transforms and partial Differential equations, University Science Press, New Delhi, 2010
9. G.B.Thomas and R.L.Finney, Calculus and analytical geometry, 11th Edition, PearsonEducation, (2006)


**LAB COMPONENT 30 Hours**

**List of MATLAB Programmes:**

1. Introduction to MATLAB.
2. Matrix Operations - Addition, Multiplication, Transpose, Inverse
3. Rank of a matrix and solution of a system of linear equations
4. Characteristic equation of a Matrix and Cayley-Hamilton Theorem.
5. Eigenvalues and Eigenvectors of Higher Order Matrices
6. Curve tracing
7. Solving first order ordinary differential equations.
8. Solving second order ordinary differential equations.
9. Determining Maxima and Minima of a function of one variable.
10. Determining Maxima and Minima of a function of two variables.

| Theory: 45 | Tutorial: 0 | Practical: 30 | Project: 0 | Total: 75 Hours |
|---|---|---|---|---|

| L | T | P | J | C |
|---|---|---|---|---|
| 2 | 0 | 2 | 0 | 3 |

**U18ENI1201 – FUNDAMENTALS OF COMMUNICATION-I**
***(Common to all Branches of I Semester B.E/B/Tech Programmes)***

**Course Objectives:**

1. To communicate effectively by using appropriate grammar and technical parlance in a range of academic scenarios.
2. To interpret and critically evaluate discourses related to functional English.
3. To disseminate professional information through appropriatemeans of communication.

**Course Outcomes:**

After the course the student will be able to:

**CO1:** Communicate in English with correct grammar
**CO2:** Communicate effectively (Oral and Written)
**CO3:** Use communication skills in the real world

**Assessment Methods:**

| **Direct** |
|---|
| 1. Continuous Assessment of Skills<br>2. Assignment<br>3. Written Test<br>4. End Semester Examination |
| **Indirect** |
| 1. Course-end survey |

**CO/PO Mapping:**

| **CO/PO Mapping**<br>(S/M/W indicates strength of correlation)S-Strong, M-Medium, W-Weak | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **COs** | **Programme Outcomes(POs)** | | | | | | | | | | | | **PSO** | |
| | **PO 1** | **PO 2** | **PO 3** | **PO 4** | **PO 5** | **PO 6** | **PO 7** | **PO 8** | **PO 9** | **PO 10** | **PO 11** | **PO 12** | **PSO 1** | **PSO 2** |
| **CO1** | | | | | | | | | | **S** | | **S** | | |
| **CO2** | | **M** | | **W** | | **W** | | | **M** | **S** | | **S** | | |
| **CO3** | | **M** | | **M** | | **W** | | | **M** | **S** | | **S** | | |

| No | Topic | Hours |
|---|---|---|
| **MODULE I - 12Hrs** | | |
| 1.1 | Parts of Speech | 2 |
| 1.2 | Subject Verb Agreement | 2 |
| 1.3 | Speak up (Self Introduction, JAM) | 4 |
| 1.4 | Writing sentences using 'Be-forms' | 3 |
| 1.5 | Test | 1 |
| **MODULE II - 12Hrs** | | |
| 2.1 | Articles, Gerunds, Infinitives | 2 |
| 2.2 | Speak up (Greetings & Polite English) | 4 |
| 2.3 | Dialogue Writing | 3 |
| 2.4 | Skimming & Scanning | 2 |
| 2.5 | Listening Skills - I | 1 |
| **MODULE III - 12Hrs** | | |
| 3.1 | Tenses & Voice | 2 |
| 3.2 | Sentences & its kinds | 2 |
| 3.3 | Speak up (Narration & Description) | 4 |
| 3.4 | Summarizing & Note-making | 3 |
| 3.5 | Listening Skills - II | 1 |
| **MODULE IV - 12 Hrs** | | |
| 4.1 | Framing Questions – 4 types | 2 |
| 4.2 | Speak up (Role play) | 4 |
| 4.3 | Letter writing – Formal and Informal & Email Writing | 3 |
| 4.4 | Reading Comprehension & Cloze test | 2 |
| 4.5 | Listening Skills - III | 1 |
| **MODULE V - 12 Hrs** | | |
| 5.1 | Degrees of Comparison | 2 |
| 5.2 | Clauses | 2 |
| 5.3 | Speak up (Power Point Presentation) | 4 |
| 5.4 | Writing (Picture perception) | 3 |
| 5.5 | Test | 1 |
| **Total** | | **60** |

**Reference:**


1. A Modern Approach to Non Verbal Reasoning (English, Paperback, Dr. R S Aggarwal)
2. The Power of Words(Bloomsbury, UK, 2012, Hyacinth Pink)
3. Word Power Made Easy: The Complete Handbook for Building a Superior Vocabulary (By Norman Lewis)
4. Effective Technical Communication Tata McGraw Hills Publications (Ashraf Rizvi)
5. English and Soft skills Orient Black Swan Publishers (S. P. Dhanavel)
6. Know Your Grammar: Trans.in Tamil & Malayalam –A Bilingual Approach (Bloomsbury, UK, 2012, Hyacinth Pink)

| U18 PHI1201 | Engineering Physics (Common to All B.E., B.Tech.) | L | T | P | J | C |
|---|---|---|---|---|---|---|
| | | 3 | 0 | 2 | 0 | 4 |

**Course Outcomes**

After successful completion of this course, the students should be able to

**CO1:** Understand the principles of motion and rotation of a rigid body in the plane.

**CO2:** Enhance the fundamental knowledge in properties of matter and its applications relevant to various streams of Engineering and Technology.

**CO3:**Recognise the nature and role of the thermodynamic parameters.

**CO4:**Compute electrostatic field and electric potential due to point and distributed charges.

**CO5:** Use electrostatic & magneto static boundary conditions to relate fields in adjacent media.

**CO6:** Introduce and provide a broad view of the smart materials and Nano science to undergraduates.

**Pre-requisites :Nil**

**CO/PO Mapping**

(S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak

| Cos | Programme Outcomes(POs) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
| CO1 | S | M | | | | | | | | | | M |
| CO2 | S | M | | | S | | | | | | | M |
| CO3 | S | M | | | S | | | | | | | M |
| CO4 | S | M | | | S | | | | | | | M |
| CO5 | S | M | | | S | | | | | | | M |
| CO6 | S | M | | | | | M | | | | | M |

## Course Assessment methods

| **Direct** |
| --- |
| 1. Continuous Assessment Test I, II (Theory component)<br>2. Cooperative learning report, Assignment; Group Presentation, Project report, Poster preparation,<br>3. Pre/Post - experiment Test/Viva; Experimental Report for each experiment (lab component)<br>4. Model examination (lab component)<br>5. End Semester Examination (Theory and lab component) |
| **Indirect** |
| 1. Course-end survey |

## Theory Component contents

**KINEMATICS & RIGID BODY MOTION 9Hours**

Definition and motion of a rigid body in the plane; Rotation in the plane; Kinematics in a coordinate system rotating and translating in the plane; Angular momentum about a point of a rigid body in planar motion; Euler's laws of motion, their independence from Newton's laws, and their necessity in describing rigid body motion; Examples.

**PROPERTIES OF MATTER AND MATERIALS TESTING 9Hours**

**Properties of matter:** Hooke's Law Stress - Strain Diagram - Elastic moduli - Relation between elastic constants - Poisson's Ratio - Expression for bending moment and depression - Cantilever - Expression for Young's modulus by Non uniform bending and its experimental determination.

**Materials testing**: Mechanism of plastic deformation, slip and twinning – types of fracture – Vickers Hardness test - fatigue and creep test.

**HEAT 9 Hours**

Specific heat capacity, thermal capacity. Temperature rise. Coefficient of linear thermal expansion. Methods of measurement of thermal expansion. Thermal stresses in composite structures due to non-homogeneous thermal expansion. Applications -The bimetallic strip. Expansion gaps and rollers in engineering structures. Thermal conductivity: differential equation of heat flow. Lee's disc apparatus for determination of thermal conductivity. Thermal Insulation. Convection and radiation. Applications to refrigeration and power electronic devices.

**ELECTROSTATICS & MAGNETOSTATICS 10 Hours**

**ELECTROSTATICS** : Maxwell's equation for electrostatics – E due to straight conductors, circular loop, infinite sheet of current -electric field intensity (D) - Electric potential - dielectrics - dielectric polarization - internal field – Clasious- Mosotti equation - dielectric strength - applications.

**MAGNETOSTATICS**: Maxwell's equation for magnetostatics - B in straight conductors, circular loop, infinite sheet of current - Lorentz force, magnetic field intensity (H) – Biot–Savart's Law – Ampere's Circuit Law –Magnetic flux density (B) – magnetic materials – Magnetization – Applications.

**NEW ENGINEERING MATERIALS AND NANOTECHNOLOGY 8 Hours**

**New Engineering Materials:** Metallic glasses – preparation, properties and applications – Shape memory alloys (SMA) – characteristics, properties of NiTi alloy applications - advantages and disadvantages of SMA.

**Nano Materials:** synthesis - Ball milling - Sol-gel - Electro deposition — properties of nano particles and applications. – Carbon Nano Tubes – fabrication by Chemical Vapour Deposition - structure, properties & applications.

| **Theory: 45** | **Tutorial: 0** | **Practical: 0** | **Project: 0** | **Total: 45 Hours** |
|---|---|---|---|---|

**REFERENCES**


1. Elements of Properties of Matter, Mathur D.S., Shyamlal Charitable Trust, New Delhi, 1993.
2. Essential University Physics, Vols. 1 and 2., Richard Wolfson, Pearson Education, Singapore, 2011.
3. Properties of matter, brijlal and Subharamaniam, S.Chand and Co, New Delhi, 2004.
4. Fundamentals of General Properties of Matter by Gulati H.R., R. Chand & Co., New Delhi, 1982.
5. Engineering Mechanics (2nd ed.), Harbola M. K., Cengage publications, New Delhi, 2009.
6. Introduction to Mechanics, Verma M. K. (CRC Press), University Press, 2000.
7. Thermodynamics: An Engineering Approach (SI Units), yunus a. cengel&michael a. boles 7th edition, mcgraw-hill companies 2014.
8. Concepts in Thermal Physics, Stephen Blundell, Oxford University Press, 2 nd Edition 2010.
9. Concepts of Physics, H.C.Vermavol 1 and 2, BharatiBhawan Publishers & Distributors; First edition (2017).
10. Engineering Electromagnetics, W. H. Hayt and John A. Buck, 6th Edition, Tata McGraw Hill, New Delhi, 2014.

11. Fundamentals of Applied Electromagnetics (7th Edition), Fawwaz T. Ulaby, Umberto Ravaioli Pearson, 2010
12. Electromagnetic Field Theory, 5th Edition, Gangadhar K.A. and Ramanathan P.M., Khanna Publishers, New Delhi, 2013.
13. Problems and Solutions in Electromagnetics, 1st Edition, J.A. Buck and W. H. Hayt, Tata McGraw Hill, New Delhi, 2010.
14. Electromagnetic with Applications, 5th Edition, John D. Kraus and Daniel A. Fleisch, Tata McGraw Hill, New Delhi, 2010.
15. Theory and Problems of Electromagnetic Schaum's Outline Series, 5th Edition, Joseph A. Edminister, Tata McGraw Hill Inc., New Delhi, 2010.
16. Engineering Physics, Rajendran V., Tata McGraw-Hill Education Pvt. Ltd., 2010
17. Nano – the Essentials, Pradeep T., McGraw-Hill Education, Pvt. Ltd., 2007.

## Lab component:

**COURSE OUTCOMES**

**CO 1:** Determine different physical properties of a material like band gap, magnetic field intensity, etc.,for engineering and technological applications.

**CO 2:** Perform experiments involving the physical phenomena like light, heat and sound.

**CO 3:** Verify physics concepts through experiments.

**CO/PO Mapping**

(S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak

| COs | Programme Outcomes(POs) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
| CO1 | S | | | | | | | | | | | |
| CO2 | | M | S | | | | | | | | | |
| CO3 | | S | | M | | | | | | | | |

**LIST OF EXPERIMENTS**

1. Lee's disc - determination of thermal conductivity of a bad conductor
2. Measurement of Moment of Inertia
3. Hysteresis curve
4. Determination of band gap of a semiconductor
5. Determination of specific resistance by Carry – Foster Bridge
6. Calibration of Ammeter, Voltmeter
7. Determination of thickness of thin sheet – Air wedge
8. Determination of frequency of an electrically maintained turning fork – Melde's string
9. Spectrometer - determination of wavelength of mercury source using grating
10. Determination of solar cell parameters

**Experiments for Demonstration:**

1. Hall effect
2. Hardness Test
3. Four probe experiment
4. Laser experiments - Determination of wavelength of light, Numerical aperture and acceptance of optical fibre

| **Theory: 0** | **Tutorial: 0** | **Practical: 30** | **Project: 0** | **Total: 30 Hours** |
|---|---|---|---|---|

**REFERENCES**


1. Laboratory Manual of Engineering Physics, Dr. Y. Aparna& Dr. K. Venkateswara Rao, V.G.S Publishers.
2. Practical Physics, G.L. Squires, Cambridge University Press, Cambridge, 1985.
3. Great Experiments in Physics, M.H. Shamos, Holt, Rinehart and Winston Inc., 1959.
4. Experiments in Modern Physics, A.C. Melissinos, Academic Press, N.Y., 1966.

## U18CSI1201 STRUCTURED PROGRAMMING USING C

(Common to CSE,ISE & IT)

| L | T | P | J | C |
|---|---|---|---|---|
| 3 | 0 | 2 | 0 | 4 |

## COURSE OUTCOMES

**AFTER SUCCESSFUL COMPLETION OF THIS COURSE, THE STUDENTS SHOULD BE ABLE TO**

**CO1:** Explain the basics of problem solving techniques.
**CO2:** Select appropriate data types and control structures for solving a given problem.
**CO3:** Illustrate the representation of arrays, strings and usage of string operations.
**CO4:** Illustrate the importance of pointers and functions.
**CO5:** Explain the fundamentals of structures and unions.
**CO6:** Explain the fundamentals of file handling **.**

**Pre-requisites :Nil**

**CO/PO MAPPING**

(S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak

| COs | PROGRAMME OUTCOMES (POs) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
| CO1 | S | M | | | | | | | | | | |
| CO2 | S | M | | | | | | | | | | |
| CO3 | S | L | | | L | | | | L | L | | |
| CO4 | M | L | | | L | | | | L | L | | M |
| CO5 | M | L | | | L | | | | L | L | | M |
| CO6 | L | L | | | | | | | | | | |

## COURSE ASSESSMENT METHODS

**DIRECT**

1. Continuous Assessment Test I, II (Theory Component)
2. Assignment (Theory Component)
3. Group Presentation (Theory Component)
4. Pre/Post - experiment Test/Viva; Experimental Report for each experiment (lab component)
5. Model examination (lab component)
6. End Semester Examination (Theory and lab component)

**INDIRECT**

1. Course-end survey

## THEORY COMPONENT CONTENTS

### STRUCTURED PROGRAMMING 9 Hours

Algorithms, building blocks of algorithms (instructions/statements, state, control flow, functions), notation (pseudo code, flow chart, programming language), algorithmic problem solving.

### ARRAYS AND STRINGS 9 Hours

Introduction to C Programming – Operators and Expressions – Data Input and Output – Control Statements. Defining an array – Processing an array – Passing arrays to functions –Multidimensional Arrays Character Arithmetic – Defining a string – NULL character – Initialization of Strings – Reading and Writing Strings – Processing Strings –Searching and Sorting of Strings.

**FUNCTIONS, STORAGE CLASSES** **9 Hours**

Defining a function – Accessing a function – Function prototypes – Passing arguments to a function – Function with string - Recursion – Storage classes

**POINTERS** **9 Hours**

Pointer Fundamentals – Pointer Declaration – Passing Pointers to a Function – Pointers and one dimensional arrays – operations on pointers– Dynamic memory allocation

**STRUCTURES, UNIONS AND FILES** **9 Hours**

Structures and Unions: Defining a Structure – Processing a Structure – User defined data types (Typedef) – Unions
Files: Opening and Closing a Data File – Reading and writing a data file – Processing a data file – Unformatted data files – Concept of binary files – Accessing a file randomly using fseek

| Theory: 45 | Tutorial: 0 | Practical: 0 | Project: 0 | Total: 45 Hours |
|---|---|---|---|---|

**REFERENCES**


1. Byron S Gottfried and Jitendar Kumar Chhabra, “Programming with C”, Tata McGraw Hill Publishing Company, Third Edition, New Delhi, 2011.
2. PradipDey and ManasGhosh, “Programming in C”, Second Edition, Oxford University Press, 2011.
3. Kernighan,B.W and Ritchie,D.M, “The C Programming language”, Second Edition, Pearson Education, 2006
4. Ashok N. Kamthane, “Computer programming”, Pearson Education, 2007.
5. Byron S Gottfried and Jitendar Kumar Chhabra, “Programming with C”, Tata McGraw Hill Publishing Company, Third Edition, New Delhi, 2011.
6. PradipDey and ManasGhosh, “Programming in C”, Second Edition, Oxford University Press, 2011.
7. Kernighan,B.W and Ritchie,D.M, “The C Programming language”, Second Edition, Pearson Education, 2006
8. Ashok N. Kamthane, “Computer programming”, Pearson Education, 2007.


## LAB COMPONENT CONTENTS

## LIST OF EXPERIMENTS 30 Hours

1. Writing algorithms, flowcharts and pseudo codes for simple problems.
2. Programs on expressions and conversions
3. Programs using if, if-else, switch and nested if statements
4. Programs using while, do-while, for loops
5. Programs on one dimensional arrays, passing arrays to functions and array operations
6. Programs using two dimensional arrays, passing 2D arrays to functions
7. Programs using String functions
8. Programs using function calls, recursion, call by value
9. Programs on pointer operators, call by reference, pointers with arrays
10. Programs using structures and unions.
11. Programs on file operations and modes.

12. Working with text files, random files and binary files

| Theory: 0 | Tutorial: 0 | Practical: 30 | Project: 0 | Total: 30 Hours |
|---|---|---|---|---|

## REFERENCES


1. Byron S Gottfried and Jitendar Kumar Chhabra, “Programming with C”, Tata McGraw Hill Publishing Company, Third Edition, New Delhi, 2011.
2. PradipDey and ManasGhosh, “Programming in C”, Second Edition, Oxford University Press, 2011.
3. Kernighan,B.W and Ritchie,D.M, “The C Programming language”, Second Edition, Pearson Education, 2006
4. Ashok N. Kamthane, “Computer programming”, Pearson Education, 2007.

# U18EEI1201 BASIC ELECTRICAL AND ELECTRONICS ENGINEERING
## (Common to Auto, Aero, Bio, FT, CSE,IT)

| L | T | P | J | C |
|---|---|---|---|---|
| 3 | 0 | 2 | 0 | 4 |

## COURSE OUTCOMES

**AFTER SUCCESSFUL COMPLETION OF THIS COURSE, THE STUDENTS SHOULD BE ABLE TO**

| | | |
|---|---|---|
| **CO1** | Acquire basic knowledge on DC and AC circuits. | **$K_2$** |
| **CO2** | Understandthe construction, working principle and applications of DC machines | **$K_2$** |
| **CO3** | Understandthe construction, working principle and applications of AC machines and transformers. | **$K_2$** |
| **CO4** | Acquire basic knowledge on logic gates, semiconductor devices and their applications. | **$K_2$** |
| **CO5** | Identify electronic components and use them to design simple circuits. | **$K_2$** |

## CO/PO Mapping

| **CO/PO Mapping** (S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| COs | Programme Outcomes(POs) | | | | | | | | | | | | PSOs | |
| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 |
| CO1 | M | M | | | | | | | | | | W | | |
| CO2 | M | M | | | | | | | | | | W | | |
| CO3 | M | M | | | | | | | | | | W | | |
| CO4 | M | M | | | | | | | | | | W | | |
| CO5 | M | M | | | | | | | | | | W | | |

**DC circuits:**
Basic circuit elements and sources, Ohms law, Kirchhoff's laws, series and parallel connection of circuit elements, Node voltage analysis, Mesh current analysis.

**AC circuits:** Alternating voltages and currents - SinglePhase Series RL, RC, RLC Circuits, Power in AC circuits –PowerFactor-power measurements.

**Electrical Machines:** Construction, Working Principle andapplications of DC generators, DC Motors, single phase Transformers, three phase and single phase induction motors.

**Semiconductor devices and Circuits:** PN junction diode – Zener Diode – Half wave and Full wave rectifier-voltage regulators – Bipolar Junction transistors, JFET, MOSFET – characteristics

**Digital Systems:** Binary Number System – Logic Gates – Boolean algebra – Half and Full Adders - sbutractor– Multiplexer – Demultiplexer-decoder-flip flops.

**TEXT BOOKS:**
1. Mittle N., "Basic Electrical Engineering", Tata McGraw Hill Edition, New Delhi, 1990.
2. Sedha R.S., "Applied Electronics", S. Chand & Co., 2006.

**REFERENCES**

1. Muthusubramanian R, Salivahanan S and Muraleedharan K A, “Basic Electrical, Electronics and Computer Engineering”, Tata McGraw Hill, Second Edition, 2017.

2. Nagsarkar T K and Sukhija M S, “Basics of Electrical Engineering”, Oxford press 2005.

3. Mehta V K, “Principles of Electronics”, Third Edition,S.Chand& Company Ltd, 1994.

4. MahmoodNahvi and Joseph A. Edminister, “Electric Circuits”, Schaum’ Outline Series, McGraw Hill, 2002.

5. Premkumar N, “Basic Electrical Engineering”, Anuradha Publishers, 2003.

## Lab Component

1. Measurementofelectricalquantities–voltage,current,power&power factor in RL, RC and RLC circuits.
2. Verification of Kirchoff’s Voltage and Current Laws.
3. Verification of Mesh and Nodal analysis.
4. Load test on DC shunt motor.
5. Load test on single phase transformer.
6. Load test on single phase induction motor.
7. Verification of truth tables of OR, AND, NOT, NAND, NOR, EX-OR, EXNOR gates.
8. Full wave rectifier with and without filter.
9. Input and output Characteristics of BJT – CE configuration.
10. Characteristics of PN junction diode and Zener diode.

# Semester II

**U18MAI2201 ADVANCED CALCULUS AND LAPLACE TRANSFORMS**
**(Common to All branches)**

| L | T | P | J | C |
|---|---|---|---|---|
| 3 | 0 | 2 | 0 | 4 |

**COURSE OUTCOMES**

**After successful completion of this course, the students should be able to**

**CO1:** Evaluate double and triple integrals in Cartesian coordinates and apply them to calculate area and volume.

**CO2:** Apply various integral theorems for solving engineering problems involving cubes and rectangular parallelepipeds.

**CO3:** Construct analytic functions of complex variables and transform functions from z-plane to w-plane and vice-versa, using conformal mappings.

**CO4:** Transform Functions in Time Domain to Frequency Domain using Laplace Transform

**CO5:** Use Laplace Transforms to Solve Ordinary Differential Equations and Integral Equations

**CO6:** Determine multiple integrals, vector differentiation, vector integrals and Laplace transforms using MATLAB.

**Pre-requisites : U18MAI1101**

**CO/PO MAPPING**
(S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak

| COs | PROGRAMME OUTCOMES (POs) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
| CO1 | S | S | | | M | | | | M | M | | M |
| CO2 | S | S | | | M | | | | M | M | | M |
| CO3 | S | S | | | M | | | | M | M | | M |
| CO4 | S | S | | | M | | | | M | M | | M |
| CO5 | S | S | | | M | | | | M | M | | M |

**COURSE ASSESSMENT METHODS**

**DIRECT**

1. Continuous Assessment Test I, II (Theory component)
2. Open book test; Cooperative learning report, Assignment; Journal paper review, Group Presentation, Project report, Poster preparation, Prototype or Product Demonstration etc (as applicable) (Theory component)
3. Pre/Post - experiment Test/Viva; Experimental Report for each experiment (lab component)
4. Model examination (lab component)
5. End Semester Examination (Theory and lab component)

**INDIRECT**

1. Course-end survey

**THEORY COMPONENT**

**MULTIPLEINTEGRALS 10 Hours**

Double integration – Cartesian coordinates – Change of order of integration - Application: Area as double integral - Triple integration in Cartesian coordinates — Volume as triple integral.

**VECTOR DIFFERENTIATION 6 Hours**

Gradient, divergence and curl – Directional derivative – Irrotational and Solenoidal vector fields.

**VECTOR INTEGRATION 6 Hours**

Green's theorem in a plane, Gauss divergence theorem and Stoke's theorem (excluding proofs) – Verification of theorem and simple applications

**ANALYTIC FUNCTIONS 8 Hours**

Functions of a complex variable – Analytic functions – Necessary conditions, Cauchy- Riemann equations in Cartesian coordinates and sufficient conditions (excluding proofs) – Properties of analytic function – Construction of analytic function by Milne Thomson method – Conformal mapping : $w = z + c$ , $cz$ , $1/z$ .

**LAPLACE TRANSFORMS 8 Hours**

Definition of the Laplace Transform; Properties of the Laplace Transform – Superposition, Shift in t or Time Delay, Shift in s, Time Derivatives, Time Integral-Initial Value Theorem - Final Value Theorem; Transform of periodic functions

**INVERSE LAPLACE TRANSFORMS 7 Hours**

Inverse transforms - Convolution theorem – Applications to solution of linear ordinary differential equations of second order with constant coefficients - Solution of integral equations.

**REFERENCES**


1. Grewal B.S., "Higher Engineering Mathematics", Khanna Publishers, New Delhi, 41st Edition, 2011.
2. Ramana B.V., "Higher Engineering Mathematics", Tata McGraw Hill Co. Ltd., New Delhi, 11th Reprint, 2010.
3. Veerarajan T., Engineering Mathematics (for First Year), Tata McGraw Hill Pub. Co. Ltd., New Delhi, Revised Edition, 2007.
4. Kandasamy P., Thilagavathy K., and Gunavathy K., "Engineering Mathematics", S. Chand & Co., New Delhi, (Reprint) 2008.
5. Kreyzig E., "Advanced Engineering Mathematics", Tenth Edition, John Wiley and sons, 2011.
6. Venkataraman M.K., "Engineering Mathematics", The National Pub. Co., Chennai, 2003.
7. Weir, MD, Hass J, Giordano FR: Thomas' Calculus Pearson education 12th ED, 2015.
8. N.P.Bali., Dr. Manish Goyal., — Transforms and Partial Differential equations, University science Press, New Delhi, 2010


| Theory: 45 | Tutorial: 0 | Practical: 0 | Project: 0 | Total: 45 Hours |
|---|---|---|---|---|

**LAB COMPONENT30 Hours**

**List of MATLAB Programmes:**

1. Evaluating double integral with constant and variable limits.
2. Area as double integral
3. Evaluating triple integral with constant and variable limits
4. Volume as triple integral
5. Evaluating gradient, divergence and curl
6. Evaluating line integrals and work done
7. Verifying Green's theorem in the plane
8. Evaluating Laplace transforms and inverse Laplace transforms of functions including impulse.
9. Heaviside functions and applying convolution.
10. Applying the technique of Laplace transform to solve differential equations.

| Theory: 0 | Tutorial: 0 | Practical: 30 | Project: 0 | Total: 30 Hours |
|---|---|---|---|---|

**U18ENI2201 – FUNDAMENTALS OF COMMUNICATION-II**
***(Common to all branches of II Semester B.E/B/Tech Programmes)***

| L | T | P | J | C |
|---|---|---|---|---|
| 2 | 0 | 2 | 0 | 3 |

**Course Objectives:**

1. To adopt relevant job related oral and written communication skills to competently perform in campus recruitments.
2. To train students in presentation skills, persuasive skills and career skills.
3. To comprehend critical text leading to academic articulation.

**Course Outcomes:**

After the course the student will be able to:

**CO1:** Demonstrate comprehension
**CO2:** Write reports and projects
**CO3:** Communicate verbally in the business environment

**Pre-requisite: Nil**

**CO/PO Mapping:**

| **CO/PO Mapping** (S/M/W indicates strength of correlation)S-Strong, M-Medium, W-Weak | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **COs** | **Programme Outcomes(POs)** | | | | | | | | | | | | **PSO** | |
| | **PO 1** | **PO 2** | **PO 3** | **PO 4** | **PO 5** | **PO 6** | **PO 7** | **PO 8** | **PO 9** | **PO 10** | **PO 11** | **PO 12** | **PSO 1** | **PSO 2** |
| **CO1** | | **M** | | **M** | | | | | | **S** | | **S** | | |
| **CO2** | | **W** | | | | | | | **W** | **S** | | **S** | | |
| **CO3** | | | **M** | | | **M** | | | **M** | **S** | | **S** | | |

**Assessment Methods:**

| **Direct** |
|---|
| 1. Continuous Assessment of Skills<br>2. Assignment<br>3. Written Test<br>4. End Semester Examination |
| **Indirect** |
| 1. Course-end survey |

| No | Topic | Hours |
|---|---|---|
| **MODULE I - 12 Hrs** | | |
| 1.1 | Writing Instructions, Recommendations | 2 |
| 1.2 | Listening Skills - IV | 1 |
| 1.3 | Speak up ( Debate) | 5 |
| 1.4 | Writing Memos, Circulars, Agenda and Minutes | 3 |

| | | |
|---|---|---|
| 1.5 | Test | 1 |
| **MODULE II - 12 Hrs** | | |
| 2.1 | Interview Skills I | 4 |
| 2.2 | Writing a Technical Report | 3 |
| 2.3 | Transcoding Graphics | 3 |
| 2.4 | Reading Short Stories – Home Assignment | 1 |
| 2.5 | Listening Skills -V | 1 |
| **MODULE III - 12 Hrs** | | |
| 3.1 | Interview Skills II | 5 |
| 3.2 | Writing Reviews – Product Review/ Article Review | 3 |
| 3.3 | Book Review – Home Assignment | 1 |
| 3.4 | Reading Comprehension – Double Passage | 2 |
| 3.5 | Listening Skills - VI | 1 |
| **MODULE IV - 12 Hrs** | | |
| 4.1 | Inferential Reading | 2 |
| 4.2 | Speak up (GD) | 5 |
| 4.3 | Creating an organizational flowchart | 1 |
| 4.4 | Drafting a project proposal | 3 |
| 4.5 | Listening Skills - VII | 1 |
| **MODULE V - 12 Hrs** | | |
| 5.1 | Speak up (Formal Presentation) | 4 |
| 5.2 | Reading & Responding to texts | 2 |
| 5.3 | Writing a News story / Advertisement | 2 |
| 5.4 | Writing Essays | 2 |
| 5.5 | Test | 2 |
| **Total** | | **60** |

## References


1. Word Power Made Easy: The Complete Handbook for Building a Superior Vocabulary (By Norman Lewis)
2. Effective Technical Communication Tata McGraw Hills Publications (Ashraf Rizvi)
3. English and Soft skills Orient Black Swan Publishers (S. P. Dhanavel)
4. Verbal Ability (Bloomsbury, UK, June 2012) Hyacinth Pink


| | | | | |
|---|---|---|---|---|
| **Theory: 30** | **Tutorial: 0** | **Practical: 30** | **Project: 0** | **Total: 60 Hours** |

| U18BTI2201 | COMPUTATIONAL BIOLOGY | L | T | P | J | C |
|---|---|---|---|---|---|---|
| | | 3 | 0 | 2 | 0 | 4 |

**Course Objectives:**

The objective of the course to give students an overall idea about the origin of life, biological system and the engineering problems associated with it.

**Course Outcomes (COs):**

After successful completion of this course, the students should be able to

| | |
|---|---|
| **CO1:** | Understand the basics of evolution. |
| **CO2** | Learn the composition of cells and information storage and transfer in cells. |
| **CO3:** | Obtaining an overview on the various biological systems and engineering problems |

**Course Assessment methods:**

| Direct | | Indirect | |
|---|---|---|---|
| 1 | Continuous Assessment Tests | 1 | Course end survey |
| 2 | Assignments | | |
| 3 | End Semester Examination | | |

**Basis of Life:** **9 Hours**

Origin of life –theory of evolution, Uniqueness of life on earth; Characteristics of living organisms, Tree of life classification –archaea, prokaryotes, eukaryotes, Viruses and life in extremophiles

**Fundamentals of Cell Biology** **9 Hours**

Nucleus, Endoplasmic reticulum, Mitochondria, golgi bodies, lysosomes, cell membrane – structure and functions. Methods to study cellular function (enzymatic reactions, specific Ag-Ab reactions, separation –chromatography, centrifugation, radioisotopes).

**Introduction to Biomolecules & Physiology** **9 Hours**

Biomolecules and their functions; Organs and physiological systems.

Case Study: Analytical Methods in Biological Sample Analysis – Blood, Urine

**Information storage and transfer** **9 Hours**

Heredity and DNA; organization of DNA in cells; Genes and chromosomes; Central dogma of information transfer; transcription and Protein synthesis; Cell division and cell cycle. Mutation and cancer.

Case Study: Personalized Medicine

**Analysis of DNA and Protein sequences** **9 Hours**

Basics of Sequence analysis- Pairwise sequence alignment, Basic Local Alignment Search Tool, Multiple sequence alignment, Molecular phylogeny and evolution; High throughput Gene expression analysis.

**Lab Component**

**Wet Lab Experiments:**

1. Quantification of DNA by uv-vis method (MS-Excel)
2. Quantification of protein by colorimetry / uv-vis method (MS-Excel)
3. Isolation of biomolecules
4. Separation of cell organelles using centrifugation

**Insilico-based Experiments:**

5. Retrieval of data from public biological databases
6. Sequence alignment using emboss (Percent similarity finding method)
7. Sequence alignment using k-tuple method (Database search method using percent similarity).
8. Phylogenetic analysis using emboss (Clustering sequence using percent similarity).

| **Theory: 45 Hours** | **Tutorial: 0 Hours** | **Practical: 15 Hours** | **Total : 60 Hours** |
|---|---|---|---|

**REFERENCES**


| | |
|---|---|
| 1 | Satyanarayan, U., & Chakrapani, U. (1999) Ed. June 2017. Textbook of Biochemistry. |
| 2 | Verma, P. S., Agarwal, V. K., & Verma, P. S. (2007). *Cell biology, genetics, molecular biology, evolution and ecology*. S. chand & Company Limited. |
| 3 | William, T. (2009). *Introduction to biotechnology*. Pearson Education India. |
| 4 | Chatterjee, C. C. (1992). *Human physiology*. Medical Allied Agency. |
| 5 | Taylor, D. J., Green, N. P., Stout, G. W., & Soper, R. (1997). *Biological science* (Vol. 983). Cambridge, United Kingdom: Cambridge University Press. |
| 6 | Campbell, N. A., Mitchell, L. G., Reece, J. B., & Taylor, M. R. (2000). *Biology: concepts & connections* (No. QH308. 2 C35 1996). Benjamin/Cummings. |
| 7 | Rastogi, S. C., Rastogi, P., & Mendiratta, N. (2008). *Bioinformatics Methods And Applications: Genomics Proteomics And Drug Discovery 3Rd Ed*. PHI Learning Pvt. Ltd.. |
| 8 | Fumento, M. (2003). Bioevolution: how biotechnology is changing our world. |

| L | T | P | J | C |
|---|---|---|---|---|
| 2 | 0 | 2 | 0 | 3 |

# U18CSI2201 PROBLEM SOLVING AND PROGRAMMING USING PYTHON

(Common to All Branches)

## COURSE OUTCOMES

**AFTER SUCCESSFUL COMPLETION OF THIS COURSE, THE STUDENTS SHOULD BE ABLE TO**

**CO1:** Develop simple Python program in interactive and script mode.

**CO2:** Solve problems using control statements in Python

**CO3:** Construct Python programs using functions and strings.

**CO4:** Make use of Python lists ,set, tuples, dictionaries to represent compound data.

**CO5:** Build Python Programs to read and write data from/to files.

**CO6:** Develop python programs to handle exceptions.

**Pre-requisites :Nil**

**CO/PO MAPPING**

(S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak

| Cos | PROGRAMME OUTCOMES (POs) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
| CO1 | S | S | M | | M | | | | M | M | | M |
| CO2 | S | S | M | | M | | | | M | M | | M |
| CO3 | S | S | M | | M | | | | M | M | | M |
| CO4 | S | S | M | | M | | | | M | M | | M |
| CO5 | S | S | M | | M | | | | M | M | | M |
| CO6 | S | S | M | | M | | | | M | M | | M |

## COURSE ASSESSMENT METHODS

**DIRECT**

1. Continuous Assessment Test I, II (Theory component)
2. Open Book Test, Assignment, Group Presentation
3. Viva, Experimental Report for each Experiment (lab Component)
4. Model Examination (lab component)
5. End Semester Examination (Theory and lab components)

**INDIRECT**

1. Course-end survey

## THEORY COMPONENT CONTENTS

### BASICS OF PYTHON PROGRAMMING 6 Hours

Introduction-Python interpreter- interactive and script mode; values and types, operators, expressions, statements, precedence of operators, Multiple assignments, comments.

### CONTROL STATEMENTS AND FUNCTIONS IN PYTHON 6 Hours

Conditional (if), alternative (if-else), chained conditional (if-elif-else); Iteration: state, while, for, break, continue, pass; Functions: Introduction, inbuilt functions, user defined functions, passing parameters, return values, recursion.

**DATA STRUCTURES: STRINGS,LSTS,SET** **7 Hours**

Strings: string slices, immutability, string methods and operations; Lists: creating lists, list operations, list methods, mutability, aliasing, cloning lists, list and strings, list and functions ; list processing : list comprehension, searching and sorting, Sets: creating sets, set operations.

**DATA STRUCTURES: TUPLES, DICTIONARIES** **5 Hours**

Tuples: Tuple assignment, Operations on Tuples, lists and tuples, Tuple as return value; Dictionaries: operations and methods, Nested Dictionaries.

**FILES, MODULES, PACKAGES** **6 Hours**

Files and exception: text files, reading and writing files, format operator, exception handling, modules, packages.

| **Theory: 30** | **Tutorial: 0** | **Practical: 0** | **Project: 0** | **Total: 30 Hours** |
|---|---|---|---|---|

**REFERENCES**


1. Ashok NamdevKamthane,Amit Ashok Kamthane, Programming and Problem Solving with Python , Mc-Graw Hill Education,2018.
2. Allen B. Downey, Think Python: How to Think Like a Computer Scientist, Second edition, Updated for Python 3, Shroff / O'Reilly Publishers, 2016John V Guttag, Introduction to Computation and Programming Using Python, Revised and expanded Edition, MIT Press , 2013.
3. Robert Sedgewick, Kevin Wayne, Robert Dondero, Introduction to Programming in Python: An Inter-disciplinary Approach, Pearson India Education Services Pvt. Ltd., 2016.
4. Timothy A. Budd, Exploring Python, Mc-Graw Hill Education (India) Private Ltd., 2015.
5. Kenneth A. Lambert, Fundamentals of Python: First Programs, CENGAGE Learning, 2012.
6. Charles Dierbach, Introduction to Computer Science using Python: A Computational Problem Solving Focus, Wiley India Edition, 2013.


**E BOOKS AND ONLINE LEARNING MATERIALS**


1. www.mhhe.com/kamthane/python
2. Allen B. Downey, Think Python: How to Think Like a Computer Scientist, Second edition, Updated for Python 3, Shroff / O'Reilly Publishers, 2016 (http://greenteapress.com/wp/think-python/ )

## LAB COMPONENT CONTENTS 30 Hours

### LIST OF EXPERIMENTS

1. Programs using expressions and input and output statements.
2. Programs using operators and built in functions.
3. Programs using conditional statements.
4. Program to exchange the values of two variables.
5. Program to test whether a given year is a leap year or not
6. Programs performing all string operations.
7. Programs using functions
8. Programs to find square root, GCD, exponentiation, sum an array of numbers
9. Programs to perform linear search, binary search
10. Programs to perform operations on list
11. Programs using dictionary and set
12. Programs to work with Tuples.
13. Programs to sort elements (Selection, Insertion, Merge, Quick)
14. Programs to search element.
15. Program to perform word count in file.
16. Program to copy file
17. Program to read and write file
18. Programs using modules and packages

| Theory: 0 | Tutorial: 0 | Practical: 30 | Project: 0 | Total: 30 Hours |
|---|---|---|---|---|

**ONLINE COURSES AND VIDEO LECTURES:**
**http://nptel.ac.in**

**U18CSI2202 DIGITAL AND MICROPROCESSOR SYSTEMS**

| L | T | P | J | C |
|---|---|---|---|---|
| 3 | 0 | 2 | 0 | 4 |

**Course Outcomes (CO):**

**After Successful completion of this course, the students will be able to:**

CO1- Apply minimization techniques to simplify the Boolean function.
CO2- Analyze and design of combinational circuits.
CO3- Analyze and design of sequential circuits.
CO4- Illustrate the architecture of 8086 processor and write assembly language programs
CO5- Illustrate the configurations of 8086 microprocessor.
CO6- Develop I/O interfacing circuits.

**Pre-requisite:U18EEI1201**

**CO/PO MAPPING**
(S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak

| COs | PROGRAMME OUTCOMES (POs) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
| CO1 | S | S | | | M | | | | M | M | | M |
| CO2 | S | S | | | M | | | | M | M | | M |
| CO3 | S | S | | | M | | | | M | M | | M |
| CO4 | S | S | | | M | | | | M | M | | M |
| CO5 | S | S | | | M | | | | M | M | | M |
| CO6 | S | S | | | M | | | | M | M | | M |

**COURSE ASSESSMENT METHODS**

**DIRECT**

1. Continuous Assessment Test I, II (Theory component)
2. Assignment, Group Presentation
3. Demonstration etc (as applicable) (Theory component)
4. Pre/Post - Experiment Test/Viva; Experimental Report for each Experiment (lab Component)
5. Model Examination (lab component)
6. End Semester Examination (Theory and lab components)

**INDIRECT**

1. Course-end survey

**Course Content:**

**BASIC LOGIC AND COMBINATIONAL CIRCUITS 10 Hours**

Boolean functions – Canonical and standard forms – Digital logic gates- Karnaugh map Minimization – Combinational Circuits- Design procedure – Code converters- Binary Adder – Subtractor - Magnitude Comparator

**SEQUENTIAL CIRCUITS** **9 Hours**

Flip-flops – Characteristic table and equation – State reduction and assignment – Design procedure- Registers – Shift registers - Ripple Counters - Synchronous counters

**8086 MICROPROCESSOR** **9 Hours**

Introduction to 8086 – Microprocessor architecture – Addressing modes – Instruction set and assembler directives – Assembly language programming –Interrupts and interrupt service routines – Byte and String Manipulation.

**8086 SYSTEM BUS STRUCTURE** **9 Hours**

8086 Signals – Basic Configurations – System Bus Timing – Introduction To Multiprogramming – System Bus Structure – Multiprocessor Configurations – Coprocessor, Closely Coupled And Loosely Coupled Configurations.

**I/O INTERFACING** **8 Hours**

Parallel communication interface – Serial communication interface – Keyboard /display controller – Interrupt controller – DMA controller

| Theory: 45 | Tutorial: 0 | Practical: 0 | Project: 0 | Total: 45 Hours |
|---|---|---|---|---|

**References:**


1. M. Morris Mano and Michael D. Ciletti, "Digital Design", 5th Edition, Prentice Hall of India Pvt. Ltd., New Delhi, 2013.
2. S.Salivahanan and S. Arivazhagan, "Digital Circuits and Design", 2nd Edition, Vikas Publishing House Pvt. Ltd, New Delhi, 2012.
3. Yu-Cheng Liu, Glenn A.Gibson, "Microcomputer Systems: The 8086 / 8088 Family – Architecture, Programming and Design", Second Edition, Prentice Hall of India, 2007.
4. DoughlasV.Hall, "Microprocessors and Interfacing, Programming and Hardware", Tata McGrawHill , 2012.


**LAB COMPONENT CONTENTS** **30 Hours**

**LIST OF EXPERIMENTS**

1. Design and implementation of combinational circuits using basic gates for arbitrary functions and code converters.
2. Design and implementation of 4-bit binary adder /subtractor using basic gates and MSI devices
3. Design and implementation of magnitude comparator.

4. Design and implementation of shift registers
5. Design and implementation of synchronous and asynchronous counters
6. Programming with 8086 - String manipulations
7. Programming with 8086 - sorting and searching
8. Interfacing 8086 with peripherals

| Theory: 0 | Tutorial: 0 | Practical: 30 | Project: 0 | Total: 30 Hours |
|---|---|---|---|---|

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