KAKATIYA INSTITUTE OF TECHNOLOGY & SCIENCE
Warangal – 506 015, Telangana, INDIA (An Autonomous Institute under Kakatiya University, Warangal)
కాకతీయ సాంకేతిక విజ్ఞాన శాస్త్ర విద్యాలయం వరంగల్ – ౫౦౬ ౦౧౫.
Estd-1980
KITSW

# URR-18

*(Applicable from the Academic Year 2018-19)*

## SYLLABI (I to IV SEMESTERS)

**KAKATIYA INSTITUTE OF TECHNOLOGY & SCIENCE: WARANGAL-15**

*(An Autonomous Institute under Kakatiya University, Warangal)*

**SCHEME OF INSTRUCTIONS & EVALUATION FOR B.TECH. 4-YEAR DEGREE PROGRAMME**

**BRANCH : B.Tech. – ME / CSE / CSN / IT (Stream – I)**

**SEMESTER : FIRST**

| Sl.No | Course Category | Course Code | Course Name | Periods/week | | | Credits | Evaluation Scheme | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | L | T | P | C | CIE | | | ESE | Total Marks |
| | | | | | | | | TA | MSE | Total | | |
| 1 | BSC | U18MH101 | Engineering Mathematics - I | 3 | 1 | - | 4 | 10 | 30 | 40 | 60 | 100 |
| 2 | ESC | U18CS102 | Programming for Problem Solving using C | 3 | - | - | 3 | 10 | 30 | 40 | 60 | 100 |
| 3 | BSC | U18PH103 | Engineering Physics | 3 | 1 | - | 4 | 10 | 30 | 40 | 60 | 100 |
| 4 | HSMC | U18MH104 | English for Communication | 2 | - | 2 | 3 | 10 | 30 | 40 | 60 | 100 |
| 5 | ESC | U18EE105 | Basic Electrical Engineering | 3 | 1 | - | 4 | 10 | 30 | 40 | 60 | 100 |
| 6 | ESC | U18EE106 | Basic Electrical Engineering Laboratory | - | - | 2 | 1 | 40 | - | 40 | 60 | 100 |
| 7 | ESC | U18CS107 | Programming for Problem Solving using C Laboratory | - | - | 2 | 1 | 40 | - | 40 | 60 | 100 |
| 8 | BSC | U18PH108 | Engineering Physics Laboratory | - | - | 2 | 1 | 40 | - | 40 | 60 | 100 |
| 9 | ESC | U18ME109 | Workshop Practice | - | - | 2 | 1 | 40 | - | 40 | 60 | 100 |
| 10 | MC | U18EA110 | EAA* : Sports/Yoga/NSS | - | - | 2 | - | 100 | - | - | - | 100 |
| 11 | MC | -- | Induction Programme | - | - | - | - | - | - | - | - | - |
| | | | **Total:** | **14** | **3** | **12** | **22** | **310** | **150** | **360** | **540** | **1000** |

***Note:*** **L -** Lectures; ***T*** **–** Tutorials; **P** – Practicals; **CIE** – Continuous Internal Evaluation; **TA** – Teachers Assessment;
***MSE*** – Mid Semester Examination; **ESE** – End Semester Examination; **EAA** – Extra Academic Activity;

*** indicates mandatory non-credit course**

**Student Contact Hours / Week : 29 (periods/week)**

**Total Credits (C) : 22 Credits**

**KAKATIYA INSTITUTE OF TECHNOLOGY & SCIENCE: WARANGAL-15**

*(An Autonomous Institute under Kakatiya University, Warangal)*

**SCHEME OF INSTRUCTIONS & EVALUATION FOR B.TECH. 4-YEAR DEGREE PROGRAMME**

**BRANCH : B.Tech. – ME / CSE / CSN/IT (Stream – I)**

**SEMESTER : SECOND**

| S. No. | Course Category | Course Code | Course Name | Periods | | | Credits | Evaluation Scheme | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | L | T | P | | CIE | | | ESE | Total Marks |
| | | | | | | | | TA | MSE | Total | | |
| 1 | BSC | U18MH201 | Engineering Mathematics - II | 3 | 1 | - | 4 | 10 | 30 | 40 | 60 | 100 |
| 2 | ESC | U18CS202 | Data Structures through C | 3 | - | - | 3 | 10 | 30 | 40 | 60 | 100 |
| 3 | BSC | U18CH203 | Engineering Chemistry | 3 | 1 | - | 4 | 10 | 30 | 40 | 60 | 100 |
| 4 | ESC | U18ME204 | Engineering Drawing | 2 | - | 4 | 4 | 10 | 30 | 40 | 60 | 100 |
| 5 | ESC | U18CE205 | Engineering Mechanics | 3 | 1 | - | 4 | 10 | 30 | 40 | 60 | 100 |
| 6 | ESC | U18CS207 | Data Structures through C Laboratory | - | - | 2 | 1 | 40 | - | 40 | 60 | 100 |
| 7 | BSC | U18CH208 | Engineering Chemistry Laboratory | - | - | 2 | 1 | 40 | - | 40 | 60 | 100 |
| 8 | MC | U18CH209 | Environmental Studies* | 2 | - | - | - | 10 | 30 | 40 | 60 | 100 |
| 9 | MC | U18EA210 | EAA* : Sports/Yoga/NSS | - | - | 2 | - | 100 | - | - | - | 100 |
| | | | **Total:** | **16** | **3** | **10** | **21** | **240** | **180** | **320** | **480** | **900** |

***Note:*** **L -** Lectures; ***T*** **–** Tutorials; **P** – Practicals; **CIE** – Continuous Internal Evaluation; **TA** – Teachers Assessment;
***MSE*** – Mid Semester Examination; ESE – End Semester Examination; EAA – Extra Academic Activity;
*** indicates mandatory non-credit course**

**Student Contact Hours / Week : 29 (periods/week)**
**Total Credits (C) : 22 Credits**

**KAKATIYA INSTITUTE OF TECHNOLOGY & SCIENCE: WARANGAL-15**

*(An Autonomous Institute under Kakatiya University, Warangal)*

**SCHEME OF INSTRUCTIONS & EVALUATION FOR B.TECH. 4-YEAR DEGREE PROGRAMME**

**BRANCH : B.Tech. – CE / EIE / EEE / ECE/ECI (Stream – II)**

**SEMESTER : FIRST**

| Sl.No | Course Category | Course Code | Course Name | Periods/week | | | Credits | Evaluation Scheme | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | L | T | P | C | CIE | | | ESE | Total Marks |
| | | | | | | | | TA | MSE | Total | | |
| 1 | BSC | U18MH101 | Engineering Mathematics - I | 3 | 1 | - | 4 | 10 | 30 | 40 | 60 | 100 |
| 2 | ESC | U18CS102 | Programming for Problem Solving using C | 3 | - | - | 3 | 10 | 30 | 40 | 60 | 100 |
| 3 | BSC | U18CH103 | Engineering Chemistry | 3 | 1 | - | 4 | 10 | 30 | 40 | 60 | 100 |
| 4 | ESC | U18ME104 | Engineering Drawing | 2 | - | 4 | 4 | 10 | 30 | 40 | 60 | 100 |
| 5 | ESC | U18CE105 | Engineering Mechanics | 3 | 1 | - | 4 | 10 | 30 | 40 | 60 | 100 |
| 6 | ESC | U18CS107 | Programming for Problem Solving using C Laboratory | - | - | 2 | 1 | 40 | - | 40 | 60 | 100 |
| 7 | BSC | U18CH108 | Engineering Chemistry Laboratory | - | - | 2 | 1 | 40 | - | 40 | 60 | 100 |
| 8 | MC | U18CH109 | Environmental Studies* | 2 | - | - | - | 10 | 30 | 40 | 60 | 100 |
| 9 | MC | U18EA110 | EAA* : Sports/Yoga/NSS | - | - | 2 | _ | 100 | - | 100 | - | 100 |
| 10 | MC | -- | Induction Programme | - | - | - | - | - | - | - | - | - |
| | | | **Total** | **16** | **3** | **10** | **21** | **240** | **180** | **420** | **480** | **900** |

***Note:*** **L -** Lectures; **T –** Tutorials; **P –** Practicals; **CIE –** Continuous Internal Evaluation; **TA –** Teachers Assessment;
***MSE*** – Mid Semester Examination; **ESE –** End Semester Examination; **EAA –** Extra Academic Activity;
*** indicates mandatory non-credit course**

**Student Contact Hours / Week : 29 (periods/week)**

**Total Credits (C) : 22 Credits**

**KAKATIYA INSTITUTE OF TECHNOLOGY & SCIENCE: WARANGAL-15**

*(An Autonomous Institute under Kakatiya University, Warangal)*

**SCHEME OF INSTRUCTIONS & EVALUATION FOR B.TECH. 4-YEAR DEGREE PROGRAMME**

**BRANCH : B.Tech. – CE / EIE / EEE / ECE/ECI (Stream – II)**

**SEMESTER : SECOND**

| Sl.No | Course Category | Course Code | Course Name | Periods/week | | | Credits | Evaluation Scheme | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | L | T | P | C | CIE | | | ESE | Total Marks |
| | | | | | | | | TA | MSE | Total | | |
| 1 | BSC | U18MH201 | Engineering Mathematics - II | 3 | 1 | - | 4 | 10 | 30 | 40 | 60 | 100 |
| 2 | ESC | U18CS202 | Data Structures through C | 3 | - | - | 3 | 10 | 30 | 40 | 60 | 100 |
| 3 | BSC | U18PH203 | Engineering Physics | 3 | 1 | - | 4 | 10 | 30 | 40 | 60 | 100 |
| 4 | HSMC | U18MH204 | English for Communication | 2 | - | 2 | 3 | 10 | 30 | 40 | 60 | 100 |
| 5 | ESC | U18EE205 | Basic Electrical Engineering | 3 | 1 | - | 4 | 10 | 30 | 40 | 60 | 100 |
| 6 | ESC | U18EE206 | Basic Electrical Engineering Laboratory | - | - | 2 | 1 | 40 | - | 40 | 60 | 100 |
| 7 | ESC | U18CS207 | Data Structures through C Laboratory | - | - | 2 | 1 | 40 | - | 40 | 60 | 100 |
| 8 | BSC | U18PH208 | Engineering Physics Laboratory | - | - | 2 | 1 | 40 | - | 40 | 60 | 100 |
| 9 | ESC | U18ME209 | Workshop Practice | - | - | 2 | 1 | 40 | - | 40 | 60 | 100 |
| 10 | MC | U18EA210 | EAA* : Sports/Yoga/NSS | - | - | 2 | - | 100 | - | 100 | - | 100 |
| | | | **Total** | **14** | **3** | **12** | **22** | **310** | **150** | **460** | **540** | **1000** |

***Note:*** **L -** Lectures; ***T*** **–** Tutorials; **P** – Practicals; **CIE** – Continuous Internal Evaluation; **TA** – Teachers Assessment;
***MSE*** – Mid Semester Examination; ESE – End Semester Examination; EAA – Extra Academic Activity;
*** indicates mandatory non-credit course**

**Student Contact Hours / Week : 29 (periods/week)**

**Total Credits (C) : 22 Credits**

# KAKATIYA INSTITUTE OF TECHNOLOGY & SCIENCE:WARANGAL-15
## DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING
### Semester-wise Structure of Curriculum
### III - Semester [Second year]

| Sl. No | Category | Course Code | Course Title | Hours per week | | | Credits | Evaluation Scheme | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | L | T | P | | CIE | | | ESE | Total Marks |
| | | | | | | | | TA | MSE | Total | | |
| 1 | BSC | U18MH301 | Engineering Mathematics - III | 3 | 1 | - | 4 | 10 | 30 | 40 | 60 | 100 |
| 2 | HSMC | U18TP302 | Soft and Interpersonal Skills | - | - | 2 | 1 | 100 | - | 100 | - | 100 |
| 3 | OE | U18OE303 | Open Elective-I | 3 | - | - | 3 | 10 | 30 | 40 | 60 | 100 |
| 4 | PCC | U18EC304 | Signals & Systems | 3 | - | - | 3 | 10 | 30 | 40 | 60 | 100 |
| 5 | PCC | U18EC305 | Analog Circuits – I | 3 | - | - | 3 | 10 | 30 | 40 | 60 | 100 |
| 6 | PCC | U18EC306 | Switching Theory & Logic Design | 3 | - | - | 3 | 10 | 30 | 40 | 60 | 100 |
| 7 | ESC | U18EE312 | Network Analysis | 3 | - | - | 2 | 10 | 30 | 40 | 60 | 100 |
| 8 | PCC | U18EC308 | Analog Circuits - I Laboratory | - | - | 2 | 1 | 40 | - | 40 | 60 | 100 |
| 9 | OE | U18OE311 | Open Elective-I based Laboratory | - | - | 2 | 1 | 40 | - | 40 | 60 | 100 |
| | | | Total: | **18** | **1** | **6** | **21** | **240** | **180** | **420** | **480** | **900** |

Periods: 25

**Open Elective-I:**

U18OE303A: Object Oriented Programming (CSE)
U18OE303B: Fluid Mechanics & Hydraulic Machines (CE)
U18OE303C: Fundamentals of Mechatronics (ME)
U18OE303D: Web Programming (IT)
U18OE303E: Microprocessors (ECE)
U18OE303F: Strength of Materials (CE)

**Open Elective-I based Laboratory**

U18OE311A: Object Oriented Programming Lab (CSE)
U18OE311B: Fluid Mechanics & Hydraulic Machines Lab (CE)
U18OE311C: Mechatronics Lab (ME)
U18OE311D: Web Programming Lab (IT)
U18OE311E: Microprocessors Lab (ECE)
U18OE311F: Strength of Materials Lab (CE)

**KAKATIYA INSTITUTE OF TECHNOLOGY & SCIENCE: WARANGAL-15**
**DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING**
**Semester-wise Structure of Curriculum**

## IV - Semester [Second year]

| Sl. No | Category | Course Code | Course Title | Hours per week | | | Credits | Evaluation Scheme | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | L | T | P | | CIE | | | ESE | Total Marks |
| | | | | | | | | TA | MSE | Total | | |
| 1 | OE | U18OE401 | Open Elective-II | 3 | 1 | - | 4 | 10 | 30 | 40 | 60 | 100 |
| 2 | HSMC | U18MH402 | Professional English | - | - | 2 | 1 | 100 | - | 100 | - | 100 |
| 3 | PCC | U18EC403 | Electro Magnetic Waves & Transmission Lines | 3 | - | - | 3 | 10 | 30 | 40 | 60 | 100 |
| 4 | PCC | U18EC404 | Analog Circuits - II | 3 | - | - | 3 | 10 | 30 | 40 | 60 | 100 |
| 5 | PCC | U18EC405 | Pulse and Digital Circuits | 3 | - | - | 3 | 10 | 30 | 40 | 60 | 100 |
| 6 | PCC | U18EC406 | Probability& Random Processes | 3 | - | - | 3 | 10 | 30 | 40 | 60 | 100 |
| 7 | PCC | U18EC407 | Digital Design | 3 | - | - | 3 | 10 | 30 | 40 | 60 | 100 |
| 8 | MC | U18MH415 | Essence of Indian Traditional Knowledge | 2 | - | - | - | 10 | 30 | 40 | 60 | 100 |
| 9 | PCC | U18EC408 | Analog Circuits - II Laboratory | - | - | 2 | 1 | 40 | - | 40 | 60 | 100 |
| 10 | PCC | U18EC409 | Pulse and Digital Circuits Laboratory | - | - | 2 | 1 | 40 | - | 40 | 60 | 100 |
| | | | Total | **20** | **1** | **6** | **22** | **250** | **210** | **460** | **540** | **1000** |
| 11 | MC | U18CH416 | Environmental Studies * | 2 | - | - | 0 | 10 | 30 | 40 | 60 | 100 |

* indicates Mandatory Non Credit course for Lateral Entry Students Only Periods: 27

**Open Elective-II**

U18OE401A: Applicable Mathematics (M&H)
U18OE401B: Basic Electronics Engg. (ECE)
U18OE401C: Elements of Mech. Engg. (ME)
U18OE401D: Measurements & Instrumentations (EIE)
U18OE401E: Computers Networks (IT)
U18OE401F: Renewable Energy Resources (EEE)

## U18MH101 ENGINEERING MATHEMATICS- I

**Class:** B.Tech. I-Semester **Branch:** Common to all branches

**Teaching Scheme :**

| L | T | P | C |
|---|---|---|---|
| 3 | 1 | - | 4 |

**Examination Scheme :**

| | |
|---|---|
| Continuous Internal Evaluation | 40 marks |
| End Semester Exam | 60 marks |

**Course Learning Objectives (LOs):**
This course will develop students' knowledge in /on

***LO1*:** *basic concepts such as convergence and divergence of series, tests for convergence of series; limit, continuity, differentiability of a function, mean value theorems, expansion of a function in series*

***LO2* :** *partial differentiation and total differentiation , and maxima & minima of functions of two/several variables*

***LO3* :** *differential equations of first order along with certain applications.*

***LO4* :** *the methods of solving higher order linear differential equations and introduce few applications to engineering problems.*

### UNIT-I (9+3)

**Infinite Series:** Sequences & Series, General properties of series, Series of positive terms, Comparison test, Limit comparison test, Integral test, D'Alembert's Ratio test, Cauchy's $n^{th}$ root test, Alternating series- absolute convergence.

**Differential Calculus (Functions of One Variable):** Limits, Continuity, Differentiability, Rolle's theorem (Physical and algebraic interpretations), Lagrange's mean value theorem (Geometrical interpretation), Cauchy's mean value theorem. Taylor's theorem and Power series representation of functions, Maclaurin's series, Asymptotes and Tracing of Simple Curves.

### UNIT-II (9+3)

**Differential Calculus (Functions of Several Variables):**Partial differentiation, Total differentiation, Change of variables, Application to find Tangent plane and Normal to a surface, Jacobians. Taylor's theorem for function of two variables (without proof), Maximum and minimum values of functions of two variables. Langrage's method of undetermined multipliers. Differentiation under integral sign.

### UNIT-III (9+3)

**Differential Equations of First Order:** Practical approach to differential equations. Formation and solution of differential equation. Solution of first order and first degree differential equation, variables separable form, homogeneous form, reducible to homogeneous form, First order linear equations, Equations reducible to linear equation (Bernoulli's equation), Exact differential equations, Equations reducible to exact form.

**Applications of First Order Differential Equations:** Simple examples of Physical applications (Orthogonal trajectories, RL series circuit problem).

### UNIT-IV (9+3)

**Higher Order Linear Differential Equations with Constant Coefficients:**Linear differential Equations of higher order with constant coefficients, General solution, Complementary function, Particular Integral. Methods of evaluation of particular Integrals. Wronskian, Linear dependence of solutions, Method of Variation of parameters. Cauchy's homogenous linear equation. Applications: Simple examples of RLC series circuit problem.

**Text Books**

1. Grewal, B.S., "Higher Engineering Mathematics", *Khanna Publishers,* Delhi, 43rd edition, 2014.

**Reference Books**

1. Kreyszig E., "Advanced Engineering Mathematics", *John Wiley & Sons, Inc.,* U.K 9th edition, 2013.
2. Shanti Narayan, "Differential Calculus", *S. Chand & Co.*, New Delhi.
3. S.S.Sastry, "Engineering Mathematics", Vol.II ,*Prentice Hall of India*, 3rd edition, 2014.

**Course Learning Outcomes (COs):**

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

***CO1*** : *test the convergence/divergence of a given series t ; understand the basic concepts of limit, continuity, differentiability of a function, and will be able to expand a given function in series .*

***CO2*** : *apply the technique of differentiation under integral sign to solve an integral and find maxima & minima of functions of two/several variables.*

***CO3*** : *solve a given differential equations of first order with boundary conditions and understand the application of differential equations of first order.*

***CO4*** : *solve a given higher order linear differential equation with constant coefficients and Understand few engineering applications.*

**Mapping of the Course Learning Outcomes with Program Outcomes:**

| CO/PO | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **CO1** | 3 | 2 | 1 | - | - | - | - | - | - | - | - | 1 |
| **CO2** | 3 | 3 | 2 | - | - | - | - | - | - | - | - | 1 |
| **CO3** | 3 | 2 | 2 | - | - | - | - | - | - | - | - | 1 |
| **CO4** | 3 | 3 | 2 | - | - | - | - | - | - | - | - | 1 |
| **Avg.** | **3** | **2.5** | **1.75** | **-** | **-** | **-** | **-** | **-** | **-** | **-** | **-** | **1** |

## U18CS102 PROGRAMMING FOR PROBLEM SOLVING USING C

**Class:** B.Tech. I -Semester **Branch:** Common to all branches

**Teaching Scheme :**

| L | T | P | C |
|---|---|---|---|
| 3 | - | - | 3 |

**Examination Scheme :**

| | |
|---|---|
| Continuous Internal Evaluation | 40 marks |
| End Semester Examination | 60 marks |

**Course Learning Objectives (LOs):**
This course will develop students' knowledge in /on
***LO1****: computer fundamentals and concepts of problem solving using structured programming paradigm*
***LO2****: control structures and array operations*
***LO3****: string functions and modular programming concepts*
***LO4****: structures, unions, pointers and files in C programming*

### UNIT-I (9)

**Introduction to Computers:** Block diagram of computer, types of computers, computer languages, problem solving and program development steps, algorithm, flowchart
**Overview of C:** History, basic structure of C program
**Constants, Variables and Data Types:** Character set, C tokens, declaration of variables, symbolic constants and macros
**Operators and Expressions:** Arithmetic, relational, increment, decrement, conditional, logical, bit-wise, special operators, arithmetic expressions, precedence of operators and associativity
**Managing Input and Output Operations:** Reading a character, writing a character, formatted input, formatted output

### UNIT-II (9)

**Decision Making and Branching:** Simple if, if-else, nested–if, else-if ladder, switch, conditional operator, goto statement
**Decision Making** and **Looping:** While, do-while, for statements, nested loops, break and continue statements
**Arrays:** One dimensional array, declaration of one dimensional arrays, initialization of one dimensional arrays, two dimensional arrays, initializing two dimensional arrays, linear search

### UNIT-III (9)

**Character Arrays and Strings:** Reading strings, writing strings, string handling functions, table of strings
**User Defined Functions:** Need of user defined functions, definition of function, return values and their types, function calls, function declaration, category of function, no arguments and no return values, arguments but no return values, arguments with return values, no arguments but returns a value, recursion, storage classes

## UNIT-IV (9)

**Structures and Unions:** Declaring structure variables, accessing structure members, array of structures, structures within structures, unions

**Pointers:** Understanding **pointers**, declaring and initializing pointer variables, pointer expressions, pointers and arrays, pointers and character strings, array of pointers, pointers as function arguments, pointers and structures

**File Management in C:** Defining and opening a file, input and output operations on sequential text files

**Text Books:**


1. E.Balagurusamy, "Programming in ANSIC", *Tata McGraw Hill*, 6th Edn, ISBN-13: 978-1- 25 - 90046 -2, 2012


**Reference Books:**


1. Kerninghan and Ritchie, "The C Programming Language", *Prentice Hall of India*, 2nd Edn., ISBN-13:007-6092003106, 1988
2. A.K.Sharma, "Computer Fundamentals and programming in C", *Universities Press, II edition,* ISBN-9789386235299, 2018.
3. Peter Norton, "Introduction to Computers", *Tata McGraw-Hill*, 6th Edn.,ISBN-978-0-07-0593-74-9. 2008
4. Herbert Schildt, "Complete Reference with C", *Tata McGraw Hill,* 4th Edn., ISBN-13: 9780070411838, 2000
5. Yaswanth Khanetkar, "Let Us C", *BPB Publications*, 13th Edn., ISBN-13: 9788183331630, 2012


**Course Learning Outcomes (COs):**

After completion of the course, the students will be able to,

***CO1***: *draw the block diagram of a computer, enumerate programming development steps, design an algorithm and flow chart for a given application*

***CO2***: *apply logical skills for problem solving using control structures and arrays*

***CO3***: *develop string programs and modular programming with functions*

***CO4***: *implement structures, unions, pointers and files in C programming*

### Mapping of the Course Learning Outcomes with Program Outcomes:

| CO/PO | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **CO1** | 2 | 1 | - | - | - | - | - | 2 | 2 | 1 | 2 | 1 |
| **CO2** | 2 | 2 | 2 | 1 | - | 1 | - | 2 | 2 | 1 | 3 | 1 |
| **CO3** | 3 | 3 | 3 | 2 | 1 | 1 | - | 2 | 2 | 1 | 3 | 1 |
| **CO4** | 3 | 3 | 3 | 3 | 3 | 1 | 1 | 2 | 2 | 1 | 3 | 1 |
| **Avg.** | **2.5** | **2.25** | **2.66** | **2** | **2** | **1** | **1** | **2** | **2** | **1** | **2.75** | **1** |

## U18PH103 / U18PH203 ENGINEERING PHYSICS

**Class**: B.Tech. I / II -Semester

**Branch:** Common to all branches

**Teaching Scheme:**

| L | T | P | C |
|---|---|---|---|
| 3 | 1 | - | 4 |

**Examination Scheme:**

| | |
|---|---|
| **Continuous Internal Evaluation** | 40 Marks |
| **End Semester Exam** | 60 Marks |

**Course Learning Objectives (LOs):**

This course will develop students' knowledge in/on

***LO1**: different types of oscillations with illustrations by mechanical and electrical examples, high frequency sound waves and their applications in various fields*

***LO2**: concepts of interference, diffraction and polarization of light waves and their applications*

***LO3**: concepts and working principles of lasers, fiber optics and their applications in various fields*

***LO4**: basic concepts of quantum mechanics, modern materials and their applications*

### UNIT-I (9+3)

**Oscillations:** Introduction, physical examples of simple harmonic motion- torsional pendulum, physical pendulum, spring-mass systems, loaded beams, two body oscillations; qualitative treatment of free, damped and forced oscillations- resonance, applications to series and parallel resonant circuits, Q-factor.

**Ultrasonics:** Introduction, properties of ultrasonics, production of ultrasonic waves- magnetostriction method and piezo-electric method; detection of ultrasonics, acoustic grating- determination of wavelength of ultrasonics; applications of ultrasonic waves- pulse echo NDT technique (reflection mode).

### UNIT-II (9+3)

**Interference & Diffraction:** Superposition principle, coherence, phase change on reflection, interference of reflected light from uniform thin films- anti reflection coating, Newton's rings in reflected light; applications- determination of wavelength of a monochromatic light and refractive index of a liquid; Michelson's Interferometer, applications- determination of wavelength of a monochromatic light, thickness and refractive index of a thin transparent sheet;

distinction between Fresnel and Fraunhofer class of diffraction, Fraunhofer diffraction at a single slit (phasor method) and a circular aperture, Rayleigh's criterion for resolution; diffraction grating (qualitative)- dispersive power and resolving power of a diffraction grating, determination of wavelength of a monochromatic light using diffraction grating.

**Polarisation:** Polarised light, double refraction, geometry of calcite crystal, Nicol prism, Huygen's explanation (positive and negative crystals)- quarter and half wave plates; production and detection of plane, circularly and elliptically polarized light; applications- optical activity, LCDs.

### UNIT-III (9+3)

**Lasers(Qualitative):** Introduction- difference between conventional and laser light; absorption, spontaneous and stimulated emission, relation among Einstein coefficients; basic principles- population inversion, pumping methods, optical resonator; types of lasers- Ruby, Nd-YAG, He-Ne and $CO_2$ Laser; applications of lasers, holography- introduction, formation and reconstruction of a hologram, applications of holography.

**Fiber Optics(Qualitative):** Introduction, total internal reflection, fiber construction, numerical aperture and acceptance angle; types of optical fibers- step index and graded index, V-number; Fiber drawing- double crucible technique; splicing- fusion & mechanical; power losses in optical fibers- attenuation, dispersion, bending; fiber optic communication system, applications of optical fibers- endoscope, fiber optic sensors (temperature and displacement).

**UNIT-IV (9+3)**

**Elements of Quantum Mechanics:** de-Broglie concept of matter waves- de-Broglie wavelength, properties of matter waves; Schrodinger time-independent wave equation (one dimension)- physical significance of wave function (Max Born interpretation); particle in a box (one dimension)- energy quantization; uncertainty principle- illustration and application to the non-existence of free electron in the nucleus.

**Modern Materials (Qualitative):**

**Magnetic Materials**: Introduction- origin of magnetic moment, Bohr magneton, permeability, magnetization, susceptibility; classification of magnetic materials, applications of magnetic materials- magnetic recording and magnetic memories.

**Superconducting Materials**: Superconductivity- Meissner effect, transition temperature, isotope effect, London's penetration depth; types of superconductors- type-I and type-II superconductors; high $T_c$ superconductors; applications of superconductors.

**Nanomaterials**: Introduction, classification of nanomaterials, surface area to volume ratio, quantum confinement; properties of nanomaterials- physical, chemical, electrical, optical, magnetic and mechanical properties; applications of nanomaterials (in brief); synthesis of nanomaterials- bottom up approach (sol-gel method) and top down approach (ball milling method).

**Text Books:**


1. Bhattacharya and Bhaskaran, "Engineering Physics", *Oxford University Press*, 1/e, ISBN-13: 978-0-19-806542-5, 2013.
2. V. Rajendran, "Engineering Physics", *Mc Graw Hill,* ISBN-13:978-9-35-134295-3, 2013.


**Reference Books:**


1. David Halliday, Robert Resnick and Krane, "Physics Volume I & II", *Wiley India Limited,* 5/e, *ISBN: 978-81-265-1089-4,2014.*
2. R.K. Gaur and S.L.Gupta, "Engineering Physics", *Dhanpath Rai and Sons,* ISBN13-9788189928223, 2013.
3. P.K. Palanisamy,"Engineering Physics", *Scitech Publishers*, 3/e, ISBN: 978 81 83714 487 7, 2013.
4. M. Avadhanulu and Kshirsagar, "A Text Book of Engineering Physics", *S. Chand & Company Ltd,* 10/e, ISBN: 81-219-0817-5, 2013.

**Course Learning Outcomes (COs):**

After completion of the course, the students will be able to,

***CO1***: *determine the time period and frequency of SHM oscillatory system and know the principles and applications of ultrasonics in different fields*

***CO2***: *analyse and apply the concepts of interference, diffraction and polarization phenomena in accurate determination of wavelengths, thicknesses, narrow slit widths, optical activity, etc*

***CO3***: *describe the characteristics and working of lasers, optical fibers and their applications in various fields*

***CO4***: *classify and enumerate the properties of magnetic, superconducting and nanomaterials and know their engineering applications*

**Mapping of the Course Learning Outcomes with Program Outcomes:**

| CO/PO | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **CO1** | 2 | 1 | - | - | 1 | 1 | - | - | 1 | - | - | - |
| **CO2** | 2 | 1 | 1 | 1 | - | 1 | 1 | - | 1 | - | - | - |
| **CO3** | 3 | 1 | 1 | 1 | 2 | 1 | 1 | - | 1 | - | | - |
| **CO4** | 3 | - | 1 | 1 | 1 | 2 | 1 | - | 1 | - | - | - |
| **Avg.** | **2.5** | **1** | **1** | **1** | **1.33** | **1.25** | **1** | **-** | **1** | **-** | **-** | **-** |

## U18CH103 / U18CH203 ENGINEERING CHEMISTRY

**Class:** B.Tech. I / II–Semester

**Branch:** Common to all branches

**Teaching Scheme:**

| L | T | P | C |
|---|---|---|---|
| 3 | 1 | - | 4 |

**Examination Scheme:**

| | |
|---|---|
| **Continuous Internal Evaluation** | 40 Marks |
| **End Semester Exam** | 60 Marks |

**Course Learning objectives(LOs):**
This course will develop students' knowledge in/on
***LO1****: fundamental concepts of electrochemistry, electrochemical cells*
***LO2*** *: corrosion science; phase rule application to various equilibria; I/C engine fuels.*
***LO3*** *: basic spectroscopic techniques of chemical analysis; water analysis, treatment*
***LO4****: basic concepts of organic chemistry; polymerization reactions, versatile applications of polymers*

### UNIT-I (9+3)

**Electrochemistry:** Specific conductance ,equivalent conductance, effect of dilution ; conductometric titrations -acid base titrations, their advantages over conventional methods; electrode potential, Nernst equation, electrochemical series and its applications; calomel electrode , determination of pH using quinhydrone electrode, hydrogen electrode, potentiometric titrations (acid base titrations), commercial cells;lead-acid storage cell ,fuel cells:hydrogen-oxygen fuel cell.

### UNIT-II (9+3)

**Corrosion:** Introduction-corrosion by pure chemical reaction(dry corrosion), electrochemical corrosion(wet corrosion), factors influencing corrosion, prevention methods of corrosion - cathodic protection, hot dipping methods(galvanising,tinning), cladding, electroplating.
**Phase rule:** Description of the terms-'phase', 'component' and 'degrees of freedom'; Gibbs phase rule equation; application of the phase rule to one-component system (water system), two-component system (silver-lead system), Pattinson's process for desilverisation of lead.
**Fuels:** characteristics of fuels for internal combustion engines, knocking , octane number, cetane number, compressed natural gas(CNG), power alcohol.

### UNIT-III (9+3)

**Introduction to Methods of Chemical Analysis:** Introduction to spectroscopy- microwave spectra- theory, application of microwave spectra in the determination of bond length of a diatomic molecule; infra-red spectra, theory, applications- calculation of force constant and identification of functional groups in organic compounds, Lambert-Beer's law and its applications.
**Water Analysis and Treatment:** Hardness of water, determination of hardness of water by using EDTA, determination of alkalinity,determination of fluoride by spectrophotometry, determination of dissolved oxygen, biochemical oxygen demand, chemical oxygen demand, softening of water by ion-exchange process, desalination of brackish
water- reverse osmosis, electrodialysis.

**UNIT-IV (9+3)**

**Organic Chemistry:** Fission of a covalent bond,types of electronic effects- inductive effect, mesomeric effect , reaction intermediates, their stabilities,types of reagents- electrophilic, nucleophilic reagents, mechanisms of nucleophilic substitution($SN^1$and $SN^2$) ; addition (electrophilic, nucleophilic and free radical) reactions .

**Polymers:** Introduction -types of polymerization reactions -addition ,condensation ; mechanism of free radical, cationic and anionic addition polymerization; thermo-setting and thermo plastic resins; conducting polymers and their applications.

**Text Books:**

1. Jain and Jain, "Engineering Chemistry *(16th edn.)*", *Dhanpat Rai Publishing Company,* 2012.

**Reference Books:**

1. J C Kuriacose and J.Rajaram, "Chemistry in Engineering and Technology (vol.I & vol.II)", *Tata Mc.Graw-Hills education private limited*, 2010.
2. Shashi Chawla, "Text book of Engineering Chemistry (3rd edn.)", *Dhanpat Rai Publishers*, 2003.
3. S.S.Dara, S S. Umare, "A Text book of Engineering Chemistry (12th edn.)", *S.Chand & Company Ltd.*, 2010.

**Course Learning Outcomes(COs):**

After completion of this course, students will be able to,

***CO1****: Predict the feasibility of redox reactions , calculate electrode potentials, determine pH of a solution by various potentiometric methods,compare the principles and applications of batteries*

***CO2****: make judicious selection of materials in the field of engineering; apply phase rule in the study of material science; select suitable fuels for internal combustion engines*

***CO3****: calculate molecular parameters using spectroscopic techniques; calculate various quality parameters of water sample,describe softening methods of hard water*

***CO4****: apply the fundamental concepts of organic chemistry; distinguish polymerization reactions and their mechanisms; describe versatile applications of polymers*

## Mapping of the Course Learning Outcomes with Program Outcomes:

| CO/PO | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **CO1** | 2 | 2 | 1 | 1 | 1 | - | 1 | - | 1 | - | - | - |
| **CO2** | 2 | 1 | 2 | 2 | - | 1 | 1 | - | 2 | - | - | - |
| **CO3** | 2 | 1 | 1 | 2 | - | 1 | 1 | - | 2 | - | - | - |
| **CO4** | 1 | - | 1 | 2 | - | 1 | - | - | 2 | - | - | - |
| **Avg.** | **1.75** | **1.33** | **1.25** | **1.75** | **1.00** | **1** | **1** | **-** | **1.75** | **-** | **-** | **-** |

## U18MH104 / U18MH204 ENGISH FOR COMMUNICATION

**Class**: B.Tech. I / II- Semester **Branch:** Common to all branches

**Teaching Scheme :**

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

**Examination Scheme :**

| | | |
|---|---|---|
| Continuous Internal Evaluation | : | 40 marks |
| End Semester Exam | : | 60 marks |

**Course Learning Objectives (LOs):**
This course will develop students' knowledge in / on
***LO1*** **:** *To strengthen grammar and improve language ability to write effectively*
***LO2*** **:** *To enrich vocabulary and use it appropriately to describe situations*
***LO3*** **:** *To master reading skill and sub skills to comprehend the text*
***LO4*** **:** *To acquire listening, speaking and life skills using language laboratory*

### UNIT-I (6)

**Grammar:**

**Clause Analysis**-Types of Clauses-Noun Clause-Relative Clause-Adverb Clause-Transformation –Simple, Complex, Compound Sentences
**Errors**-Nouns-Pronouns-Adjectives-Adverbs-Prepositions-Tenses-Articles-Subject-Verb Agreement
"In Banaras"- from the Stories of My Experiments with Truth-An Autobiography of Mahathma Gandhi

### UNIT-II (6)

**Vocabulary:**

Vocabulary-Antonyms-Synonyms-Prefixes-Suffixes-Phrasal Verbs-One Word Substitutes-Word Pairs
"Education Provides a Solid Foundation"- from Wings of Fire –An Autobiography of APJ Abdul Kalam

### UNIT-III (6)

**Reading Skills:**

"An Astrologer's Day" by R.K.Narayan
"On Saying Please" by A. G. Gardiner

### UNIT-IV (6)

**Writing Skills:**

Precis Writing
Essay Writing
Report Writing

**REFERENCE BOOKS:**


1. Harper Collins, "Cobuild English Grammar" Third Edition, *Harper Collins Publishers Ltd.*
2. Sanjay Kumar & Pushp Lata, "Communication Skills" Second Revised Edition,2015, *Oxford University Press Ltd.*
3. R.K. Narayan," Malgudi Days" Indian Thought Publications,1943
4. APJ Abdul Kalam, "Wings of Fire" An Autobiography, Universities Press,1999
5. Mahatma Gandhi," The Story of My Experiments with Truth" An Autobiography, Global Vision Press,2013

## ENGLISH LANGUAGE LAB

**Listening Skills (3×2):**

Listening to Sounds, Stress and Intonation
Listening for Information

**Life Skills (3×2)**

Etiquette
Goal Setting
Body Language

**Speaking Skills (6×2)**

a. ***Presentation Techniques:***
   Self Introduction
   JAM (Just A Minute)
   Group Discussion
   Debate
   Description
   Interview Skills
b. ***Assignment:***
   Students have to present PPT on the topics given in the English Laboratory

**Course Learning Outcomes (COs):**

After completion of this course, students' will be able to

***CO1*** : *acquire grammar awareness and use error-free language in speech and writing*

***CO2*** : *use appropriate vocabulary to describe various situations*

***CO3*** : *implement a particular reading strategy to comprehend the text*

***CO4*** : *communicate impressively and effectively*

**Mapping of the Course Learning Outcomes with Program Outcomes:**

| CO/PO | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **CO1** | - | 1 | - | 1 | 1 | 1 | 1 | 1 | 1 | 3 | 2 | 1 |
| **CO2** | 1 | 1 | - | - | - | - | 1 | - | 3 | 2 | - | 3 |
| **CO3** | - | 1 | - | - | - | - | - | - | 2 | 2 | 2 | 3 |
| **CO4** | - | 1 | 1 | 1 | - | - | 1 | - | 3 | 2 | 1 | 3 |
| **Avg.** | **1** | **1** | **1** | **1** | **1** | **1** | **1** | **1** | **2.25** | **2.25** | **1.7** | **2.5** |

## U18ME104 / U18ME204 ENGINEERING DRAWING

**Class:** B. Tech. I / II-Semester **Branch:** Common to all branches

**Teaching Scheme :**

| L | T | P | C |
|---|---|---|---|
| 2 | 4 | - | 4 |

**Examination Scheme :**

| | | |
|---|---|---|
| Continuous Internal Evaluation | : | 40 marks |
| End Semester Exam | : | 60 marks |

**Course Learning Objectives (LOs)**:
This course will develop students' knowledge in/on
***LO1****: projections of points and straight lines-I*
***LO2****: projections of straight lines-II and planes.*
***LO3****: projections of solids and sections of solids*
***LO4****: isometric and orthographic projections.*

### UNIT – I (6+12)

**Introduction:** Importance of Engineering Drawing, instruments- uses; Layout of drawing sheets, Types of Lines, Lettering and dimensioning, Construction of regular polygons.
**Projection of Points**: Introduction to orthographic projections-Vertical Plane, Horizontal plane; Views-Front view, Top view and Side view; Projection of Points-different quadrants.
**Projection of Straight lines - I:** Line parallel to both the planes, Line parallel to one plane and perpendicular to the other reference plane, Line parallel to one plane and inclined to the other reference plane.

### UNIT – II (6+12)

**Projection of Straight Lines – II**: Line- inclined to both the planes and Traces.
**Projection of Planes:** Planes - Perpendicular and Oblique planes; Projections of planes - parallel to one of the reference planes, inclined to one of the reference plane and perpendicular to the other; Projections of oblique planes.

### UNIT – III (6+12)

**Projection of Solids:** Types-prisms, pyramids, cylinder and cone; Simple Positions-axis parallel to a reference plane and perpendicular to the other plane, axis parallel to one plane and inclined to other reference plane; axis inclined to both the reference planes.
**Sections of Solids:** Types-prisms and pyramids; Section planes, Sectional views and true shape of a section.

### UNIT – IV (6+12)

**Orthographic projections:** Conversion of isometric views into orthographic views.
**Isometric Projections:** Isometric axis, Isometric Planes, Isometric View, Isometric projection, Construction of isometric view from orthographic views
**AutoCAD**: Introduction to AutoCAD, DRAW tools, MODIFY tools, TEXT, DIMENSION, PROPERTIES tool bar, Standard tool bars, LAYERS; drawing of orthographic and isometric projections in AutoCAD.

**Text Books:**

1. Bhatt N.D., "Elementary Engineering Drawing", *Charotar Publishing House,* Anand, India, 2017.

**Reference Books:**

1. Dhananjay A Jolhe, "Engineering Drawing", *Tata Mc Graw- hill,* 2008.
2. Venugopal K. "Engineering Graphics with Auto CAD", *New Age International Publishers Ltd.*, Hyderabad, 2012.
3. W J Luzadder and J M Duff, "Fundamentals of Engineering Drawing", *Prentice-Hall of India*, 1995.

**Course Outcomes (COs)**:
After completion of the course, the student will be able to,
***CO1****: draw projections of points and straight lines-I.*
***CO2****: draw projections straight lines-II and planes.*
***CO3****: draw solids and sections of solids*
***CO4****: draw projections of solids, orthographic and isometric views using AutoCAD.*

**Mapping of the Course Learning Outcomes with Program Outcomes:**

| CO/PO | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **CO1** | 3 | 2 | 1 | 3 | 1 | - | - | - | - | - | - | 1 |
| **CO2** | 3 | 2 | 1 | 3 | 1 | - | - | - | - | - | - | 1 |
| **CO3** | 3 | 2 | 1 | 3 | 1 | - | - | - | - | - | - | 1 |
| **CO4** | 3 | 2 | 1 | 3 | 1 | - | - | - | - | - | - | 1 |
| **Avg.** | **3** | **2** | **1** | **3** | **1** | - | - | - | - | - | - | **1** |

## U18EE105 / U18EE205 BASIC ELECTRICAL ENGINEERING

**Class:** B.Tech. I / II-Semester **Branch:** Common to all branches

**Teaching Scheme:**

| L | T | P | C |
|---|---|---|---|
| 3 | 1 | - | 4 |

**Examination Scheme:**

| | | |
|---|---|---|
| **Continuous Internal Evaluation** | : | 40 marks |
| **End Semester Exam** | : | 60 marks |

**Course Learning Objectives (LOs)**:

This course will develop students' knowledge in/on

***LO1***: *network elements and analysis of simple electrical DC circuits*

***LO2***: *DC network theorems*

***LO3***: *fundamentals of 1-ϕ and 3-ϕ AC circuits*

***LO4***: *working principles and applications of DC & AC machines, concepts of earthing, fuses, lighting sources, MCB & batteries*

### UNIT – I (9+3)

**DC circuits:** Introduction, network elements, Ohm's law, electric power, electrical energy, Kirchhoff's laws, resistances in series-voltage divider rule; resistances in parallel-current divider rule; series & parallel circuits, mesh analysis, nodal analysis (T & π networks only).

### UNIT – II (9+3)

**DC network theorems (Independent sources only):** Introduction, superposition theorem, Thevenin's theorem, Norton's theorem, maximum power transfer theorem (T and π networks only).

### UNIT – III (9+3)

**1-ϕ AC circuits:** Phasor representation of sinusoidal quantities, average and R.M.S values of sinusoidal wave form, AC through resistor, inductor, capacitor and series R-L-C circuit.

**3-ϕ AC circuits**: Production of 3-ϕ voltages, voltage & current relationships of line and phase values for balanced star and delta connections.

### UNIT – IV (9+3)

**Introduction to electrical machines (Qualitative treatment):** Construction, principle of operation & applications of 1-ϕ transformer, 3-ϕ induction motor, 1-ϕ induction motor and DC motor.

**Electrical earthing, fuses & lighting sources:** Basic concepts of earthing, fuses and lighting sources-incandescent, fluorescent, CFL & LED lamps, Miniature Circuit Breaker(MCB), types of batteries.

**Text Books:**

1. K. Uma Rao, "Basic Electrical Engineering", *Pearson Education,* edn ,2011.

**Reference Books:**

1. B.L.Thereja, A.K.Thereja, "Electrical Technology Vol. I & II", *S.Chand & Company Ltd,* edn , 2005.
2. Edward Hughes, "Electrical & Electronics Technology", *Pearson Education,* 10/e., 2010.
3. D. P. Kothari and I. J. Nagrath, "Basic Electrical Engineering", *Tata McGraw Hill*, edn , 2010.
4. Chakravarthy A, Sudhipanath and Chandan Kumar, "Basic Electrical Engineering", *Tata McGraw Hill Ltd*, edn, 2009.

**Course Outcomes (COs)**:

After completion of the course, the students will be able to,

***CO1****: determine voltage, current & power in electrical circuits using mesh & nodal analysis*

***CO2****: apply suitable DC network theorems to analyze T & π networks*

***CO3****: find current, voltage & power in 1-ϕ & 3 -ϕ AC circuits*

***CO4****: explain construction, working principle & applications of electrical machines; electrical earthing, fuses, lighting sources, MCB & batteries.*

**Mapping of the Course Learning Outcomes with Program Outcomes:**

| CO/PO | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **CO1** | 2 | 1 | - | - | - | - | - | - | - | - | - | - |
| **CO2** | 2 | 2 | - | - | - | - | - | - | - | - | - | - |
| **CO3** | 3 | 3 | 1 | 1 | 1 | | 1 | | | 1 | - | - |
| **CO4** | 3 | 3 | 1 | 1 | 1 | 1 | 1 | 1 | | 1 | - | - |
| **Avg.** | **3** | **3** | **1** | **1** | **1** | **1** | **1** | **1** | | **1** | - | - |

## U18CE105 / U18CE205 ENGINEERING MECHANICS

**Class:** B.Tech. I / II-Semester **Branch :** Common to all branches

**Teaching Scheme :**

| L | T | P | C |
|---|---|---|---|
| 3 | 1 | - | 4 |

**Examination Scheme :**

| | | |
|---|---|---|
| Continuous Internal Evaluation | : | 40 marks |
| End Semester Exam | : | 60 marks |

**Course Learning Objectives (LOs):**
This course will develop students' knowledge in/on
***LO1****: concept of force, principles of force and their application on engineering structures and machines*
***LO2****: various kinds of statically determinate pin jointed structures and methods of analysing the trusses*
***LO3****: importance of geometric centre, cross sectional areas of plane lamina through centroid and moment of inertia*
***LO4****: dynamic behavior of particles in motion subjected to force system.*

### UNIT – I (9+3)

**Laws of Mechanics**: Parallelogram law of forces, triangle law of forces, *Newton's law of gravitation,* law of superposition and transmissibility of forces.
**Force Systems:** Types of forces, co-planar, concurrent and parallel forces, moment and couple, free body diagram, resultant of force systems, resolution of forces, composition of forces, equilibrium equations of forces, Lami's theorem, Varignon's theorem, moment equilibrium equations, types of supports, beams and loadings, statically determinate structures, resultant and equilibrium of general force system.

### UNIT –II (9+3)

**Friction:** Introduction, classification, laws of friction, coefficient of friction, angle of friction, ladder friction and wedge friction.
**Plane Trusses**: Rigid truss, stability and determinacy conditions, basic assumptions for a perfect truss, analysis of trusses by method of joints and method of sections of a cantilever and simply supported statically determinate pin-jointed trusses.

### UNIT– III (9+3)

**Centroid: C**entroid of one dimensional figures, centroid of simple figures from first principles, centroid of composite sections.
**Moment of Inertia:** Moment of inertia of plane sections from first principles, theorems of moment of inertia – parallel axis theorem and perpendicular axis theorem, moment of inertia of standard sections and composite sections.

### UNIT - IV (9+3)

**Kinematics**: Introduction to dynamics, rectilinear motion of a particle – displacement, velocity and acceleration, motion with uniform acceleration and motion with variable acceleration, curvilinear motion- rectangular components, components, acceleration of normal and tangential acceleration, projectile motion.
**Kinetics**: Rectilinear motion-equations of rectilinear motion, equations of dynamic equilibrium, D'Alembert's principle, curvilinear motion-equations of motion in rectangular components, tangential and normal components, equations of dynamic equilibrium, applications of work-energy, impulse –momentum principles of rectilinear motion and curvilinear motion.

**Text Books:**

1. Tayal A.K., "Engineering Mechanics: Statics and Dynamics", *Umesh Publishers,* New Delhi, 14th edn., 2014.

**Reference Books:**

1. Timoshenko S., Young D.H., Rao J.V., and Sukumar Pati, "Engineering Mechanics in SI units", *McGraw Hill Education Pvt. Ltd.,* New Delhi, 5th edn., 2013.
2. Vijaya Kumar Reddy K., Suresh Kumar J. "Singer's Engineering Mechanics Statics and Dynamics" *BS Publications / BSP Books*, 3rd edn. (SI Units), 8th Reprint, 2014.
3. Bhavikatti S.S., "Engineering Mechanics", *New Age International,* New Delhi, 4th edn., 2013 (reprint).
4. Basudeb Bhattacharyya, "Engineering Mechanics", *Oxford University Press*, 9th edn., 2013.

**Course Learning Outcomes (COs):**

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

***CO1****: understand the physical action of forces on the bodies through free body diagrams and analyse the forces using principles of force*

***CO2****: determine the axial forces in members of pin jointed structures subjected to various types of loadings*

***CO3****: understand the technical importance of geometrical shapes using centroid and moment of inertia concepts*

***CO4****: understand equilibrium condition of particles in dynamic condition and can analyse the problems using various applications such as impulse-momentum principle and work energy.*

**Mapping of the Course Learning Outcomes with Program Outcomes:**

| CO/PO | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **CO1** | 3 | 1 | 3 | 2 | -- | 1 | -- | -- | -- | -- | -- | -- |
| **CO2** | 3 | 2 | 3 | 1 | -- | 1 | -- | -- | -- | -- | -- | -- |
| **CO3** | 3 | 1 | 2 | 2 | -- | 1 | -- | -- | -- | -- | -- | 1 |
| **CO4** | 3 | 2 | 3 | 1 | -- | 1 | -- | -- | -- | -- | -- | 1 |
| **Avg.** | **3** | **1.5** | **2.7** | **1.5** | **--** | **1** | **--** | **--** | **--** | **--** | **--** | **1** |

## U18MH201 ENGINEERING MATHEMATICS- II

**Class:** B.Tech. II-Semester **Branch:** Common to all branches

**Teaching Scheme :**

| L | T | P | C |
|---|---|---|---|
| 3 | 1 | - | 4 |

**Examination Scheme :**

| | |
|---|---|
| Continuous Internal Evaluation | 40 marks |
| End Semester Exam | 60 marks |

**Course Learning Objectives (LOs):**
This course will develop students' knowledge in/on
***LO1* :** *various methods of solving system of linear equations and eigen value problem.*
***LO2* :** *double integral , triple integral and their applications.*
***LO3* :** *vector point function and vector differential calculus with few engineering applications.*
***LO4* :** *integration of vector valued functions with few engineering applications.*

### UNIT-I (9+3)

**Matrices:** Elementary transformations on a matrix. To find inverse of a matrix using elementary transformations- Rank of matrix, Normal form of a matrix, Solution of system of homogenous and non homogeneous linear equations, Linear dependence and independence of vectors.
Eigen values and Eigen vectors of a matrix- Cayley Hamilton's theorem, Reduction of a matrix to diagonal form, Reduction of a quadratic form to canonical form.

### UNIT-II (9+3)

**Multiple Integrals and Applications:** Double integral, Change of order of integration, Double integration in polar coordinates, Triple integrals, Applications: Area enclosed by plane curves, Volumes of solids, Calculation of mass, Center of gravity, Moment of Inertia of plane lamina.
Beta and Gama functions and their relations. Evaluation of improper integrals in terms of Beta and Gamma functions.

### UNIT-III (9+3)

**Vector Differential Calculus:** Vector functions - Derivative of a vector function of a scalar variable, Velocity and acceleration, Curves in Space, Tangent, Principal normal, Binormal, Curvature, Torsion of a given curve and Frenet -Serret Formulae.
Scalar and vector point functions, Vector operators – Gradient of a scalar field, Directional derivative, angle between two surfaces.
Divergence of a vector field, Curl of a vector field and their physical interpretations. Irrotational fields & Solenoidal fields.To find scalar potential of a conservative vector field.

### UNIT-IV (9+3)

**Vector Integration:** Integration of vector valued functions of a scalar variable, Application to find velocity and displacement of a particle. Line integral of scalar point and vector point functions, Applications: Work done by a force, Circulation; Surface Integral & Volume integral.
Green's theorem in plane, and area of a plane region using Green's theorem. Stokes theorem & Gauss divergence theorems (without proof).

**Text Books**

1. Grewal, B.S., "Higher Engineering Mathematics", *Khanna Publishers,* Delhi, 43rd edition, 2014.

**Reference Books**

1. Kreyszig E., "Advanced Engineering Mathematics", *John Wiley & Sons, Inc.,* U.K 9th edition, 2013.
2. Spiegel M., "*Vector Analysis -Schaum Series*", McGraw Hill
3. S.S.Sastry, "Engineering Mathematics", Vol.II ,*Prentice Hall of India*, 3rd edition, 2014.

**Course Learning Outcomes (COs):**

After completion of this course, students' will be able to,

***CO1***: *compute inverse of a matrix using elementary transformations, compute rank of a matrix, and to solve a system of linear algebraic equations, to compute characteristic values, characteristic vectors of a given square matrix and reduce a given quadratic form to canonical form*

***CO2*** : *find double integral and triple integral and apply them to find moment of inertia, centre of gravity of plane lamina ; understand Beta and Gama functions and their relations and evaluate an improper integral in terms of Beta and Gamma functions*

***CO3*** : *understand the concept of a vector function and vector differentiation and will be able to find the characteristics of a space curve such as tangent, normal, binormal, curvature and torsion ; understand the concept of gradient , divergence and curl of a vector point function and will be able to apply them to find angle between two surfaces, and scalar potential*

***CO4*** : *find line, surface and volume integrals of vector valued functions and understand Green's theorem, Stokes theorem and Gauss theorem.*

**Mapping of the Course Learning Outcomes with Program Outcomes:**

| CO/PO | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **CO1** | 3 | 2 | 1 | - | - | - | - | - | - | - | - | 1 |
| **CO2** | 3 | 3 | 2 | - | - | - | - | - | - | - | - | - |
| **CO3** | 3 | 2 | 2 | - | - | - | - | - | - | - | - | - |
| **CO4** | 3 | 2 | 2 | - | - | - | - | - | - | - | - | 1 |
| **Avg.** | **3** | **2.5** | **1.75** | **-** | **-** | **-** | **-** | **-** | **-** | **-** | **-** | **0.5** |

## U18CS202 DATA STRUCTURES THROUGH C

**Class:** B. Tech II-Semester **Branch:** All Branches

| Teaching Scheme : | | | |
|---|---|---|---|
| L | T | P | C |
| 3 | - | - | 3 |

| Examination Scheme: | |
|---|---|
| Continuous Internal Evaluation | 40 marks |
| End Semester Examination | 60 marks |

**Course Learning Objectives(LOs):**

This course will develop students' knowledge in/on

***LO1**: fundamental data structures and their usage with arrays*
***LO2**: representing the linear data structures with stacks and queues*
***LO3**: arranging the data using various sorting techniques and representing the data using linked lists*
***LO4**: representing non-linear data structures with trees and graphs*

### UNIT – I (9)

**Introduction to Data Structures:** Basic terminology, classification of data structures, operations on data structures

**Arrays**: Operations on arrays-traversing an array, inserting an element in an array, deleting an element from an array, searching an element using binary search

**Dynamic Memory Allocation:** Memory allocation functions, dynamic memory allocation for single and two dimensional arrays

### UNIT – II (9)

**Stacks:** Introduction to stacks, array representation of stacks, operations on a stack–push and pop; applications of stacks- recursion, evaluation of expressions (infix to postfix conversion, evaluation of postfix expression)

**Queues:** Introduction to queues, array representation of queues, circular queues

### UNIT - III (9)

**Linked Lists**: Basic terminologies, linked list versus arrays, memory allocation and deallocation for a linked list, singly linked list operations- traversing, searching, inserting, deleting, reversing; representing stack and queue using linked list

**Sorting Techniques:** bubble sort, selection sort, quick sort

### UNIT – IV (9)

**(Concepts and algorithms only)**

**Trees**: Introduction, types of trees. **Binary Tree:** Creating a binary tree, traversing a binary tree-preorder, inorder, postorder recursive traversals.

**Binary Search Tree:** Operations- searching for a node in binary search tree, inserting an element into binary search tree.

**Graphs:** Introduction, graph terminology, representation of graphs, graphs traversal methods-breadth first search, depth first search

**Text Book:**

1. Reema Thareja, "Data Structures Using C", *Oxford University Press*, 2nd Edn., ISBN-13: 978-0-19-809930-7, 2014.

**Reference Books:**

1. E.Balagurusamy, "Programming in ANSI-C", *Tata McGraw Hill*, 6th Edn., ISBN-13: 978-1-25-90046-2, 2012.
2. Debasis Samanta, "Classic Data Structures", *Prentice Hall India*, 2nd Edn., ISBN-13: 978-81-203-3731-2, 2009.
3. E Balagurusamy, "Data Structure Using C", *McGraw Hill Education*, 1st Edn., ISBN-13: 978-125-902-9547, 2017.
4. Richard F. Gilberg and Behrouz A. Forouzan, "Data Structures: A Pseudocode Approach with C", *Cengage Learning*, 2nd Edn., ISBN-13: 9788131503140, 2007.

**Course Learning Outcomes(COs):**

After completion of this course, students' will be able to,
***CO1****: implement programs using static & dynamic arrays*
***CO2****: apply the linear data structures with stacks and queues*
***CO3****: arrange the data with the help of various sorting techniques and linked lists*
***CO4****: organize the data using non-linear data structures with trees and graphs*

## Mapping of the Course Learning Outcomes with Program Outcomes:

| CO/PO | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **CO1** | 2 | 1 | - | - | - | - | - | 1 | 2 | 1 | 2 | |
| **CO2** | 2 | 2 | 2 | 1 | - | 1 | - | 1 | 2 | 1 | 3 | |
| **CO3** | 3 | 3 | 3 | 2 | 1 | 1 | - | 1 | 2 | 1 | 3 | 1 |
| **CO4** | 3 | 3 | 3 | 3 | 3 | 1 | 1 | 1 | 2 | 1 | 3 | 1 |
| **Avg.** | **2.5** | **2.25** | **2.66** | **2** | **2** | **1** | **1** | **1** | **2** | **1** | **2.75** | **1** |

## U18EE106 / U18EE206 BASIC ELECTRICAL ENGINEERING LABORATORY

**Class:** B.Tech. I / II-Semester **Branch:** Common to all branches

**Teaching Scheme:**

| L | T | P | C |
|---|---|---|---|
| - | - | 2 | 2 |

**Examination Scheme:**

| | | |
|---|---|---|
| **Continuous Internal Evaluation** | : | 40 marks |
| **End Semester Exam** | : | 60 marks |

**Course Learning Objectives (LOs):**
This course will develop students' knowledge in/on
***LO1***: *domestic wiring & basic electrical installations*
***LO2***: *network elements and analysis of electrical circuits*
***LO3***: *1-phase and 3-phase AC circuits*
***LO4***: *measurement of illumination*

**List of Experiments**

1. Verification of Kirchhoff's Laws
2. Verification of voltage divider rule and current divider rule
3. Verification of Thevenin's theorem
4. Verification of Norton's theorem
5. Verification of Superposition theorem
6. Verification of Maximum power transfer theorem
7. Determination of internal parameters of a choke coil
8. Impedance calculations and phasor representation of R-L series circuit
9. Impedance calculations and phasor representation of R-C series circuit
10. Load test on 1-phase transformer
11. Voltage and current relationships between line & phase quantities for balanced 3-phase star & delta connections
12. Measurement of illumination for various lighting sources

** DEMONSTRATION OF ELECTRICAL INSTALLATIONS **

[Wires, Cables, Fuse, MSB, Batteries, Earthing]

**Text Books:**
1. User manual prepared by the department of Electrical & Electronics Engineering, KITSW.

**Course Outcomes (COs)**:
After completion of the course, the students will be able to
***CO1***: *handle basic electrical equipments*
***CO2***: *understand the concepts of network elements and theorems*
***CO3***: *understand fundamental concepts of 1-phase and 3-phase AC circuits*
***CO4***: *determine illumination of various lighting sources*

**Mapping of the Course Learning Outcomes with Program Outcomes:**

| CO/PO | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **CO1** | 2 | 2 | 1 | 1 | 1 | 1 | - | - | 2 | 2 | 1 | 2 |
| **CO2** | 2 | 1 | - | 1 | - | 1 | - | - | 2 | 1 | 1 | 1 |
| **CO3** | 2 | 2 | 2 | 2 | 1 | 1 | 1 | - | 2 | 1 | 2 | 1 |
| **CO4** | 2 | 1 | 1 | 2 | 1 | 1 | 1 | - | 2 | 1 | 1 | 1 |
| **Avg.** | **2** | **1.5** | **1.3** | **1.5** | **1** | **1** | **1** | **-** | **2** | **1.2** | **1.2** | **1.2** |

## U18CS107 PROGRAMMING FOR PROBLEM SOLVING USING C LAB

**Class:** B.Tech. I- Semester **Branch:** Common to all branches

**Teaching Scheme :**

| L | T | P | C |
|---|---|---|---|
| - | - | 2 | 1 |

**Examination Scheme :**

| | |
|---|---|
| Continuous Internal Evaluation | 40 marks |
| End Semester Examination | 60 marks |

**Course Learning Objectives (LOs):**
This course will develop students' knowledge in / on
***LO1*** *: the operators and decision making statements*
***LO2*** *: loop techniques and array operations for problem solving*
***LO3*** *: string functions and modular programming approach for problem solving*
***LO4*** *: structures, unions, pointers and files*

### LIST OF EXPERIMENTS

1. Programs using input output functions, operators (arithmetic, relational and conditional)
2. Programs using operators (bit-wise, logical, increment and decrement)
3. Programs using conditional control structures: if, if-else, nested if
4. Programs using else if ladder, switch and goto
5. Programs using loop control structures: while
6. Programs using loop control structures: do-while and for
7. Programs on one dimensional array and two dimensional arrays
8. Programs on string handling functions
9. Programs on different types of functions, parameter passing using call-by-value, call-by-reference, recursion and storage classes
10. Programs using structures, unions, pointers to arrays and pointers to strings
11. Programs using array of pointers and pointers to structures
12. File operations and file handling functions for sequential file

**Laboratory Manual:**

1. Programming in C Lab Manua, prepared by faculty of Computer Science & Engineering, KITSW

**Reference Books:**


1. E.Balagurusamy, "Programming in ANSIC", *Tata McGraw Hill*, 6th Edn, ISBN-13: 978-1- 25 - 90046 -2, 2012
2. Kerninghan and Ritchie, "The C Programming Language", *Prentice Hall of India*, 2nd Edn., ISBN-13:007-6092003106, 1988
3. Herbert Schildt, "Complete Reference with C", *Tata McGraw Hill,* 4th Edn., ISBN-13: 9780070411838, 2000
4. Yaswanth Kkanetkar, "Let Us C", *BPB Publications*, 13th Edn., ISBN-13: 9788183331630, 2012

**Course Learning Outcomes (COs):**

After completion of the course, the students will be able to
***CO1*** *: write programs using operators and decision making statements*
***CO2*** *: use the loops and array operations for a given application*
***CO3*** *: implement string programs and apply modular programming techniques*
***CO4*** *: develop programs using structures, unions, pointers and files*

## Mapping of the Course Learning Outcomes with Program Outcomes:

| CO/PO | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **CO1** | 2 | 1 | - | 1 | - | - | - | 1 | 2 | 1 | 2 | 1 |
| **CO2** | 2 | 2 | 2 | 1 | - | 1 | - | 1 | 2 | 1 | 3 | 1 |
| **CO3** | 3 | 3 | 3 | 2 | 1 | 1 | - | 1 | 2 | 1 | 3 | 1 |
| **CO4** | 3 | 3 | 3 | 3 | 3 | 1 | 1 | 1 | 2 | 1 | 3 | 1 |
| **Avg.** | **2.5** | **2.25** | **2.66** | **1.75** | **2** | **1** | **1** | **1** | **2** | **1** | **2.75** | **1** |

## U18PH108 / U18PH208 ENGINEERING PHYSICS LABORATORY

**Class:** B.Tech. I / II-Semester **Branch:** Common to all branches

**Teaching Scheme:**

| L | T | P | C |
|---|---|---|---|
| - | - | 2 | 1 |

**Examination Scheme:**

| | |
|---|---|
| **Continuous Internal Evaluation** | 40 Marks |
| **End Semester Exam** | 60 Marks |

**Course Learning Objectives (LOs):**
This laboratory course will develop students' knowledge in/on

***LO1***: *determination of various properties like rigidity modulus, moment of inertia, acceleration due to gravity and other elastic properties from SHMs*

***LO2***: *determination of the wavelengths, diameters of thin wires, limit of resolution and optical activity with high degree of accuracy from interference, diffraction and polarization phenomena using conventional light*

***LO3***: *determination of the wavelengths, slit widths with high degree of accuracy from diffraction phenomena using laser light*

***LO4***: *determination of optical fiber characteristics*

### LIST OF EXPERIMENTS

1. Determination of (a) rigidity modulus of a given wire and (b) moment of inertia of a ring using torsional pendulum
2. Acceleration due to gravity (g) by compound pendulum
3. Determination of force constant of a spiral spring using static method
4. Determination of wavelengths in mercury light using diffraction Grating- Normal incidence method
5. Determination of wavelength of He-Ne laser using reflection grating
6. Resolving power of a telescope
7. Determination of slit width using He-Ne laser
8. Dispersive power of a prism using spectrometer
9. Determination of wavelength of a monochromatic light using Newton's rings
10. Determination of thickness of thin wire using wedge method
11. Determination of specific rotation of sugar solution using Polarimeter (Saccharimeter)
12. Numerical Aperture of an Optical fiber

**Laboratory Manual:**

1. Manual for "Engineering Physics Laboratory" *prepared by the Department of Physical Sciences/Physics,* KITSW

**Reference Book:**

1. C.V.Madhusudhana Rao and V. Vasanth Kumar, "Engineering Lab Manual", *Scitech publications India Pvt. Ltd,* 3/e, 2012.

**Course Learning Outcomes (COs):**
After completion of this course, students will be able to
***CO1***: *measure precisely the values of elastic properties, moments of inertia, acceleration due to gravity, etc*
***CO2***: *make precise measurements of wavelengths, diameter of thin wires, limit of resolution and optical rotation from light phenomena (Interference, diffraction and polarization)*
***CO3***: *measure wavelengths, slit widths from diffraction patterns using laser light*
***CO4***: *measure numerical aperture, acceptance angle and fiber losses of optical fibers*

**Mapping of the Course Learning Outcomes with Program Outcomes:**

| CO/PO | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **CO1** | 1 | - | - | 3 | - | - | 2 | - | 2 | - | - | - |
| **CO2** | 1 | - | - | 3 | - | - | 2 | - | 2 | - | - | - |
| **CO3** | 1 | - | - | 3 | - | - | 2 | - | 2 | - | - | - |
| **CO4** | 2 | - | 1 | 3 | - | - | 2 | - | 2 | - | - | - |
| **Avg.** | **1.25** | **-** | **1** | **3** | **-** | **-** | **2** | **-** | **2** | **-** | **-** | **-** |

## U18CH108 / U18CH208 ENGINEERING CHEMISTRY LABORATORY

**Class:** B.Tech. I / II-Semester **Branch:** Common to all branches

**Teaching Scheme:**

| L | T | P | C |
|---|---|---|---|
| - | - | 2 | 1 |

**Examination Scheme:**

| | |
|---|---|
| Continuous Internal Evaluation | 40 Marks |
| End Semester Exam | 60 Marks |

**Course Learning Objectives(LOs):**

This course will develop students knowledge in /on

***LO1****: water analysis techniques*

***LO2****: estimation of metals from their ores; concepts of adsorption*

***LO3****: instrumentation methods of chemical analysis*

***LO4****: saponification/acid value of an oil*

**LIST OF EXPERMENTS:**

1. Determination of alkalinity of test sample of water
2. Estimation of available chlorine in test sample of bleaching powder
3. Determination of hardness of water by using complexometric method
4. Determination of calcium in lime stone / dolomite
5. Estimation of cupric ions in the test solution
6. Adsorption of an acid on charcoal -applicability of adsorption isotherm
7. Synthesis of a polymer
8. Conductometric titrations
9. Potentiometric titrations
10. Colorimetric analysis-verification of Lambert-Beer's law
11. Estimation of metal ion using ion-exchange resin
12. Determination of saponification / acid value of an oil

**Course Learning Outcomes (COs):**

After completion of this course, students will be able to,

*CO1: determine water quality parameters - alkalinity, hardness*

*CO2: estimate metals from their ores*

*CO3: handle analytical instruments for chemical analysis*

*CO4: measure saponification / acid value of an oil*

**Mapping of the Course Learning Outcomes with Program Outcomes:**

| CO/PO | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **CO1** | 2 | - | 1 | 3 | - | 1 | 2 | - | 2 | - | - | - |
| **CO2** | 2 | - | 1 | 3 | - | - | 2 | - | 2 | - | - | - |
| **CO3** | 2 | - | 1 | 3 | - | - | 3 | - | 2 | - | - | - |
| **CO4** | 2 | - | 1 | 3 | - | - | 1 | - | 2 | - | - | - |
| **Avg.** | **2** | **-** | **1** | **3** | **-** | **1** | **2** | **-** | **2** | **-** | **-** | **-** |

## U18CS207 DATA STRUCTURES THROUGH C LABORATORY

**Class**: B. Tech II-Semester

**Branch**: All Branches

**Teaching Scheme:**

| L | T | P | C |
|---|---|---|---|
| - | - | 2 | 1 |

**Examination Scheme:**

| | |
|---|---|
| Continuous Internal Evaluation | 40 marks |
| End Semester Examination | 60 marks |

**Course Learning Objectives(LOs):**

This course will develop student's knowledge in/on

***LO1***: *implementing array operations*
***LO2***: *organizing the data using stacks and queues*
***LO3***: *different types of sorting techniques*
***LO4***: *memory and data management using linked list*

**List of Experiments**

**Experiment-I**

1. Program to implement initialization of array and traversal operation
2. Program to implement insertion operation on array

**Experiment-II**

3. Program to implement searching operations on array
4. Program to implement deletion operations on array

**Experiment-III**

5. Program to display the count of occurrences of every number in an array
6. Program to represent and display the sparse matrix

**Experiment-IV**

7. Program to implement initialization of arrays and traversal operation with DMA
8. Program to implement matrix addition and subtraction with DMA

**Experiment-V**

9. Program to implement matrix multiplication with DMA
10. Program to implement stack operations

**Experiment-VI**

11. Program to convert infix expression into postfix
12. Program to evaluate given postfix expression

**Experiment-VII**

13. Program to implement queue operations using arrays

**Experiment-VIII**

14. Program to create single linked list and implement its operations
    i) insert ii) traversal iii) search

**Experiment-IX**

15. Program to create single linked list and implement its operations
    i) delete ii) reversal

**Experiment-X**

16. Program to implement stack operations using linked list
17. Program to implement queue operations using linked list

**Experiment-XI**

18. Program to implement bubble sort
19. Program to implement selection sort

**Experiment-XII**

20. Program to implement quick sort

**Laboratory Manual:**

1. 'Data Structures Using C' laboratory manual, *prepared by faculty of Dept. of Computer Science &Engineering.*

**Reference Books:**


1. Reema Thareja, "Data Structures Using C", *Oxford University Press*, 2nd Edn., ISBN-13: 978-0-19-809930-7, 2014.
2. E.Balagurusamy, "Programming in ANSI-C", *Tata McGraw Hill*, 6th Edn., ISBN-13: 978-1-25-90046-2, 2012.
3. E Balagurusamy, "Data Structure Using C", *McGraw Hill Education*, 1st Edn., ISBN-13: 978-125-902-9547, 2017.


**Course Learning Outcomes(COs):**

After completion of this course, students will be able to,

***CO1***: *implement the fundamental data structures using C-language*
***CO2***: *develop programs using liner data structures (stacks, queues)*
***CO3***: *develop programs arranging the data using various sorting techniques*
***CO4***: *develop program using linked representation*

## Mapping of the Course Learning Outcomes with Program Outcomes:

| CO/PO | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **CO1** | 2 | 1 | - | - | - | - | - | 1 | 2 | 1 | 2 | 1 |
| **CO2** | 2 | 2 | 2 | 1 | - | 1 | - | 1 | 2 | 1 | 3 | 1 |
| **CO3** | 3 | 3 | 3 | 2 | 1 | 1 | - | 1 | 2 | 1 | 3 | 1 |
| **CO4** | 3 | 3 | 3 | 3 | 3 | 1 | 1 | 1 | 2 | 1 | 3 | 1 |
| **Avg.** | **2.5** | **2.25** | **2.66** | **2** | **2** | **1** | **1** | **1** | **2** | **1** | **2.75** | **1** |

## U18ME109 / U18ME209 WORKSHOP PRACTICE

**Class:** B. Tech. I / II-Semester **Branch:** Common to all branches

**Teaching Scheme :**

| L | T | P | C |
|---|---|---|---|
| - | - | 2 | 1 |

**Examination Scheme :**

| | |
|---|---|
| Continuous Internal Evaluation : | 40 marks |
| End Semester Exam : | 60 marks |

**Course Learning Objectives (LOs):**

This course will develop students' knowledge in/on

***LO1***: *preparation of various joints in carpentry*
***LO2***: *preparation of mould cavity using single and two piece pattern*
***LO3***: *preparation of joints using fitting and plumbing*
***LO4***: *operation of arc welding, gas welding and soldering*

**LIST OF EXPERIMENTS**

**Carpentry**:

1. Prepare a cross half lap joint
2. Prepare a half lap dovetail joint
3. Prepare mortise and tenon joint

**Foundry:**

1. Prepare a sand mould using single piece pattern-bracket
2. Prepare a sand mould using two piece pattern-dumbbell

**Fitting:**

1. Prepare a square fit.
2. Prepare a half round fit.

**Plumbing:**

1. Prepare a PVC Pipe joint using elbows & tee
2. Prepare a PVC Pipe joint using union & coupling

**Welding:**

1. Prepare a single V – Butt Joint using Arc welding
2. Preparation of pipe joint using gas welding
3. Soldering and de-soldering of Resistor in PCB.

**Text Books:**

1. Hajra Choudhury S.K., Hajra Choudhury A.K. and Nirjhar Roy ., "Elements of Workshop Technology, Vol-I-2008 &Vol-II-2010", *Media Promoters and publishers Pvt. Ltd,* India.

**Reference:**

1. Engineering Workshop Practice manual, Department of Mechanical Engineering, KITSW, 2018.

**Course Learning Outcomes (COs):**

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

***LO1***: *prepare various joints in carpentry trade*
***LO2***: *prepare a mould cavity using single and two piece pattern*
***LO3***: *perform various joints in fitting and plumbing trade*
***LO4***: *weld metals using arc welding, gas welding and soldering*

**Mapping of the Course Learning Outcomes with Program Outcomes:**

| CO/PO | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **CO1** | 3 | 2 | 1 | 3 | 1 | 1 | 1 | - | - | - | - | 1 |
| **CO2** | 3 | 2 | 1 | 3 | 1 | 1 | 1 | - | - | - | - | 1 |
| **CO3** | 3 | 2 | 1 | 3 | 1 | 1 | 1 | - | - | - | - | 1 |
| **CO4** | 3 | 2 | 1 | 3 | 1 | 1 | 1 | - | - | - | - | 1 |
| **Avg.** | **3** | **2** | **1** | **3** | **1** | **1** | **1** | **-** | **-** | **-** | **-** | **1** |

## U18CH109 / U18CH209 ENVIRONMENTAL STUDIES

**Class**: B.Tech, I / II-Semester **Branch:** Common to all branches

**Teaching Scheme :**

| L | T | P | C |
|---|---|---|---|
| 2 | - | - | 2 |

**Examination Scheme :**

| | |
|---|---|
| Continuous Internal Evaluation : | 40 marks |
| End Semester Exam : | 60 marks |

**Course Learning objectives (LOs):**
This course will develop students' knowledge in/on
*LO1*: *necessity to use natural resources more equitably*
*LO2* : *concepts of ecosystem and the importance of biodiversity conservation*
*LO3* : *causes, effects and control measures of various environmental issues*
*LO4* : *issues involved in enforcement of environmental legislation*

### UNIT-I (6)

**Introduction -** The multidisciplinary nature of environmental studies - definition, scope and importance.
**Natural Resources: Forest Resources -** Use and over–exploitation of forests, deforestation, timber extraction, mining, dams - their effects on forests and tribal people; **Water Resources -** Use and over-utilization of surface and ground water, floods, drought, conflicts over water; **Mineral Resources -** Environmental effects of extracting and using mineral resources; **Agricultural Land -** Land as a resource, land degradation, soil erosion and desertification; **Food Resources** - World food problems, effects of modern agriculture, fertilizer-pesticide problems, water logging and salinity; **Energy Resources -** Renewable and non-renewable energy sources, use of alternate energy sources.

### UNIT-II (6)

**Ecosystem and Biodiversity: Ecosystem -** Concepts of an ecosystem, food chain, food webs, ecological pyramids, energy flow in the ecosystem and ecological succession;
**Biodiversity and its Conservation –** Introduction, definition, genetic, species and ecosystem diversity, value of biodiversity, biodiversity in India, hot spots of biodiversity, man-wildlife conflicts, endangered and endemic species of India, in-situ and ex-situ conservation.

### UNIT-III (6)

**Environmental Pollution:** Global climatic change, green house gases, effects of global warming, ozone layer depletion; International conventions/protocols - Earth summit, Kyoto protocol and Montreal protocol; causes and effects of air, water, soil, marine and noise pollution with case studies; solid and hazardous waste management, effects of urban industrial and nuclear waste; natural disaster management - flood, earthquake, cyclone and landslides.

### UNIT-IV (6)

**Social Issues and the Environment**: **Role of Individual and Society** - Role of individual in prevention of pollution, water conservation, Rain water harvesting and watershed management; **Environmental Protection / Control Acts** - Air (Prevention and control of Pollution) Act- 1981, water (Prevention and Control of Pollution ) Act-1974, water Pollution Cess Act-1977, Forest conservation Act (1980 and 1992), wildlife Protection Act 1972 and environment protection Act 1986, issues involved in enforcement of environmental legislations; **Human Population and Environment** - Population growth, family welfare programmes, women and child welfare programmes, role of information technology in environment and human health.

**TEXT BOOKS:**

1.Erach Bharucha, "Text Book of Environmental Studies for Under Graduate Courses (2nd edn.)", *Universities Press (India) Private Limited,* 2013.

**REFERENCE BOOKS:**

1. Y. Anjaneyulu, "Introduction to Environmental Science", *B.S. Publications*, 2004.
2. Gilbert M. Masters, "Introduction to Environmental Engineering & Science ", *Prentice Hall of India,*Third Edition,1991.
3. Anubha Kaushik, C.P. Kaushik, "Environmental Studies", 4/e, *New Age International Publishers,* 2014.
4. R.Rajagopalan, "Environmental Studies from crisis to cure", *Oxford University Press*, Second Edition, 2011.

**Course Learning Outcomes(COs):**

After completion of this Course, the student will be able to…

***CO1*** : *investigate any environmental issue using an interdisciplinary framework*

***CO2*** : *formulate an action plan for sustainable alternatives and conserving biodiversity that integrates science, humanist, social and economic perspective*

***CO3*** : *identify and explain the complexity of issues and processes which contribute to an environmental problem*

***CO4*** : *participate effectively in analysis and problem-solving through knowledge in environmental legislations*

**Mapping of the Course Learning Outcomes with Program Outcomes:**

| CO/PO | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **CO1** | 2 | 1 | 2 | 1 | - | 2 | 1 | - | 1 | - | - | - |
| **CO2** | - | - | 2 | - | - | 1 | 2 | - | 1 | - | - | - |
| **CO3** | 1 | 2 | 1 | - | - | 1 | 2 | 1 | 1 | - | - | - |
| **CO4** | - | - | 1 | - | - | 1 | 2 | - | 1 | - | - | - |
| **Avg.** | **1.5** | **1.5** | **1.5** | **1** | **-** | **1.25** | **1.75** | **1** | **1** | **-** | **-** | **-** |

**U18EA110 / U18EA210 EAA: SPORTS/YOGA/NSS**

**Class:** B. Tech. I-Semester **Branch:** Common to all branches

**Teaching Scheme :**

| L | T | P | C |
|---|---|---|---|
| - | - | - | - |

**Examination Scheme :**

| | |
|---|---|
| Continuous Internal Evaluation : | |
| End Semester Exam : | |

## I. SPORTS

**Course Learning objectives (LOs):**
***LO1***: *to perform and engage in a variety of physical activities*
***LO2*** : *to develop and maintain physical health and fitness through regular participation in physical activities*
***LO3*** : *to demonstrate positive self esteem, mental health and physiological balance through body awareness and control*
***LO4*** : *to exhibit the spirit of fair play, team work and sportsmenship*

**Activities related to:**

1. Physical Fitness
2. Games & Sports

## II. NATIONAL SERVICE SCHEME (NSS)

**Course Learning objectives (LOs):**
The objectives of the NSS is to
***LO1***: *arouse the social consciousness of the students*
***LO2*** : *provide them with opportunity to work with people in villages and slums*
***LO3*** : *expose them to the reality of life*
***LO4*** : *bring about a change in their social perceptions*
***LO5*** : *develop competence required for responsibility sharing and team work*

**List of Activities:**

1. Shramadanam
2. Tree Plantation
3. General Medical camps in Villages
4. Awareness on Eye Donation
5. Awareness on "Child Labour and Child Marriages"
6. Awareness programs on " Literacy, Good Health Practices, etc."
7. Safe Riding Program
8. Awareness program on "RTI Act"
9. Awareness on Blood Donation

**Course Learning Outcomes (COs):**
After completion of the course, the student will be able to
***CO1***: *develop his/her personally through community service rendered*
***CO2*** : *apply their education to find solutions to individual and community problems*
***CO3*** : *acquire capacity to meet emergencies and natural disasters*
***CO4*** : *acquire a democratic attitude, leadership qualities and practice national integration*

# KAKATIYA INSTITUTE OF TECHNOLOGY & SCIENCE:WARANGAL-15
## DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING
### Semester-wise Structure of Curriculum
### III - Semester [Second year]

| Sl. No | Category | Course Code | Course Title | Hours per week | | | Credits | Evaluation Scheme | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | L | T | P | | CIE | | | ESE | Total Marks |
| | | | | | | | | TA | MSE | Total | | |
| 1 | BSC | U18MH301 | Engineering Mathematics - III | 3 | 1 | - | 4 | 10 | 30 | 40 | 60 | 100 |
| 2 | HSMC | U18TP302 | Soft and Interpersonal Skills | - | - | 2 | 1 | 100 | - | 100 | - | 100 |
| 3 | OE | U18OE303 | Open Elective-I | 3 | - | - | 3 | 10 | 30 | 40 | 60 | 100 |
| 4 | PCC | U18EC304 | Signals & Systems | 3 | - | - | 3 | 10 | 30 | 40 | 60 | 100 |
| 5 | PCC | U18EC305 | Analog Circuits – I | 3 | - | - | 3 | 10 | 30 | 40 | 60 | 100 |
| 6 | PCC | U18EC306 | Switching Theory & Logic Design | 3 | - | - | 3 | 10 | 30 | 40 | 60 | 100 |
| 7 | ESC | U18EE312 | Network Analysis | 3 | - | - | 2 | 10 | 30 | 40 | 60 | 100 |
| 8 | PCC | U18EC308 | Analog Circuits - I Laboratory | - | - | 2 | 1 | 40 | - | 40 | 60 | 100 |
| 9 | OE | U18OE311 | Open Elective-I based Laboratory | - | - | 2 | 1 | 40 | - | 40 | 60 | 100 |
| | | | Total: | **18** | **1** | **6** | **21** | **240** | **180** | **420** | **480** | **900** |

Periods: 25

**Open Elective-I:**

U18OE303A: Object Oriented Programming (CSE)
U18OE303B: Fluid Mechanics & Hydraulic Machines (CE)
U18OE303C: Fundamentals of Mechatronics (ME)
U18OE303D: Web Programming (IT)
U18OE303E: Microprocessors (ECE)
U18OE303F: Strength of Materials (CE)

**Open Elective-I based Laboratory**

U18OE311A: Object Oriented Programming Lab (CSE)
U18OE311B: Fluid Mechanics & Hydraulic Machines Lab (CE)
U18OE311C: Mechatronics Lab (ME)
U18OE311D: Web Programming Lab (IT)
U18OE311E: Microprocessors Lab (ECE)
U18OE311F: Strength of Materials Lab (CE)

## U18MH301 ENGINEERING MATHEMATICS- III

**Class:** B. Tech. III-Semester **Branch:** Common to all branches

**Teaching Scheme :**

| L | T | P | C |
|---|---|---|---|
| 3 | 1 | - | 4 |

**Examination Scheme :**

| | |
|---|---|
| Continuous Internal Evaluation | 40 marks |
| End Semester Exam | 60 marks |

**Course Learning Objectives (LOs):**
This course will develop students' knowledge in /on

***LO1***: *Laplace transform and its use to find the solutions of certain initial and boundary value problems in engineering*

***LO2***: *Fourier series and its application to solve engineering problems*

***LO3***: *functions of complex variables, the property of analyticity of a function of complex variable and their applications*

***LO4***: *integration of a function of complex variable, evaluation of certain real integrals using complex analysis*

### UNIT-I (9+3)

**Laplace Transforms:** Integral transforms, Kernel of a transform, Laplace transform of a function, Inverse Transform-Existence and uniqueness of Laplace Transforms, S- plane and region of convergence (ROC), Laplace Transform of some commonly used signals- Dirac-delta (impulse) function $[\delta(t)]$,step $[u(t)]$,ramp $[tu(t)]$,parabolic $[t^2u(t)]$,real exponential $[e^{at}u(t)]$, complex exponential $[e^{j\Omega t}u(t)]$, sine and cosine functions, damped sine and cosine functions, hyperbolic sine and cosine functions, damped hyperbolic sine and cosine functions, rectangular pulse and triangle. Properties of Laplace Transforms- Linearity, First shifting theorem (Frequency shift property), Laplace transforms of derivatives and integrals, time scaling property, time reversal property, Laplace Transform of Heaviside unit step function, Second shifting theorem (time shift property), Initial value and final value theorems, Laplace transform of periodic functions- Convolution theorem.

**Operational Calculus:** Transfer functions, Solution of ordinary differential equations with constant coefficients and system of ordinary differential equations with constant coefficients using Laplace Transforms. Application of Laplace transforms to the first order and second order system subjected to impulse, step, periodic, rectangular, square, ramp, triangular and sinusoidal functions.

### UNIT-II (9+3)

**Fourier Series:** Periodic functions, orthogonal and orthonormal functions and systems of orthogonal functions, representation of a function as Trigonometric Fourier series (FS) in a range of length 2π, Euler formulae, Conditions for the existence of Fourier series (Dirichlet's conditions), FS for typical wave forms-square wave, pulse train, impulse train(comb function), periodic rectangular wave, triangle, saw tooth, half wave rectified signal, full wave rectified signal, plotting FS coefficients - line spectrum (magnitude and Phase spectra), Fourier series on an arbitrary period, effects of symmetry of function on FS coefficients, half range series – half range cosine and sine series expansions, exponential FS .

### UNIT-III (9+3)

**Complex Variables:** Functions of complex variables, Limit, Continuity, Differentiability, Analytic Functions, Cauchy-Riemann Equations in Cartesian and Polar coordinates. Elementary functions, Harmonic Functions, Construction of Analytic functions. Applications to find

velocity potential and stream function of a flow, conformal mapping and bilinear transformation.

**UNIT-IV (9+3)**

**Complex Integration:** Line integration in complex plane, integral of a non analytic function, dependence on path of integration, *ML*-Inequality, Cauchy's integral theorem, Cauchy's integral formula, series expansion of complex functions: Taylor's series and Laurent's series, zeros and singularities, residues, Residue Theorem- Applications of Residue theorem to the properly chosen integrals around a unit circle and semi circle.

**Text Books:**

1. Grewal, B.S., "Higher Engineering Mathematics", *Khanna Publishers,* Delhi, 43/e, 2014.

**Reference Books:**

1. Kreyszig E., "Advanced Engineering Mathematics", *John Wiley & Sons, Inc.,* U.K, 9/e, 2013.
2. Churchill R.V., "Complex Variable and its Applications", McGraw Hill, New York, 9/e, 2013.

## Course Outcomes (COs):

| Course Code: **U18MH301** Course Name: **Engineering Mathematics- III** | | |
|---|---|---|
| **CO** | **CO code** | Upon completion of this course, the student will be able to… |
| **CO1** | **U18MH301.1** | *apply Laplace transform to solve certain differential equations whose solutions cannot be computed using classical methods* |
| **CO2** | **U18MH301.2** | *describe a given function as Fourier series in an interval* |
| **CO3** | **U18MH301.3** | *construct analytic function; find velocity potential and stream function of a fluid flow using complex analytical methods* |
| **CO4** | **U18MH301.4** | *represent a given function in Taylor's and Laurent's series, evaluate certain real integrals using integral theorems* |

## Course Articulation Matrix (Mapping of COs with POs and PSOs):

| Course code: **U18 MH301** Course Name: **Engineering Mathematics- III** | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **CO Code** | **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** |
| **U18MH301.1** | 2 | 2 | -- | -- | -- | -- | -- | -- | -- | -- | -- | 1 | 2 | -- |
| **U18MH301.2** | 2 | 2 | -- | -- | -- | -- | -- | -- | -- | -- | -- | 1 | 2 | -- |
| **U18MH301.3** | 2 | 2 | -- | -- | -- | -- | -- | -- | -- | -- | -- | 1 | 2 | -- |
| **U18MH301.4** | 2 | 1 | -- | -- | -- | -- | -- | -- | -- | -- | -- | 1 | 2 | -- |
| **U18MH301** | **2** | **1.75** | **--** | **--** | **--** | **--** | **--** | **--** | **--** | **--** | **--** | **1** | **2** | **--** |

**U18TP302** **SOFT AND INTERPERSONAL SKILLS**

**Class:** B.Tech III semester **Branch:** ME, CSE, IT

**Teaching Scheme :**

| L | T | P | C |
|---|---|---|---|
| - | - | 2 | 1 |

**Examination Scheme :**

| | |
|---|---|
| Continuous Internal Evaluation | 100 marks |
| End Semester Examination | - |

**Course Learning Objectives (LOs):**
*This course will develop students' knowledge in/on….*
**LO1**: analyzing self and learning to overcome possible threats
**LO2**: group dynamics to demonstrate respect for the opinions and beliefs of group
**LO3**: effective presentations using visual aids and analyzing the videos
**LO4**: communicating professionally, making resume in line with industry expectations

## LIST OF ACTIVITIES

Introduction

| | |
|---|---|
| **Activity 1** | Team interaction |
| **Activity 2** | SWOT analysis |
| **Activity 3** | Debate |
| **Activity 4** | Group Discussion |

| | |
|---|---|
| **Activity 5** | Presentations through PPTs |
| **Activity 6** | Video Synthesis |
| **Activity 7** | Resume Writing |
| **Activity 8** | Email Etiquette |

**Activity 9** : My interview Plan: Self Introduction & FAQs
**Activity 10** : "My Career Plan" Oral presentation
} Comprehensive Presentation

**Text Books:**

- Developing Communications Skills – Krishna Mohan & Meera Benerji, Mcmillan Publications, New Delhi, 2005
- Soft Skills - Alex.K, S. Chand Publications, New Delhi, 2010
- Soft skills Cornerstone of Professional success – Raman & Meenakshi, Jain Brothers Publications, New Delhi, 2009

**References:**

- https://onlinecourses.nptel.ac.in/noc19_hs20/preview
- https://onlinecourses.nptel.ac.in/noc18_hs30/preview

**Course Outcomes (COs):**

| Course code: **U18TP302** Course Name: **Soft and Interpersonal Skills** | | |
|---|---|---|
| **CO** | **CO code** | *Upon completion of this course, the student will be able to…* |
| **CO1** | **U18TP302.1** | introspect to convert strengths into opportunities, identify weaknesses, bypass threats |
| **CO2** | **U18TP302.2** | present views on various issues confidently in a group |
| **CO3** | **U18TP302.3** | make effective PPT presentations, synthesize videos |
| **CO4** | **U18TP302.4** | prepare a professional resume, communicate effectively to attain better opportunities |

**Course Articulation Matrix (Mapping of COs with POs and PSOs):**

| Course code: **U18TP302** Course Name: **Soft and Interpersonal Skills** | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **CO Code** | **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** |
| **U18TP302.1** | - | - | - | - | - | - | - | - | 2 | 3 | - | - | - | - |
| **U18TP302.2** | - | - | - | - | - | - | - | 2 | 3 | 3 | - | - | - | - |
| **U18TP302.3** | - | - | - | - | - | - | - | - | 2 | 3 | - | - | - | - |
| **U18TP302.4** | - | - | - | - | - | - | - | 1 | 2 | 3 | - | - | - | - |
| **U18TP302** | **-** | **-** | **-** | **-** | **-** | **-** | **-** | **1.5** | **2.25** | **3** | **-** | **-** | **-** | **-** |

**U18OE303A Object Oriented Programming**

**Class:** B. Tech III-Semester **Branch:** Computer Science & Engineering

**Teaching Scheme:**

| L | T | P | C |
|---|---|---|---|
| 3 | - | - | 3 |

**Examination Scheme:**

| | |
|---|---|
| Continuous Internal Evaluation | 40 marks |
| End Semester Examination | 60 marks |

**Course Learning Objectives(LOs):**

This course will develop students' knowledge in/on…

*LO1: fundamentals of object oriented and java programming.*

*LO2: classes, objects and inheritance for implementing object oriented concepts.*

*LO3: polymorphism, interfaces and packages for realizing object oriented programming.*

*LO4: manage Exceptional and I/O operations in application developments.*

**UNIT- I (9)**

**Fundamentals of Object Oriented Programming:** Programming paradigms, Basic concepts of Object Oriented paradigm (OOP), benefits and applications of OOP.

**Basics of Java Language:** Java language Features, Java Programming Structure, Java Tokens, JVM, Constants, Variables, Data types, Scope of variable, Type Casting, Operators and Expressions, Branching and looping statements, Arrays.

**UNIT – II (9)**

**Classes and Objects**: Defining a class, Field declaration, Method declaration, Creating object, Accessing Class Members, Constructors, garbage collection, Static members, Nested and inner classes, Command line arguments, Wrapper classes.

**Inheritance:** Extending a class, Defining subclasses, Subclass constructor, Multilevel inheritance, Hierarchical inheritance, Access controls, *this* and *super* keywords.

**UNIT-III (9)**

**Polymorphism:** Overloading methods, Overloading constructors, Overriding Methods, Dynamic method dispatch, Abstract classes, Final Keyword.

**Interfaces:** Defining an interface, Implementing interfaces, Nested Interfaces, Variables in interfaces, Extending interfaces

**Packages:** Packages, java API packages, Using System Packages, Naming Conventions, Creating Packages, Accessing Packages, Adding a class to package, Hiding classes, Static Import.

**UNIT – IV (9)**

**Exception handling:** Fundamentals, Exception types, Uncaught exceptions, Using try and catch, Multiple catch clauses, Explicit exceptions with *throw, throws* and *finally* keywords.

**String Handling:** String constructors, String length, String operations, Character extraction, String comparison, Searching string, Modifying string, Changing string cases, Joining strings**.**

**Using I/O:** I/O Basics, Reading console Input, Writing console output, Reading and writing files.

**Text Books:**

1. Herbert Schildt,"JAVA The Complete Reference", 9th Edition, McGraw-Hill Education India Pvt.Ltd , ISBN: 9781259002465, 2014.

2. E.Balgurusamy, "Programming with JAVA a primer", 5e Edition, McGraw-Hill Publication Ltd, ISBN: 9351343200, 2014.

**References Books**:

1. P Radha Krishna, "Object Oriented Programming through JAVA", Universities Press, ISBN: 9788173715723,2011.
2. Herbert Schildt,"JAVA The Complete Reference", McGraw-Hill Education India Pvt.Ltd , 9th Edition, ISBN: 9781259002465, 2011.
3. Kathy Sierra, Bert Bates, "Head First Java", O'Reilly Publictions, 2nd Edition, ISBN-13: 978-0596009205.
4. Uttam K.Roy, "Advanced JAVA Programming", Oxford Publications; First edition, ISBN-13: 978-0199455508.

| Course Code: **U18OE303A** Course Name: **Object Oriented Programming** | | |
|---|---|---|
| **CO** | **CO code** | *Upon completion of this course, the student will be able to…* |
| **CO1** | **U18OE303A.1** | *demonstrate object oriented concepts and java programming features.* |
| **CO2** | **U18OE303A.2** | *solve computing problems using object orientation and inheritance concepts.* |
| **CO3** | **U18OE303A.3** | *use polymorphism, interfaces and Packages for effective object oriented programming* |
| **CO4** | **U18OE303A.4** | *handle Exceptions and I/O operations in application development.* |

**Mapping of the Course Learning Outcomes with Program Outcomes:**

| CO/PO | 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 | PSO 3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **U18OE303A.1** | 2 | 2 | 2 | 1 | 2 | 1 | - | 1 | 2 | 1 | 2 | 1 | 2 | 2 | 2 |
| **U18OE303A.2** | 2 | 2 | 2 | 1 | 2 | 1 | - | - | 2 | 1 | 2 | 1 | 2 | 2 | 2 |
| **U18OE303A.3** | 2 | 2 | 2 | 1 | 2 | 1 | - | - | 2 | 1 | 2 | 1 | 2 | 2 | 2 |
| **U18OE303A.4** | 2 | 2 | 2 | 1 | 2 | 1 | 1 | 1 | 2 | 1 | 2 | 1 | 2 | 2 | 2 |
| **U18OE303A** | **2** | **2** | **2** | **1** | **2** | **1** | **1** | **1** | **2** | **1** | **2** | **1** | **2** | **2** | **2** |

## U18OE303B FLUID MECHANICS AND HYDRAULIC MACHINES

**Class:** B.Tech. III -Semester **Branch:** Common to all branches

**Teaching Scheme :**

| L | T | P | C |
|---|---|---|---|
| 3 | - | - | 3 |

**Examination Scheme :**

| | |
|---|---|
| Continuous Internal Evaluation | 40 marks |
| End Semester Examination | 60 marks |

**Course Learning Objectives (LOs):**
This course will develop students' knowledge in /on
***LO1***: *various Properties of fluids and fluid statics*
***LO2***: *application of Bernoulli's equation and dimensional analysis*
***LO3***: *flow through pipes and working principles of hydraulic turbines*
***LO4***: *performance of reciprocating and centrifugal pumps*

### UNIT-I(9)

**Fluid fundamentals:** Classification of fluids, fluid properties - density, specific weight, specific gravity, specific volume, viscosity, capillarity, vapor pressure, compressibility, surface tension, cohesion and adhesion.

**Fluid statics**:Pascal's Law, hydrostatic Law, measurement of pressure, manometers, Piezometer, U-tube differential manometer, inverted differential manometer, hydrostatic forces on submerged plane and curved surfaces, buoyancy, metacenter, stability of floating and submerged bodies

### UNIT-II (9)

**Fluid dynamics:** Classification of fluid flow, continuity equation in one, two and three dimensional flow, velocity potential and stream function, forces causing motion, Euler's equation of motion, Bernoulli's Equation, applications of Bernoulli's equation, venturi meter, orifice meter, pitot tube, linear momentum equation ,application of linear momentum equation to forces on pipe bend.

**Dimensional analysis:** Dimensional analysis by Rayleigh's method and Buckingham π's theorem, dimensionless numbers and model laws, Reynolds law and Froude's law.

### UNIT-III(9)

**Flow through pipes:** Loss of head in pipes, expression for head loss due to major and minor losses in pipes, HGL and TEL lines, pipes in series and parallel, equivalent pipe.

**Hydraulic turbines:** Concept of impact jets, classification, head, losses and various efficiencies, Pelton turbines, components, velocity triangles, power and efficiencies, reaction turbines, Francis and Kaplan turbines, efficiencies and characteristics, unit quantities, specific speed, draft tube theory.

### UNIT-IV (9)

**Reciprocating pumps**: Working of single and double acting pumps, work done and efficiencies, slip, negative slip, performance characteristics of pumps, air vessel.

**Centrifugal pumps:** Principle, components, work done and efficiency, pumps in series and in parallel, multi stage pumps, characteristics, cavitation and priming.

**Text Books:**

1. P.N.Modi and S.M. Seth, "*Hydraulics and Fluid Mechanics Including Hydraulic Machines*", Standard Book House, Rajsons Publications Private Limited, 21thedn., 2017

**Reference Books:**

1. R.K.Bansal, "*Fluid Mechanics and Hydraulic Machines*", Periodicals Private Ltd.,2018
2. Victor Streeter and E. Benjamin Wylie, "*Fluid Mechanics*", McGraw Hill, Singapore, 9thedn., 2017.
3. Frank M. White, "*Fluid Mechanics*", Special Indian Edition, Tata McGraw Hill, New Delhi, 2011.
4. A.K. Jain, "*Fluid Mechanics Including Hydraulic Machines*", Khanna Publications, 12thedn, 2018.

## Course Outcomes (COs):

| Course Code:**U18OE303B** Course Name: **Fluid mechanics and hydraulic machines** | | |
|---|---|---|
| **CO** | **CO code** | Upon completion of this course, the student will be able to… |
| **CO1** | **U18CE303B.1** | *summarize fluid properties using fundamental laws of fluid statics.* |
| **CO2** | **U18CE303B.2** | *analyse fluid flows using Bernoulli's equation and model laws.* |
| **CO3** | **U18CE303B.3** | *estimate losses in pipes and characterize hydraulic turbines.* |
| **CO4** | **U18CE303B.4** | *discuss the working principle and characteristics of pumps.* |

## Course Articulation Matrix (Mapping of COs with POs and PSOs):

Course Code:**U18OE303B** Course Name: **Fluid mechanics and hydraulic machines**

| CO Code | PO 1 | PO 2 | PO 3 | PO 4 | PO 5 | PO 6 | PO7 | PO 8 | PO 9 | PO 10 | PO 11 | PO 12 | PSO 1 | PSO 2 | PSO 3 | PSO 4 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **U18CE303B.1** | 2 | 1 | - | - | - | - | - | - | 1 | 1 | - | 1 | 2 | - | 1 | 1 |
| **U18CE303B.2** | 2 | 1 | - | 1 | - | - | - | - | 1 | 1 | - | 1 | 2 | - | 1 | 1 |
| **U18CE303B.3** | 2 | 1 | - | 1 | - | - | - | - | 1 | 1 | - | 1 | 2 | - | 1 | 1 |
| **U18CE303B.4** | 2 | 1 | - | 1 | - | 1 | - | - | 1 | 1 | - | 1 | 2 | - | 1 | 2 |
| **U18CE303B** | **2** | **1** | **-** | **1** | **-** | **1** | **-** | **-** | **1** | **1** | **-** | **1** | **2** | **-** | **1** | **1.25** |

## U18OE303C MECHATRONICS

**Class:** B.Tech. III-Semester **Branch:** Common to all branches

**Teaching Scheme :**

| L | T | P | C |
|---|---|---|---|
| 3 | - | - | 3 |

**Examination Scheme :**

| | |
|---|---|
| Continuous Internal Evaluation | 40 marks |
| End Semester Exam | 60 marks |

**Course Learning Outcomes (LOs):**
This course will develop students' knowledge in /on
***LO1***: *role of mechatronics based technology, sensors and transducers used in industry*
***LO2***: *various types of actuation systems, working principles and their applications*
***LO3***: *mathematical models for various types of systems*
***LO4***: *various transfer functions and control modes*

### UNIT-I (9)

**Introduction to Mechatronics**: Measuring system, Control systems, Microprocessor based controllers. Mechatronics approach.

**Sensors and Transducers**: Performance, terminology. displacement, position, proximity, velocity and motion.

### UNIT-II (9)

**Actuation Systems**: working principles of pneumatic and hydraulic systems, directional control valves, pressure control valves, process control valves and rotary actuators.

**Electrical Actuation Systems**: working principles of electrical system, mechanical switches, solid-state switches solenoids, DC motors, AC motors and stepper motors.

### UNIT-III (9)

**Basic Models**: Mathematical models, mechanical system building blocks, electrical system building blocks, fluid system building blocks and thermal system building blocks.

**System Models**: Engineering system, rotational-translational system and electro- mechanical systems and hydraulic-mechanical system.

### UNIT-IV (9)

**System Transfer functions**: Transfer function, first order system, second order system, system in series and systems with feedback loops.

**Closed Loop Controllers**: Continuous and discrete processes. Control modes. Two step mode and proportional mode. Derivative control, integral control, PID controller, digital controllers, velocity controllers and adaptive control.

**TEXT BOOK:**

1. Bolton W., Mechatronics, *Pearson Publications,* 6/e, ISBN: 9788131732533, 2015.

**REFERENCE BOOKS:**


1. Nitaigour Premchand Mahalik, Mechatronics: Principles Concepts and Applications, *Tata McGraw Hill, 2/e,* ISBN-13: 978-0070483743, 2017.
2. HMT, Mechatronics, *Tata McGraw-Hill, ISBN*9788415700272 New Delhi, 2000.
3. Devdas Shetty, Richard and Kilk, Mechatronics System and Design, *Cenage Learning*, Inc. 2/e, ISBN-13: 978-1439061985, 2010.


**Course Outcomes (COs):**

| Course Code: **U18OE303C** Course Name: **MECHATRONICS** | | |
|---|---|---|
| **CO** | **CO code** | Upon completion of this course, the student will be able to… |
| **CO1** | **U18OE303C.1** | *apply the mechatronics approach ad select suitable sensors and transducers for a given application.* |
| **CO2** | **U18OE303C.2** | *explain working principles of mechanical, hydraulic, pneumatic and electrical actuators and their applications.* |
| **CO3** | **U18OE303C.3** | *develop basic building blocks for mechanical, electrical, fluid and thermal systems and build mathematical models and analyze.* |
| **CO4** | **U18OE303C.4** | *explain various system transfer functions and select an appropriate closed loop controller for a given application* |

**Course Articulation Matrix (Mapping of COs with POs and PSOs):**

| Course Code: **U18OE303C** Course Name: **MECHATRONICS** | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **CO Code** | **PO** | **PO 2** | **PO** | **PO** | **PO** | **PO 6** | **PO 7** | **PO** | **PO 9** | **PO** | **PO** | **PO** | **PSO 1** | **PSO 2** |
| **U18OE303C.** | 2 | 2 | 1 | - | 2 | 2 | - | - | - | 1 | - | 1 | 2 | 1 |
| **U18OE303C.** | 2 | 2 | 1 | - | 2 | - | - | - | - | 1 | - | 1 | 2 | 1 |
| **U18OE303C.** | 2 | 2 | 1 | 3 | 2 | - | - | - | - | 1 | - | 1 | 2 | 1 |
| **U18OE303C.** | 2 | 2 | 1 | 1 | 2 | - | - | - | - | 1 | - | 1 | 2 | 1 |
| **U18OE303C** | **2** | **2** | **1** | **2** | **2** | **2** | **-** | **-** | **-** | **1** | **-** | **1** | **2** | **1** |

## U18OE303D WEB PROGRAMMING

**Class:** B.Tech. III-Semester **Branch:** Common to all branches

**Teaching Scheme :**

| L | T | P | C |
|---|---|---|---|
| 3 | | - | 3 |

**Examination Scheme :**

| | |
|---|---|
| Continuous Internal Evaluation | 40 marks |
| End Semester Exam | 60 marks |

**Course Learning Objectives (LOs):**
This course will develop students' knowledge in /on

*LO1: designing static webpage using HTML Tags, CSS properties, interactivity with JavaScript*
*LO2: creating dynamic webpage using JSP.*
*LO3: developing server-side scripts for web applications using PHP.*
*LO4: building databases applications using PHP, MYSQL and XML.*

### UNIT-I (9)

**HTML:** Document Structure, Basic Tags, Creating Headings, Working with Links, Creating Paragraph, Working with Images, Tables, Frames. Introduction to Forms and Controls: Creating HTML Form, Specifying Action URL and Method to Send the Form, Using HTML Controls.
**CSS:** *CSS* (Cascading style sheet) rules and properties, Types: Inline, External and Internal Style Sheets, Style Classes, Multiple Styles.
**JAVASCRIPT:** JavaScript syntax, Embedding JavaScript in HTML Page. Usage of variables, Working with Operators, Control-Flow Statements, Functions and Array, Creating Objects, Handling Events.

### UNIT-II (9)

**JSP:** Syntax and Semantics, JSP Development Model, Components of JSP page: Directives, Comments, Expressions, Scriptlets, Declarations, Implicit Objects, Standard Actions, Tag Extensions, A Complete JSP Example. Session and Thread Management: Session Tracking, Session API, Thread Management. Application Event Listeners.
**JDBC:** Database access with JDBC, Overview, JDBC drivers, connecting to database with DriverManager, Statement Interfaces: Statement, Prepared statement, Callable statement, Result Sets.

### UNIT-III (9)

**Introduction to PHP:** Overview of PHP, Advantages of PHP over scripting languages, Creating and running a PHP script, handling errors. Working with Variables and Constants: Variables, Data Types and Operators. Controlling Program Flow: Conditional Statements, Looping Statements, Break, Continue and Exit Statements. Working with Functions, Arrays, Files and Directories.
**Working with Forms:** Web Forms and Form Elements, Processing a Web Form, Validating a Web Form.

### UNIT-IV (9)

**Database using PHP**: Exploring Relational Database Model, Records and Primary Keys. Working with SQL Statements. Using PHP and MySql: Checking Configuration, Connecting to Database, Selecting a Database, Adding and Altering a Table in a Database, Inserting and modifying Data in a Table, Retrieving Data from a Table.
**XML :**Introduction to XML, XML Basics: Syntax, Declaration, Elements, Attributes, Valid XML Documents, Viewing XML, XML Parser, XML Technologies, Document Object Model(DOM).

**Text Books:**

1. Kogent, "Web Technologies HTML, CSS, JavaScript, ASP.NET, Servlets, JSP, PHP, ADO.NET, JDBC and XML", *1st Edition, Dreamtech Press (Black Book),* ISBN-13:9789351192510, 2013.
2. Phil Hanna, "JSP: The Complete Reference", *2ndEdition, McGraw-Hill,* ISBN: 007-212768-6, 2001.

**Reference Books:**

1. Ivan Bayross, "Web Enabled Commercial Application Development Using HTML, JavaScript, DHTML and PHP", *4th Edition,BPB Publications,*ISBN-13: 978-8183330084, 2009,
2. UttamK.Roy, "Web Technologies", *7th Edition, Oxford Higher Education,* ISBN-10: 0-19-806622-8, ISBN-13: 978-0-19-806622-4, 2010
3. Luke Welling, Laura Thomson,"PHP and MySQL Web Development", *3rd Edition, Sams Publications,* ISBN: 0-672-32672-8, 2005
4. Jayson Falkner, Kevin Jones, "Servlets and Java Server Pages", *1st Edition, Pearson,* ISBN: 0-321-13649-7, 2003

**Course Outcomes (COs):**

| Course Code: **U18OE303D** | | Course Name: **Web Programming** |
|---|---|---|
| **CO** | **CO code** | Upon completion of this course, the student will be able to… |
| **CO1** | **U18OE303D.1** | *create static web pages using HTML Tags, CSS properties and Java scripts* |
| **CO2** | **U18OE303D.2** | *create dynamic web pages using java server page concepts.* |
| **CO3** | **U18OE303D.3** | *develop web server side applications using PHP concepts* |
| **CO4** | **U18OE303D.4** | *develop enterprise databases for web-based applications using PHP and MySQL.* |

**Course Articulation Matrix (Mapping of COs with POs and PSOs):**

Course Code: **U18OE303D** Course Name: **Web Programming**

| **CO Code** | **PO 1** | **PO 2** | **PO 3** | **PO 4** | **PO 5** | **PO 6** | **PO 7** | **PO 8** | **PO 9** | **PO 10** | **PO 11** | **PO 12** | **PS O1** | **PS O2** | **PS O3** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **U18OE303D.1** | 2 | 2 | 2 | 1 | 2 | 1 | - | 1 | 2 | 1 | 2 | 1 | 2 | 2 | 2 |
| **U18OE303D.2** | 2 | 2 | 2 | 1 | 2 | 1 | - | 1 | 2 | 1 | 2 | 1 | 2 | 2 | 2 |
| **U18OE303D.3** | 2 | 2 | 2 | 1 | 2 | 1 | - | 1 | 2 | 1 | 2 | 1 | 2 | 2 | 2 |
| **U18OE303D.4** | 2 | 2 | 2 | 1 | 2 | 1 | 1 | 1 | 2 | 1 | 2 | 1 | 2 | 2 | 2 |
| **U18OE303D** | **2** | **2** | **2** | **1** | **2** | **1** | **1** | **1** | **2** | **1** | **2** | **1** | **2** | **2** | **2** |

## U18OE303E MICROPROCESSORS

**Class:** B.Tech., III-Semester

**Branch:** Common to all branches

**Teaching Scheme:**

| L | T | P | C |
|---|---|---|---|
| 3 | - | - | 3 |

**Examination Scheme:**

| | |
|---|---|
| Continuous Internal Evaluation: | 40 marks |
| End Semester Exam: | 60 marks |

**Course Learning Objectives:**

This course will develop students' knowledge in/on

**LO1***: architectural issues of 8086 Microprocessor*

**LO2***: programming concepts of 8086 Microprocessor*

**LO3***: interfacing of 8086 microprocessor to various I/O subsystems.*

**LO4:** *serial data communication types and standards like RS232, IEEE 488 Bus.*

### UNIT – I(9)

Review of 8085 MPU Architecture

**8086 Family Architecture:** Organization of 8086 CPU, Concept of Memory Segmentation, Segment Registers, Physical and Logical Addressing, Addressing Modes and Instruction Formats, Instruction Set**.**

### UNIT – II(9)

**Assembly Language Programming:** Assembler Directives, Simple Programming of 8086, Arithmetic, Logical and Data Processing Programs; Implementation of Control Loops, Structures, Strings, Procedures, Macros.

Pin Configuration, Minimum / Maximum Modes, Timing Diagrams, Delay Subroutines.

### UNIT – III(9)

**Interfacing with 8086:** 8086 Interrupts, Interrupt Service Routines, Programmable Interrupt Controller 8259, Programmable Peripheral Interface 8255, Interfacing of Switches, Keyboards, LEDs, Stepper Motor, ADCs and DACs.

### UNIT – IV(9)

DMA Controller 8257, Programmable Timer/Counter 8254.

**Serial Data Communication through 8086:** Types of Serial Communication, Synchronous and Asynchronous Communication, Serial Data Communication through USART 8251, Serial Data Communication Standards, RS-232, IEEE 488 Bus (GPIB).

### Text Books:


1. D.V.Hall, "Microprocessors and Interfacing: Programming & Hardware", 2nd Edition, *Tata McGraw Hill*, New Delhi, 1992. (Chapter 3 to 10)
2. Yuchang Liu, Glen A. Gibson," Microcomputer Systems. The 8086/8088 Family, Architecture, Programming and Design*", 2nd Edition, PHI*, New Delhi, 1995. (Chapter 2 to 11)


**Reference Books:**


1. Kenneth J. Ayala, Ayala Kenneth," The 8086 Microprocessor: Programming and Interfacing The PC", *West Pub*., 1994.
2. Barry B. Brey," The Intel Microprocessors: Architecture, Programming and Interfacing", 2nd Edition, *PHI, New Delhi,* 1998.

**Course Outcomes (COs):**

| Course Code: **U18OE 303E** | | Course Name: **MICROPROCESSORS** |
|---|---|---|
| **CO** | **CO Code** | Upon completion of this course, the student will be able to… |
| **CO1** | **U18OE 303E.1** | *describe the architecture of 8086 microprocessor and explain instructions with suitable* |
| **CO2** | **U18OE 303E.2** | *write Assembly Language Programs (ALPs) to perform a given task* |
| **CO3** | **U18OE 303E.3** | *design 8086 microprocessor based system for given specifications with memory mapping* |
| **CO4** | **U18OE 303E.4** | *explain serial communication modes and discuss it standards* |

**Course Articulation Matrix (Mapping of COs with POs and PSOs):**

| Course code: **U18OE 303E** | | | | | | | | | | | | | Course Name: **MICROPROCESSORS** | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **CO Code** | **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** |
| **U18OE 303E.1** | 3 | 3 | 2 | 1 | -- | -- | -- | -- | -- | -- | -- | -- | 2 | 2 |
| **U18OE 303E.2** | 3 | 2 | 2 | 1 | -- | -- | -- | -- | -- | -- | -- | -- | 2 | 2 |
| **U18OE 303E.3** | 3 | 3 | 2 | 1 | -- | -- | -- | -- | -- | -- | -- | -- | 2 | 2 |
| **U18OE 303E.4** | 3 | 3 | 2 | 1 | -- | -- | -- | -- | -- | -- | -- | 1 | 2 | 2 |
| **U18OE 303E** | **3** | **2.75** | **2** | **1** | **--** | **--** | **--** | **--** | **--** | **--** | **--** | **1** | **2** | **2** |

**U18OE303F STRENGTH OF MATERIALS**

**Class:** B.Tech. III -Semester **Branch:** Common to all branches

**Teaching Scheme :**

| L | T | P | C |
|---|---|---|---|
| 3 | - | - | 3 |

**Examination Scheme :**

| | |
|---|---|
| Continuous Internal Evaluation | 40 marks |
| End Semester Examination | 60 marks |

**Course Learning Objectives (LOs):**
This course will develop students' knowledge in /on
***LO1****: behaviour of bodies subjected to various types of stresses and strains*
***LO2****: shear force and bending moment for determinate beams*
***LO3****: bending and shearing stresses for beams in flexure*
***LO4****: behaviour of circular shafts, springs and thin cylinders*

**UNIT-I(9)**

**Simple stresses and strains:** Types of stresses, strains, stress–strain diagram, elastic limit, Hooke's law, bars of varying sections, uniformly tapering circular and rectangular sections, elongation of bars due to self weight, temperature stresses in uniform bars.

**Elastic modulii:** Elastic constants, longitudinal strain, lateral strain, Poisson's ratio, complimentary shear stress, state of simple shear, modulus of elasticity (E), modulus of rigidity (N), bulk modulus (K), relation between E, N & K, strain energy, resilience, impact loading.

**UNIT-II (9)**

**Principal stresses:** Definition, normal and shear stress, principal stresses, principal planes and their graphical representation by Mohr's circle.

**Shear force and bending moment:** Types of supports, classification of beams, concept of shear force and bending moment, shear force diagram and bending moment diagram for simply supported, cantilever and overhanging beams, loading from shear force and bending moment diagram, principle of superposition.

**UNIT-III(9)**

**Bending stresses in beams:** Assumptions, theory of simple bending, application of bending equation and calculation of bending stresses in beams of homogeneous and flitched beam material, beams of uniform strength.

**Shearing stresses in beams:** Shearing stress due to bending, variation of flexural shear stress distribution across rectangular, triangular, circular, flanged section, shear resilience.

**UNIT-IV (9)**

**Circular shafts and springs:** Theory of pure torsion in solid and hollow circular shafts, shear stresses, angle of twist, power transmitted by shaft, close-coiled and open-coiled helical spring subjected to axial load and axial twist, springs in series and parallel.

**Thin cylinders:** Analysis of thin walled pressure vessels, hoop stress, longitudinal stress.

**Text Books:**

1. Rajput R.K., "*Strength of Materials*", *7th Edition*, S Chand and Company.
2. Gunneswara Rao T. D.and MudimbyAndal,"*Strength of Materials*", *1st edn.2018*, Cambridge University Press.

**Reference Books:**

1. Timoshenko and Gere, "*Mechanics of Materials*", *1st Edition* Mc Graw Hill International.
2. Punmia B.C., Arun K. Jain, Ashok K. Jain, "*Mechanics of Materials*", *2nd Edition*, Laxmi Publications, New Delhi.
3. Subramanian R., "*Strength of Materials*", *3rd Edition*, Oxford University Press.
4. Ramamrutham S.,"*Strength of Materials*", *2nd Edition*, Dhanpat Rai & Sons, New Delhi.

## Course Outcomes (COs):

| Course Code:**U18OE303F** | | Course Name: **Strength of Materials** |
|---|---|---|
| **CO** | **CO code** | *Upon completion of this course, the student will be able to…* |
| **CO1** | **U18CE303F.1** | *estimate various types of stresses and strains* |
| **CO2** | **U18CE303F.2** | *construct Mohr's circle, shear force and bending moment diagrams for determinate beams* |
| **CO3** | **U18CE303F.3** | *determine the bending and shearing stresses for beams subjected to pure bending* |
| **CO4** | **U18CE303F.4** | *analyze stresses in thin cylinders, circular shafts and springs by theory of pure torsion* |

## Course Articulation Matrix (Mapping of COs with POs and PSOs):

Course code: **U18OE303F** Course Name: **Strength of Materials**

| CO Code | 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 | PSO 3 | PSO 4 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **U18CE303F.1** | 2 | 2 | 1 | 1 | - | - | - | - | - | 1 | - | 2 | 2 | 1 | - | 1 |
| **U18CE303F.2** | 2 | 2 | 1 | - | - | - | - | - | - | 1 | - | 1 | 2 | 1 | - | 1 |
| **U18CE303F.3** | 2 | 2 | 1 | 1 | - | - | - | - | - | - | - | 1 | 2 | 1 | - | 1 |
| **U18CE303F.4** | 2 | 2 | 1 | 2 | - | - | - | - | - | 1 | - | 1 | 2 | 1 | - | 1 |
| **U18CE303F** | **2** | **2** | **1** | **1.33** | **-** | **-** | **-** | **-** | **-** | **1** | **-** | **1.25** | **2** | **1** | **-** | **1** |

## U18EC304 SIGNALS AND SYSTEMS

**Class**: B.Tech., III-Semester **Branch:** Electronics & Communication Engineering

**Teaching Scheme:**

| L | T | P | C |
|---|---|---|---|
| 3 | - | - | 3 |

**Examination Scheme:**

| | |
|---|---|
| Continuous Internal Evaluation | 40 marks |
| End Semester Examination | 60 marks |

**Course Learning Objectives**:

This course will develop student's knowledge on/in…

**LO1:** *continuous-time (CT) and discrete-Time (DT) signals and systems and convolution*
**LO2:** *continuous-time Fourier transform (CTFT) and analysis of LTI systems.*
**LO3:** *discrete-time Fourier series(DTFS) and discrete-time Fourier transform (DTFT) and its applications*
**LO4:** *z-Transform, stability of LTI systems and realizations of IIR systems*

### UNIT – I(9)

**Signals and Systems:** Continuous-time (CT) and Discrete-Time (DT) signals, Sampling theorem (statement only), Transformations of independent variable, Exponential and sinusoidal signals, Singularity functions, CT & DT Systems, Basic system properties.

**Linear Time–Invariant (LTI) Systems:** DT-LTI systems, Convolution sum, CT-LTI systems, Convolution integral, Properties of LTI systems, LTI systems described by differential and difference equations, FIR and IIR systems.

### UNIT – II(9)

**Continuous-Time Fourier Transform (CTFT):** CTFT for representation of aperiodic signals, CTFT for periodic signals; Properties of the CTFT - Convolution property, Multiplication property; Systems characterized by linear constant–coefficient differential equations (LCCDE).

### UNIT – III(9)

**Discrete-Time Fourier Series (DTFS):** Fourier series representation of DT periodic signals, Properties of DTFS, Fourier series and LTI systems, Filtering, Examples of DT filtersdescribed by difference equations

**Discrete-Time Fourier Transform (DTFT):** DTFT for aperiodic signals, DTFT for periodic signal, properties for the DTFT, Convolution property, Multiplication property, Systems characterized by linear constant-coefficient difference equations (LCCDE).

### UNIT – IV(9)

***z*-Transform:** Representing signals by using DT complex exponentials, *z*-transform, Region of convergence (ROC), Inverse *z*-transform, Properties of *z*-transform, *z*-transform of some common signals, Analysis and characterization of LTI system using *z*-transform.

**Block Diagram Representations:** Structures for IIR systems - Direct, cascade and parallel form realizations of IIR systems.

**Text Book:**

1. Alan V. Oppenheim and Alan S.Willsky with S. Hamid Nawab, "Signals & Systems",*PHI*, 2/e,
2010 *(Chapters 1, 2, 3, 4, 5, 10)*.

**Reference Books:**

1. Simon Haykin and Barry Van Veen, "Signals & Systems", Wiley India, 2/e , 2008.
2. Mrinal Mandal and Amir Asif, "Continuous and Discrete Time Signals and Systems", Cambridge University Press, 1/e, 2008.
3. M.J.Roberts and Govind Sharma, "Fundamentals of Signals and Systems", *McGraw Hill*, 2/e, 2010.
4. H.P. Hsu, "Signals & Systems", Schaum's Outlines (McGraw Hill), 2/e, 2009.

## Course Outcomes (COs):

| Course Code: **U18EC304** | | Course Name: **SIGNALS AND SYSTEMS** |
|---|---|---|
| **CO** | **CO code** | Upon completion of this course, the student will be able to… |
| **CO1** | **U18EC304.1** | *classify CT and DT signals and systems and perform convolution for finding response of an LTI system to any arbitrary signal* |
| **CO2** | **U18EC304.2** | *evaluate CTFT of standard signals, use properties of CTFT for solving LCCDE* |
| **CO3** | **U18EC304.3** | *compute DTFT of standard signals, derive properties of DTFT and use them for solving LCCDE and find DTFS of periodic signals.* |
| **CO4** | **U18EC304.4** | *determine the z-transform of standard DT signals with ROC, use properties of z-transform to solve difference equations, evaluate stability of an LTI system and realize the DT systems in direct, cascade and parallel forms.* |

## Course Articulation Matrix (Mapping of COs with POs and PSOs):

| Course code: **U18EC304** | | | | | | | | | | | | | | Course Name: **SIGNALS AND SYSTEMS** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **CO Code** | **PO 1** | **PO 2** | **PO 3** | **PO 4** | **PO 5** | **PO 6** | **PO7** | **PO 8** | **PO 9** | **PO 10** | **PO 11** | **PO 12** | **PSO 1** | **PSO 2** |
| **U18EC304.1** | 2 | 2 | 1 | 1 | -- | -- | -- | -- | -- | 1 | -- | -- | 2 | 3 |
| **U18EC304.2** | 2 | 2 | 1 | 1 | -- | -- | -- | -- | -- | 1 | -- | -- | 2 | 3 |
| **U18EC304.3** | 2 | 2 | 1 | 1 | -- | -- | -- | -- | -- | 1 | -- | -- | 2 | 3 |
| **U18EC304.4** | 2 | 2 | 1 | 1 | -- | -- | -- | -- | -- | 1 | -- | 1 | 2 | 3 |
| **U18EC304** | **2** | **2** | **1** | **1** | **--** | **--** | **--** | **--** | **--** | **1** | **--** | **1** | **2** | **3** |

## U18EC305 ANALOG CIRCUITS-1

**Class:** B.Tech. III-Semester **Branch:** Electronics & Communication Engineering

**Teaching Scheme:**

| L | T | P | C |
|---|---|---|---|
| 3 | - | - | 3 |

**Examination Scheme:**

| | |
|---|---|
| Continuous Internal Evaluation | 40 marks |
| End Semester Examination | 60 marks |

**Course Learning Objectives:**
This course will develop students' knowledge in/on

**LO1:** *semiconductors, working of a various diodes.*
**LO2:** *half and full wave rectifiers.*
**LO3:** *transistor characteristics, it's biasing.*
**LO4:** *FETCharacterstics, its operation, Biasing and operation of special devices.*

### UNIT-I(9)

**Conduction in Semiconductors**: Conductivity of a Semiconductor, Carrier Concentrations in an Intrinsic Semiconductor, Donor and Acceptor Impurities, Charge densities in a semiconductor, Fermi level in a Semiconductor having Impurities, Diffusion, Carrier life time, Continuity equation, The Hall effect.

**Semiconductor Diode Characteristics**: Qualitative theory of P-N junction, p-n Junction as a Diode, Band Structure of an Open Circuited p-n Junction, Quantitative theory of P-N diode currents, The Volt-. Ampere Characteristics, The temperature dependence of P-N Characteristics, Diode Resistance, Space Charge or Transition Capacitance, Diffusion capacitance, Breakdown Diodes, The Tunnel Diode, Characteristics of a Tunnel Diode.

### UNIT-II(9)

**Rectifiers:** A Half Wave Rectifier, Ripple Factor, A Full wave Rectifier, Harmonic Components in Rectifier Circuits, Inductor Filters, Capacitor Filters, Approximate Analysis of Capacitor Filters, L - Section Filter, Multiple L - Section Filter, π - Section Filter.

### UNIT-III(9)

**Transistor Characteristics**: The Junction Transistor, Transistor Current Components, the Transistor as an Amplifier, The Common Base Configuration, The Common Emitter Configuration, The Common Collector Configuration.

**Transistor Biasing & Thermal Stabilization**: The Operating Point, Transistor as a switch, Bias Stability, Collector to Base Bias, Self-Bias, Stabilisation against variations in VBE and β for the Self Bias Circuit, Bias Compensation, Thermistor & Sensistor Compensation, Thermal Runaway and Thermal Stability.

### UNIT- IV(9)

**Field Effect Transistors**: Construction and Characteristics of JFETs, Transfer Characteristics, Depletion-type MOSFET and Enhancement-type MOSFET.

**FET Biasing**: Fixed Bias Configuration, Self-Bias Configuration, Voltage Divider Biasing, Common Gate Configuration, Common Drain Configuration, Depletion-type MOSFETs, Enhancement- type MOSFETs.

**Special Devices**: Silicon Controlled Rectifier, Basic Silicon Controlled Rectifier Operation, SCR Characteristics & Ratings, Silicon Controlled Switch, DIAC, TRIAC, Uni-Junction Transistor, LED, photo Diode, Photo Transistor.

**Text books:**

1. L.K.Maheshwari, "*Analog Electronics*", 1st edition, Laxmi Publications.

**Reference Books:**

1. Anil.K. Maini," *Analog Electronics*", 1st edition, Khanna Publishing House.
2. Robert L Boylested and Louis Nashelsky (2009), "*Electronic Devices and Circuit Theory*", 10th Edition, Pearson India.

| Course Code: **U18EC305** | | Course Name: **ANALOG CIRCUITS-1** |
|---|---|---|
| **CO** | **CO code** | Upon completion of this course, the student will be able to… |
| **CO1** | **U18EC305.1** | *describe band diagrams, conduction mechanism in Semiconductors and explain the* |
| **CO2** | **U18EC305.2** | *analyze performance of diode rectifiers with and without filters.* |
| **CO3** | **U18EC305.3** | *explain the Characteristics of Bipolar Junction Transistor in CB, CE, CC* |
| **CO4** | **U18EC305.4** | *explain the operation of different types of FETs and discuss the characteristics of special devices such as SCR,UJT,DIAC,TRIAC.* |

## Course Articulation Matrix (Mapping of COs with POs and PSOs):

Course code: **U18EC305** Course Name: **ANALOG CIRCUITS-1**

| CO Code | 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 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| U18EC305.1 | 1 | 1 | 1 | - | - | - | - | - | 1 | - | - | 1 | 1 | 2 |
| U18EC305.2 | 1 | 1 | 1 | - | - | - | - | - | 1 | - | - | 1 | 1 | 2 |
| U18EC305.3 | 1 | 1 | 1 | - | - | - | - | - | 1 | - | - | 1 | 1 | 2 |
| U18EC305.4 | 1 | 1 | 1 | - | - | - | - | - | 1 | - | - | 1 | 1 | 2 |
| **U18EC305** | 1 | 1 | 1 | - | - | - | - | - | 1 | - | - | 1 | 1 | 2 |

## U18EC306 SWITCHING THEORY AND LOGIC DESIGN

**Class:** B.Tech. III-Semester
**Branch:** Electronics & Communication Engineering

**Teaching Scheme :**

| L | T | P | C |
|---|---|---|---|
| 3 | - | - | 3 |

**Examination Scheme :**

| | |
|---|---|
| Continuous Internal Evaluation | 40 marks |
| End Semester Exam | 60 marks |

**Course Learning Objectives (LOs):**
This course will develop students' knowledge in /on

***LO1*:** *number system, binary codes and minimization of switching functions.*
***LO2* :** *combinational circuits design and implementation using logic gates, adders/subtractors, multiplexer and decoders.*
***LO3* :***implementation of sequential circuits, counters, registers using flip flops and logic gates.*
***LO4* :***finite state machines and its minimization; algorithmic state machines.*

### UNIT – I(9)

**Number Systems:** Review of number systems, binary weighted and non-weighted codes binary arithmetic, 1's &2's complement subtraction, error detecting and error correcting codes.
**Boolean Algebra:** Postulates and theorems, logic gates and truth tables, representation of switching functions using SOP & POS forms, Karnaugh map representation, minimization using K-Map and Quine Mc'Clusky method.

### UNIT – II(9)

**Design of Combinational Circuits:** Adders– half Adder, full Adder; subtractors-half subtractor, full Subtractor; parallel adder, carry look ahead adder, BCD adder, multiplexers, decoders - BCD to 7 segment, BCD to decimal decoders. Encoders-priority encoders, demultiplexers, realization of switching functions using multiplexers and decoders.

### UNIT – III(9)

**Sequential Circuits:** Flip Flops – SR flip flop, JK flip flop, D flip flop, T flip flop and master-slave flip flop. Design of synchronous counters, asynchronous counters, shift registers, bidirectional shift registers, ring counter and Johnson counter; state table, state diagram, state assignment, state minimization, synthesis of synchronous, sequential circuits – sequence detectors.

### UNIT – IV(9)

**Finite State Machines:** Mealy and Moore machines – capabilities and limitations of finite state machine, state equivalence and machine minimization- Merger graph and Merger table.
**Algorithmic State Machines:** Salient features of the ASM charts, design example- ASM chart-timing sequence – Data path design, ASM design examples using flip-flops.

**Text Books:**

1. Moris Mano, "Digital Design", *Prentice Hall of India, New Delhi.* 4th Edition, 2006.
2. Zvi. Kohavi, "Switching and Finite Automata Theory", *Cambridge University Press.* 3rd Edition 2010.

**Reference Books:**

1. G.K. Kharate, "Digital Electronics", *Oxford University Press*, Hyderabad, India, 1st Edition 2012.
2. R.P. Jain, "Modern Digital Electronics", *Tata McGraw-Hill,* India, 4th Edition 2010.
3. A. Anand Kumar, "Switching Theory & Logic Design", *Prentice Hall of India*, New Delhi, 1st Edition, 2014
4. Samuel. C. Lee & B.S. Sonde, "Digital Circuits & Logic Design", *Prentice Hall of India*, New Delhi. 1st Edition 1976

## Course Outcomes (COs):

| Course Code: **U18EC306** Course Name: **SWITCHING THEORY AND LOGIC DESIGN** | | |
|---|---|---|
| **CO** | **CO code** | Upon completion of this course, the student will be able to… |
| **CO1** | **U18EC306.1** | *explain number systems, binary codes; prove the given Boolean identity and apply minimization techniques to obtain minimal SOP/POS forms of logic functions.* |
| **CO2** | **U18EC306.2** | *design switching functions using combinational circuits for given application* |
| **CO3** | **U18EC306.3** | *develop a sequential circuit using flip flops and logic gates for given specifications* |
| **CO4** | **U18EC306.4** | *develop finite state machine with optimum states for given specifications; draw an ASM chart and state diagram for a specific application and build corresponding control unit.* |

## Course Articulation Matrix (Mapping of COs with POs and PSOs):

| Course code: **U18EC306** Course Name: **SWITCHING THEORY AND LOGIC DESIGN** | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **CO Code** | **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** | **PSO 3** |
| **U18EC306.1** | 3 | 2 | 1 | - | - | 1 | 1 | - | - | - | - | 1 | 1 | 3 | 2 |
| **U18EC306.2** | 3 | 2 | 1 | - | - | 1 | 1 | - | - | - | - | 1 | 2 | 3 | 2 |
| **U18EC306.3** | 3 | 2 | 2 | 1 | - | 2 | 2 | - | - | - | - | 1 | 2 | 3 | 2 |
| **U18EC306.4** | 3 | 2 | 3 | 3 | - | 3 | 3 | - | - | - | - | 1 | 3 | 3 | 2 |
| **U18EC306** | 3 | 2 | 1.75 | 1 | - | 1.75 | 1.75 | - | - | - | - | 1 | 2 | 3 | 2 |

## U18EE312 NETWORK ANALYSIS

**Class: B.Tech, III-Semester** **Branch:** Electronics & Communication Engineering

**Teaching Scheme :**

| L | T | P | C |
|---|---|---|---|
| 2 | - | - | 2 |

**Examination Scheme :**

| | |
|---|---|
| Continuous Internal Evaluation | 40 marks |
| End Semester Exam | 60 marks |

**Course Learning Objectives (LOs):**
This course will develop students' knowledge in/on
***LO1****: steady state analysis and resonance of electrical networks*
***LO2****: network theorems and their application for network analysis*
***LO3****: time response analysis of networks*
***LO4****: two port networks and their equivalent circuit representation*

### UNIT – I(6)

**Circuit Elements and Relations:** Introduction, Kirchhoff's laws; Types of sources and source transformations; Network reduction by star–delta transformation
**Steady State Analysis of Circuits for Sinusoidal Excitations:** Analysis of single-phase series, parallel and series-parallel circuits; Resonance - series and parallel resonance, bandwidth, Q-factor; Mesh and nodal analysis

### UNIT – II(6)

**Network Theorems and Applications:** Introduction, superposition theorem, Thevenin's theorem, Norton's theorem, maximum power transfer theorem, Tellegen's theorem, Millman's theorem, reciprocity theorem

### UNIT – III(6)

**Time response analysis of networks:** Transient analysis of RL, RC, RLC series and parallel networks with step, impulse, sinusoidal and pulse excitation, initial conditions, Analysis with special signal waveforms - ramp, triangular, train of pulses, delayed input

### UNIT – IV(6)

**Two port networks** : Characterizations of linear time invariant two port networks - open circuit impedance parameters, short circuit admittance parameters, transmission parameters, inverse-transmission parameters, hybrid parameters, inverse-hybrid parameters, symmetry and reciprocity conditions in terms of two-port parameters, inter-relationship between parameters, inter connections of two-port networks

**TEXT BOOKS:**


1. M.E. Van Valken Burg, "Network Analysis", *Pearson Education* 3/e, 2006
2. W.H. Hayt and Jr. Kemmerly, "Engineering Circuit Analysis", *McGraw-Hill Higher Education,* 7/e, *2006*
3. D. Roy Choudhary, "Network analysis and Synthesis", *New age Publishers*, 1/e, 2006


**REFERENCES:**


1. K. A. Gangadhar, "Circuit Theory", *Khanna Publishers*, 2/e, 2006
2. Parker Smith, "Problems in Electrical Engineering", *CBS Publishers*, 1/e, 2010

**Course Outcomes (COs):**

| Course Code: **U18EE312** | | Course Name: **NETWORK ANALYSIS** |
|---|---|---|
| **CO** | **CO code** | Upon completion of this course, the student will be able to… |
| **CO1** | **U18EE312.1** | *determine voltage, current, power by performing steady state analysis; calculate bandwidth, Q-factor of resonant circuits* |
| **CO2** | **U18EE312.2** | *analyse the electrical network using network theorems to determine current, voltage & power* |
| **CO3** | **U18EE312.3** | *evaluate transient and steady state response of RLC circuits with step, sinusoidal and other special signals* |
| **CO4** | **U18EE312.4** | *find two port network parameters and draw equivalent circuit of given two-port network* |

**Course Articulation Matrix (Mapping of COs with POs and PSOs):**

Course Code: **U18EE312** Course Name: **NETWORK ANALYSIS**

| **CO Code** | **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** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **U18EE312.1** | 2 | 2 | - | 2 | - | - | - | - | - | - | - | 2 | 1 | 2 |
| **U18EE312.2** | 2 | 2 | - | 2 | - | - | - | - | - | - | - | 2 | 1 | 2 |
| **U18EE312.3** | 2 | 2 | - | 2 | - | - | - | - | - | - | - | 2 | 1 | 2 |
| **U18EE312.4** | 2 | 2 | - | 2 | - | - | - | - | - | - | - | 2 | 1 | 2 |
| **U18EE312** | **2** | **2** | - | **2** | - | - | - | - | - | - | - | 2 | **1** | **2** |

## U18EC308 ANALOG CIRCUITS-1 LABORATORY

**Class:** B.Tech III-Semester **Branch:** Electronics & Communication Engineering

**Teaching Scheme :**

| L | T | P | C |
|---|---|---|---|
| - | - | 2 | 1 |

**Examination Scheme :**

| | |
|---|---|
| Continuous Internal Evaluation | 40 marks |
| End Semester Exam | 60 marks |

**Course Learning Objectives:**
This laboratory course will develop student's knowledge in/on
***LO1: c****haracteristics of diode and Zener diode.*
***LO2****: BJT amplifiers.*
***LO3****: JFET amplifiers.*
***LO4****: characteristics of SCR, Diac.*

**LIST OF EXPERIMENTS**
(Based on theory course U18EC305)

1. Study of CRO.
2. Characteristics of PN Junction diode.
3. Characteristics of Zener diode.
4. Half wave and Full wave rectifier with and without filters.
5. Bridge rectifier with and without filters.
6. Characteristics of Transistor in Common Base Configuration.
7. Characteristics of Transistor in Common Emitter Configuration.
8. Design of BJT in Fixed bias And Self Bias.
9. JFET in common source Configuration.
10. Characteristics of SCR.
11. Characteristics of Diac.
12. Characteristics of Photo Diode and Photo transistor.

**Laboratory Manual:**

1. Manual for "Analog Circuit-1" prepared by faculty of department of ECE.

| Course Code: **U18EC308** Course Name: **ANALOG CIRCUITS-1 LABORATORY** | | |
|---|---|---|
| **CO** | **CO code** | Upon completion of this course, the student will be able to… |
| **CO1** | **U18EC308.1** | *implement the circuits based on diodes.* |
| **CO2** | **U18EC308.2** | *analyze the transistor amplifiers.* |
| **CO3** | **U18EC308.3** | *design circuits related to JFET.* |
| **CO4** | **U18EC308.4** | *implement circuits based on SCR and Diac.* |

### Course Articulation Matrix (Mapping of COs with POs and PSOs):

| Course code: **U18EC308** Course Name: **ANALOG CIRCUITS-1 LABORATORY** | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **CO Code** | **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** |
| **U18EC308.1** | 2 | 2 | 1 | - | - | - | - | - | - | - | - | 1 | 2 | 2 |
| **U18EC308.2** | 2 | 1 | 2 | - | - | - | - | - | - | - | - | 1 | 2 | 1 |
| **U18EC308.3** | 2 | 2 | 2 | - | 2 | - | - | - | - | 1 | 1 | 1 | 2 | 2 |
| **U18EC308.4** | 2 | 1 | 2 | - | 2 | - | - | - | - | 1 | 1 | 1 | 2 | 1 |
| **U18EC308** | 2 | 1.5 | 1.75 | - | 1 | - | - | - | - | 0.5 | 0.5 | 1 | 2 | 1.5 |

## U18OE311A OBJECT ORIENTED PROGRAMMING LABORATORY

**Class:** B. Tech III-Semester **Branch:** Common to all branches

**Teaching Scheme:**

| L | T | P | C |
|---|---|---|---|
| - | - | 2 | 1 |

**Examination Scheme:**

| | |
|---|---|
| Continuous Internal Evaluation | 40 marks |
| End Semester Examination | 60 marks |

**Course Learning Objectives(LO):**

This course will develop students' knowledge in/on…

*LO1: implementing concepts of object oriented programming*
*LO2: debug and test java applications effectively*
*LO3: effective use of exception handling, interfaces and packages during applications development*
*LO4: I/O and applet programming in java*

### List Of Experiments

**Experiment-I**

1. Write a program to demonstrate operators of java.
2. Write a program to demonstrate type casting and operator precedence.
3. Write a program to demonstrate different types of if-statements.
4. Write a program to demonstrate switch-case.

**Experiment-II**

1. Write a program to demonstrating loop control statements.
2. Write a program to demonstrate for-each control loop.
3. Implement programs using single dimensional arrays.
4. Write a program to define a two dimensional array where each row contains different number of columns.

**Experiment -III**

1. Write a program to demonstrate creating object to a class for accessing variables and methods.
2. Write a program to demonstrate creating multiple object.
3. Write a program to demonstrate passing objects to methods.
4. Write a program to demonstrate constructors and garbage collector by invoking it explicitly.

**Experiment -IV**

1. Write a program to demonstrate static members.
2. Write a program to demonstrate command line argument.
3. Write a program to demonstrate variable length argument.
4. Write a program to demonstrate wrapper classes.

**Experiment -V**

1. Write a program to demonstrate inheritance using extends keyword.
2. Write a program to demonstrate multilevel inheritance.
3. Write a program to demonstrate hierarchical inheritance.
4. Write a program to demonstrate access controls.

**Experiment -VI**

1. Write program to demonstrate *this* and *supper* keywords.
2. Write program to demonstrate dynamic method dispatch.
3. Write a program to demonstrate final variable and methods.
4. Write a program to demonstrate use of abstract class.

**Experiment -VII**

1. Write a program to define an Interface and implement it into a class.
2. Write a program to implement multiple interfaces into single class.
3. Write a program to extend interfaces.
4. Write a program to implement nested interfaces.

**Experiment -VIII**

1. Write a program to create a package, and demonstrate to import a package to a class.
2. Write a program to demonstrate access protection of packages.
3. Write a program to demonstrate static import of package.

**Experiment-IX**

1. Write a program to demonstrate *try* and *catch* statement for exception handling
2. Handle *ArrayIndexOfBoundsException*, *NumberFormatException* and *DivideByZeroException* using multiple catch blocks.
3. Write a program to demonstrate user defined exception with *throw keyword*
4. Write a program to demonstrate *finally* block.

**Experiment-X**

1. Write a program to demonstrate string handling functions.
2. Write a program to demonstrate string searching functions.
3. Write a program to demonstrate string comparison functions.
4. Write a program to demonstrate string modification functions.

**Experiment-XI**

1. Write a program to demonstrate reading and writing input using byte stream classes
2. Write a program to demonstrate reading and writing input using character stream classes
3. Write a program to demonstrate data input and output streams
4. Write a program to demonstrate array input and output streams

**Experiment-XII**

1. Write a program to create a file using byte stream classes
2. Write a program to create a file using character stream classes
3. Write a program to open the specific file
4. Write a program to copy the content of one file to another.

**Laboratory Manual:**

1. Java Programming laboratory manual, *prepared by faculty of Dept. of CSE.*

**Text Book:**

1. Herbert Schildt,"JAVA The Complete Reference", 9th Edition, McGraw-Hill Education India Pvt.Ltd , ISBN: 9781259002465, 2014.

**Course Outcomes (COs):**

| **Course Code: U18OE311A** | | **Course Name: Object Oriented Programming Laboratory** |
|---|---|---|
| **CO** | **CO code** | Upon completion of this course, the student will be able to… |
| **CO1** | **U18OE311A.1** | *implement OOP concepts using Java* |
| **CO2** | **U18OE311A.2** | *use the concepts like inheritance, polymorphism, packages and interfaces in application development* |
| **CO3** | **U18OE311A.3** | *handle runtime exceptions in object oriented programming* |
| **CO4** | **U18OE311A.4** | *build effective I/O interfaces for software applications* |

## Mapping of the Course Learning Outcomes with Program Outcomes:

| **Course Code: U18OE311A** | | | | | | | | | | | | | | **Course Name: Object Oriented Programming Laboratory** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **CO/PO** | **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** |
| **U18OE311A.1** | 2 | 2 | 2 | 1 | 2 | 1 | - | 1 | 2 | 1 | 2 | 1 | - | 1 |
| **U18OE311A.2** | 2 | 2 | 2 | 1 | 2 | 1 | 1 | - | 2 | 1 | 2 | 1 | - | 1 |
| **U18OE311A.3** | 2 | 2 | 2 | 1 | 2 | 1 | - | - | 2 | 1 | 2 | 1 | - | 1 |
| **U18OE311A.4** | 2 | 2 | 2 | 1 | 2 | 1 | 1 | 1 | 2 | 1 | 2 | 1 | - | 1 |
| **U18OE311A** | **2** | **2** | **2** | **1** | **2** | **1** | **1** | **1** | **2** | **1** | **2** | **1** | **-** | **1** |

## U18OE311B FLUID MECHANICS AND HYDRAULIC MACHINES LABORATORY

**Class:** B.Tech. III -Semester **Branch:** Common to all branches

**Teaching Scheme :**

| L | T | P | C |
|---|---|---|---|
| - | - | 2 | 1 |

**Examination Scheme :**

| | |
|---|---|
| Continuous Internal Evaluation | 40 marks |
| End Semester Examination | 60 marks |

**Course Learning Objectives (LOs):**

This course will develop students' knowledge in /on

***LO1:*** *determining the hydraulic coefficient for various flow measuring devices*

***LO2:*** *implementing Bernoulli's equation and application of Bernoulli's theorem in estimating various losses in pipe*

***LO3:*** *studying the various parameters which effects the impact of jet*

***LO4:*** *studying the characteristics of hydraulic machines*

### LIST OF EXPERIMENTS

1. Determination of Coefficient of Discharge for given Orifice meter and Venturi meter.
1. Determination of Coefficient of Discharge for given notches (triangular/rectangular)
2. Determination of Coefficient of Discharge for given orifice and mouth piece.
3. Verification of Bernoulli's theorem.
4. Estimation of coefficients of various head losses in pipes due to major and minor losses (sudden enlargement, sudden contraction and bend).
5. Determineof Reynolds's number using Reynolds's apparatus.
6. Determination of coefficient of impact for a jet on given vane.
7. Determination of performance characteristics of Francis Turbine
8. Determination of performance characteristics of Pelton Wheel.
9. Determination of performance characteristics of Centrifugal Pump.
10. Determination of performance characteristics of Submersible Pump.
11. Determination of performance characteristics of Reciprocating Pump.

**Laboratory Manual:**

1. "Fluid Mechanics Laboratory Manual", prepared by the faculty of Department of Civil Engineering.

**Reference Books:**


**1.** N. Kumara Swamy, "*Fluid Mechanics and Machinery Laboratory Manual*",Charotar Publishing House Pvt., Ltd., 1st edn., 2008.

**2.** Sarbjit Singh, "*Experiments in Fluid Mechanics*", PHI Learning Private Limited, New Delhi, 2009.

## Course Outcomes (COs):

| Course Code: **U18OE311B** | | Course Name: **Fluid Mechanics and Hydraulic Machines Laboratory** |
|---|---|---|
| **CO** | **CO code** | *Upon completion of this course, the student will be able to…* |
| **CO1** | **U18OE311B.1** | *determine the hydraulic coefficient for various flow measuring devices* |
| **CO2** | **U18OE311B.2** | *apply Bernoulli's equation in estimating head lossin pipes* |
| **CO3** | **U18OE311B.3** | *apply the principles of impact of jet on different vanes* |
| **CO4** | **U18OE311B.4** | *demonstrate the characteristics of hydraulic machines.* |

## Course Articulation Matrix (Mapping of COs with POs and PSOs):

Course Code: **U18OE311B** Course Name: **Fluid Mechanics And Hydraulic Machines Laboratory**

| CO Code | 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 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **U18OE311B.1** | 2 | 1 | - | 1 | - | - | - | - | 1 | - | - | 1 | 1 | 1 |
| **U18OE311B.2** | 2 | 1 | - | 1 | - | - | - | - | 1 | - | - | 1 | 1 | 1 |
| **U18OE311B.3** | 2 | 1 | - | 1 | - | - | - | - | 1 | - | - | 1 | 1 | 1 |
| **U18OE311B.4** | 2 | 1 | - | 1 | - | - | - | - | 1 | 1 | - | 1 | 1 | 1 |
| **U18OE311B** | **2** | **1** | **-** | **1** | **-** | **-** | **-** | **-** | **1** | **1** | **-** | **1** | **1** | **1** |

## U18OE311C MECHATRONICS LAB

**Class:** B.Tech. III- Semester **Branch:** Mechanical Engineering

**Teaching Scheme :**

| L | T | P | C |
|---|---|---|---|
| - | - | 2 | 1 |

**Examination Scheme :**

| | | |
|---|---|---|
| Continuous Internal Evaluation | : | 40 marks |
| End Semester Examination | : | 60 marks |

**Course Learning Outcomes (LOs):**

This course will develop students' knowledge in /on

**LO1**: *basic elements underlying mechatronic systems: analog electronics, digital electronics, sensors, transducers, actuators, microcontrollers and embedded software.*

***LO2****: interface of various systems to a PLC.*

***LO3****: integration of various systems through programming.*

***LO4****: design and simulation of hydraulic and pneumatic circuits.*

### LIST OF EXPERIMENTS

1. Controlling A.C. Non servomotor clockwise and anti clockwise with time delay.
2. Controlling A.C. Non servo motor using digital inputs proximity sensors.
3. Controlling of Single acting Pneumatic Cylinder with time delay
4. Controlling of double acting Pneumatic Cylinder with time delay and sequencing
5. Control of D.C servomotor (rotating table clockwise and counter clockwise)
6. Integration of AC Non servo motors, single acting pneumatic cylinder and double acting pneumatic cylinder.
7. Integration of AC Non- servomotor and pneumatic cylinders with digital inputs.
8. Controlling of X table and Y table.
9. Controlling of various systems using manual inputs.
10. Controlling of traffic lights with time delay.
11. Controlling of lift operations with time delay.
12. Hydraulic and Pneumatic simulation.

**Laboratory Manual:**

1. Mechatronics Lab Manual, prepared by faculty of Mechanical Engineering, KITSW

**REFERENCE BOOKS:**


1. *ATS Manual of L.S. Mechatronics 2000*.
2. Bolton W., Mechatronics, *Pearson Publications*, 5/e, ISBN-13: 978-0273742869, 2011.

**Course Outcomes (COs):**

| Course Code: **U18 OE311C** | | Course Name: **MECHATRONICS LAB** |
|---|---|---|
| **CO** | **CO code** | *Upon completion of this course, the student will be able to…* |
| **CO1** | **U18OE311C.1** | *Develop PLC program to control AC non servomotors, single acting and double acting pneumatic cylinders with different operation conditions* |
| **CO2** | **U18OE311C.2** | *Develop PLC program to control various systems.* |
| **CO3** | **U18OE311C.3** | *Integrate various mechanical and electrical systems and operate them.* |
| **CO4** | **U18OE311C.4** | *Design and simulate the hydraulic and pneumatic circuits.* |

**Course Articulation Matrix (Mapping of COs with POs and PSOs):**

Course Code: **U18OE311C** Course Name: **MECHATRONICS LAB**

| CO Code | PO 1 | PO 2 | PO 3 | PO 4 | PO 5 | PO 6 | PO7 | PO 8 | PO 9 | PO 10 | PO 11 | PO 12 | PSO 1 | PSO 2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| U18OE311C.1 | 1 | 2 | 1 | 2 | - | - | - | - | - | 1 | - | 1 | 1 | 1 |
| U18OE311C.2 | 1 | 2 | 1 | 2 | 2 | - | - | - | - | 1 | - | 1 | 1 | 1 |
| U18OE311C.3 | 1 | 2 | 1 | 2 | 2 | - | - | - | - | 1 | - | 1 | 1 | 1 |
| U18OE311C.4 | 1 | 2 | 1 | 2 | 2 | - | - | - | - | 1 | - | 1 | 1 | 1 |
| U18OE311C | 1 | 2 | 1 | 2 | 2 | - | - | - | - | 1 | - | 1 | 1 | 1 |

**U18OE311D WEB PROGRAMMING LABORATORY**

**Class:** III Semester **Branch:** Common to all branches

**Teaching Scheme :**

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

**Examination Scheme :**

| | |
|---|---|
| Continuous Internal Evaluation : | 40 marks |
| End Semester Exam : | 60 marks |

**Course Learning Objectives:**
This course will develop students' knowledge in /on

**CO1:** implementing HTML Tags, CSS and JavaScripts for creating static web pages.
**CO2:** usage of JSP in designing dynamic web pages.
**CO3:** usage of PHP in designing a web base application.
**CO4:** accessing different web data servers using JSP and PHP

**Experiment-1**

1. Design the following static web pages with the following attributes:
   a. Basic Tags.
   b. Heading Tags.
   c. List (Ordered and Un-Ordered).
   d. Textbox, Buttons.

**Experiment-2**

2. **HTML**

**AIM:** Design the following static web pages required for an online book store web site.
   a. **HOME PAGE:**
   b. **LOGIN PAGE**
   c. **CATALOGE PAGE**

**DESCRIPTION:**

a. **HOME PAGE**

The static home page must contain three **frames**.

- ***Top frame*:** Logo and the college name and links to Home page, Login page, Registration page, Catalogue page and Cart page (the description of these pages will be given below).
- ***Left frame*:** At least four links for navigation, which will display the catalogue of respective links. For e.g.: When you click the link **"CSE"** the catalogue for **CSE** Books should be displayed in the Right frame.
- ***Right frame*:** The *pages to the links in the left frame must be loaded here*. Initially this page contains description of the web site.

| Logo | Web Site Name | | | |
|---|---|---|---|---|
| Home | Login | Registration | Catalogue | Cart |
| CSE<br>ECE<br>EEE<br>CIVIL | Description of the Web Site | | | |

**b. LOGIN PAGE:** This page looks like below:

| Logo | Web Site Name | | | |
|---|---|---|---|---|
| Home | Login | Registration | Catalogue | Cart |
| CSE<br>ECE<br>EEE<br>CIVIL | Login :<br>Password:<br>**Submi** **Reset** | | | |

**Experiment-3**

**c. CATOLOGUE PAGE:**

The catalogue page should contain the details of all the books available in the web site in a table. The details should contain the following:

- Snap shot of Cover Page.
- Author Name and Publisher.
- Price and Add to cart button.

| Logo | Web Site Name | | | |
|---|---|---|---|---|
| Home | Login | Registration | Catalogue | Cart |
| CSE | | Book : XML Bible<br>Author : Winston<br>Publication : Wiely | $ 40.5 | Add to cart |
| ECE | | Book : AI<br>Author : S.Russel<br>Publication : Princeton hall | $ 63 | Add to cart |
| EEE | | Book : Java 2<br>Author : Watson<br>Publication : BPB publications | $ 35.5 | Add to cart |
| CIVIL | | Book : HTML in 24 hours<br>Author : Sam Peter<br>Publication : Sam publication | $ 50 | Add to cart |

**Experiment-4**

3. **VALIDATION**

**AIM:** To do validation for registration page using JavaScript.

**DESCRIPTION:** Write *JavaScript* to validate the following fields of the above registration page.

a. Name (Name should contains alphabets and the length should not be less than 6 characters).
b. Password (Password should not be less than 6 characters length).
c. E-mail id (should not contain any invalid and must follow the standard pattern ***(name@domain.com)***
d. Phone number (Phone number should contain 10 digits only).

Note: You can also validate the login page with these parameters.

4. **CSS**

**AIM:** Write a program illustrating various methods in cascading style sheets.

a. Use different font, styles and set a background image
b. Control the repetition of the image
c. Define styles for links
d. Work with layers and add a customized cursor

**DESCRIPTION:** Design a web page using **CSS (C**ascading **S**tyle **S**heets**)** which includes the following:

a. Use different font, styles: In the style definition you define how each selector should work (font, color etc.).Then, in the body of your pages, you refer to these selectors to activate the styles.
b. Set a background image for both the page and single elements on the page. You can define the background image for the page like this:
c. Control the repetition of the image with the background-repeat property. As background-repeat: repeat
d. Define styles for links
e. Work with layers:
f. Add a customized cursor:

***Selector {cursor:value}***
***.xlink {cursor:crosshair}***
***.hlink{cursor:help}***

5. Embedding JavaScript in HTML pages.
6. Design a registration form and validate its field by using JavaScript.

**Experiment-5**

7. To design the scientific calculator and make event for each button using JavaScript.
8. WAP to create popup boxes in JavaScript.
9. Program to create a class calculator that contains an overloaded method called "add" to calculate the sum of two integers, two float numbers and, one integer and one float.

**Experiment-6**

**10.** Print current date & time
**11.** JSP Program to auto refresh a page
**12.** JSP Program to count no. of visitors on website
**13.** JSP program for error handling
**14.** Demonstrate expression tag
**15.** Detect locale, language settings & local specific time
**16.** Demonstrate JSP implicit object
**17.** JSP Program to display given number in words

**Experiment-7**

**18.** Display the contents of Employee table in a neat format.
***19.*** Insert ***N***, no. of records into Employee table using ***Prepared Statement.***
**20.** Enhance the salaries of Employee by 10% who are earning salary greater than 5000 using ***Callable Statement.***
**21.** Delete all students whose marks are below 50% and also display the count.

**Experiment-8**

**22.** Write a HTML file to create a simple form with 5 input fields ***(Name, Password, Email, Pin code, Phone No. and a Submit button)*** and demonstrate required field validations to validate that all input fields are required and display error messages if the above validations do not hold.
**23.** Create a JSP Page with and run in JSP Engines.
**24.** Demonstrate Session Tracking in JSP.
**25.** JSP Program to validate username and password

**Experiment-9**

**26.** Create Database Connectivity with JSP page with different JDBC Drivers.
**27.** JSP Program to Select record from database
**28.** JSP Program to Insert a record into the database
**29.** Create a CRUD operation for JSP Page using MySQL
**30.** JSP Program to upload file into server

**Experiment-10**

**31.** Create a form for your college library entering student details for each student in the college. Validate the form using PHP valuators and display error messages.
**32.** Write a PHP which does the following job:
Insert the details of the 3 or 4 users who register with the web site by using registration form. Authenticate the user when he submits the login form using the UserName and Password from the database (instead of cookies).

**Experiment-11**

**33.** Create tables in the database which contain the details of items (books in our case like Book name, Price, Quantity, Amount) of each category. Modify your catalogue page in such a way that you should connect to the database and extract data from the tables and display them in the catalogue page using PHP.

**34.** Create and delete MYSQL database using PHP.

**Experiment-12**

**35.** Create a PHP program to demonstrate opening and closing a file.

**36.** Create a PHP program to demonstrate reading a file and writing in a file.

| Course Code: **U18OE311D** Course Name: **Web Programming Laboratory** | | |
|---|---|---|
| **CO** | **CO code** | *Upon completion of this course, the student will be able to…* |
| **CO1** | **U18OE311D.1** | create the static web pages using HTML Tags and CSS and JavaScripts |
| **CO2** | **U18OE311D.2** | design dynamic web page for web applications using JSP |
| **CO3** | **U18OE311D.3** | develop server side scripts for web base applications using PHP |
| **CO4** | **U18OE311D.4** | design web applications for effective storage and retrieval of data in MySQL using PHP. |

**Mapping of the course outcome with program outcomes**

| Course outcomes | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | P10 | P11 | P12 | PSO1 | PSO2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| U18OE311D.1 | 2 | 2 | 2 | 1 | 2 | 1 | - | 1 | 2 | 1 | 2 | 1 | - | 1 |
| U18OE311D.2 | 2 | 2 | 2 | 1 | 2 | 1 | - | 1 | 2 | 1 | 2 | 1 | - | 1 |
| U18OE311D.3 | 2 | 2 | 2 | 1 | 2 | 1 | - | 1 | 2 | 1 | 2 | 1 | - | 1 |
| U18OE311D.4 | 2 | 2 | 2 | 1 | 2 | 1 | 1 | 1 | 2 | 1 | 2 | 1 | - | 1 |
| U18OE311D | 2 | 2 | 2 | 1 | 2 | 1 | 1 | 1 | 2 | 1 | 2 | 1 | - | 1 |

## U18OE311E MICROPROCESSORS LABORATORY

**Class**: B.Tech. III-Semester **Branch:** Common to all branches

**Teaching Scheme:**

| L | T | P | C |
|---|---|---|---|
| - | - | 2 | 1 |

**Examination Scheme:**

| | |
|---|---|
| Continuous Internal Evaluation | 40 marks |
| End Semester Examination | 60 marks |

**Course Learning Objectives (LO)**:
This Course will develop student'sknowledge on/in
**LO1***: programming using 8086 Microprocessor kit*
**LO2***: basic arithmetic programs and sorting using 8086 Microprocessor kit*
**LO3***: string manipulation and code conversions using MASM*
**LO4***: interfacing of subsystems to 8086 microprocessor kit*

**List of Experiments**
(Based on theory course U18OE303E)

1. Study of 8086 Trainer Board
2. Simple Arithmetic Operations (Addition, Subtraction, Multiplication and Division)
3. Finding Sum, Average.
4. Largest/Smallest Number in a given array
5. Arranging in Ascending/ Descending order
6. Finding Factorial using recursive procedure
7. Transfer of bytes from DS to ES
8. ALPs for String Manipulation
9. ALPs for Code conversions
10. Wave form Generation using DAC modules
    i. Square wave ii. Saw tooth wave iii. Triangular wave
11. ADC interfacing
12. Stepper motor –interfacing

**Laboratory Manual:**

1. Microprocessors Laboratory Manual, *prepared by the faculty of department of ECE, KITSW.*

## Course Learning Outcomes (COs):

| Course Code: **U18OE311E** | | Course Name: **MICROPROCESSORS LAB** |
|---|---|---|
| **CO** | **CO code** | Upon completion of this course, the student will be able to… |
| **CO1** | **U18OE311E.1** | *write and execute assembly language programs for given tasks on 8086 microprocessor kit* |
| **CO2** | **U18OE311E.2** | *implement code conversions and bit manipulations programs in 8086 using MASM* |
| **CO3** | **U18OE311E.3** | *write waveform generation code using DAC modules* |
| **CO4** | **U18OE311E.4** | *interface stepper motor, keyboard, memory etc. with 8086 microprocessor* |

## Course Articulation Matrix (Mapping of COs with POs and PSOs):

| Course code: **U18OE311E** | | | | | | | | | | | | | | Course Name: **MICROPROCESSORS LAB** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **CO Code** | **PO1** | **PO2** | **PO3** | **PO4** | **PO 5** | **PO6** | **PO7** | **PO 8** | **PO 9** | **PO 10** | **PO 11** | **PO 12** | **PSO 1** | **PSO 2** |
| **U18OE311E.1** | 3 | 3 | 2 | 1 | -- | -- | -- | -- | -- | -- | -- | -- | - | 1 |
| **U18OE311E.2** | 3 | 2 | 2 | 1 | -- | -- | -- | -- | -- | -- | -- | -- | - | 1 |
| **U18OE311E.3** | 3 | 2 | 1 | 1 | -- | -- | -- | -- | -- | -- | -- | -- | - | 1 |
| **U18OE311E.4** | 3 | 3 | 2 | 1 | -- | -- | -- | -- | -- | -- | -- | -- | - | 1 |
| **U18OE311E** | **3** | **2.5** | **1.75** | **1** | **--** | **--** | **--** | **--** | **--** | **--** | **--** | **--** | **-** | **1** |

## U18OE311F STRENGTH OF MATERIALS LABORATORY

**Class:** B.Tech. III -Semester **Branch:** Common to all branches

**Teaching Scheme :**

| L | T | P | C |
|---|---|---|---|
| - | - | 2 | 1 |

**Examination Scheme :**

| | |
|---|---|
| Continuous Internal Evaluation | 40 marks |
| End Semester Examination | 60 marks |

**Course Learning Objectives (LOs):**
This course will develop students' knowledge in /on
***LO1:*** *testing of civil engineering materials*
***LO2:*** *mechanical properties of civil engineering materials*
***LO3:****behavior of civil engineering materials when tested*
***LO4:****codal specifications of various engineering materials*

### LIST OF EXPERIMENTS

1. Determination of Stress–Strain characteristics of (a) Mild steel and (b) TOR steel.
2. Determination of the compressive strength of wood and punching shear strength.
3. Determination of the Brinell's hardness numbers for steel, brass and aluminum.
4. Determination of the modulus of rigidity by conducting torsion test on solid shaft or hollow shaft.
5. Determination of the modulus of rigidity by conducting compression test on spring.
6. Determination of the Young's modulus of the given material by conducting flexural test on simply supported beam.
7. Determination of the Young's modulus of the given material by conducting flexural test on continuous beam.
8. Determination of the Young's modulus of the given material by measuring conducting flexural test on propped cantilever beam.
9. Bend and rebend test on steel specimen.
10. Shear test for Mild steel specimen.
11. Impact test on Metal Specimens using Izod test.
12. Impact test on Metal Specimens using Charpy test.
13. Demonstration of measuring strains using strain gauges, LVDTs

**Laboratory Manual:**

1. *Strength of MaterialsLaboratory Manual*, prepared by faculty ofCivil Engineering, KITSW

**Reference Books:**

1. Harmer E. Davis and George Earl Troxell, "*Testing and Inspection of Engineering Materials*",McGraw-Hill book company, inc, 2ndedn.,1955.
2. A.V.K. Suryanarayana, "*Testing of Metallic Materials*", Prentice-Hall of India, 2ndedn., 2007.
3. IS 1786:2008 "*High strength deformed steel bars and wires for concrete reinforcement-specification.* Bureau of Indian standards, New Delhi, 2008.
4. IS 432(Part-I):1982 "*Specification for mild steel and medium tensile steel bars and Hard drawn steel wires for concrete reinforcement*". Bureau of Indian standards, New Delhi, 1992.
5. IS 432(Part-II):1982 "*Specification for mild steel and medium tensile steel bars and Hard drawn steel wires for concrete reinforcement*". Bureau of Indian standards, New Delhi, 2004.

## Course Outcomes (COs):

| Course Code: **U18OE311F** | | Course Name: **Strength of Materials Laboratory** |
|---|---|---|
| **CO** | **CO code** | *Upon completion of this course, the student will be able to…* |
| **CO1** | **U18OE311F.1** | correlate theory with the testing of engineering materials for quality assessment. |
| **CO2** | **U18OE311F.2** | evaluate the mechanical properties of civil engineering materials. |
| **CO3** | **U18OE311F.3** | appraise the behavior of civil engineering materials when tested under loads. |
| **CO4** | **U18OE311F.4** | realize the specifications recommended by codes to civil engineering materials. |

## Course Articulation Matrix (Mapping of COs with POs and PSOs):

Course Code: **U18OE311F** Course Name: **Strength of Materials Laboratory**

| CO Code | 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 | PSO 3 | PSO 4 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **U18OE311F.1** | 1 | - | - | 1 | - | 1 | - | - | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| **U18OE311F.2** | 1 | - | - | 1 | - | 1 | - | - | 2 | - | - | 1 | 1 | 1 | 1 | - |
| **U18OE311F.3** | 1 | - | - | 1 | - | 1 | - | - | 2 | - | - | 1 | 1 | 1 | 1 | - |
| **U18OE311F.4** | 1 | - | - | 1 | - | 1 | - | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| **U18OE311F** | **1** | **-** | **-** | **1** | **-** | **1** | **-** | **2** | **1.75** | **1** | **1** | **1** | **1** | **1** | **1** | **1** |

# KAKATIYA INSTITUTE OF TECHNOLOGY & SCIENCE: WARANGAL-15
## DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING
### Semester-wise Structure of Curriculum

### IV - Semester [Second year]

| Sl. No | Category | Course Code | Course Title | Hours per week | | | Credits | Evaluation Scheme | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | L | T | P | | CIE | | | ESE | Total Marks |
| | | | | | | | | TA | MSE | Total | | |
| 1 | OE | U18OE401 | Open Elective-II | 3 | 1 | - | 4 | 10 | 30 | 40 | 60 | 100 |
| 2 | HSMC | U18MH402 | Professional English | - | - | 2 | 1 | 100 | - | 100 | - | 100 |
| 3 | PCC | U18EC403 | Electro Magnetic Waves & Transmission Lines | 3 | - | - | 3 | 10 | 30 | 40 | 60 | 100 |
| 4 | PCC | U18EC404 | Analog Circuits - II | 3 | - | - | 3 | 10 | 30 | 40 | 60 | 100 |
| 5 | PCC | U18EC405 | Pulse and Digital Circuits | 3 | - | - | 3 | 10 | 30 | 40 | 60 | 100 |
| 6 | PCC | U18EC406 | Probability& Random Processes | 3 | - | - | 3 | 10 | 30 | 40 | 60 | 100 |
| 7 | PCC | U18EC407 | Digital Design | 3 | - | - | 3 | 10 | 30 | 40 | 60 | 100 |
| 8 | MC | U18MH415 | Essence of Indian Traditional Knowledge | 2 | - | - | - | 10 | 30 | 40 | 60 | 100 |
| 9 | PCC | U18EC408 | Analog Circuits - II Laboratory | - | - | 2 | 1 | 40 | - | 40 | 60 | 100 |
| 10 | PCC | U18EC409 | Pulse and Digital Circuits Laboratory | - | - | 2 | 1 | 40 | - | 40 | 60 | 100 |
| | | | Total | **20** | **1** | **6** | **22** | **250** | **210** | **460** | **540** | **1000** |
| 11 | MC | U18CH416 | Environmental Studies * | 2 | - | - | 0 | 10 | 30 | 40 | 60 | 100 |

* indicates Mandatory Non Credit course for Lateral Entry Students Only Periods: 27

**Open Elective-II**

U18OE401A: Applicable Mathematics (M&H)
U18OE401B: Basic Electronics Engg. (ECE)
U18OE401C: Elements of Mech. Engg. (ME)
U18OE401D: Measurements & Instrumentations (EIE)
U18OE401E: Computers Networks (IT)
U18OE401F: Renewable Energy Resources (EEE)

## U18OE401A APPLICABLE MATHEMATICS

**Class:** B.Tech. IV-Semester **Branch:** Common to all branches

**Teaching Scheme :**

| L | T | P | C |
|---|---|---|---|
| 3 | 1 | - | 4 |

**Examination Scheme :**

| | |
|---|---|
| Continuous Internal Evaluation | 40 marks |
| End Semester Exam | 60 marks |

**Course Learning Objectives (LOs):**
This course will develop students' knowledge in /on
***LO1****: application of Fourier series to solve wave equation, heat conduction equation and Laplace equation*
***LO2*****:** *the methods of fitting curves by the method of least squares, statistical methods and probability distributions with applications to engineering disciplines.*
***LO3*****:** *finite difference operators; the concept of interpolation and numerical integration.*
***LO4*****:** *numerical methods and application to find numerical solutions of differential equations.*

### UNIT-I (9+3)

**Applications of Partial Differential Equations:** Basic concepts of partial differential equations, classification of second order partial differential equations, solution of a partial differential equation, solution through the method of separation of variables.
**Vibrating String:** Wave equation and its solution by the method of separation of variables, D'Alembert's solution of wave equation, solutions of various boundary value problems based on vibrating string.
**One Dimensional Heat Flow:** Transient heat flow equation, heat flow through a bar of finite length with homogeneous and non homogeneous boundary conditions, heat flow through a bar with insulated ends.
**Two Dimensional Heat Flow:** Equation of two dimensional heat flow (Laplace's equation) under steady state / the electrostatic potential of electrical charges in any region that is free of these charges (problems based on Trigonometric FS only),solution of Laplace's equation in Cartesian and polar form, heat flow through infinite rectangular plates, finite square plate and semi circular and circular plates.

### UNIT-II (9+3)

**Statistics:** Statistical data: Review of measures of central tendency and measures of dispersion, correlation coefficient, rank correlation, regression – Linear regression equations.
**Curve Fitting:** Method of least squares –fitting of (i) Straight line (ii) Second degree parabola (iii) Exponential curves, most plausible solution of a system of linear algebraic equations.
**Probability**: Review of the concepts of probability, random variables, Discrete and continuous probability distributions, mean and variance of a distribution, Binomial distribution, Poisson distribution, and Normal distribution, fitting of these probability distributions to the given data.

### UNIT-III (9+3)

**Numerical Analysis:** Finite differences and difference operators.
**Interpolation**: Newton's forward and backward interpolation formulae. Lagrange interpolation
**Numerical Differentiation:** First and second derivatives using forward and backward interpolation polynomials at the tabulated points.
**Numerical Integration**: Gaussian quadrature formula, Trapezoidal rule, Simpson's $1/3^{rd}$ rule and Simpson's $3/8^{th}$ rule.

**UNIT-IV (9+3)**

**Solution to System of Linear Equations:** Gaussian elimination method, Jacobi Method and Guass-Siedel Iteration Method.

**Numerical Solution of Algebraic and Transcendental Equations**: Bisection method, Regula-Falsi method and Newton Raphson's method.

**Numerical Solution of Ordinary Differential Equations:**Taylor's method, Picard's method, Euler's method and Runge - Kutta methods of second and fourth order**.**

**Text Books:**

2. Grewal, B.S., "Higher Engineering Mathematics", *Khanna Publishers,* Delhi, 43/e, 2014.

**Reference Books:**

3. Gupta and Kapoor, "Fundamentals of Mathematical Statistics", *Sulthan Chand and & sons,* New Delhi, 11th edition, 2010.
4. Kreyszig E.," Advanced Engineering Mathematics", John wiely *& sons, Inc.,U.K.,*9th edition,2013.
5. Sastry S.S, "Introduction to numerical Analysis", *Prentice Hall of India Private Limited*,New Delhi.4th edition,2005.

## Course Outcomes (COs):

| Course Code: **U18OE401A** Course Name: **APPLICABLE MATHEMATICS** | | |
|---|---|---|
| **CO** | **CO code** | *Upon completion of this course, the student will be able to…* |
| **CO1** | **U18OE401A.1** | *solve wave equation, heat conduction equation and Laplace equation using Fourier series* |
| **CO2** | **U18OE401A.2** | *find correlation regression coefficients, fit curves using method of least squares for given data and apply theoretical probability distributions in decision making* |
| **CO3** | **U18OE401A.3** | *estimate value of a function by applying interpolation formulae* |
| **CO4** | **U18OE401A.4** | *apply numerical methods to solve simultaneous algebraic equations, differential equations, find roots of algebraic and transcendental equations* |

## Course Articulation Matrix (Mapping of COs with POs and PSOs):

Course code: **U18OE401A** Course Name: **APPLICABLE MATHEMATICS**

| CO Code | PO | PO | PO | PO | PO | PO | PO7 | PO8 | PO | PO10 | PO11 | PO1 | PSO1 | PSO2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **U18OE401A.1** | 2 | 2 | -- | -- | -- | -- | -- | -- | -- | -- | -- | 1 | 1 | -- |
| **U18OE401A.2** | 2 | 2 | -- | -- | -- | -- | -- | -- | -- | -- | -- | 1 | 1 | -- |
| **U18OE401A.3** | 2 | 2 | -- | -- | -- | -- | -- | -- | -- | -- | -- | 1 | 1 | -- |
| **U18OE401A.4** | 2 | 2 | -- | -- | -- | -- | -- | -- | -- | -- | -- | 1 | 1 | -- |
| **U18OE401A** | **2** | **2** | **--** | **--** | **--** | **--** | **--** | **--** | **--** | **--** | **--** | 1 | **1** | **--** |

**U18OE401B BASIC ELECTRONICS ENGINEERING**

**Class:** B.Tech. IV Semester **Branch:** Common to all branches

**Teaching Scheme:**

| L | T | P | C |
|---|---|---|---|
| 3 | 1 | - | 4 |

**Examination Scheme:**

| | |
|---|---|
| Continuous Internal Evaluation | 40 Marks |
| End Semester Exam | 60 Marks |

**Course Learning Objectives**:

This course will develop student's knowledge on/in…

**LO1**: t*o introduce the basic concepts of semiconductors and conductivity in semiconductors*
**LO2**: t*o impart the knowledge on working of semiconductor diode as Rectifier*
**LO3**: t*o make the students to understand the basic concepts of BJT &DC biasing concepts*
**LO4**: t*o introduce the fundamental concepts and basic principles of special semiconductor devices.*

**UNIT-I(9+3)**

**Introduction to Electronics:**
Analog Signals (DC & AC), Sources (DC & AC), Digital Signals
**Semiconductors**:
Energy bands in solids, Concept of forbidden gap, Insulator, Metals and Semiconductors, Transport phenomenon in semiconductors: Mobility and conductivity, Intrinsic semiconductor, Donor and Acceptor impurities, Fermi level, Drift currents and Diffusion currents, Temperature dependence of conductivity, Hall Effect

**UNIT-II(9+3)**

**Semiconductor Diode:**
P-N Junction, Band diagram, Depletion layer, V-I characteristics of P-N Diode, Diode resistance and capacitance, Avalanche and Zener breakdown mechanisms

**Diode Circuits:**
Rectifier circuits – Half wave, Full wave & Bridge rectifiers, Ripple factor with and without filters, Voltage regulation using Zener diode, Block diagram of DC adapter.

**UNIT-III(9+3)**

**Bipolar Junction Transistor:**
Physical structure, Transistor current components, CE, CB & CC configurations and their Input & Output characteristics

**DC Analysis of BJT Circuits**:
DC load line, Need for biasing, Transistor biasing techniques for CE configuration, Basic transistor applications: Switch and Amplifier.

**UNIT-IV(9+3)**

**Field Effect Transistor:**
Physical **s**tructure, Operation and Characteristics of a Junction Field Effect Transistor (JFET), MOSFET, DMOSFET, EMOSFET.

**Special Semiconductor Devices:**
Operation and Characteristics- Tunnel Diode, Schottky diode, Photo Diode, Photo Transistor, PIN Diode, LED, LASER, UJT.

**Text Books:**


1. Bhargava and Kulashresta, "Basic Electronics and Linear Circuits", *TTTI, TMH, India*.
2. S.Salivahanan and N.Suresh Kumar, "Electronic Devices and Circuits", *Tata McGraw Hill Education (India) Private* Ltd, 2nd Edition, 2009.

**Reference Books:**


1. Jacob Millman, Christos C Halkias, "Electronic Devices and Circuits", 3/e, *TMH,* India.
2. David.A.Bell, "Electronic Devices and Circuits", *Oxford University Press,* New Delhi, India.
3. Neil storey, "Electronics: A systems Approach", *4/e-Pearson Education Publishing company Pvt. Ltd*, India


**Course Outcomes (COs)**

| Course Code: **U18EC401B** | | Course Name: **BASIC ELECTRONICS ENGINEERING** |
|---|---|---|
| **CO** | **CO Code** | Upon completion of this course, the student will be able to.. |
| **CO1** | **U18EC401B.1** | *Analyze the behavior of semiconductor devices* |
| **CO2** | **U18EC401B.2** | *Design half wave and full wave rectifier circuits with filters* |
| **CO3** | **U18EC401B.3** | *Characterize BJT configurations with input output characteristics and biasing techniques* |
| **CO4** | **U18EC401B.4** | *Acquire knowledge of new emerging areas of science and technology in differentiating semiconductor devices..* |

## Course Articulation Matrix (Mapping of COs with POs and PSOs )

| Course Code: **U18EC401B** | | | | | | | | | | | | | Course Name: **BASIC ELECTRONICS ENGINEERING** | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **CO Code** | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** | **PO6** | **PO7** | **PO8** | **PO9** | **PO10** | **PO11** | **PO12** | **PSO1** | **PSO2** |
| **U18EC401B.1** | 2 | 2 | 1 | 2 | - | - | - | - | - | - | - | - | 1 | - |
| **U18EC401B.2** | 2 | 2 | 2 | 2 | - | - | - | - | - | - | - | - | 1 | - |
| **U18EC401B.3** | 2 | 2 | 2 | 2 | - | - | - | - | - | - | - | - | 1 | - |
| **U18EC401B.4** | 2 | 2 | 1 | 2 | - | - | - | - | - | - | - | 2 | 1 | - |
| **U18EC401B** | **2** | **2** | **1.5** | **2** | **-** | **-** | **-** | **-** | **-** | **-** | **-** | **2** | **1** | **-** |

**U18OE401C ELEMENTS OF MECHANICAL ENGINEERING**

**Class:** B.Tech., IV-Semester **Branch:** Common to all branches

**Teaching Scheme :**

| L | T | P | C |
|---|---|---|---|
| 3 | 1 | - | 4 |

**Examination Scheme :**

| | |
|---|---|
| Continuous Internal Evaluation : | 40 marks |
| End Semester Exam : | 60 marks |

**Course Learning Objectives (LOs)**:
This course will develop students' knowledge in/on
***LO1****: types of materials, design methodology and elements of power transmission*
***LO2:*** *different manufacturing processes and their applications.*
***LO3:*** *laws of thermodynamics and types of systems*
***LO4:*** *principle and applications of SI &CI engines.*

**UNIT- I (12)**

**Engineering Materials:** Classification, properties and applications
**Design Criterion:**Discrete steps in engineering design process
**Power Transmission:** Classification;flat belt drives - length of open and cross belts, belt tensions and power transmitted; Gears-types and applications; spur gear-nomenclature
**Bearings**: Types – sliding& rolling contact bearings and applications;

**UNIT- II (12)**

**Manufacturing Processes:** Classification; Foundry- steps in sand casting process; pattern-types, materials and allowances, mould cross section,moulding sand-composition and properties; Machining: lathe machine-line diagram and operations;Welding-classification; principle of arc welding- AC and DC welding, principle of gas welding, principle of brazing and soldering;
Metal forming process: forging, rolling, extrusion.

**UNIT- III (12)**

**Thermodynamics**: System-types, state, property, process and cycle; Energy-property; Zeroth law,thermodynamic equilibrium,laws of perfect gases.
**Law of Thermodynamics:** First law- applied to a cycle, change of state, Internal energy, Enthalpy;Work and Heat in closed systems- Isobaric, Isochoric, Isothermal, Adiabatic and Polytropic; PMM-I,limitations of first law of thermodynamics.

**UNIT- IV (12)**

**Second Law of Thermodynamics:** Kelvin-Planck and Clausius Statements and their equivalence; Carnot cycle, Carnot theorem, heat engine, heat pump and refrigerator; working principle of domestic air conditioner-line diagram.
**IC Engines:** Classification; working principle of four and two stroke SI and CI engines.

**Text Book:**

1. Mathur, Mehta and Tiwari, "Elements of Mechanical Engineering", *Jain Brothers*, New Delhi,2017.

**Reference Books:**

1. Hazra Chowdary. S. K and Bose, "Basic Mechanical Engineering", *Media Promoters and Publishers Pvt. Ltd,* India, 2010.
2. P. K. Nag, "Engineering Thermodynamics", *Tata McGraw Hill*, New Delhi.
3. Hazra Chowdary. S. K and Bose, "Workshop Technology, Vol. I & II", *Media Promoters and publishers Pvt Ltd,* India.

**Course Outcomes (COs):**

| Course Code:**U18OE401C** | | Course Name: **Elements of Mechanical Engineering** |
|---|---|---|
| **CO** | **CO code** | Upon completion of this course, the student will be able to… |
| **CO1** | **U18OE401C.1** | *explain mechanical properties of an engineering materials and learn the steps in design methodology.* |
| **CO2** | **U18OE401C.2** | *describe the principles of manufacturing processes* |
| **CO3** | **U18OE401C.3** | *apply first law of thermodynamics to various processes to calculate work and heat for a closed system.* |
| **CO4** | **U18OE401C.4** | define *second law of thermodynamics and demonstrate the working principle of IC engines.* |

**Course Articulation Matrix (Mapping of COs with POs and PSOs):**

Course code:**U18OE401C**Course Name: **Elements of Mechanical Engineering**

| CO Code | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO 12 | PSO1 | PSO2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **U18OE401C.1** | 2 | 2 | - | - | - | - | - | - | - | - | - | - | 1 | 1 |
| **U18OE401C.2** | 2 | - | - | - | - | - | - | - | - | - | - | - | 1 | - |
| **U18OE401C.3** | 2 | 2 | - | - | - | - | - | - | - | - | - | - | 1 | 1 |
| **U18OE401C.4** | 2 | 2 | - | - | - | - | - | - | - | - | - | - | 1 | 1 |
| **U18OE401C** | **2** | **2** | **-** | **-** | **-** | **-** | **-** | **-** | **-** | **-** | **-** | **-** | **1** | **1** |

## U18OE401D FUNDAMENTALS OF MEASUREMENTS & INSTRUMENTATION

**Class**: B.Tech. IV – Semester

**Branch**: Common to all Branches

**Teaching Scheme:**

| L | T | P | C |
|---|---|---|---|
| 3 | 1 | - | 4 |

**Examination Scheme:**

| | |
|---|---|
| Continuous Internal Evaluation | 40 marks |
| End Semester Examination | 60 marks |

**Course Learning Objectives (LOs)**:

This course will develop students' knowledge on /in

*LO1: working principle of DC measuring instruments; DC, AC bridge circuits and their applications*

*LO2: principle of operation of Q meter, DVM, DMM, CRO, DSO and display devices*

*LO3: working principle of various transducers and their applications*

*LO4: working principle of seismic transducers, piezoelectric accelerometer, sound level meter, level transducer, flow meter and data acquisition system*

### UNIT–I (9+3)

**DC measuring instruments (principle of operation):** Measurement system – block diagram and example; performance characteristics – accuracy, precision, resolution, threshold, span, % error and fidelity; DC meters (working principle) – PMMC mechanism, shunt type ammeter, series type voltmeter, shunt type ohmmeter; DC potentiometers - Crompton's DC potentiometer, calibration of meters (ammeter, voltmeter & wattmeter) using DC potentiometer

**DC & AC bridges:** General bridge balance equation, bridge calibration, applications of bridges, Wheatstone bridge, Maxwell bridge, Schering bridge, Wien's bridge

### UNIT – II (9+3)

**Electronic instruments (principle of operation):** Q-meter – basic Q-meter circuit; digital meter – characteristics (resolution & count), DC & AC attenuators, block diagram of dual slope type digital voltmeter, block diagram of digital multimeter (DMM); oscilloscopes – working principle of cathode ray tube (CRT), block diagram of cathode ray oscilloscope (CRO) , block diagram of digital storage oscilloscope (DSO); display devices – working principle of LED & LCD types

### UNIT – III (9+3)

**Transducers (principle of operation)**: Transducer - classification, examples and ideal requirements; sensors – cantilever beam & proving ring types of load cells, bourdon tube & diaphragm type pressure sensors; resistive transducers – piezo-resistive effect of strain gauge (SG), gauge factor, SG type force transducer, SG type pressure transducer and RTD; thermocouple type temperature transducer, LVDT type inductive transducer, differential type capacitive transducer, piezoelectric type transducer; photoelectric type transducer

### UNIT – IV (9+3)

**Transducers (principle of operation)**: Seismic transducers – displacement transducer, velocity pickup and accelerometer, piezoelectric accelerometer, sound level meter (block diagram), capacitive microphone, capacitive type level transducer (double electrode type), ultrasonic flow meter and electromagnetic flow meter; introduction to data acquisition (DAQ) system

**Text Books:**

1 P. Pruthviraj, B. Bhudaditya, S. Das and K. Chiranjib, "Electrical and Electronic Measurement and Instrumentation", McGraw-Hill Education, 2nd edition, 2013, New Delhi. (*Chapters 1 to 3, 8 to 10 and 13 to 15*)

2 Arun K. Ghosh, "Introduction to Transducers", *PHI*, 4th edition, 2015, New Delhi. (*Chapters 1 to 7*)

**Reference Books:**

1 A.K. Sawhney, "Electrical and Electronics Measurements and Instrumentation", *Dhanpatrai* & Co., 2015, New Delhi.

2 Helfrick. A.D and Cooper W.D., "Modern Electronic Instrumentation and Measurement Techniques", *Pearson India Edn.*, 2nd edition, 2016, New Delhi.

3 B.C. Nakra, K.K Choudhry, "Instrumentation Measurement and Analysis", *TMH*, 4th edition, 2008, New Delhi.

4 D.V.S. Murthy, "Transducers and Instrumentation", *Prentice Hall of India*, 2nd edition, 2012, New Delhi.

**Course Outcomes (COs):**

| Course Code: **U18EI401D** Course Name: **FUNDAMENTALS OF MEASUREMENTS & INSTRUMENTATION** | | |
|---|---|---|
| **CO** | **CO Code** | *Upon completion of this course, students will be able to…* |
| **CO1** | **U18EI401D.1** | explain about working principle of measurement system, PMMC based meters and applications of DC & AC bridge circuits |
| **CO2** | **U18EI401D.2** | describe the principle of operation of Q-meter, DVM, DMM, CRO, DSO and display devices |
| **CO3** | **U18EI401D.3** | elaborate on the working principle of resistive, inductive, capacitive and piezoelectric transducers and their applications |
| **CO4** | **U18EI401D.4** | explain about seismic transducers, sound level meter, level transducer, flow meters and block diagram of data acquisition system |

**Course Articulation Matrix (Mapping of COs with POs and PSOs):**

| Course Code: **U18EI401D** Course Name: **FUNDAMENTALS OF MEASUREMENTS & INSTRUMENTATION** | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **CO Code** | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** | **PO6** | **PO7** | **PO8** | **PO9** | **PO10** | **PO11** | **PO12** | **PSO1** | **PSO2** |
| **U18EI401D.1** | 2 | 1 | 1 | 1 | - | - | 1 | - | - | - | - | 1 | 1 | 1 |
| **U18EI401D.2** | 2 | 1 | 1 | 1 | - | - | 1 | - | - | - | - | 1 | 1 | 1 |
| **U18EI401D.3** | 2 | 1 | 1 | 1 | - | - | 1 | - | - | - | - | 1 | 1 | 1 |
| **U18EI401D.4** | 2 | 1 | 1 | 1 | - | - | 1 | - | - | - | - | 1 | 1 | 1 |
| **U18EI401D** | **2** | **1** | **1** | 1 | - | - | 1 | - | - | - | - | 1 | 1 | 1 |

## U18OE401E FUNDAMENTALS OF COMPUTER NETWORKS

**Class:** B.Tech. IV- Semester **Branch:** Common to all branches

**Teaching Scheme :**

| L | T | P | C |
|---|---|---|---|
| 3 | - | - | 3 |

**Examination Scheme :**

| | |
|---|---|
| Continuous Internal Evaluation | 40 marks |
| End Semester Exam | 60 marks |

**Course Learning Objectives (LO) :**

This course will develop students' knowledge in/on

*LO1: network topologies, network reference models, network architecture and data transmission*

*LO2: design issues and protocols of data link layer, error detection and correction, MAC protocols and ethernet standards*

*LO3: principles and design issues of network layer and internet protocols*

*LO4: transport layer design issues, protocols and application layer services*

### UNIT - I (9)

**Introduction:** History of Computer Networks and The Internet, Principles of Computer Network Design, Network Architecture, Network Types.

**Physical Layer:** Factors Affecting Data Transmission, Data Transmission, Data Transmission Codes: Non-return to Zero, Manchester Encoding, Digital modulation & Modems, Transmission Media.

### UNIT- II (9)

**Data Link Layer:** Functions of Data Link Layer, Framing Techniques, Error Detection and Correction, Elementary Data Link Layer Protocols for Flow Control.

**Local Area Networks:** Medium Access Protocols, LAN Protocol Stack, Ethernet Protocols, IEEE 802.11 LAN Standard: IEEE 802.11 Protocol Stack, Wireless LAN Topologies, Frames in IEEE 802.11.

### UNIT - III (9)

**The Network Layer:** Network Layer Services, Packet Switching Networks, The Internet Protocol(IP): IP Header in IPv4, IP Addressing in IPv4, Subnet addressing and Classless Inter-Domain Routing (CIDR), Address Resolution Protocol, Dynamic Host Configuration Protocol, Internet Layer Protocols, Fragmentation and Reassembly, IP Version 6: Motivation for IPv6 Development, Features of IPv6, IPv6 Address Representation.

**Routing Protocols:** Elements of Routing Protocol Performance, Flooding, Distance-Vector and Link State Routing Protocols, Hierarchical Routing.

### UNIT - IV (9)

**The Transport Layer**: User Datagram Protocol, Transmission Control Protocol, TCP State Transition Diagram, Other TCP Timers, TCP Congestion Control.

**The Application Layer**: World Wide Web, Domain Name System, Electronic Mail.

**Network Security:** Threats and Vulnerabilities in Computer Networks, Cryptographic Algorithms, Data Encryption Standard.

**Text Books:**

1. Mayank Dave, "Computer Networks", Second Edition, Cengage Learning, ISBN-13:978-81-315-0986-9, 2014.

**Reference Books:**

1. Forouzan, "Data Communication and Networking", Fifth Edition, *TMH*, *ISBN*978-0-07-296775-3, 2012.
2. William Stallings, "Data and Computer Communications", Ninth Edition, *Prentice-Hall India*, ISBN-81-203-1240-6, 2011.
3. Andrew S.Tanenbaum , David J. Wetherall, "Computer Networks", Fifth Edition, *Pearson Education*, ISBN-13: 978-0-13-212695-3, 2011.

**Course Outcomes (COs):**

| Course Code: **U18OE401E** Course Name: **Fundamentals of Computer Networks** | | |
|---|---|---|
| **CO** | **CO code** | Upon completion of this course, the student will be able to… |
| **CO1** | **U18OE401E.1** | *describe various network topologies, architecture and techniques for data transmission modes* |
| **CO2** | **U18OE401E.2** | *outline various design issues in data link layer and develop protocols to handle data link layer operation* |
| **CO3** | **U18OE401E.3** | *describe various design issues and develop protocols for network Layer.* |
| **CO4** | **U18OE401E.4** | *explain various design issues , protocols of transport layer & application layer services* |

**Course Articulation Matrix (Mapping of COs with POs and PSOs):**

Course code: **U18OE401E** Course Name: **Fundamentals of Computer Networks**

| CO Code | PO 1 | PO 2 | PO 3 | PO 4 | PO 5 | PO 6 | PO7 | PO 8 | PO 9 | PO 10 | PO 11 | PO 12 | PSO 1 | PSO2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **U18OE401E.1** | 2 | 1 | - | 1 | - | 1 | - | - | - | - | - | 1 | - | 1 |
| **U18OE401E.2** | 3 | 3 | 2 | 1 | 1 | 1 | - | - | - | - | - | 1 | - | 1 |
| **U18OE401E.3** | 3 | 3 | 2 | 2 | 1 | 1 | - | - | - | - | - | 1 | - | 1 |
| **U18OE401E.4** | 3 | 3 | 2 | 2 | 1 | 1 | - | - | - | - | - | 1 | - | 1 |
| **U18OE401E** | **2.75** | **2.5** | **2** | **1.5** | **1** | **1** | **-** | **-** | **-** | **-** | **-** | **1** | **-** | **1** |

**U18OE401F RENEWABLE ENERGY SOURCES**

**Class:** B.Tech, IV Semester **Branch:** Common to all branches

**Teaching Scheme:**

| L | T | P | C |
|---|---|---|---|
| 3 | - | - | 3 |

**Examination Scheme:**

| | |
|---|---|
| Continuous Internal Evaluation | 40 marks |
| End Semester Examination | 60 marks |

**Course Learning Objectives (LOs) :**

This course will develop student's knowledge in/on

**LO1** *different renewable energy sources and principle of solar energy systems*

**LO2** *wind energy, geothermal energy and MHD power generation systems*

**LO3** *harnessing energy from oceans and biomass*

**LO4** *working of fuel cells and different energy storage systems*

**UNIT-I (9)**

**Introduction:** Conventional and non-conventional sources of energy – Brief Description of different Renewable energy sources

**Solar Energy:** Introduction to prospects of solar photovoltaic (SPV) systems, principle of a PV cell, large scale SPV systems, economic considerations of SPV systems, PV cell technology, merits and limits of SPV systems, applications of SPV systems-street lighting, domestic lighting, Battery charging, SPV pumping systems

**UNIT-II (9)**

**Wind Energy:** Principles of wind power- Operation of a wind turbine- Site Characteristics.

**Geothermal Energy:** Origin and types of geothermal energy- Operational Difficulties- Vapor dominated systems- Liquid dominated systems- Petro- thermal systems.

**Magneto-Hydro Dynamic (Mhd) Power Generation:** MHD system- Open and Closed systems- Advantages of MHD systems.

**UNIT-III (9)**

**Energy from Oceans:** Ocean temperature differences, ocean waves-Wave motions and tides- Energy from the waves; Introduction of tidal power, basic principle of tidal power, components of tidal power plants, advantages and disadvantages

**Bio-Energy:** Introduction-bio-mass conversion, technologies-wet process, dry process, photo synthesis; Biogas generation- biogas from power plant wastes, methods of maintaining biogas production, utilization of biogas, biogas gasification, applications of gasifiers

**UNIT-IV (9)**

**Chemical Energy Sources:** Introduction of fuel cells, Principle of Operation of fuel cell, Classification of Fuel cells, Advantages and disadvantages of fuel cells.

**Types of Energy Storage Systems**: Introduction, Different types of Batteries, Ultra Capacitors, Flywheels, Super Conducting Magnetic storage

**TEXT BOOKS:**

1. Rai G.D "*Non-Conventional Energy Sources*", Khanna Publishers, New Delhi
2. Felix A. Farret, M. Godoy Simoes, —Integration of Alternative Sources of Energy, John Wiley & Sons, 2006
3. Bansal N.K, Kaleeman and M.Miller, "Renewable *Energy Sources and Conversion Technology*", TATA Mc Graw-Hill, New Delhi

**REFERENCE BOOKS:**

1. EL-Wakil M.M, "Power Plant Technology", Mc Graw-Hill, New York
2. Duffie and Beckman, "Solar Energy Thermal Process", John Wiley & Sons, New York

| Course code: **U18OE401F** | Course Name: **Renewable Energy Sources** | |
|---|---|---|
| **CO** | **CO code** | Upon completion of this course, the student will be able to… |
| **CO1** | **U18OE401F.1** | *compare conventional and non-conventional energy resources; explain the working principle of solar energy harnessing and its applications* |
| **CO2** | **U18OE401F.2** | *explain the working principles of wind energy, geothermal energy and MHD power generation systems* |
| **CO3** | **U18OE401F.3** | *describe the harnessing of electric power from oceans and biomass* |
| **CO4** | **U18OE401F.4** | *explain the principle of operation of fuel cells and different types of energy storage systems* |

**Course Articulation Matrix (Mapping of COs with POs and PSOs):**

| Course code: **U18OE401F** | Course Name: **Renewable Energy Sources** | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **CO Code** | **PO 1** | **PO 2** | **PO 3** | **PO 4** | **PO 5** | **PO 6** | **PO7** | **PO 8** | **PO 9** | **PO 10** | **PO 11** | **PO 12** | **PS O1** | **PS O2** |
| **U18OE401F.1** | 3 | - | - | - | - | - | 1 | - | - | - | - | - | 1 | 1 |
| **U18OE401F.2** | 3 | - | - | - | - | - | 1 | - | - | - | - | - | 1 | 1 |
| **U18OE401F.3** | 3 | - | - | - | - | - | 1 | - | - | - | - | - | 1 | 1 |
| **U18OE401F.4** | 3 | - | - | - | - | - | 1 | - | - | - | - | - | 1 | 1 |
| **U18OE401F** | **3** | **-** | **-** | **-** | **-** | **-** | **1** | **-** | **-** | **-** | **-** | **-** | **1** | **1** |

**U18MH402 PROFESSIONAL ENGLISH**

**Class**: B.Tech IV Semester **Branch:** Common to all branches

**Teaching Scheme :**

| L | T | P | C |
|---|---|---|---|
| - | - | 2 | 1 |

**Examination Scheme :**

| | |
|---|---|
| Continuous Internal Evaluation : | 100 marks |
| End Semester Exam : | - |

**Course Learning Objectives (LOs):**
This course will develop the student's knowledge in/on
*LO1: reading skill and sub skills to comprehend the text*
*LO2: vocabulary and using it appropriately to describe situations*
*LO3: using phrasal verbs in speech and writing*
*LO4: grammar and improve language ability to write effectively*

| Week | Topic Name |
|---|---|
| I | **I. Reading Comprehension-** Significance of Reading Skimming<br>**II. Verbal Ability-** Synonyms<br>**III. Grammar-** Articles |
| II | **I. Reading Comprehension-** Scanning<br>**II. Verbal Ability-** Antonyms<br>**III. Grammar-** Articles |
| III | **I. Reading Comprehension-** Critical Reading<br>**II. Verbal Ability-** Sentence completion with correct alternative word/group<br>**III. Grammar-** Prepositions |
| IV | **I. Reading Comprehension-** Intensive Reading<br>**II. Verbal Ability-** Sentence completion with correct alternative word/group<br>**III. Grammar-** Reported Speech |
| V | **I. Reading Comprehension-** Intensive Reading<br>**II. Verbal Ability-** Jumbled Sentences<br>**III. Grammar-** Error Detection |
| VI | **I. Reading Comprehension-** Inferential Reading<br>**II. Verbal Ability-** Jumbled Sentences<br>**III. Grammar-** Error Detection |
| VII | **I. Reading Comprehension-** Lexical Reading<br>**II. Verbal Ability-** Phrasal Verbs<br>**III. Grammar-** Tenses, Structures |
| VIII | **I. Reading Comprehension-** Read to Interpret<br>**II. Verbal Ability-** Single Word Substitutes<br>**III. Grammar-** Tenses, Uses |
| IX | **I. Reading Comprehension-** Read to Analyze<br>**II. Verbal Ability-** Collocations<br>**III. Grammar-** Tenses, Uses |
| X | **I. Reading Comprehension-** Read to Summarize<br>**II. Verbal Ability-** Spellings<br>**III. Grammar,** Agreement between Subject & verb (concord) |

**Text Books:**

1. Professional English *Manual prepared by the faculty of English, KITSW*
2. Arun Sharma & Meenakshi Upadhyay, "Verbal Ability and Reading Comprehension for CAT & Other Management Examinations", 8th Edition *McGraw Hill Education (India) Private Ltd*, Chennai, 2018

**Reference Books:**

1. Nishit K. Sinha, " Verbal Ability and Reading Comprehension for the CAT", 3rd Edition Pearson India Education Services Pvt. Ltd., Chennai
2. Harper Collins, "Collins COBUILD English Grammar" Third Edition, *Harper Collins Publishers Ltd.*
3. Rosemary & Courtney, "Longman-English-Chinese Dictionary of Phrasal Verbs"

**Course Outcomes (COs):**

| **Course Code: U18MH402 Course Name: Professional English** | | |
|---|---|---|
| **CO** | **CO Code** | *Up on completion of this course, the students will be able to…* |
| **CO1** | **U18MH402.1** | analyze the passage using skill and sub skill to solve different types of questions related to reading comprehension |
| **CO2** | **U18MH402.2** | identify grammatical errors in the given sentences and correct them |
| **CO3** | **U18MH402.3** | select correct synonyms/antonyms/phrasal verbs and complete sentences with suitable words or phrases |
| **CO4** | **U18MH402.4** | keep the given jumbled sentences in proper sequence to make a coherent paragraph |

**Course Articulation Matrix (Mapping of COs with POs and PSOs):**

| **Course Code: U18MH402 Course Name: Professional English** | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Course Outcomes** | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** | **PO6** | **PO7** | **PO8** | **PO9** | **PO10** | **PO11** | **PO12** | **PSO1** | **PSO2** |
| **U18MH402.1** | - | - | - | - | - | - | - | - | 1 | 2 | - | 1 | - | 1 |
| **U18MH402.2** | - | - | - | - | - | - | - | - | 1 | 2 | - | 1 | - | 1 |
| **U18MH402.3** | - | - | - | - | - | - | - | - | 1 | 2 | - | 1 | - | 1 |
| **U18MH402.4** | - | - | - | - | - | - | - | - | 1 | 2 | - | 1 | - | 1 |
| **U18MH402** | **-** | **-** | **-** | **-** | **-** | **-** | **-** | **-** | **1** | **2** | **-** | **1** | **-** | **1** |

## U18EC403 ELECTROMAGNETIC WAVES & TRANSMISSION LINES

**Class:** B.Tech. IV-Semester **Branch:** Electronics & Communication Engineering

**Teaching Scheme :**

| L | T | P | C |
|---|---|---|---|
| 3 | - | - | 3 |

**Examination Scheme :**

| | |
|---|---|
| Continuous Internal Evaluation | 40 marks |
| End Semester Exam | 60 marks |

**Course Learning Objectives (LOs):**

This course will develop students' knowledge in /on

**LO1:** *electric field due to various charge distributions, energy stored in electrostatic field.*
**LO2:** *magnetic field due to various current distributions, wave propagation in different medium.*
**LO3:** *poynting theorem and field components in parallel plate & rectangular waveguides.*
**LO4:** *transmission line equations, distortion-less transmission line, Smith chart and Stub-matching.*

### UNIT-I(9)

Review of Vector calculus, Co-ordinate systems - Cartesian, Cylindrical and Spherical, Statements of Stoke's theorem and Divergence theorem.

**Electrostatics:** Coulomb's law, Electric field intensity, Electric field due to Point charge, Line charge and Sheet charge, Electric flux density, Gauss's law and its applications, Relation between E & V, Poisson's and Laplace's Equations, Capacitance – Parallel plate, Coaxial and Spherical Capacitances, Energy stored in Electrostatic field, Boundary conditions.

### UNIT-II(9)

**Magnetostatics:** Biot–Savart's law, Magnetic field intensity, Magnetic flux density, Ampere's circuit law, Magnetic potential, Energy stored in magnetic field, Magnetic boundary conditions. **Time-varying fields:** Faraday's law of Electromagnetic Induction, Continuity of current equation, Inconsistency of Ampere's circuit law, Maxwell's Equations in differential & integral forms. **Electromagnetic waves:** Wave propagation in lossy dielectric, loss-less dielectric, free space and good conductor, Skin effect, Polarization, Reflection of EM waves.

### UNIT-III(9)

Poynting vector, Poynting theorem, Instantaneous, Average & Complex Poynting vectors and Power loss in a plane conductor.

**Waveguides:** Parallel plate Waveguide – Field components in TE, TM & TEM mode propagation, Characteristics of parallel plate waveguide, Rectangular waveguides – Field components in TE & TM mode propagation, Impossibility of TEM mode in rectangular waveguides, Characteristics of Rectangular waveguide, Introduction to circular wave guides.

### UNIT-IV(9)

**Transmission Lines:** Primary & Secondary constants, Transmission Line Equations, Infinite length transmission line, Phase velocity & Group velocity, Loss-less transmission line, Condition for distortion-less transmission line, Input impedance of a transmission line, Short-circuit & Open-circuit transmission lines, Quarter wave transformer, Smith chart – Construction, Properties and Applications, Single-stub matching.

**Text Books:**

2. Mathew N.O. Sadiku, "Principles of Electromagnetics", *Oxford University Press*, 4th Edition, 2014.
3. Umesh Sinha "Transmission Lines and Networks", *Satya Prakashan Publication*, 2nd Edition, 1999.

**Reference Books:**

4. Nathan Ida, "Engineering Electromagnetics", *Springer*, 3rd Edition.
5. Edward C. Jordan, Keith G. Balmain,"Electromagnetic Waves and Radiating Systems", *Prentice Hall of India*, 2nd Edition, 2001.
6. W H Hayt, J A Buck, "Engineering Electromagnetics", *The McGraw-Hill Companies*.
7. G.S.N. Raju, "Electromagnetic Field Theory and Transmission Lines", *Pearson Education*.

**Course Outcomes (COs):**

| Course Code: **U18EC403** Course Name: **ELECTROMAGNETIC WAVES & TRANSMISSION LINES** | | |
|---|---|---|
| **CO** | **CO code** | Upon completion of this course, the student will be able to… |
| **CO1** | **U18EC403.1** | *determine the electric field at any given point due to various charge distributions and measure the energy stored in a given electrostatic field.* |
| **CO2** | **U18EC403.2** | *apply Biot-Savart's law for determining magnetic field intensity and analyze the wave propagation in different medium.* |
| **CO3** | **U18EC403.3** | *prove Poynting theorem and derive the field components in parallel plate and rectangular waveguides.* |
| **CO4** | **U18EC403.4** | *find voltage and current in a given transmission line and evaluate the impedance using Smith chart.* |

**Course Articulation Matrix (Mapping of COs with POs and PSOs):**

| Course code: **U18EC403** Course Name: **ELECTROMAGNETIC WAVES & TRANSMISSION LINES** | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **CO Code** | **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** |
| **U18EC403.1** | 2 | 2 | 1 | 1 | -- | -- | -- | -- | -- | 1 | -- | -- | 1 | 2 |
| **U18EC403.2** | 2 | 2 | 1 | 1 | -- | -- | -- | -- | -- | 1 | -- | -- | 1 | 2 |
| **U18EC403.3** | 2 | 2 | 1 | 1 | -- | -- | -- | -- | -- | 1 | -- | -- | 1 | 2 |
| **U18EC403.4** | 2 | 2 | 1 | 1 | -- | -- | -- | -- | -- | 1 | -- | -- | 1 | 2 |
| **U18EC403** | **2** | **2** | **1** | **1** | **--** | **--** | **--** | **--** | **--** | **1** | **--** | **--** | **1** | **2** |

## U18EC404: ANALOG CIRCUITS - II

**Class:** B.Tech. IV-Semester **Branch:** Electronics & Communication Engineering

**Teaching Scheme:**

| L | T | P | C |
|---|---|---|---|
| 3 | - | - | 3 |

**Examination Scheme:**

| | |
|---|---|
| Continuous Internal Evaluation | 40 marks |
| End Semester Exam | 60 marks |

**Course Learning Objectives (LOs):**
This course will develop students' knowledge in/on
**LO1**: *familiarize the Biasing and Operating Point, analysis of transistor at low and high frequency.*
**LO2**: *analysis of multistage amplifiers and FET at low frequencies.*
**LO3**: *concept of Positive and Negative feedback and their applications.*
**LO4**: *fundamentals of Large signal amplifiers and tuned amplifiers.*

### UNIT-I(9)

**Small Signal Low Frequency Transistor Amplifier Circuits:** Review of BJT biasing and operating point, BJT small signal low frequency h-parameter model, Analysis of Single Stage transistor amplifier circuits using h-parameter CE, CB and CC configurations, Simplified analysis of these configurations.

**High Frequency Transistor Amplifier Circuits:** The Hybrid-$\pi$ (pi) Common Emitter Transistor model, Hybrid-$\pi$ Conductances, CE short Circuit Current gain, High frequency model of a transistor α and β cut-off frequencies, Frequency response analysis of single stage amplifier at mid band gain, Gains at low and high frequency, Calculation of Gain-bandwidth product.

### UNIT-II(9)

**Multistage Amplifiers:** Classification of Multistage Amplifiers based on Coupling, RC coupled Amplifier, Direct and Transformer Coupled Amplifiers, cut-off frequencies for $n^{th}$ Stage,Effect of cascading on gain and bandwidth, Darlington Pair, Cascode amplifier, Differential amplifiers, Bootstrap amplifier.

**FET Amplifiers:** Review - Biasing of FET, FET low frequency models, Low frequency response of amplifier circuits, Analysis of single stage amplifier.

### UNIT-III(9)

**Feedback Amplifiers:** Concept of Feedback, Classification of Feedback amplifiers, General characteristics of negative feedback amplifiers, Effect of negative feedback on amplifier characteristics, Analysis of Voltage Series, Voltage Shunt, Current Series and Current Shunt Feedback amplifiers.

**Oscillators:** Conditions for oscillations, RC and LC oscillators, Generalized analysis of LC oscillators, Crystal Oscillator, Frequency and Amplitude stability of oscillations.

### UNIT-IV(9)

**Large Signal Amplifiers:** Classification, Series fed and Transformer coupled Class A, Class-Bpower amplifier, Push-Pull amplifiers and Complementary Symmetry, Class-AB power amplifiers, Cross over and Harmonic distortion, Heat sinks.

**Tuned Amplifiers:** Introduction, Q-factor, Class C tuned amplifiers, Single tuned, Double tuned and Stagger tuned Voltage amplifier, Effect of Cascading Double tuned amplifiers on Bandwidth, Stability of Tuned amplifiers.

**Text Books:**

1. Jacob Millman and C.C.Halkias, "*Integrated Electronics*", TMH, New Delhi, 2nd Edition, 1991.
2. Donald A Neamen, "*Electronic Circuits Analysis and Design*", Tata McGraw-Hill, ThirdEdition, 2009.

**Reference Books:**

1. Robert L.Boylestad, Louis Nashelsky, "*Electronic Devices and Circuit Theory*", Pearson Education, 9th edition, 2008.
2. Sedra, Kenneth, Smith, "*Microelectric circuits*", Oxford University Press, 5th edition, 2011.
3. Mohammad H. Rashid, "*Electronic Circuit and Applications*", CENGAGE Learning.

## Course Outcomes (COs):

| Course Code:**U18EC404** | | Course Name: **ANALOG CIRCUITS - II** |
|---|---|---|
| **CO** | **CO code** | Upon completion of this course, the student will be able to… |
| **CO1** | **U18EC404.1** | *analyse the given circuit by drawing relevant h-parameter, hybrid- π equivalents and design singlestage BJT amplifier for given specification.* |
| **CO2** | **U18EC404.2** | *analyse the frequency response of multistage transistor amplifiers and FET amplifiers at low frequencies.* |
| **CO3** | **U18EC404.3** | *design the negative feedback amplifiers and oscillator circuits.* |
| **CO4** | **U18EC404.4** | *evaluate the efficiencies of large signal amplifiers and calculate the Q-factor various tuned amplifiers.* |

## Course Articulation Matrix (Mapping of COs with POs and PSOs):

| Course code: **U18EC404** | | | | | | | | | | | | | Course Name: **ANALOG CIRCUITS - II** | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **CO Code** | **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** |
| **U18EC404.1** | 3 | 2 | 2 | -- | -- | -- | -- | -- | -- | -- | 2 | 1 | 3 | 2 |
| **U18EC404.2** | 2 | 3 | 3 | -- | -- | -- | -- | -- | 1 | -- | 2 | 1 | 3 | 2 |
| **U18EC404.3** | 2 | 2 | 3 | -- | -- | -- | -- | -- | 1 | -- | 2 | 1 | 3 | 2 |
| **U18EC404.4** | 2 | 3 | 3 | -- | -- | -- | -- | -- | 1 | -- | 2 | 1 | 3 | 2 |
| **U18EC404** | 2.25 | 2.50 | 2.75 | -- | -- | -- | -- | -- | 1 | -- | 2 | 1 | 3 | 2 |

## U18EC405 PULSE AND DIGITAL CIRCUITS

**Class:** B.Tech. IV-Semester **Branch:** Electronics and Communication Engineering

**Teaching Scheme :**

| L | T | P | C |
|---|---|---|---|
| 3 | - | - | 3 |

**Examination Scheme :**

| | |
|---|---|
| Continuous Internal Evaluation | 40 marks |
| End Semester Exam | 60 marks |

**Course Learning Objectives (LOs):**
This course will develop students' knowledge in /on
**LO1***:various wave shaping circuits and their applications*
**LO2***: negative resistance switching circuits and methods of generating various sweep waveforms*
**LO3***: analysis and design of multivibrators using BJTs*
**LO4:** *diodes and transistors based sampling gates, synchronization and frequency division*

### UNIT-I(9)

**Linear Wave Shaping Circuits:** Introduction**,** High pass RC and Low pass RC circuits - Response to sine, step, pulse, square, exponential and ramp inputs with different time constants, High pass RC circuit as a differentiator and Low pass RC circuit as an Integrator.
**Non-Linear Wave Shaping Circuits**: Introduction, Switching characteristics of diode; Clipping Circuits - Diode Clippers, Shunt Clippers, Series Clippers, Clipping at two Independent Levels; The Clamping Operation, Clamping Circuits with source and diode Resistances,Clamping Circuit Theorem and Practical Clamping Circuits.

### UNIT-II(9)

**Negative Resistance Switching Circuits**: Introduction, Voltage Controlled and Current Controlled negative resistance circuits, its application to switching (using Tunnel diode and UJT).
**Time Base Generators:** General features of a time base signal; Errors in sweep generators- Sweep error, Transmission error and Displacement error, Methods of generating a time base waveform - Exponential sweep circuits, Sweep circuit using UJT, Miller sweep circuit and Bootstrap sweep circuit.

### UNIT-III(9)

**Multivibrators**: Introduction; Analysis and Design of**Bistable Multivibrator** - Fixed bias and Self bias, Triggering of Bistable Multi; **Monostable multivibrator** - Collector coupled, Triggering of Monostable multivibrator and Voltage to Time converter; **Astable multivibrator** - Collector coupled, Voltage to frequency converter and Schmitt Trigger - UTP, LTP, Hysteresis and applications of Schmitt Trigger;

### UNIT-IV(9)

**Sampling Gates:** Basic operating principle of sampling gates, Unidirectional diode gate, Other forms of the unidirectional diode gate, Bidirectional gates using transistors, Reduction of pedestal in gate circuit, Bidirectional diode gate, Balanced Condition in a Bidirectional diode gate, Four diode Gate, Applications of sampling gates - Chopper amplifier and Sampling scope.

**Synchronization and Frequency Division**: Introduction, Pulse synchronization of relaxation devices (using UJT), Synchronization with Frequency division, Synchronization of a sweep circuit with symmetrical signals - Sinusoidal synchronization signals, Phase Delay and Phase Jitter.

**Text Books:**

1. Jacob Millman and Herbert Taub, "Pulse, Digital and Switching Waveforms", 2nd Edition, McGraw Hill, 2007.

**Reference Books:**

1. A.Anand kumar," Pulse and digital circuits", PHI, 2nd Edition, 2008.
2. B.N. Yoganarasimha, " Pulse and Digital Circuits", Dhanpat Rai Publications , 2006.
3. VenkataRao, Rama Sudha and ManmadhaRao "Pulse and digital circuits", Pearson India Education Services Pvt Ltd, 1st Edition, 2016.

## Course Outcomes (COs):

| Course Code: **U18EC405** | | Course Name: **PULSE AND DIGITAL CIRCUITS** |
|---|---|---|
| **CO** | **CO code** | Upon completion of this course, the student will be able to… |
| **CO1** | **U18EC405.1** | *analyze the responses of linear and nonlinear wave shaping circuits for standard input signals.* |
| **CO2** | **U18EC405.2** | *describe the need and working of various negative resistance switching circuits, voltage sweep circuits and their applications.* |
| **CO3** | **U18EC405.3** | *analyze and design multivibrators using Bipolar Junction Transistors (BJTs) for various applications.* |
| **CO4** | **U18EC405.4** | *explain working of different sampling gates and discuss the different methods to achieve frequency synchronization and division in UniJunction Transistor (UJT) relaxation oscillator.* |

## Course Articulation Matrix (Mapping of COs with POs and PSOs):

| Course code: **U18EC405** | | | | | | | | | | | | | | Course Name: **PULSE AND DIGITAL CIRCUITS** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **CO Code** | **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** |
| **U18EC405.1** | 3 | 2 | 1 | 1 | 1 | -- | -- | -- | -- | -- | -- | -- | 3 | 2 |
| **U18EC405.2** | 3 | 1 | 1 | 1 | 1 | -- | -- | -- | -- | -- | -- | -- | 2 | 3 |
| **U18EC405.3** | 3 | 3 | 3 | 1 | 2 | -- | -- | -- | -- | -- | -- | -- | 3 | 2 |
| **U18EC405.4** | 3 | 1 | 1 | 1 | 2 | -- | -- | -- | -- | -- | -- | -- | 2 | 3 |
| **U18EC405** | **3** | **1.75** | **1.5** | **1.5** | **1.5** | **--** | **--** | **--** | **--** | **--** | **--** | -- | **2.5** | **2.5** |

## U18EC406 PROBABILITY AND RANDOM PROCESSES

**Class:** B.Tech., **IV**-Semester **Branch:** Electronics & Communication Engineering

**Teaching Scheme:**

| L | T | P | C |
|---|---|---|---|
| 3 | - | - | 3 |

**Examination Scheme:**

| | |
|---|---|
| Continuous Internal Evaluation: | 40 marks |
| End Semester Examination: | 60 marks |

**Course Learning Objectives:**

This course will develop students' knowledge in/on…

**LO1:** *distribution function, density function and statistical parameters of a random variable*
**LO2:** *operations of multiple random variables.*
**LO3:** *spectral characteristics of random processes.*
**LO4:** *response of linear system with random inputs.*

### UNIT-I(9)

**Random Variable:** Introduction; Random variable concept - Discrete and Continuous random variables; Cumulative Distribution function, Probability Density function and their Properties; Binomial, Poisson, Uniform and Gaussian Distribution functions; Conditional Distribution function, Conditional Density function and their properties.

**Operations on One Random Variable– Expectation:** Introduction, Expected Value of a Random Variable, Function of a Random Variable, Conditional expected value; Moments-Moments about the Origin, Central Moments, Variance and Skew; Characteristic Function, Moment Generating Function; Transformations of a Random Variable - Monotonic and Non monotonic Transformation of continuous random variable and transformation of discrete random variable.

### UNIT-II(9)

**Multiple Random Variables:** Vector Random Variables; Joint Distribution Function – Properties; Marginal Distribution Function; Joint Density Function – Properties; Marginal Density Functions, Conditional Distribution and Density Function, Statistical Independence, Distribution and Density of a sum of Random Variables, Central Limit Theorem**.**

**Operations on Multiple Random Variables**: Expected value of a function of Random Variables, Joint Moments about the Origin, Joint Central Moments, Joint Characteristic Functions; Jointly Gaussian Random Variables- Two Random Variables case, N Random Variables, Properties of Gaussian Random Variables; Transformations of Multiple Random Variables and Linear Transformations of Gaussian Random Variables.

### UNIT-III(9)

**Random Processes – Temporal Characteristics:** Random Process Concept - Classification; Distribution and Density Functions, Concept of Stationarity and Statistical Independence, First-Order and N-order Stationarity, Wide-Sense and Strict-Sense Stationarity, Time Averages and Ergodicity, Ergodic Processes, Autocorrelation Function, Cross-Correlation Function and their Properties, Covariance.

**Random Processes-Spectral Characteristics:** Power Density Spectrum - Properties; Relationship between Power Spectrum and Autocorrelation function; Cross-Power Density Spectrum - Properties; Relationship between Cross-Power Spectrum and Cross-Correlation Function.

## UNIT-IV(9)

**Linear System with Random Inputs:** Introduction, Linear System Fundamentals; Random signal response of Linear systems- Convolution, Mean and Mean-square value, Autocorrelation function of response, Cross-Correlation functions of input and output; System evaluation using random noise; Spectral Characteristics of system response- Power Density Spectrum of response, Cross-Power Density Spectrums of input and output; Noise Bandwidth; Band pass, BandLimited and Narrowband Processes.

**Text Book:**

1. Peyton Z. Peebles, "Probability, Random Variables and Random Signal Principles", *TMH*, 4th Edition, 2001.(Chapters 2,3,4,5,6,7,8)

**Reference Books:**

1. R.P. Singh and S.D. Sapre, "Communication Systems Analog and Digital", *TMH*, 2nd Edition, 2008.
2. Henry Stark and John W. Woods, "Probability and Random Processes with Application to Signal Processing", *Prentice Hall*, 3rdEdition, 2002.
3. Athanasios Papoulis and S. Unnikrishna Pillai, "Probability, Random Variables and Stochastic Processes", *PHI*, 4thEdition, 2002.
4. S.P. Eugene Xavier, "Statistical Theory of Communication", *New Age Publications*, 1997.

### Course Outcomes (COs):

| Course Code: **U18EC406** | | Course Name: **PROBABILITY AND RANDOM PROCESSES** |
|---|---|---|
| **CO** | **CO Code** | Upon completion of this course, the student will be able to… |
| **CO1** | **U18EC406.1** | *evaluate various statistical parameters of a random variable* |
| **CO2** | **U18EC406.2** | *perform various operations on multiple random variables.* |
| **CO3** | **U18EC406.3** | *describe the spectral characteristics of random processes.* |
| **CO4** | **U18EC406.4** | *evaluate the response of linear system for different inputs.* |

### Course Articulation Matrix (Mapping of COs with POs and PSOs):

| Course code: **U18EC406** | | | | | | | | | | | | | | Course Name: **PROBABILITY AND RANDOM PROCESSES** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **CO Code** | **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** |
| **U18EC406.1** | 2 | 2 | 1 | 1 | -- | -- | -- | -- | -- | 1 | -- | -- | 2 | 2 |
| **U18EC406.2** | 2 | 2 | 1 | 1 | -- | -- | -- | -- | -- | 1 | -- | -- | 2 | 2 |
| **U18EC406.3** | 2 | 2 | 1 | 1 | -- | -- | -- | -- | -- | 1 | -- | -- | 2 | 2 |
| **U18EC406.4** | 2 | 2 | 1 | 1 | -- | -- | -- | -- | -- | 1 | -- | 1 | 2 | 2 |
| **U18EC406** | **2** | **2** | **1** | **1** | **--** | **--** | **--** | **--** | **--** | **1** | **--** | **1** | **2** | **2** |

## U18EC407 DIGITAL DESIGN

**Class:** B.Tech. **IV**-Semester **Branch:** Electronics & Communication Engineering

**Teaching Scheme:**

| L | T | P | C |
|---|---|---|---|
| 3 | - | - | 3 |

**Examination Scheme:**

| | |
|---|---|
| Continuous Internal Evaluation: | 40 marks |
| End Semester Exam: | 60 marks |

**Course Learning Objectives (LOs):**

This course will develop students' knowledge in/on

**LO1:** *logic families such as RTL, DTL, CMOS, TTL etc.*
**LO2:** *memory devices, PLD, CPLD and FPGA.*
**LO3:** *VHDL programming using behavioral modeling.*
**LO4:** *VHDL programming using dataflow and structural modeling.*

### UNIT- I(9)

**Logic Families:** Introduction to logic families, Characteristics –Fan-in, Fan-out, Noise margin, Figure of Merit, Propagation delay, Study of Logic Families- RTL, DCTL, $I^2L$, DTL, HTL, TTL-open collector, Totem pole and Tristate output, ECL, MOS, CMOS, comparison.

### UNIT- II(9)

**Memory**: Memory hierarchy, RAM, ROM, Memory Address Mapping, Auxiliary Memory - Manage tic tapes & Disks, Associative memories: Match logic, Read and write logics, Cache memory: Mapping techniques, R/W operations, Virtual memory: Paging, segmentation and Interleaved memories.

**Programmable logic devices:** Introduction to PLDs, PROM, PLA, PAL, SPLD, CPLD, FPGA

### UNIT -III(9)

**VHDL Programming**: Introduction to EDA Tools, Introduction VHDL, Basic elements of VHDL- Identifiers, Data objects, Data types, Operators, Primary Constructs of VHDL - Entity declaration, Architecture description, various modeling styles of VHDL.

**Behavioral Modelling:** Different types of Process assignment statements - Design examples.

### UNIT -IV(9)

**Data Flow Modelling:** Concurrent signal assignment statement, Comparison of concurrent and sequential signal assignment statements, Conditional and Selected signal assignment statements, Design examples.

**Structural Modelling:** Component declaration, Component instantiation, Design examples, Generics and Configurations.

**Text Books:**

1. M. Moris Mano, M.D.Cilletti, "Digital Design", *Pearson*, India, 6th Edition, 2019
2. J. Bhaskar, "VHDL Primer", *PHI Learning*, India, 3rd Edition, 1992.

**Reference Books:**

1. Taub & Schiling, "Digital Integrated Electronics", *McGraw Hill Education (India) Pvt. Ltd.*, India, 1997.
2. Richard S Sandige, Michael L Sandige, "Fundamentals of Digital and Computer Design with VHDL", *McGraw Hill Education (India) Pvt. Ltd.*, 1st Edition, 2014.
3. R. Ananda Natarajan, "Digital Design", *PHI learning, India*, 1st Edition, 2015.

## Course Outcomes (COs):

| Course Code: **U18EC407** | | Course Name: **DIGITAL DESIGN** |
|---|---|---|
| **CO** | **CO Code** | Upon completion of this course, the student will be able to… |
| **CO1** | **U18EC407.1** | *explain and compare the characteristics of different logic families based on various parameters like propagation delay, power dissipation, fan-in, fan-out, figure of merit and noise margin.* |
| **CO2** | **U18EC407.2** | *describe different memory devices, PLDs and FPGA* |
| **CO3** | **U18EC407.3** | *write VHDL code using behavioral style of modeling for a given design.* |
| **CO4** | **U18EC407.4** | *write the VHDL code using dataflow and structural modeling for a given schematic.* |

## Course Articulation Matrix (Mapping of COs with POs and PSOs):

| Course code: **U18EC407** | | | | | | | | | | | | | Course Name: **DIGITAL DESIGN** | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **CO Code** | **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** |
| **U18EC407.1** | 2 | 2 | 2 | 1 | -- | -- | -- | -- | -- | 1 | -- | -- | 1 | 2 |
| **U18EC407.2** | 2 | 2 | 2 | 1 | -- | -- | -- | -- | -- | 1 | -- | -- | 1 | 2 |
| **U18EC407.3** | 2 | 2 | 2 | 1 | 1 | -- | -- | -- | -- | 1 | -- | -- | 1 | 2 |
| **U18EC407.4** | 2 | 2 | 2 | 1 | 1 | -- | -- | -- | -- | 1 | -- | -- | 1 | 2 |
| **U18EC407** | **2** | **2** | **2** | **1** | **1** | **--** | **--** | **--** | **--** | **1** | **--** | **--** | **1** | **2** |

## U18MH415 ESSENCE OF INDIAN TRADITIONAL KNOWLEDGE

Class : **B.Tech. IV Semester** Branch : **Common to all branches**

**Teaching Scheme:**

| L | T | P | C |
|---|---|---|---|
| 2 | - | - | - |

**Examination Scheme:**

| | |
|---|---|
| Continuous Internal Evaluation | 40 marks |
| End Semester Exam | 60 marks |

**Course Learning Objectives (LOs):**
*This course will develop the student's knowledge in/on*
**LO1:** basic structure of Indian knowledge system
**LO2:** Indian perspective of modern science
**LO3:** basic principles of yoga and holistic health care
**LO4:** benefits of yoga practice

**Unit – I (6)**

**Basic Structure of Indian Knowledge System:** Introduction, Vedas – Origin, Classification, Structure, Rig Veda, Sama Veda, Yajur Veda, Atharva Veda; Upavedas – Dhanurveda, Sthapatveda, Gandharvaveda, Ayurveda; Vedang – Shiksha, Chanda, Vyakarna, Nirukta, Kalpa, Jyothisha; Upanga – Dharmashastra, Mimamsa, Tarkashastra, Purvana.

**Unit – II (6)**

**Modern Science and Indian Knowledge System:** Introduction – Vedas as Basis for Modern Science – Architectural Developments – Medicine and its relevance – Mathematical Sciences in Vedas – Space and Military related developments – Chemical Sciences

**Unit – III (6)**

**Yoga and Holistic Health Care:** Healthy mind in healthy body – Yoga: Definition, types; Yoga to keep fit: Diet, Yoga Asanas – Fundamentals; Breathing techniques in Patanjali Yoga tradition – Pranayama; chakras; meditation; Benefits of Yoga – Physical Health, Emotional Health, Prevention of Disease, Reducing or Alleviating Symptoms of Problems

**Unit – IV (6)**

**Case studies – Yoga Practice:** Yoga as an effective tool for management of human crisis – Depression, Self – Concept & Mental health, Yoga for stress management; Yoga : A way to cure for Insomnia.

**Requisite:**
Yoga practice sessions are to be conducted for all the students taking this course by the time they complete Unit 1 and Unit 2.

**Text Books:**


1. Sathish Chandra Chaterjee, Dhirendramohan Datta, "An Introduction to Indian Philosophy", Rupa Publications Pvt. Ltd. New Delhi. (Chapter 2, 3)
2. Priyadaranjan Ray, S.N. Sen, "The Cultural Heritage of India", Vol. 6, Science and Technology, The Ramakrishna Mission Institute of Culture, Calcutta
3. Yoga Sutra of Patanjali, Ramakrishna Mission, Kolkatta
4. RN Jha, Science of Consciousness Psychotherapy and Yoga Practices, Vidyanidhi Prakasham Delhi, 2016 (Chapter 4, 5, 6, 7, 8)

**Reference Books:**

1. Swami Jitatmananda, "Holistic Science and Vedanta", Bharatiya Vidya Bhavan Bombay. (Chapter 2, 3)

**Course Outcomes (COs):**

| Course Code:**U18MH415** | | Course Name: **Essence Of Indian Traditional Knowledge** |
|---|---|---|
| **CO** | **CO code** | *Upon completion of this course, the student will be able to…* |
| **CO1** | **U18MH415.1** | summarize the basic structure of Vedas, Upavedas, Vedanga, Upanga |
| **CO2** | **U18MH415.2** | explain Vedas as principal source of knowledge for scientific inventions |
| **CO3** | **U18MH415.3** | describe different yogasanas, breathing techniques, chakras, meditation and their benefits |
| **CO4** | **U18MH415.4** | discuss the benefits of yoga as an effective tool for management of human crisis |

**Course Articulation Matrix (Mapping of COs with POs and PSOs):**

| Course code: **U18MH415** | | | | | | Course Name: **Essence Of Indian Traditional Knowledge** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **CO Code** | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** | **PO6** | **PO7** | **PO8** | **PO9** | **PO10** | **PO11** | **PO12** | **PSO1** | **PSO2** |
| **U18MH415.1** | - | - | - | - | - | 1 | - | 2 | 1 | 1 | - | - | - | - |
| **U18MH415.2** | - | - | - | - | - | 1 | 1 | 2 | 1 | 1 | - | - | - | 1 |
| **U18MH415.3** | - | - | - | - | - | 1 | - | 2 | 2 | 1 | - | 2 | - | - |
| **U18MH415.4** | - | - | - | - | - | 1 | 1 | 2 | 2 | 1 | - | 2 | - | - |
| **U18MH415** | **-** | **-** | **-** | **-** | **-** | **1** | **1** | **2** | **1.5** | **1** | **-** | **2** | **-** | **1** |

## U18CH416 ENVIRONMENTAL STUDIES

**Class**: B. Tech. IV -Semester **Branch:** Common to all branches

**Teaching Scheme :**

| L | T | P | C |
|---|---|---|---|
| 2 | - | - | 2 |

**Examination Scheme :**

| | |
|---|---|
| Continuous Internal Evaluation : | 40 marks |
| End Semester Exam : | 60 marks |

**Course Learning objectives (LOs):**
This course will develop students' knowledge in/on
*LO1*: *necessity to use natural resources more equitably*
*LO2* : *concepts of ecosystem and the importance of biodiversity conservation*
*LO3* : *causes, effects and control measures of various environmental issues*
*LO4* : *issues involved in enforcement of environmental legislation*

### UNIT-I (6)

**Introduction -** The multidisciplinary nature of environmental studies - definition, scope and importance.
**Natural Resources: Forest Resources -** Use and over–exploitation of forests, deforestation, timber extraction, mining, dams - their effects on forests and tribal people; **Water Resources -** Use and over-utilization of surface and ground water, floods, drought, conflicts over water; **Mineral Resources -** Environmental effects of extracting and using mineral resources; **Agricultural Land -** Land as a resource, land degradation, soil erosion and desertification; **Food Resources** - World food problems, effects of modern agriculture, fertilizer-pesticide problems, water logging and salinity; **Energy Resources -** Renewable and non-renewable energy sources, use of alternate energy sources.

### UNIT-II (6)

**Ecosystem and Biodiversity: Ecosystem -** Concepts of an ecosystem, food chain, food webs, ecological pyramids, energy flow in the ecosystem and ecological succession;
**Biodiversity and its Conservation –** Introduction, definition, genetic, species and ecosystem diversity, value of biodiversity, biodiversity in India, hot spots of biodiversity, man-wildlife conflicts, endangered and endemic species of India, in-situ and ex-situ conservation.

### UNIT-III (6)

**Environmental Pollution:** Global climatic change, green house gases, effects of global warming, ozone layer depletion; International conventions/protocols - Earth summit, Kyoto protocol and Montreal protocol; causes and effects of air, water, soil, marine and noise pollution with case studies; solid and hazardous waste management, effects of urban industrial and nuclear waste; natural disaster management - flood, earthquake, cyclone and landslides.

### UNIT-IV (6)

**Social Issues and the Environment**: **Role of Individual and Society** - Role of individual in prevention of pollution, water conservation, Rain water harvesting and watershed management; **Environmental Protection / Control Acts** - Air (Prevention and control of Pollution) Act- 1981, water (Prevention and Control of Pollution ) Act-1974, water Pollution Cess Act-1977, Forest conservation Act (1980 and 1992), wildlife Protection Act 1972 and environment protection Act 1986, issues involved in enforcement of environmental legislations; **Human Population and Environment** - Population growth, family welfare programmes, women and child welfare programmes, role of information technology in environment and human health.

**TEXT BOOKS:**

1. Erach Bharucha, "Text Book of Environmental Studies for Under Graduate Courses (2nd edn.)", *Universities Press (India) Private Limited,* 2013.

**REFERENCE BOOKS:**

1. Y. Anjaneyulu, "Introduction to Environmental Science", *B.S. Publications*, 2004.
2. Gilbert M. Masters, "Introduction to Environmental Engineering & Science ", *Prentice Hall of India,*Third Edition,1991.
3. Anubha Kaushik, C.P. Kaushik, "Environmental Studies", 4/e, *New Age International Publishers,* 2014.
4. R.Rajagopalan, "Environmental Studies from crisis to cure", *Oxford University Press*, Second Edition, 2011.

**Course Outcomes (COs):**

| Course Code: **U18CH416** | | Course Name: **Environmental Studies** |
|---|---|---|
| **CO** | **CO code** | Upon completion of this course, the student will be able to… |
| **CO1** | **U18CH416.1** | *investigate any environmental issue using an interdisciplinary framework* |
| **CO2** | **U18CH416.2** | *formulate an action plan for sustainable alternatives and conserving biodiversity that integrates science, humanist, social and economic perspective* |
| **CO3** | **U18CH416.3** | *identify and explain the complexity of issues and processes which contribute to an environmental problem* |
| **CO4** | **U18CH416.4** | *participate effectively in analysis and problem-solving through knowledge in environmental legislations* |

## Course Articulation Matrix (Mapping of COs with POs and PSOs):

| CO/PO | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **U18CH416.1** | 2 | 1 | 2 | 1 | - | 2 | 1 | - | 1 | - | - | - | 1 | - |
| **U18CH416.2** | - | - | 2 | - | - | 1 | 2 | - | 1 | - | - | - | 1 | - |
| **U18CH416.3** | 1 | 2 | 1 | - | - | 1 | 2 | 1 | 1 | - | - | - | 1 | - |
| **U18CH416.4** | - | - | 1 | - | - | 1 | 2 | - | 1 | - | - | - | 1 | - |
| **U18CH416** | **1.5** | **1.5** | **1.5** | **1** | **-** | **1.25** | **1.75** | **1** | **1** | **-** | **-** | **-** | **1** | **-** |