

# **BACHELOR OF TECHNOLOGY CURRICULA & SYLLABI**



**DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING**

**Baba Sahab Dr. Bhim Rao Ambedkar**

**College of Agril Engg & Technology - Etawah-206001 (UP)**  
(Chandra Shekhar Azad University of Agriculture & Technology, Kanpur)

**(For newly admitted students from Session 2018-2019)**

## **Computer Science and Engineering Department**

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### ***ABOUT THE DEPARTMENT***

The Department of Computer Science and Engineering established in the year 2002-03 with an intake of 40, is imparting quality education to the students in the field of Computer Science and Engineering through its Undergraduate programme. The department has, over the years, established its reputation as an excellent center for imparting high quality technical education to B. Tech students.

The department has been under Self Finance programme with the support of the core faculty of Agricultural Engineering and its staff. The good numbers of alumni of the department are occupying high positions in Governments, Semi- Governments and Private organizations in the country as well as abroad. The laboratories of the department are being updated from time to time so that they remain well equipped to cater to the Research and Development.

### ***VISION***

To EPEome an Acclaimed Department of Higher Learning, Research, Innovation and Incubation in Computer Science and Engineering.

### ***MISSION***

1. Educate a new generation of Engineers to meet the challenges of the future by providing them with a firm foundation of both the theory and practical of Computer Science and Engineering at undergraduate levels.
2. Create, develop and disseminate new knowledge by top quality applied research in Computer Science and Engineering by interacting with government agencies and private industry.
3. Promote a sense of leadership and service to the society.

***PROGRAMME EDUCATIONAL OBJECTIVES (PEOs) OF  
B.TECH. PROGRAMME***

- PEO-I Excel in professional career and/or higher education by acquiring knowledge in area of Computer Science and Engineering.
- PEO-II Analyze real life problems, design appropriate system to provide solutions that are technically sound, economically feasible and socially acceptable.
- PEO-III Exhibit professionalism, ethical attitude, communication skills, team work in their profession and adapt to current trends by engaging in life-long learning.

***PROGRAM OUTCOMES (POs) of B.Tech. PROGRAMME:***

- (a) An ability to apply knowledge of mathematics, science and engineering fundamentals to the conceptualization of engineering models.
- (b) An ability to identify and formulate the techniques and tools related to Computer Science and Engineering to analyze conflicting technical and engineering issues.
- (c) An ability to design, implement and evaluate a Computer Science and Engineering based system, components or processes to meet the desired needs within realistic constraints.
- (d) An ability to design and conduct experiments, as well as to analyze and interpret data.
- (e) An ability to use current techniques, skills and modern tools necessary for engineering practice.
- (f) An ability to apply the engineering knowledge to assess societal, health, safety, legal and cultural issues to the professional engineering practice.
- (g) An ability to understand the impact of Computer Science and Engineering in societal and environmental context and demonstrate the knowledge for sustainable development.
- (h) An ability to understand and commit to professional ethics, responsibilities and norms of engineering practice.
- (i) An ability to function individually and on team to accomplish a common goal.
- (j) An ability to communicate effectively and to prepare formal technical plans and detailed reports involving creative use of knowledge of engineering principles in novel ways.
- (k) An ability to demonstrate a knowledge and understanding of management and business practices and understand their limitations.
- (l) Knowledge of contemporary issues like increased use of portable devices, rising health care costs and etc. which influences engineering design, and an ability to engage in independent and life long learning

## Credit Structure for B. Tech. (Computer Science & Engineering)

(For newly admitted students from Session 2018-2019)

| Category                                     | Semesters    | I         | II        | III       | IV        | V         | VI        | VII       | VIII      | Total      |
|--|--------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|------------|
| Basic Sciences & Maths (BSM)                 |              | 9         | 14        | 9         | 4         | -         | -         | -         | -         | <b>36</b>  |
| Engineering Fundamentals (EF)                |              | 12        | 7         | 6         | 2         | -         | -         | -         | -         | <b>27</b>  |
| Department Core (DC)                         |              | -         | -         | 10        | 14        | 20        | 25        | 10        | 5         | <b>84</b>  |
| Management (M)                               |              | -         | -         | -         | 3         | 3         | -         | -         | -         | <b>6</b>   |
| Humanities & Social Science Core (HSSC)      |              | 4         | -         | -         | -         | -         | -         | -         | -         | <b>4</b>   |
| Project (P)                                  |              | -         | -         | -         | -         | -         | -         | 5         | 5         | <b>10</b>  |
| Programme Electives (PE)                     |              | -         | -         | -         | -         | -         | -         | 8         | 8         | <b>16</b>  |
| Open Electives (OE)                          |              | -         | -         | -         | -         | -         | -         | -         | 4         | <b>4</b>   |
| Humanities & Social Science Electives (HSSE) |              | -         | 3         | -         | -         | -         | -         | -         | -         | <b>3</b>   |
|  | <b>Total</b> | <b>25</b> | <b>24</b> | <b>25</b> | <b>23</b> | <b>23</b> | <b>25</b> | <b>23</b> | <b>22</b> | <b>190</b> |

### Curriculum for B.Tech. (Computer Science & Engineering)

#### Semester-I (1<sup>st</sup> year)

| S.N. | Category | Paper Code | Course                                     | L         | T        | P         | Credits   |
|------|----------|------------|--|-----------|----------|-----------|-----------|
| 1.   | BSM      | BSH-111    | Engineering Mathematics-I                  | 3         | 1        | 0         | 4         |
| 2.   | BSM      | BSH-112    | Engineering Physics-I                      | 3         | 1        | 2         | 5         |
| 3.   | EF       | CSE-111    | Introduction to C & Functional Programming | 3         | 1        | 2         | 5         |
| 4.   | EF       | EEE-111    | Principles of Electrical Engineering       | 3         | 1        | 2         | 5         |
| 5.   | HSSC     | BSH-113    | Professional Communication                 | 3         | 1        | 0         | 4         |
| 6.   | EF       | CSE-112    | Software Lab-I                             | 0         | 0        | 4         | 2         |
| 7.   | AC       | BSH-114    | Environment & Ecology                      | 2         | 1        | 0         | CNC       |
|      |          |            | <b>Total</b>                               | <b>15</b> | <b>5</b> | <b>10</b> | <b>25</b> |

**NOTE: CNC =COMPULSORY NON CREDIT**

#### Semester-II (1<sup>st</sup> year)

| S.N. | Category | Paper Code | Course                                  | L         | T        | P         | Credits   |
|------|----------|------------|---|-----------|----------|-----------|-----------|
| 1.   | BSM      | BSH-121    | Engineering Mathematics-II              | 3         | 1        | 0         | 4         |
| 2.   | BSM      | BSH-122    | Engineering Physics-II                  | 3         | 1        | 2         | 5         |
| 3.   | BSM      | BSH-123    | Graph Theory                            | 3         | 1        | 2         | 5         |
| 4.   | EF       | CSE-121    | Object Oriented Modeling & C++          | 3         | 1        | 2         | 5         |
| 5.   | HSSE     | BSH-***    | Humanities & Social Science Electives   | 2         | 1        | 0         | 3         |
| 6.   | EF       | CSE-122    | Software Lab-II                         | 0         | 0        | 4         | 2         |
| 7.   | AC       | BSH-127    | Fundamentals of Electronics Engineering | 3         | 1        | 2         | CNC       |
|      |          |            | <b>Total</b>                            | <b>14</b> | <b>5</b> | <b>10</b> | <b>24</b> |

**NOTE: CNC =COMPULSORY NON CREDIT**

**Semester-III (2<sup>nd</sup> Year)**

| S.N. | Category | Paper Code                      | Course  | L           | T        | P           | Credits           |
|------|----------|---------------------------------|---|-------------|----------|-------------|-------------------|
| 1.   | BSM      | BSH-231                         | Discrete Mathematics  | 3           | 1        | 0           | 4                 |
| 2.   | BSM      | BSH-232                         | Applied Computational Methods   | 3           | 1        | 2           | 5                 |
| 3.   | EF       | ECE-231                         | Digital Circuits and Logic Design   | 3           | 1        | 0           | 4                 |
| 4.   | DC       | CSE-231                         | Principles of Data Structures through C/C++   | 3           | 1        | 2           | 5                 |
| 5.   | DC       | CSE-232                         | Internet & JAVA Programming   | 3           | 1        | 2           | 5                 |
| 6.   | EF       | CSE-233                         | Software Lab-III  | 0           | 0        | 4           | 2                 |
|      | AC       | IDE 231/<br>SWE 231/<br>SWE 232 | Management of Canal Irrigation System<br>Information Technology for Land and Water<br>Wasteland Development | 3<br>3<br>3 |          | 1<br>1<br>1 | CNC<br>CNC<br>CNC |
|      |          |                                 | <b>Total</b>  | <b>15</b>   | <b>5</b> | <b>10</b>   | <b>25</b>         |

**NOTE: CNC =COMPULSORY NON CREDIT****Semester-IV (2<sup>nd</sup> Year)**

| S.N. | Category | Paper Code | Course                         | L         | T        | P        | Credits   |
|------|----------|------------|--------------------------------|-----------|----------|----------|-----------|
| 1.   | BSM      | BSH-241    | Optimization Techniques        | 3         | 1        | 0        | 4         |
| 2.   | M        | BSH-242    | Management Information System  | 2         | 1        | 0        | 3         |
| 3.   | DC       | CSE-241    | Database Management Systems    | 3         | 1        | 2        | 5         |
| 4.   | DC       | CSE-242    | Theory of Computation          | 3         | 1        | 0        | 4         |
| 5.   | DC       | CSE-243    | Computer Organization & Design | 3         | 1        | 2        | 5         |
| 6.   | EF       | CSE-244    | Software Lab-IV                | 0         | 0        | 4        | 2         |
| 7.   | AC       | BSH-243    | Microprocessors & Application  | 3         | 1        | 2        | CNC       |
|      |          |            | <b>Total</b>                   | <b>14</b> | <b>5</b> | <b>8</b> | <b>23</b> |

**NOTE: CNC =COMPULSORY NON CREDIT****Semester-V (3<sup>rd</sup> year)**

| S.N. | Category | Paper Code | Course                               | L         | T        | P        | Credits   |
|------|----------|------------|--------------------------------------|-----------|----------|----------|-----------|
| 1.   | M        | BSH-351    | Engineering and Managerial Economics | 2         | 1        | 0        | 3         |
| 2.   | DC       | CSE-351    | Principles of Operating Systems      | 3         | 1        | 2        | 5         |
| 3.   | DC       | CSE-352    | Computer Graphics                    | 3         | 1        | 2        | 5         |
| 4.   | DC       | CSE-353    | Design & Analysis of Algorithms      | 3         | 1        | 2        | 5         |
| 5.   | DC       | CSE-354    | Advanced Computer Architecture       | 3         | 1        | 2        | 5         |
| 6.   | AC       | BSH-352    | Digital Signal Processing            | 3         | 1        | 0        | CNC       |
|      |          |            | <b>Total</b>                         | <b>14</b> | <b>5</b> | <b>8</b> | <b>23</b> |

**NOTE: CNC =COMPULSORY NON CREDIT**

**Semester-VI (3<sup>rd</sup> Year)**

| S.N.         | Category | Paper Code | Course                       | L         | T        | P         | Credits   |
|--------------|----------|------------|------------------------------|-----------|----------|-----------|-----------|
| 1.           | DC       | CSE-361    | Principle of Compiler Design | 3         | 1        | 2         | 5         |
| 2.           | DC       | CSE-362    | Artificial Intelligence      | 3         | 1        | 2         | 5         |
| 3.           | DC       | CSE-363    | Web Technologies             | 3         | 1        | 2         | 5         |
| 4.           | DC       | CSE-364    | Computer Networks            | 3         | 1        | 2         | 5         |
| 5.           | DC       | CSE-365    | Software Engineering         | 3         | 1        | 2         | 5         |
| 6.           | AC       | CSE-366    | Seminar                      | 0         | 0        | 6         | CNC       |
| <b>Total</b> |          |            |                              | <b>15</b> | <b>5</b> | <b>10</b> | <b>25</b> |

**NOTE: CNC =COMPULSORY NON CREDIT**Note= The evaluation of Industrial/Practical Training shall be offered at the end of VI<sup>th</sup> semester & evaluation in VII<sup>th</sup> semester.**Semester-VII (4<sup>th</sup> year)**

| S.N.         | Category | Paper Code | Course                           | L         | T        | P         | Credits   |
|--------------|----------|------------|----------------------------------|-----------|----------|-----------|-----------|
| 1.           | DC       | CSE-471    | Introduction to Machine Learning | 3         | 1        | 2         | 5         |
| 2.           | DC       | CSE-472    | Parallel & Distributed Computing | 3         | 1        | 2         | 5         |
| 3.           | PE1      | CPE-***    | Programme Elective-1             | 3         | 1        | 0         | 4         |
| 4.           | PE2      | CPE-***    | Programme Elective-2             | 3         | 1        | 0         | 4         |
| 5.           | P        | CSE-473    | Project Part-I                   | 0         | 0        | 10        | 5         |
| 6.           | AC       | CSE-474    | Industrial/Practical Training    | 0         | 0        | 2         | CNC       |
| <b>Total</b> |          |            |                                  | <b>12</b> | <b>4</b> | <b>14</b> | <b>23</b> |

**NOTE: CNC =COMPULSORY NON CREDIT****Semester-VIII**

| S.N.         | Category | Paper Code                      | Course                                       | L         | T        | P         | Credits   |
|--------------|----------|---------------------------------|--|-----------|----------|-----------|-----------|
| 1.           | DC       | CSE-481                         | Mobile Computing                             | 3         | 1        | 2         | 5         |
| 2.           | PE3      | CPE-***                         | Programme Elective-3                         | 3         | 1        | 0         | 4         |
| 3.           | PE4      | CPE-***                         | Programme Elective-4                         | 3         | 1        | 0         | 4         |
| 4.           | OE       | COE-481/<br>COE-482/<br>COE-483 | Open Elective offered by other<br>Department | 3         | 1        | 0         | 4         |
| 5.           | P        | CSE-482                         | Project Part-II                              | 0         | 0        | 10        | 5         |
| <b>Total</b> |          |                                 |  | <b>12</b> | <b>4</b> | <b>12</b> | <b>22</b> |

## Engineering Fundamentals & Department Core (Computer Science & Engineering)

| S.N. | Paper   | Course                                      | Prerequisite | L | T | P  | Credits |
|------|---------|---|--------------|---|---|----|---------|
|      | Code    |   | Course       |   |   |    |         |
|      |         | <b>I Year ( 1<sup>st</sup> Semester )</b>   |              |   |   |    |         |
| 1.   | CSE-111 | Introduction to C & Functional Programming  | -            | 3 | 1 | 2  | 5       |
| 2.   | CSE-112 | Software Lab-I                              | -            | 0 | 0 | 4  | 2       |
|      |         | <b>I Year ( 2<sup>nd</sup> Semester )</b>   |              |   |   |    |         |
| 3.   | CSE-121 | Object Oriented Modeling & C++              | -            | 3 | 1 | 2  | 5       |
| 4.   | CSE-122 | Software Lab-II                             | -            | 0 | 0 | 4  | 2       |
|      |         | <b>II Year ( 3<sup>rd</sup> Semester )</b>  |              |   |   |    |         |
| 5.   | ECE-231 | Digital Circuits and Logic Design           | -            | 3 | 1 | 0  | 4       |
| 6.   | CSE-231 | Principles of Data Structures through C/C++ | -            | 3 | 1 | 2  | 5       |
| 7.   | CSE-232 | Internet & JAVA Programming                 | -            | 3 | 1 | 2  | 5       |
| 8.   | CSE-233 | Software Lab-III                            | -            | 0 | 0 | 4  | 2       |
|      |         | <b>II Year ( 4<sup>th</sup> Semester )</b>  |              |   |   |    |         |
| 9.   | CSE-241 | Database Management Systems                 | -            | 3 | 1 | 2  | 5       |
| 10.  | CSE-242 | Theory of Computation                       | -            | 3 | 1 | 0  | 4       |
| 11.  | CSE-243 | Computer Organization & Design              | -            | 3 | 1 | 2  | 5       |
| 12.  | CSE-244 | Software Lab-IV                             | -            | 0 | 0 | 4  | 2       |
|      |         | <b>III Year ( 5<sup>th</sup> Semester )</b> |              |   |   |    |         |
| 13.  | CSE-351 | Principles of Operating Systems             | -            | 3 | 1 | 2  | 5       |
| 14.  | CSE-352 | Computer Graphics                           | -            | 3 | 1 | 2  | 5       |
| 15.  | CSE-353 | Design & Analysis of Algorithms             | -            | 3 | 1 | 2  | 5       |
| 16.  | CSE-354 | Advanced Computer Architecture              | -            | 3 | 1 | 2  | 5       |
|      |         | <b>III Year ( 6<sup>th</sup> Semester )</b> |              |   |   |    |         |
| 17.  | CSE-361 | Principle of Compiler Design                | -            | 3 | 1 | 2  | 5       |
| 18.  | CSE-362 | Artificial Intelligence                     | -            | 3 | 1 | 2  | 5       |
| 19.  | CSE-363 | Web Technologies                            | -            | 3 | 1 | 2  | 5       |
| 20.  | CSE-364 | Computer Networks                           | -            | 3 | 1 | 2  | 5       |
| 21.  | CSE-365 | Software Engineering                        | -            | 3 | 1 | 2  | 5       |
| 22.  | CSE-366 | Seminar                                     | -            | 0 | 0 | 6  | -       |
|      |         | <b>IV Year ( 7<sup>th</sup> Semester )</b>  |              |   |   |    |         |
| 23.  | CSE-471 | Introduction to Machine Learning            | -            | 3 | 1 | 2  | 5       |
| 24.  | CSE-472 | Parallel & Distributed Computing            | -            | 3 | 1 | 2  | 5       |
| 25.  | CSE-473 | Project Part-I                              | -            | 0 | 0 | 10 | 5       |
| 26.  | CSE-474 | Industrial/Practical Training               | -            | 0 | 0 | 2  | -       |
|      |         | <b>IV Year ( 8<sup>th</sup> Semester )</b>  |              |   |   |    |         |
| 27.  | CSE-481 | Mobile Computing                            | -            | 3 | 1 | 2  | 5       |
| 28.  | CSE-482 | Project Part-II                             | CSE-473      | 0 | 0 | 10 | 5       |

### Programme Electives (Computer Science & Engineering)

| S.N.                                 | Paper Code | Course                              | Prerequisite Course | L | T | P | Credits |
|--------------------------------------|------------|-------------------------------------|---------------------|---|---|---|---------|
| <b>PE1 &amp; PE2 (VII Semester)</b>  |            |                                     |                     |   |   |   |         |
| 1.                                   | CPE-471    | Advanced JAVA                       | CSE-232             | 3 | 1 | 0 | 4       |
| 2.                                   | CPE-472    | .Net Technology                     | -                   | 3 | 1 | 0 | 4       |
| 3.                                   | CPE-473    | LAMP Technology                     | -                   | 3 | 1 | 0 | 4       |
| 4.                                   | CPE-474    | Network Programming                 | CSE-364             | 3 | 1 | 0 | 4       |
| 5.                                   | CPE-475    | Mobile Application Programming      | CSE-364             | 3 | 1 | 0 | 4       |
| 6.                                   | CPE-476    | Database Administration with ORACLE | CSE-241             | 3 | 1 | 0 | 4       |
| 7.                                   | CPE-477    | Data warehousing & Data Mining      | CSE-241             | 3 | 1 | 0 | 4       |
| 8.                                   | CPE-478    | Analytics and Systems of Big Data   | CSE-241             | 3 | 1 | 0 | 4       |
| <b>PE3 &amp; PE4 (VIII Semester)</b> |            |                                     |                     |   |   |   |         |
| 9.                                   | CPE-481    | Advanced Programming Techniques     | -                   | 3 | 1 | 0 | 4       |
| 10.                                  | CPE-482    | Software Reuse                      | CSE-365             | 3 | 1 | 0 | 4       |
| 11.                                  | CPE-483    | Software Verification & Validation  | CSE-365             | 3 | 1 | 0 | 4       |
| 12.                                  | CPE-484    | Software Design & Construction      | CSE-365             | 3 | 1 | 0 | 4       |
| 13.                                  | CPE-485    | Software Quality Management         | CSE-365             | 3 | 1 | 0 | 4       |
| 14.                                  | CPE-486    | Fundamentals of Cloud Computing     | CSE-351<br>CSE-364  | 3 | 1 | 0 | 4       |
| 15.                                  | CPE-487    | Cryptography & Information Security | -                   | 3 | 1 | 0 | 4       |
| 16.                                  | CPE-488    | Introduction to Real Time Systems   | -                   | 3 | 1 | 0 | 4       |
| 17.                                  | CPE-489    | Neural Networks & Fuzzy Systems     | -                   | 3 | 1 | 0 | 4       |

### Courses for other Departments

| S.N. | Paper Code | Course  | Prerequisite Course | L | T | P | Credits |
|------|------------|---|---------------------|---|---|---|---------|
| 1.   | COE-481    | Database Management System, Data Mining & Warehousing | -                   | 3 | 1 | 0 | 4       |
| 2.   | COE-482    | Object Oriented Techniques & JAVA Programming         | -                   | 3 | 1 | 0 | 4       |
| 3.   | COE-483    | Introduction to Web Technology                        | -                   | 2 | 1 | 2 | 4       |

### Humanities & Social Science Electives

| S.N. | Paper Code | Course                             | Prerequisite Course | L | T | P | Credits |
|------|------------|------------------------------------|---------------------|---|---|---|---------|
| 1.   | BSH-124    | Human Values & Professional Ethics | -                   | 2 | 1 | 0 | 3       |
| 2.   | BSH-125    | Industrial Psychology              | -                   | 2 | 1 | 0 | 3       |
| 3.   | BSH-126    | Industrial Sociology               | -                   | 2 | 1 | 0 | 3       |

# Computer Science & Engineering Department

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## Courses Offered by the Department

| S.N. | Paper Code | Course  | Prerequisite Course | L | T | P  | Credits |
|------|------------|---|---------------------|---|---|----|---------|
| 1.   | CSE-111    | Introduction to C & Functional Programming            | -                   | 3 | 1 | 2  | 5       |
| 2.   | CSE-112    | Software Lab-I  | -                   | 0 | 0 | 4  | 2       |
| 3.   | CSE-121    | Object Oriented Modeling & C++                        | -                   | 3 | 1 | 2  | 5       |
| 4.   | CSE-122    | Software Lab-II                                       | -                   | 0 | 0 | 4  | 2       |
| 5.   | ECE-231    | Digital Circuits and Logic Design                     | -                   | 3 | 1 | 0  | 4       |
| 6.   | CSE-231    | Principles of Data Structures through C/C++           | -                   | 3 | 1 | 2  | 5       |
| 7.   | CSE-232    | Internet & JAVA Programming                           | -                   | 3 | 1 | 2  | 5       |
| 8.   | CSE-233    | Software Lab-III                                      | -                   | 0 | 0 | 4  | 2       |
| 9.   | CSE-241    | Database Management Systems                           | -                   | 3 | 1 | 2  | 5       |
| 10.  | CSE-242    | Theory of Computation                                 | -                   | 3 | 1 | 0  | 4       |
| 11.  | CSE-243    | Computer Organization & Design                        | -                   | 3 | 1 | 2  | 5       |
| 12.  | CSE- 244   | Software Lab-IV                                       | -                   | 0 | 0 | 4  | 2       |
| 13.  | CSE-351    | Principles of Operating Systems                       | -                   | 3 | 1 | 2  | 5       |
| 14.  | CSE-352    | Computer Graphics                                     | -                   | 3 | 1 | 2  | 5       |
| 15.  | CSE-353    | Design & Analysis of Algorithms                       | -                   | 3 | 1 | 2  | 5       |
| 16.  | CSE-354    | Advanced Computer Architecture                        | -                   | 3 | 1 | 2  | 5       |
| 17.  | CSE-366    | Seminar   | -                   | 0 | 0 | 6  | -       |
| 18.  | CSE-361    | Principle of Compiler Design                          | -                   | 3 | 1 | 2  | 5       |
| 19.  | CSE-362    | Artificial Intelligence                               | -                   | 3 | 1 | 2  | 5       |
| 20.  | CSE-363    | Web Technologies                                      | -                   | 3 | 1 | 2  | 5       |
| 21.  | CSE-364    | Computer Networks                                     | -                   | 3 | 1 | 2  | 5       |
| 22.  | CSE-365    | Software Engineering                                  | -                   | 3 | 1 | 2  | 5       |
| 23.  | COE-481    | Database Management System, Data Mining & Warehousing | -                   | 3 | 1 | 0  | 4       |
| 24.  | CSE-473    | Project Part-I  | -                   | 0 | 0 | 10 | 5       |
| 25.  | CSE-471    | Introduction to Machine Learning                      | -                   | 3 | 1 | 2  | 5       |
| 26.  | CSE-472    | Parallel & Distributed Computing                      | -                   | 3 | 1 | 2  | 5       |
| 27.  | CSE-481    | Mobile Computing                                      | -                   | 3 | 1 | 2  | 5       |
| 28.  | COE-482    | Object Oriented Techniques & JAVA Programming         | -                   | 3 | 1 | 0  | 4       |

|     |         |                                     |         |   |   |    |   |
|-----|---------|-------------------------------------|---------|---|---|----|---|
| 29. | CSE-474 | Industrial/Practical Training       | -       | 0 | 0 | 2  | - |
| 30. | CSE_482 | Project Part-II                     | CSE-473 | 0 | 0 | 10 | 5 |
| 31. | CPE-471 | Advanced JAVA                       | CSE-232 | 3 | 1 | 0  | 4 |
| 32. | CPE-472 | .Net Technology                     | -       | 3 | 1 | 0  | 4 |
| 33. | CPE-473 | LAMP Technology                     | -       | 3 | 1 | 0  | 4 |
| 34. | CPE-474 | Network Programming                 | CSE-364 | 3 | 1 | 0  | 4 |
| 35. | CPE-475 | Mobile Application Programming      | CSE-364 | 3 | 1 | 0  | 4 |
| 36. | CPE-476 | Database Administration with ORACLE | CSE-241 | 3 | 1 | 0  | 4 |
| 37  | CPE-477 | Data Warehousing & Data Mining      | CSE-241 | 3 | 1 | 0  | 4 |
| 38  | CPE-478 | Analytics and Systems of Big Data   | CSE-241 | 3 | 1 | 0  | 4 |
| 39  | CPE-481 | Advanced Programming Techniques     | -       | 3 | 1 | 0  | 4 |
| 40  | CPE-482 | Software Reuse                      | CSE-365 | 3 | 1 | 0  | 4 |
| 41  | CPE-483 | Software Verification & Validation  | CSE-365 | 3 | 1 | 0  | 4 |
| 42  | CPE-484 | Software Design & Construction      | CSE-365 | 3 | 1 | 0  | 4 |
| 43  | CPE-485 | Software Quality Management         | CSE-365 | 3 | 1 | 0  | 4 |
| 44  | CPE-486 | Fundamentals of Cloud Computing     | CSE-351 | 3 | 1 | 0  | 4 |
| 45  | CPE-487 | Cryptography & Information Security | -       | 3 | 1 | 0  | 4 |
| 46  | CPE-488 | Introduction to Real Time Systems   | -       | 3 | 1 | 0  | 4 |
| 47  | CPE-489 | Neural Networks & Fuzzy Systems     | -       | 3 | 1 | 0  | 4 |

#### Audit Courses for B. Tech. (Computer Science and Engineering)

| S.N. | Paper Code | Course                                     | Prerequisite Course | L | T | P | Credits |
|------|------------|--|---------------------|---|---|---|---------|
|      |            | <b>Year-I (1<sup>st</sup> Semester)</b>    |                     |   |   |   |         |
| 1    | BSH-114    | Environment & Studies                      | -                   | 2 | 1 | 0 | CNC     |
|      |            | <b>Year-I (2<sup>nd</sup> Semester)</b>    |                     |   |   |   |         |
| 2    | BSH-127    | Fundamentals of Electronics Engineering    | -                   | 3 | 1 | 2 | CNC     |
|      |            | <b>Year-II(3<sup>rd</sup> Semester)</b>    |                     |   |   |   |         |
| 3    | IDE-231    | Management of Canal Irrigation System      |                     | 3 | - | 1 | CNC     |
| 4    | SWE-231    | Information Technology for Land and Water  |                     | 3 | - | 1 | CNC     |
| 5    | SWE-232    | Wasteland Development                      |                     | 2 | - | 1 | CNC     |
|      |            | <b>Year-II (4<sup>th</sup> Semester)</b>   |                     |   |   |   |         |
| 6    | BSH-243    | Microprocessors & Application              | -                   | 3 | 1 | 2 | CNC     |
|      |            | <b>Year-III (5<sup>th</sup> Semester )</b> |                     |   |   |   |         |
| 7.   | BSH-352    | Digital Signal Processing                  | -                   | 3 | 1 | 0 | CNC     |

**NOTE: CNC =COMPULSORY NON CREDIT**

## OPEN ELECTIVE COURSE

| S.N. Paper | Code    | Course  | L | T | P | Credits |
|------------|---------|---|---|---|---|---------|
| 1.         | MOE-481 | Fundamentals Of Mechanical Engineering                | 3 | 1 | 0 | 4       |
| 2.         | MOE-482 | Manufacturing Processes                               | 3 | 1 | 0 | 4       |
| 3.         | MOE-483 | Engineering Material                                  | 3 | 1 | 0 | 4       |
| 4.         | AOE-481 | Photovoltaic Technology And Systems                   | 3 | 0 | 2 | 4       |
| 5.         | AOE-482 | Remote Sensing And GIS Applications                   | 3 | 0 | 2 | 4       |
| 6.         | AOE-483 | Human Engineering And Safety                          | 3 | 0 | 2 | 4       |
| 7.         | COE-481 | Database Management System, Data Mining & Warehousing | 3 | 1 | 0 | 4       |
| 8.         | COE-482 | Object Oriented Techniques & Java Programming         | 3 | 1 | 0 | 4       |
| 9.         | COE-483 | Introduction to Web Technology                        | 3 | 1 | 0 | 4       |
| 10.        | EOE-481 | Non-Conventional Energy Resources                     | 3 | 1 | 0 | 4       |
| 11.        | EOE-482 | Industrial Electronics                                | 3 | 1 | 0 | 4       |
| 12.        | EOE-483 | Development Product                                   | 3 | 1 | 0 | 4       |
| 13.        | BOE-481 | Entrepreneurship Development                          | 3 | 1 | 0 | 4       |
| 14.        | BOE-482 | Enterprise Resource Planning                          | 3 | 1 | 0 | 4       |
| 15.        | BOE-483 | E-Commerce & IT                                       | 3 | 1 | 0 | 4       |

### BSH-111 ENGINEERING MATHEMATICS-I

**Course category** : Basic Sciences & Maths (BSM)

**Pre-requisite Course** : NIL

**Contact hours/week** : Lecture : 3, Tutorial : 1 , Practical: 0

**Number of Credits** : 4

**Course Assessment Methods** : Continuous assessment through tutorials, attendance, home assignments, and final Examination.

**Course Outcomes** : The students are expected to be able to demonstrate the following knowledge, skills and attitudes after completing this course

1. Use of basic differential operators in various engineering problems.
2. Solve linear system of equations using matrix algebra.
3. Use vectors to solve problems involving force, velocity, work and real life problems and able to analyze vectors in space
4. Evaluate and use double integral to find area of a plane region and us of triple integral to find the volume of region in 3<sup>rd</sup> dimension

#### Topics Covered

##### UNIT-I

**Differential Calculus:** Leibnitz theorem, Partial derivatives, Euler's theorem for homogenous function, Total derivative, Change of variable. Taylor's and Maclaurin's theorem. Expansion of function of two variables, Jacobian, Extrema of function of several variables. 9

##### UNIT-II

**Linear Algebra:** Rank of Matrix, Inverse of a Matrix, Elementary transformation, Consistency of linear system of equations and their solution. Characteristic equation, Eigen-values, Eigen-vectors, Cayley-Hamilton theorem. 9

### UNIT-III

**Multiple Integrals:** Double and triple integrals, change of order of integration, change of variables. 9  
Application of multiple integral to surface area and volume. Beta and Gamma functions, Dirichlet integral.

### UNIT-IV

**Vector Calculus:** Gradient, Divergence and Curl. Directional derivatives, line, surface and volume 9  
integrals. Applications of Green's, Stoke's and Gauss divergence theorems (without Proofs).

### Books & References

1. B.S. Grewal: Higher Engineering Mathematics; Khanna Publishers.
2. B.V. Ramana: Higher Engineering Mathematics, Tata McGraw Hill Education Pvt. Ltd., New Delhi.
3. H.K. Dass and Rama Verma: Engineering Mathematics; S. Chand Publications.
4. N.P. Bali and Manish Goel: Engineering Mathematics; Laxmi Publications.

## BSH-112 ENGINEERING PHYSICS-I

**Course category** : Basic Sciences & Maths (BSM)

**Pre-requisite Course** : NIL

**Contact hours/week** : Lecture : 3, Tutorial : 1 , Practical: 2

**Number of Credits** : 5

**Course Assessment methods** : Continuous assessment through tutorials, attendance, home assignments, practical work, record, viva vice and one mid term Examination , final Examination & Practical Examination

**Course Outcomes** : The students are expected to be able to demonstrate the following knowledge, skills and attitudes after completing this course

1. Basics of relativity and its application in Engineering.
2. Quantum Mechanics and its application to understand material properties.
3. Statistical mechanics and its application in study of Macro and Micro scale properties of Matter.
4. Use of the principle of optics in the measurement.
5. Applications of Laser and holography in Engineering.
6. Basic Principles of optical Fibre and its application in Engineering.

### Topics Covered

#### UNIT-I

**Relativistic Mechanics:** Inertial and Non-inertial Frames of reference, Galilean 9  
transformation, Michelson-Morley Experiment, Postulates of special theory of relativity, Lorentz Transformation, Length contraction, Evidences of length contraction, Time dilation, Evidences for time dilation, Relativistic velocity transformation, Relativistic variation of mass with velocity, Evidence of mass variation with velocity, Relativistic kinetic energy, Mass energy equivalence, Examples from nuclear physics, Relativistic energy-momentum relation.

#### UNIT-II

**Statistical Mechanics:** Brief Introduction of Classical Statistics, Bose Einstein Statistics, 9  
Application to Black body radiation, distribution law of energy, Planck's radiation formula and Stefan's law. Fermi – Dirac statistics, Application to electrons in metals (energy distribution, Fermi energy).

**Quantum Mechanics:** De Broglie waves and Group velocity concept, Uncertainty principle and its application, Davisson-Germer experiment, Derivation of Schrodinger equation for time independent and time dependent cases. Postulates of quantum mechanics, Significance of wave function, Application of Schrodinger wave equation for a free particle (one dimensional and three dimensional case), Particle in a box (one dimensional and three dimensional), Simple harmonic oscillator (one dimensional and three dimensional).

### UNIT-III

**Geometrical Optics:** General theory of image formation: Cardinal points of an optical system; general relationships, thick lens and lens combinations. 9

**Optical instruments:** Need for a multiple lens eyepiece, common type of eyepieces

**Physical Optics:**

**Interference:** Interference of light, Interference in thin films (parallel and wedge shaped film), Newton's rings.

**Diffraction:** Single, double and N- Slit Diffraction, Diffraction grating, Grating spectra, dispersive power, Rayleigh's criterion and resolving power of grating.

**Polarization:** Phenomena of double refraction, Nicol prism, Production and analysis of plane, circular and elliptical polarized light, Retardation Plate, Polarimeter

### UNIT-IV

**Modern Optics** 9

**Laser:** Spontaneous and stimulated emission of radiation, population inversion, concept of 3 and 4 level Laser, construction and working of Ruby, He-Ne lasers and laser applications.

**Fiber Optics:** Fundamental ideas about optical fiber, Propagation mechanism, Acceptance angle and cone, Numerical aperture, Propagation Mechanism and communication in fiber Single and Multi Mode Fibers, step index and graded index fiber, attenuation and losses.

**Holography:** Basic Principle of Holography, Construction and reconstruction of Image on hologram and applications of holography.

### EXPERIMENTS

1. To determine the wavelength of monochromatic light by Newton's Ring
2. To determine the specific rotation of cane sugar solution using polarimeter
3. To determine the wavelength of spectral lines using plane transmission grating.
4. To verify Brewster's law using rotating Nicol prism
5. To verify Stefan's law by electrical method
6. To Study resonance in LCR circuit with a c source.
7. To determine the height of a tower with a Sextant.
8. To determine the refractive index of a liquid by Newton's ring.

### Books & References

1. Introduction to Special theory Relativity-Robert Resnick, Wiley Eastern Ltd.
2. Statistical Mechanics and Properties of Matter- E S R Gopal, John Wiley and Sons
3. Quantum Mechanics: Theory and Applications- Ajoy Ghatak, Tata McGraw-Hill
4. Optics- Ajoy Ghatak, Tata McGraw-Hill
5. Optics- N. Subrahmanyam, Brij Lal, M.N. Avadhanulu, S. Chand
6. Fiber optics and laser Principles and Applications-Anuradha De, New Age International
7. Concepts of Modern Physics-Arthur Beiser, Tata McGraw-Hill

## BSH-121 ENGINEERING MATHEMATICS – II

|                                  |  |
|----------------------------------|--|
| <b>Course category</b>           | : Basic Sciences & Maths (BSM)   |
| <b>Pre-requisite Course</b>      | : NIL  |
| <b>Contact hours/week</b>        | : Lecture : 3, Tutorial : 1 , Practical: 0   |
| <b>Number of Credits</b>         | : 4  |
| <b>Course Assessment methods</b> | : Continuous assessment through tutorials, attendance, home assignments, one mid term Examination, Final Examination.            |
| <b>Course Outcomes</b>           | : The students are expected to be able to demonstrate the following knowledge, skills and attitudes after completing this course |

1. Use of various mathematical techniques such as differential operators, matrix algebra and vector differentiation and integration.
2. To identify, formulate and solve the real life problems.
3. To inculcate the habit of mathematical thinking and lifelong learning.

### Topics Covered

**UNIT-I** 9

**Differential Equations:** Linear differential equations with constant coefficients ( $y'' + ay' + by = c$ ), complementary function and particular integral. Simultaneous linear differential equations, solution of second order differential equations by changing dependent and independent variables, Method of variation of parameters, Applications of differential equations to engineering problems

**UNIT-II** 9

**Special functions:** Series solution of second order differential equations with variable coefficient (Frobenius method). Bessel and Legendre equations and their series solutions, Properties of Bessel function and Legendre polynomials

**UNIT-III** 9

**Laplace Transform:** Laplace Transform, Laplace transform of derivatives and integrals. Unit step function, Laplace transform of Periodic function. Inverse Laplace transform, Convolution theorem, Applications to solve simple linear and simultaneous differential equations.

**UNIT-IV** 9

**Fourier Series and Partial Differential Equations:** Periodic Functions, Fourier Series of period  $2\pi$ , Change of interval, Even and Odd functions, Half range Sine and Cosine Series. Harmonic analysis, Partial Differential Equations with constant coefficients

### Books & References

1. Higher Engineering Mathematics - B.S. Grewal, Khanna Publishers
2. Engineering Mathematics - H.K. Dass and Rama Verma, S. Chand Publications
3. Engineering Mathematics - N.P. Bali and Manish Goel, Laxmi Publications
4. Higher Engineering Mathematics - B.V. Ramana, Tata McGraw Hill Education Pvt. Ltd., New Delhi

## **BSH-122 ENGINEERING PHYSICS-II**

|                                  |  |
|----------------------------------|--|
| <b>Course category</b>           | : Basic Sciences & Maths (BSM)   |
| <b>Pre-requisite Course</b>      | : NIL  |
| <b>Contact hours/week</b>        | : Lecture : 3, Tutorial : 1 , Practical: 2   |
| <b>Number of Credits</b>         | : 5  |
| <b>Course Assessment methods</b> | : Continuous assessment through tutorials, attendance, home assignments, practical work, record, viva voce and one Mid Term Examination, Final Examination & Practical Examination |
| <b>Course Outcomes</b>           | : The students are expected to be able to demonstrate the following knowledge, skills and attitudes after completing this course   |

1. Basics of crystallography application in Engineering
2. Use of the principles of sound wave and acoustics in civil engineering with the consideration of NDT.
3. Basic principles of electricity and magnetism applied in Engineering.
4. Maxwell's equation of electromagnetic theory and its application in engineering.
5. Basic principles of semiconducting materials and its application.
6. Basic Principles of Superconductivity and its application in Engineering.

### **Topics Covered**

#### **UNIT-I**

9

**Crystal Structures and X-ray Diffraction:** Space lattice, basis, Unit cell, Lattice parameter, Seven crystal systems and Fourteen Bravais lattices, Crystal-System Structure, Packing factor (cubic, body and face), Crystal structure of NaCl and diamond, Lattice planes and Miller Indices, Reciprocal Lattice, Diffraction of X-rays by crystal, Laue's experiment, Bragg's Law, Bragg's spectrometer.

#### **UNIT-II**

9

**Sound Waves and Acoustics:** Sound waves, intensity, loudness, reflection of sound, echo; Reverberation, reverberation time, Sabine's formula, remedies over reverberation; Absorption of sound, absorbent materials; Conditions for good acoustics of a building; Noise, its effects and remedies; Ultrasonics –Production of ultrasonics by Piezo-electric and magnetostriction; Detection of ultrasonics; Engineering applications of Ultrasonics (Non-destructive testing).

#### **UNIT-III**

9

**Electrodynamics –I:** Basic concepts of Gauss's law, Ampere's law and faradays law of electromagnetic induction. Correction of Ampere's law by Maxwell (concept of displacement current), Maxwell's equation, transformation from integral form to differential form, physical significance of each equation

**Electrodynamics –II:** Maxwell's equation in free space, velocity of electromagnetic wave, transverse character of the wave and orthogonality of E, H and k vectors, Maxwell's equations in dielectric medium and velocity of e. m. wave, comparison with free space, Maxwell's equations in conducting media, solution of differential equation in this case and derivation of penetration depth

## UNIT-IV

9

### Physics of Advanced Materials

**Semiconducting Materials:** Concept of energy bands in solids, Carrier concentration and conductivity in intrinsic semiconductors and their temperature dependence, carrier concentration and conductivity in extrinsic semiconductors and their temperature dependence. Hall effect in semiconductors, Compound semiconductors, Optoelectronic Materials.

**Superconducting Materials:** Temperature dependence of resistivity in superconducting materials, Effect of magnetic field (Meissner effect), Temperature dependence of critical field, Type I and Type II superconductors, Electrodynamics of superconductors, BCS theory (Qualitative), High temperature superconductors and Applications of Superconductors.

**Nano-Materials:** Basic principle of nanoscience and technology, structure, properties and uses of Fullerene and Carbon nanotubes, Applications of nanotechnology.

### EXPERIMENTS

1. To determine the specific resistance of a given wire using Carrey Foster's Bridge.
2. To study the variation of magnetic field along the axis of current carrying circular coil.
3. To study the Hall's effect and to determine Hall coefficient in n type Germanium.
4. To study the energy band gap of n- type Germanium using four probe method
5. To determine e/m of electron using Magnetron valve
6. To draw hysteresis curve of a given sample of ferromagnetic material
7. To determine the velocity of Ultrasonic waves
8. To determine the Elastic constants ( $Y, \eta, \sigma$ ) by Searl's method

### Books & References

1. Introduction to Solid State Physics- Kittel , 7<sup>th</sup> edition, Wiley Eastern Ltd.
2. Solid State Physics - S. O. Pillai, 5<sup>th</sup> edition, New Age International.
3. Introduction to Electrodynamics- [David J. Griffiths](#) Pearson, New International Edition
4. Semiconductor Devices and Application - S.M. Sze, Wiley
5. Introduction to Nano Technology - Poole Owens, Wiley India
6. Master Hand book of Acoustics - F. Alton Everest and Ken Pohlmann, 5<sup>th</sup> edition, McGraw Hill

## BSH-123 GRAPH THEORY

- Course category** : Basic Sciences & Maths (BSM)
- Pre-requisite Course** : NIL
- Contact hours/week** : Lecture : 3, Tutorial : 1 , Practical: 2
- Number of Credits** : 5
- Course Assessment methods** : Continuous assessment through tutorials, attendance, home assignments, practical work, record, viva voce and one Mid Term Examination, Final Examination & Practical Examination
- Course Outcomes** : The students are expected to be able to demonstrate the following knowledge, skills and attitudes after completing this course.
1. Write precise and accurate mathematical definitions of objects in graph theory.
  2. Use a combination of theoretical knowledge and independent mathematical thinking in creative investigation of questions in graph theory.
  3. Use mathematical definitions to identify and construct examples.
  4. Validate and critically assess a mathematical proof.

## Topics Covered

### UNIT-I

9

**Preliminaries:** Sets, relations, functions & multi-sets, Inductive definition and proof by induction, Cardinality of sets Basic concepts of Graph Theory: Digraphs, graphs and other similar objects, Representations of diagraphs and graphs, Operations on graphs, degree sequence and isomorphism Connectedness and distance: Walks, trails, circuits, cycles, and paths, Connected digraphs and graphs, Weighted graphs and digraphs and distance

### UNIT-II

9

**Trees and their applications:** Basic properties of trees and forests, Minimum-weight spanning trees, Enumeration of labeled trees, Rooted trees and uniquely decipherable coding, Tree traversals and parentheses-free notations Networks and flows: Legal flows and capacities of cuts, The Ford-Fulkerson Algorithms and Maxflow-Mincut theorem

### UNIT-III

9

**Edge and Vertex traversal problems:** Euler circuits and Euler trails, Fleury's algorithm and the Chinese Postman problem, Hamilton cycles and the Travelling Salesman problem Planar embeddings of graphs: Basic properties of planar graphs, Kuratowski's theorem and non-planar graphs, The DMP planarity algorithm, Polyhedral graphs and geometric dual

### UNIT-IV

9

**Colorings and Matchings in graphs:** Legal colorings and k-colorable graphs, Chromatic Polynomial and Four color theorem, Matchings in graphs and Stable marriage algorithm Directed graphs: Tournaments, directed paths and cycles, connectivity and strongly connected digraphs, branching, Infinite graphs and digraphs

## EXPERIMENTS

1. Write a recursive program that computes the value of  $\ln(N!)$ .
2. Write a C program to Implement Euler Circuit which starts and ends on the same vertex.
3. Write a C Program to Implement Hamiltonian Cycle Algorithm.
4. Write a C Program to assign a colour to each of the states so that no two adjacent states share the same colour. The program should output each state and its colour. Example: Alabama touches Florida, Mississippi, Tennessee, and Georgia. Arkansas touches Louisiana, Texas, etc.
5. Graph implementation of BFS and DFS using C. 56
6. Write a C Program to Implement Euler Circuit problem. In graph theory, this starts and ends on the same vertex.
7. Write a C Program for the 'marriage problem', for N boys and N girls and an  $N \times N$  binary matrix telling us which pairings are suitable, and want to pair each girl to a boy. Implement perfect matching in a bipartite graph.
8. Write a C program to implement ford-fulkerson algorithm
9. Write A C program for the implementation of the Branch and Bound Algorithm: The Asymmetric Travelling Salesman Problem
10. Write a C program for Dijkstra's Algorithm for Finding Shortest Paths in Non-Negative Weight Graphs.
11. Write a C program to check whether the given graph is tree.
12. Write a C program to extract spanning tree (without using Kruskal and prim's Algorithm).
13. Write a C program to perform following operations on a given 2 connected graph i. Union ii. Intersection iii. deletion of a vertex iv. deletion of any edge v. fusion of 2 vertex
14. Write a C program to input an image (Graph) and find out its adjacency and incidence matrix.
15. Write a C program to extract walk, path from any vertex to any vertex in a given graph.
16. Write a C program for the i. test for emptyness ii. return the number of vertices iii. return the number of edges iv. test if a given vertex exists v. test if a given edge exists vi. add a vertex (this operation does not add any edge) vii. add an edge (this operation may result in adding new vertices) viii. delete a vertex (this operation may result in deleting edges) ix. delete an edge (this operation may result in deleting vertices)

### Textbooks & Reference books

1. Graphs and Hypergraphs -Berge, C., New York: Elsevier, 1973.
2. Theory of Graphs and Its Applications - Berge, C., New York: Wiley, 1962.
3. Modern Graph Theory- Bollobás, B., New York: Springer-Verlag, 1998

## BSH-231 DISCRETE MATHEMATICS

|                                  |  |
|----------------------------------|--|
| <b>Course category</b>           | : Basic Sciences & Maths (BSM)   |
| <b>Pre-requisite Course</b>      | : NIL  |
| <b>Contact hours/week</b>        | : Lecture : 3, Tutorial : 1 , Practical: 0   |
| <b>Number of Credits</b>         | : 4  |
| <b>Course Assessment methods</b> | : Continuous assessment through tutorials, attendance, home assignments, one Mid Term Examination, Final Examination.            |
| <b>Course Outcomes</b>           | : The students are expected to be able to demonstrate the following knowledge, skills and attitudes after completing this course |

1. Use logical notation to define different function such as set, function and relation.
2. Use of basic properties of group theory in computer science.
3. Use of graph theory models to solve problems of connectivity and constraint satisfaction, for example, scheduling.
4. Use of induction hypotheses to prove formulae.

### Topics Covered

|   |   |
|---|---|
| <b>UNIT-I</b>   | 9 |
| <b>Set Theory, Relation and Function:</b> Definition of sets, Countable and uncountable sets, Venn Diagrams, Proofs of some general identities on sets. Definition and types of relation, composition of relation, equivalence relation, partial order relation. Function: Definition, types of function, one to one, into and onto function, inverse function, composition of functions. |   |
| <b>UNIT-II</b>  | 9 |
| <b>Algebraic Structures:</b> Definition, properties and types of algebraic structures, Semi groups, Monoid, Groups, Abelian group, properties of groups, Subgroups, Cyclic groups, Cosets, Factor group, Permutations groups, Normal subgroups, examples and standard results. Rings and fields: Definition and Standard results.   |   |
| <b>UNIT-III</b>   | 9 |
| <b>Graphs:</b> Simple graph, multigraph, graph terminology, representation of graphs, Bipartite, regular, planar and connected graphs, connected components in a graph, Euler graphs, Hamiltonian path and circuits, graph colouring, chromatic number, chromatic polynomials. Tree: types and definition, rooted tree, properties of trees.  |   |
| <b>UNIT-IV</b>  | 9 |
| <b>Combinatorics:</b> Basic counting Technique, Pigeon-hole principle, Discrete Numeric function, Recurrence relations and their solution, Generating function, Solution of recurrence relations by method of generating function.  |   |

### Books & References

1. Discrete Mathematical Structures with applications to computer science - J.P. Tremblay and R. Manohar,
2. Graph Theory with application to engineering and computer science - Prentice Hall
3. Combinatorics: Theory and applications - V. Krishnamurthy, East

## **BSH-232 APPLIED COMPUTATIONAL METHODS**

|                                  |  |
|----------------------------------|--|
| <b>Course category</b>           | : Basic Sciences & Maths (BSM)   |
| <b>Pre-requisite Course</b>      | : NIL  |
| <b>Contact hours/week</b>        | : Lecture : 3, Tutorial : 1 , Practical: 2   |
| <b>Number of Credits</b>         | : 5  |
| <b>Course Assessment methods</b> | : Continuous assessment through tutorials, attendance, home assignments, one Mid Term Examination and Final Examination.         |
| <b>Course Outcomes</b>           | : The students are expected to be able to demonstrate the following knowledge, skills and attitudes after completing this course |

1. To find the root of a curve using Bisection, Regula falsi Newton's Method.
2. Use of moments and kurtosis to find the type of curve.
3. To interpolate a curve using Gauss, Newton's interpolation formula.
4. To find the derivative of a curve.
5. To find the area of a curve.

### **Topics Covered**

**UNIT-I** 9

**Numerical Methods:** Solution of algebraic and Transcendental equations, Bisection method, Method of False position (Regula-Falsi method) and Newton-Raphson method, Solution of linear simultaneous equations; Guass-Siedel method, Crout's method.

**UNIT-II** 9

**Interpolation and Numerical Integration:** Interpolation: Finite Differences, Difference operators, Newton's forward and backward interpolation formulae, Lagrange's formula for unequal intervals, Newton's divided difference formula for unequal intervals. Numerical Integration: Trapezoidal Rule, Simpson's one-third and three-eighth rules.

**UNIT-III** 9

**Numerical Solution of Ordinary Differential Equations and Difference Equations:** Picard's method, Taylor's Series method, Euler's method, Modified Euler's method, Runge-Kutta method of order four. Difference equations and their solutions. Rules for finding the particular integral.

**UNIT-IV** 9

**Statistical Methods and Probability Distributions:** Frequency Distributions, mean, mode, median, standard deviation, Moments, Skewness, Kurtosis, Types and measurement of Skewness and Kurtosis. Correlation; Regression and regression lines. Binomial Distribution, Poisson's Distribution, Normal Distribution.

### **Experiments**

1. To implement Regula-Falsi method to find root of algebraic equation.
2. To implement Newton-Raphson method to find root of algebraic equation.
3. To implement Newton's Divided Difference formula to find value of a function at a point.
4. To implement Numerical Integration by using Simpson's one-third rule.
5. To implement numerical solution by using Runge-Kutta method of order four to find solution of differential equation.
6. To implement numerical solution of differential equation by Picard's method.
7. To implement numerical solution of differential equation by using Euler's method.
8. To estimate regression equation from sampled data and evaluate values of standard deviation, regression coefficient.

### Books & References

1. B.S. Grewal: Higher Engineering Mathematics; Khanna Publishers.
2. B.V. Ramana: Higher Engineering Mathematics, Tata McGraw Hill Education Pvt. Ltd., New Delhi.
3. H.K. Dass and Rama Verma: Engineering Mathematics; S. Chand Publications.
4. N.P. Bali and Manish Goel: Engineering Mathematics; Laxmi Publications.

## BSH-241 OPTIMIZATION TECHNIQUES

|                                  |  |
|----------------------------------|--|
| <b>Course category</b>           | : Basic Sciences & Maths (BSM)   |
| <b>Pre-requisite Course</b>      | : NIL  |
| <b>Contact hours/week</b>        | : Lecture : 3, Tutorial : 1 , Practical: 0   |
| <b>Number of Credits</b>         | : 4  |
| <b>Course Assessment methods</b> | : Continuous assessment through tutorials, attendance, home assignments, one Mid Term Examination and Final Examination.         |
| <b>Course Outcomes</b>           | : The students are expected to be able to demonstrate the following knowledge, skills and attitudes after completing this course |

1. To find the root of a curve using iterative methods.
2. To interpolate a curve using Gauss, Newton's interpolation formula.
3. Use the theory of optimization methods and algorithms developed for various types of optimization problems.
4. To apply the mathematical results and numerical techniques of optimization theory to Engineering problems.

### Topics Covered

**UNIT-I** 9

**Classical Optimization Techniques:** Single variable optimization, Multi-variable with no constraints. Non-linear programming: One Dimensional Minimization methods. Elimination methods: Fibonacci method, Golden Section method.

**UNIT-II** 9

**Linear Programming: Constrained Optimization Techniques:** Simplex method, Solution of System of Linear Simultaneous equations, Revised Simplex method, Transportation problems, Karmarkar's method, Duality Theorems, Dual Simplex method, Decomposition principle.

**UNIT-III** 9

**Non-Linear Programming: Unconstrained Optimization Techniques:** Direct search methods: Random jumping method, Univariate method, Rosenbrock's method. Indirect search methods: Steepest Descent method, Cauchy-Newton Methods, Newton's method.

**UNIT-IV** 9

**Geometric Programming:** Polynomial, Unconstrained minimization problem, Degree of difficulty. Solution of an unconstrained **Geometric** Programming problem. Constrained minimization complementary Geometric Programming, Application of Geometric Programming.

### Books & References

1. Engineering Optimization- S.S. Rao, New Age International
2. Applied Optimal Design-E.J. Haug and J.S. Arora; Wiley New York
3. Optimization for Engineering Design-Kalyanmoy Deb; Prentice Hall of India

# Engineering Fundamental (EF)

## CSE-111 INTRODUCTION TO C & FUNCTIONAL PROGRAMMING

|                             |  |
|-----------------------------|--|
| <b>Course Category</b>      | : Engineering Fundamental (EF)   |
| <b>Pre-requisite Course</b> | : NIL  |
| <b>Contact Hours/Week</b>   | : Lecture : 3, Tutorial : 1, Practical: 2  |
| <b>Number of Credits</b>    | : 5  |
| <b>Course Assessment</b>    | : Continuous assessment through tutorials, attendance, home assignments, practical work, record, viva voce and Practical Examination |
| <b>Methods</b>              |  |
| <b>Course Outcomes</b>      | : The students are expected to be able to demonstrate the following knowledge, skills and attitudes after completing this course.    |

1. Basic Terminology used in Computer Programming.
2. Programs Development in C Language by Writing, Compiling and Debugging.
3. Design of Programs involving Simple Statements, Conditional Statements, Iterative Statements, Array, Strings, Functions, Recursion, Structure and Union.
4. Difference between Call by Value and Call by Reference.
5. Dynamic Memory Allocations and Use of Pointers.
6. Basic Operations on a File.
7. Basics of Functional Programming.

### Topics Covered

#### UNIT-I

**Basics of Programming:** Approaches to Problem Solving, Concept of Algorithm and Flow 9

Charts, Types of Computer Languages-Machine Language, Assembly Language and High Level

Language, Concept of Assembler, Compiler, Loader and Linker.

Data types, Operators, Expressions, Operator Precedence and Associativity

**Fundamentals of C Programming:** Structure of C Program, Writing and Executing the First C

Program, Components of C Language. Standard I/O in C

**Conditional program execution:** Applying if and switch Statements, Nesting if and else

**Program Loops and Iterations:** use of while, do while and for Loops, Multiple Loop Variables,

Use of break and continue Statements.

#### UNIT-II

**Arrays:** One Dimensional, Multidimensional Array and Their Applications, Declaration and 9

Manipulation of Arrays

**Strings:** String Variable, String Handling Functions, Array of Strings

**Functions:** Designing Structured Programs, Functions in C, User Defined and Standard

Functions, Formal vs. Actual Arguments, Function Category, Function Prototype, Parameter

Passing, Recursive Functions.

**Storage classes:** Auto, Extern, Register and Static Variables

### UNIT-III

**Pointers:** Pointer Variable and its Importance, Pointer Arithmetic Pointers and Arrays, 9  
Pointer

and Character Strings, Pointers and Functions, Array of Pointers, Pointers to Pointers,  
Dynamic

Memory Allocation

**Structure and Union:** Declaration and Initialization of Structures, Structure as  
Function

Parameters, Structure Pointers, Unions.

**File Management:** Defining and Opening a File, Closing a File, Input/ Output  
Operations in

Files, Random Access to Files, Error Handling

The Pre-processor Directives, Command Line Arguments, Macros

### UNIT-IV

**Principles of Functional Programming:** Expressions, Evaluations, Functions and Types 9

**Type Definitions and Built-in Types:** Numbers, Characters, Strings and Lists. Basic  
Operations on Lists, Including Map, Fold And Filter, together with Their Algebraic  
Properties. Recursive Definitions and Structural Induction, Simple Program Calculation,  
Infinite Lists and Their Uses.

### EXPERIMENTS

1. Write a program to find the nature of the roots as well as value of the roots. However, in case of imaginary roots, find the real part and imaginary part separately.
2. Fibonacci sequence is defined as follows: the first and second terms in the sequence are 0 and 1. Subsequent terms are found by adding the preceding two terms in the sequence. Write a program to generate the first n terms of the sequence. For example, for n = 8, the output should be 0 1 1 2 3 5 8 13
3. Write a program to print all the prime numbers between m and n, where the value of m and n is supplied by the user.
4. The number such as 1991 is a palindrome because it is same number when read forward or backward. Write a program to check whether the given number is palindrome or not.
5. A positive integer number IJK is said to be well-ordered if  $I < J < K$ . For example, number 138 is called well-ordered because the digits in the number (1, 3, 8) increase from left to right, i.e.  $1 < 3 < 8$ . Number 365 is not well-ordered because 6 is larger than 5. Write a program that will find and display all possible three digit well-ordered numbers. The program should also display the total number of three digit well-ordered numbers found.
6. Write a function to computer the highest common factor of integer numbers m and n. Use this function to find the highest common factor of integer numbers a and b.
7. Write a program to multiply matrix A ( $m \times n$ ) by B ( $p \times q$ ), given that  $n = p$ .
8. Write a program to sort a list of n integer numbers in descending order using bubble sort method.

### **Textbooks**

1. Jeri R. Hanly and Elliot B. Koffman, Problem Solving and Program Design in C, 7th Edition, Pearson
2. Schildt , Herbert, Complete Reference with C, Tata McGraw Hill
3. Kerningham and Ritchie, The C programming Language, 2nd Edition, Prentice Hall
4. Richard Bird, Introduction to Functional Programming using Haskell, 2nd Edition, Prentice-Hall International, 1998

### **Reference books**

1. Greg Michaelson, An Introduction to Functional Programming Through Lambda Calculus, Dover Edition, Addison Wesley Publication
2. Samuel P. Harbison, and Guy L. Steele Jr., C-A Reference Manual, Fifth Edition, Prentice Hall, 2002

## **EEE-111 PRINCIPLES OF ELECTRICAL ENGINEERING**

|                          |  |
|--------------------------|--|
| <b>Course category</b>   | : Department Core (DC)   |
| <b>Pre- requisites</b>   | : Physics and Math (10+2) <b>Contact</b>   |
| <b>hours/week</b>        | : Lecture: 3, Tutorial: 1, Practical:2   |
| <b>Number of Credits</b> | : 5  |
| <b>Course Assessment</b> | : Continuous assessment through tutorials, assignments, One mid term Examination , final Examination & Practical Examination |

### **Methods**

**Course Outcome** : The student are expected to be able to demonstrate the following knowledge, skills and attitudes after completing this course

1. Able to understand the basic concepts of network and circuit.
2. To solve the basic electrical circuits.
3. Familiarity with the basic concepts of AC circuits.
4. Introductory concept of measurement, instrumentation, working & performances of different kind of measuring instruments (PMMC, MI).
5. Able solve magnetic circuits.
6. Able to analyze three phase circuits.
7. Introduction and application to different electrical machines.

### **Topic**

#### **Covered**

#### **UNIT I**

#### **D C Circuit Analysis and Network Theorems:**

**9**

Circuit Concepts: Concepts of network, Active and passive elements, Voltage and current sources, Concept of linearity and linear network, Unilateral and bilateral elements, R, L and C as linear elements, Source transformation Kirchhoffs laws; Loop and nodal methods of analysis; Star-delta transformation Network theorems: Superposition theorem, Thevenin's theorem, Norton's theorem, Maximum Power Transfer theorem.

#### **UNIT II**

#### **Steady- State Analysis of Single Phase AC Circuits:**

**9**

AC fundamentals: Sinusoidal, square and triangular waveforms – Average and effective values, Form and peak factors, Concept of phasor, phasor representation of sinusoidally varying voltage and current, Analysis of series, parallel and series-parallel RLC Circuits, Resonance in series and Parallel circuit

Three Phase AC Circuits: Three phase system-its necessity and advantages, Star and delta connections, Balanced supply and balanced load, Line and phase voltage/current relations, Three-phase power and its measurement

### **UNIT III**

#### **Measuring Instruments, Magnetic Circuit & 1 phase Transformers: 9**

Types of instruments, Construction and working principles of PMMC and Moving Iron type voltmeters & ammeters, Use of shunts and multipliers.

Magnetic circuit, concepts, analogy between electric & magnetic circuits, B-H curve, Hysteresis and eddy current losses.

Single Phase Transformer: Principle of operation, Construction, EMF equation, Power losses, Efficiency, Introduction to auto transformer.

### **UNIT IV**

#### **Electrical Machines: 9**

Concept of electromechanical energy conversion DC machines: Types, EMF equation of generators and torque equation of motor, Characteristics and applications of DC Generators & motors

Three Phase Induction Motor: Types, Principle of operation, Torque-slip characteristics, Applications

Single Phase Induction motor: Principle of operation and introduction to methods of starting, applications.

Three Phase Synchronous Machines: Principle of operation of alternator, emf equation, Principle of operation and starting of synchronous motor, their applications.

#### **Text Books:**

1. "Principles of Electrical Engineering", V. Del Toro,; Prentice Hall International 2. "Basic Electrical Engineering", D P Kothari, I.J. Nagarath; Tata McGraw Hill 3. "Basic Electrical Engineering", S N Singh; Prentice Hall International 4. "Fundamentals of Electrical Engineering" B Dwivedi, A Tripathi; Wiley India 5. "Electrical and Electronics Technology", Edward Hughes; Pearson

### **Principles Of Electrical Engineering Laboratory**

1. Verification of Kirchoff's law
2. Verification of Norton's theorem
3. Verification of Thevenin's theorem
4. Verification of Series R-L-C circuit
5. Verification of Parallel R-L-C circuit.
6. Measurement of Power and Power factor of three phase inductive load by two wattmeter method
7. To draw the magnetization characteristics of separately excited dc motor.
8. To perform the external load characteristics of dc shunt motor.
9. To perform O.C. and S.C. test of a single phase transformer

## CSE-112 SOFTWARE LAB-I

|                                  |  |
|----------------------------------|--|
| <b>Course Category</b>           | : Engineering Fundamental (EF)   |
| <b>Pre-requisite Course</b>      | : NIL  |
| <b>Contact Hours/Week</b>        | : Lecture : 0, Tutorial : 0, Practical: 4  |
| <b>Number of Credits</b>         | : 2  |
| <b>Course Assessment Methods</b> | : Continuous assessment through Viva voce, Practical work/record, attendance and Final Practical Examination                     |
| <b>Course Outcomes</b>           | : The students are expected to be able to demonstrate the following knowledge, skills and attitudes after completing this course |

1. Basic Terminology used in C, Use of Standard C Library and Evaluation of Expressions.
2. Programming in C Language by Writing, Compiling and Debugging.
3. Designing of Programs involving Simple Statements, Conditional Statements, Iterative Statements, Array, Strings, Functions, Recursion, Structure and Union.
4. Basic Pointer Programming.
5. Programming for Searching and Sorting.
6. Basic Operations on a File.
7. Basic Knowledge of Functional Programming.

### EXPERIMENTS

The students should write programs in C to get the familiarization with following topics.

1. Get Familiar with C Compiler
2. Implement and Test Small Routine in C
3. Evaluation of Expression
4. Iteration, Function and Recursive Function
5. Arrays
6. Structures and Union
7. Searching and Selection
8. Sorting,
9. Strings Handling
10. Basic Pointer Programming
11. Files
12. Use of Standard C Library
13. Basics of Functional Programming.

## CSE-121 OBJECT ORIENTED MODELING & C++

|                                  |  |
|----------------------------------|--|
| <b>Course Category</b>           | : Engineering Fundamental (EF)   |
| <b>Pre-requisite Course</b>      | : NIL  |
| <b>Contact Hours/Week</b>        | : Lecture : 3, Tutorial : 1 , Practical: 2   |
| <b>Number of Credits</b>         | : 5  |
| <b>Course Assessment Methods</b> | : Continuous assessment through tutorials, attendance, home assignments, practical work, record, viva voce and One mid term Examination, final Examination & Practical Examination                               |
| <b>Course Outcomes</b>           | : The students are expected to be able to demonstrate the following knowledge, skills and attitudes after completing this course Understand the Concept of Object Oriented Programming and Master OOP using C++. |

1. Implementing the Real Life Problems using Object Oriented Techniques.
2. Improvement in Problem Solving Skills.

## Topics Covered

### UNIT-I

**Object Oriented Programming Concepts** – Objects, Classes, Methods and Messages- 9  
Abstraction and Encapsulation, Inheritance- Abstract Classes, Polymorphism. Introduction  
to C++- Objects-Classes- Constructors and Destructors.

### UNIT-II

**Operator Overloading** - Friend Functions- Type Conversions- Templates - Inheritance – 9  
Virtual Functions- Runtime Polymorphism. Exception Handling - Streams and Formatted  
I/O

### UNIT-III

**Object Modeling:** Objects and Classes, Links and Associations, Generalization and  
Inheritance, 9 Aggregation, Abstracts Class, Multiple Inheritance, Meta Data, Candidate  
Keys, Constraints. Dynamics Modeling: Events and States, Operations, Nested State  
Diagrams and Concurrency.

### UNIT-IV

**Functional Modeling:** Data Flow Diagram, Specifying Operations, Constraints, A Sample  
9 Functional Model. OMT (Object Modeling Techniques) Methodologies, Examples and  
Case Studies to Demonstrate Methodologies, Comparisons of Methodologies, SA/SD, JSD.

## EXPERIMENTS

Write C++ Programs to illustrate the concept of the following:

1. Arrays
2. Structures
3. Pointers
4. Objects and Classes
5. Console I/O Operations
6. Scope Resolution and Memory Management Operators
7. Inheritance
8. Polymorphism
9. Virtual Functions
10. Friend Functions
11. Operator Overloading
12. Function Overloading
13. Constructors and Destructors
14. this Pointer
15. File I/O Operations

**Analyze, Design and Develop Code for the Following System (one for a batch of three  
students) using Object Oriented Methodology**

1. ATM (Automated Teller Machine ) System
2. Online Reservation System
3. Online Quiz System
4. Stock Maintenance System
5. Course Registration System
6. Payroll System
7. Expert System

8. Library Management System
9. Real Time Scheduler
10. Online Purchase System

### **Textbooks**

1. B. Trivedi Programming with ANSI C++, Oxford University Press, 2007.
2. Ira Pohl , Object Oriented Programming using C++, Pearson Education, Second Edition
3. B. Stroustrup, The C++ Programming Language, 3<sup>rd</sup> edition, Pearson Education, 2004
4. James Rumbaugh, et. al Object Oriented Modeling and Design-, PHI
5. Robert Lafore, Object Oriented Programming in Turbo C++, Galgotia Publication, 1994
6. E. Balaguruswamy, Object Oriented Programming with C++, TMH Publication
7. Grady Booch, James Rumbaugh and Ivar Jacobson The Unified Modeling Language User Guide, Pearson Education
8. Booch, Maksimchuk, Engle, Young, Conallen and Houston, Object Oriented Analysis and Design with Applications, Pearson Education
9. S. B. Lippman, Josee Lajoie, Barbara E. Moo, C++ Primer, 4<sup>th</sup> edition, Pearson Education, 2005

### **Reference books**

1. Coleman, D. et.al. Object-Oriented Development, The Fusion Method. Prentice Hall
2. Booch, G. Object-Oriented Design with Applications. Redwood City, Bengamin/Cummings Sartaj Sahni, Data Structures, Algorithms and Applications in C++, McGraw Hill, Second Edition, 2005

## **CSE-122 SOFTWARE LAB-II**

- Course Category** : Engineering Fundamental (EF)
- Pre-requisite Course** : NIL
- Contact Hours/Week** : Lecture : 0, Tutorial : 0 , Practical: 4
- Number of Credits** : 2
- Course Assessment** : Continuous assessment through three Viva voce, Practical work/record, attendance and Final Practical Examination
- Methods** : work/record, attendance and Final Practical Examination
- Course Outcomes** : The students are expected to be able to demonstrate the following knowledge, skills and attitudes after completing this course
1. Differentiate between structures oriented programming and object oriented programming.
  2. Use object oriented programming language like C++ and associated libraries to develop object oriented programs
  3. Understand and apply various object oriented features like inheritance, data abstraction, encapsulation and polymorphism to solve various computing problems using C++ language.
  4. Apply concepts of operator-overloading, constructors and destructors
  5. Reuse the code and write the classes which work like built-in types.
  6. Apply object -oriented concepts in real world applications.

## **EXPERIMENTS**

To write following programs in C++

1. Using basic statements like control statements, looping statements, various I/O statements and various data structures.
2. Creating classes in C++ for understanding of basic OOPS features.
3. Representing concepts of data hiding, function overloading and operator overloading.
4. Using memory management features and various constructors and destructors.
5. Representing Inheritance, virtual classes and polymorphism.
6. Writing generic functions.
7. File handling programs.
8. Design and Implementation of some real life problems using Object Oriented Techniques (Object Model/Dynamic Model/Functional Model).

## **ECE-231 DIGITAL CIRCUITS AND LOGIC DESIGN**

|                             |   |
|-----------------------------|---|
| <b>Course Category</b>      | : Engineering Fundamental (EF)  |
| <b>Pre-requisite Course</b> | : NIL   |
| <b>Contact Hours/Week</b>   | : Lecture : 3, Tutorial : 1 , Practical: 0  |
| <b>Number of Credits</b>    | : 4   |
| <b>Course Assessment</b>    | : Continuous assessment through tutorials, attendance, home   |
| <b>Methods</b>              | One mid term Examination ,final xamination<br>& Practical Examination   |
| <b>Course Outcomes</b>      | : The students are expected to be able to demonstrate the<br>following knowledge, skills and attitudes after completing this<br>course  |
|                             | <ol style="list-style-type: none"><li>1. Design a finite state machine and sequential logic design.</li><li>2. Synthesize a logic design from a natural language description of a problem.</li><li>3. Realize a complete arithmetic and logic unit.</li><li>4. Generate a realization of combinational logic in a programmable gate array.</li><li>5. Simulate a complete design to evaluate functional correctness and timing.</li></ol> |
| <b>Topics Covered</b>       |   |

### **UNIT-I**

Binary Codes - Weighted and Non-Weighted - Binary Arithmetic Conversion Algorithms - Error 9 Detecting and Error Correcting Codes - Canonical and Standard Boolean Expressions - Truth Tables.

### **UNIT-II**

K-Map Reduction - Don't Care Conditions - Adders / Subtractors- Carry Look-Ahead Adder - 9 Code Conversion Algorithms - Design of Code Converters - Equivalence Functions. Binary/Decimal Parallel Adder/Subtractor for Signed Numbers - Magnitude Comparator - Decoders / Encoders - Multiplexers / Demultiplexers- Boolean Function Implementation using Multiplexers.

### **UNIT-III**

Sequential Logic - Basic Latch - Flip-Flops (SR, D, JK, T and Master-Slave) - Triggering of 9 Flip-Flops - Counters - Design Procedure - Ripple Counters - BCD and Binary - Synchronous Counters.

## UNIT-IV

Registers - Shift Registers - Registers with Parallel Load - Memory Unit - Examples of RAM, ROM, PROM, EPROM - Reduction of State and Flow Tables - Race-Free State Assignment - Hazards.

### Textbooks

1. Morris Mano, Digital Design, Prentice Hall of India, 2001
2. Raj Kamal, Digital Systems Principles and Design, Pearson Education, First Edition, 2007
3. Charles H. Roth, Jr. and Larry L. Kinney, Fundamentals of Logic Design, CL Engineering, Seventh Edition, 2013.

### Reference books

1. W. H. Gothmann, Digital Electronics -An Introduction to Theory and Practice, Prentice Hall of India, 2000
2. Donald D. Givone, Digital Principles and Design, Tata McGraw –Hill, Thirteenth Impression, 2003.

## CSE-233 SOFTWARE LAB-III

|                                  |  |
|----------------------------------|--|
| <b>Course Category</b>           | : Engineering Fundamental (EF)                             |
| <b>Pre-requisite Course</b>      | : NIL  |
| <b>Contact Hours/Week</b>        | : Lecture : 0, Tutorial : 0 , Practical: 4                 |
| <b>Number of Credits</b>         | : 2  |
| <b>Course Assessment Methods</b> | : Continuous assessment through three Viva voce, Practical |

**Course offers :** Work/record, attendance and Final Practical Examination The students are expected to be able to demonstrate the following knowledge, skills and attitudes after completing this course.

1. Analyze and represent problems in the object-oriented programming paradigm.
2. Design and implement object-oriented software systems.
3. Demonstrate the efficient implementation of various Data Structures in memory and their operation.
4. Build programs on fundamental algorithmic problems including Searching, Sorting, Tree Traversals, Graph traversals, and shortest paths.
5. Explain the main principles for client-server programming
6. Design and implement Client-side systems, server-side system and event-driven graphical user interface.
7. Integrate their knowledge and skills to produce a real life application.

## EXPERIMENTS

### C++:

1. Program using functions with default arguments implementation of call by value, address, reference
2. Simple classes for understanding objects, member functions & constructors classes with primitive data members, classes with arrays as data members classes with pointers as data members classes with constant data members classes with static member functions

3. Compile time polymorphism- operator overloading, function overloading
4. Run time polymorphism -inheritance ,virtual functions, virtual base classes
5. File handling -sequential access, random access

**JAVA:**

1. Simple JAVA applications for understanding references to an instant of a class, handling strings in JAVA, simple package creation, developing user defined packages in JAVA
2. Interfaces
3. Threading- creation of threading in JAVA applications, multi-threading
4. Exception handling mechanism in JAVA- handling predefined exceptions, handling user defined exceptions

**Internet Programming:**

1. Web page creation using HTML
  - i) To embed an image map in a web page
  - ii) To fix the hot spots
  - iii) Show all the related information when the hot spots are clicked.
2. Web page creation with all types of Cascading style sheets
3. Client side scripts for validating web form controls using DHTML
4. JAVA programs to create applets
5. i) Create a color palette with matrix of buttons
  - i) ii) Set background and foreground of the control text area by selecting a color from color palette.
  - ii) In order to select foreground or background use check box control as radio but-tons.
  - iii) To set background images.
6. Programs in JAVA using servlets
7. Programs in JAVA to create three-tier applications using JSP and Databases
  - i. for conducting online examination
  - ii. for displaying students mark list.
8. Programs using XML-schema-XSLT/XSL
9. Programs using AJAX
10. Implementation of web services and databases.

## CSE-244 SOFTWARE LAB-IV

|                                  |  |
|----------------------------------|--|
| <b>Course category</b>           | : Engineering Fundamental (EF)   |
| <b>Pre-requisite</b>             | : NIL  |
| <b>Course</b>                    |  |
| <b>Contact hours/week</b>        | : Lecture : 0, Tutorial : 0 , Practical: 4   |
| <b>Number of Credits</b>         | : 2  |
| <b>Course Assessment methods</b> | : Continuous assessment through three Viva voce, Practical work/record, attendance and Final Practical Examination               |
| <b>Course Outcomes</b>           | : The students are expected to be able to demonstrate the following knowledge, skills and attitudes after completing this course |

1. Tools and techniques for optimizations in design processes.
2. Design and develop the software packages/ systems to support the management of an organization in question.
3. Design and develop a DBMS.

### EXPERIMENTS

1. Write user-friendly computer programs to implement algorithms in your course of Optimization Techniques.
2. Design and develop a software packages/ systems for your University Management System.
3. Design and develop your own DBMS. Design and develop a simulator for (i) Logic Circuit Design, (ii) Electronic Circuit Design

## DEPARTMENT CORE (DC)

### CSE-231 PRINCIPLES OF DATA STRUCTURES THROUGH C/C++

|                                  |  |
|----------------------------------|--|
| <b>Course Category</b>           | : Department Core (DC)   |
| <b>Pre-requisite Course</b>      | : NIL  |
| <b>Contact Hours/Week</b>        | : Lecture : 3, Tutorial : 1 , Practical: 2   |
| <b>Number of Credits</b>         | : 5  |
| <b>Course Assessment Methods</b> | : Continuous assessment through tutorials, attendance, home Assignments, practical work, record, viva voce and One Mid Term Examination and One Final Theory & Practical Examination |
| <b>Course Outcomes</b>           | : The students are expected to be able to demonstrate the following knowledge, skills and attitudes after completing this course   |

1. Describe how arrays, records, linked lists, stacks, queues, trees, and graphs are represented in memory, used by the algorithms and their common applications.
2. Write programs that use arrays, records, linked structures, stacks, queues, trees, and graphs.

3. Compare and contrast the benefits of dynamic and static data structures implementations.
4. Identify the alternative implementations of data structures with respect to its performance to solve a real world problem.
5. Demonstrate organization of information using Trees and Graphs and also to perform different operations on these data structures.
6. Design and implement an appropriate organization of data on primary and secondary memories for efficient its efficient retrieval. .
7. Discuss the computational efficiency of the principal algorithms for sorting, searching and hashing.
8. Describe the concept of recursion, its application, its implementation and removal of recursion.

### **Topics Covered**

#### **UNIT-I**

**9**

**Introduction:** Basic Terminology, Elementary Data Organization, Structure Operations, Complexity and Time-Space Tradeoff

**Arrays:** Definition, Representation and Analysis, Single and Multi Dimension Array, Address Calculation, Application of Arrays, Character, String in C, Character String Operation, Arrays Parameters, Ordered List, Sparse Matrices and Vectors

**Stacks:** Array Representation and Implementation of Stack, Operations on Stacks: Push &Pop, Array Representation of Stack, Linked Representation of Stack, Operations Associated with Stacks, Application of Stack, Conversion of Infix to Prefix and Postfix Expressions, Evaluation of Postfix Expressions using Stack, Application of Recursion in Problem like Tower of Hanoi

#### **UNIT-II**

**9**

**Queues:** Array and Linked Representation and Implementation of Queues, Operations on Queue: Create, Add, Delete, Full and Empty, Circular Queues, D-Queues and Priority Queues.

**Linked List:** Representation and Implementation of Singly Linked Lists, Two-Way Header List, Traversing and Searching of Linked List, Overflow and Underflow, Insertion and Deletion to / from Linked Lists, Insertion and Deletion Algorithms, Doubly Linked List, Linked List in Array, Polynomial Representation and Addition, Generalized Linked List, Garbage Collection and Compaction.

#### **UNIT-III**

**9**

**Trees:** Basic Terminology, Binary Trees, Binary Tree Representation, Algebraic Expressions, Complete Binary Tree, Extended Binary Trees, Array and Linked Representation of Binary Trees, Traversing Binary Trees, Threaded Binary Trees, Traversing Threaded Binary Trees, Huffman Algorithm.

**Binary Search Trees:** Binary Search Tree (BST), Insertion and Deletion in BST, Complexity of Search Algorithm, Path Length, AVL Trees, B-Trees.

#### **UNIT-IV**

**9**

**Searching and Hashing:** Sequential Search, Binary Search, Comparison and Analysis, Hash Table, Hash Functions, Collision Resolution Strategies, Hash Table Implementation.

**Sorting:** Insertion Sort, Bubble Sorting, Quick Sort, Two Way Merge Sort, Heap Sort, Sorting on Different Keys, Practical Consideration for Internal Sorting.

**Graphs:** Terminology & Representations, Graphs & Multi-Graphs, Directed Graphs, Sequential Representations of Graphs, Adjacency Matrices, Traversal, Connected Component and Spanning Trees, Minimum Cost Spanning Trees.

## **EXPERIMENTS**

Write C/C++ Programs to illustrate the concept of the following:

1. Sorting Algorithms-Non-Recursive
2. Sorting Algorithms-Recursive
3. Searching Algorithm
4. Stack
5. Queue
6. Linked List
7. Graph

## **Textbooks**

1. Horowitz and Sahani, Fundamentals of Data Structures, Galgotia Publication, New Delhi.
2. R. Kruse et al, Data Structure and Program Design in C, Pearson Education Asia Delhi
3. A. M. Tenenbaum, Data Structures using C & C++, PHI, India
4. K Loudon, Mastering Algorithms with C, Shroff Publication and Distributor Pvt. Ltd.
5. Bruno R Preiss, Data Structure and Algorithms with Object Oriented Design Pattern in C++, John Wiley & Sons
6. Adam Drozdek, "Data Structures and Algorithms in C++", Thomson Asia Pvt. Ltd. Singapore

## **Reference books**

1. Lewis, H.R., Denenberg, L., Data Structures and their Algorithms. Published by Addison-Wesley, UK, 1991
2. Oluwadare, S.A., Agbonifo, O.C., Fundamentals of Data structures and Algorithms. Lecture Notes, 2013

## **CSE-232 INTERNET & JAVA PROGRAMMING**

|                             |   |
|-----------------------------|---|
| <b>Course Category</b>      | : Department Core (DC)  |
| <b>Pre-requisite Course</b> | : NIL   |
| <b>Contact Hours/Week</b>   | : Lecture : 3, Tutorial : 1 , Practical: 2  |
| <b>Number of Credits</b>    | : 5   |
| <b>Course Assessment</b>    | : Continuous assessment through tutorials, attendance, home assignments, practical work, record, viva voce and One Mid Term Examination and One Final Theory & Practical Examination  |
| <b>Methods</b>              |   |
| <b>Course Outcomes</b>      | : The students are expected to be able to demonstrate the following knowledge, skills and attitudes after completing this course  |
|                             | <ol style="list-style-type: none"><li>1. To identify different components of client server architecture on Internet computing.</li><li>2. Knowledge of how to develop and deploy applications and applets in JAVA.</li><li>3. Knowledge of how to develop and deploy GUI using JAVA Swing and AWT.</li><li>4. Design, develop and implement interactive web applications.</li></ol> |

5. Be able to implement, compile, test and run JAVA programs comprising more than one class and to address a particular software problem.
6. To understand the basic concepts of Internet services and related technologies.
7. Develop programs using the JAVA Collection API as well as the JAVA standard class library.

### **Topics Covered**

#### **UNIT-I**

**Internet:** Internet, Connecting to Internet: Telephone, Cable, Satellite Connection, Choosing an ISP, Introduction to Internet Services, E-Mail Concepts, Sending and Receiving Secure E-Mail, Voice and Video Conferencing.

#### **UNIT-II**

**Core JAVA:** Introduction, Operator, Data type, Variable, Arrays, Control Statements, 9 Methods & Classes, Inheritance, Package and Interface, Exception Handling, Multithread Programming, I/O, JAVA Applet, String Handling, Networking, Event Handling, Introduction to AWT, AWT Controls, Layout Managers.

#### **UNIT-III**

**JAVA Swing:** Creating a Swing Applet and Application, Programming using Panes, Pluggable Look and feel, Labels, Text Fields, Buttons, Tabbed Panes.

**JDBC:** Connectivity Model, JDBC/ODBC Bridge, JAVA. SQL Package, Connectivity to Remote Database.

#### **UNIT-IV**

**JAVA Beans:** Application Builder Tools, The Bean Developer Kit(BDK), JAR files, 9 Introspection, Developing a Simple Bean, using Bound Properties, The JAVA Beans API, Session Beans, Entity Beans, Introduction to JAVA Servlet: Servlet Basics, Servlet API Basic, Life Cycle of a Servlet, Running Servlet.

### **EXPERIMENTS**

1. Basic programs of simple statements, conditional statements, iterative statements and arrays
2. Programs having object oriented concepts like Inheritance and Interface
3. Programs for Exception Handling and Event Handling
4. Programs of Threads and Multithreading
5. Programs related to Applets and Swings
6. Programs including JAVA Beans and Servlets

#### **Textbooks**

1. Naughton, Schildt, The Complete Reference JAVA2, TMH.
2. Balaguruswamy E, Programming in JAVA, TMH

#### **Reference books**

1. Margaret Levine Young, The Complete Reference Internet, TMH.
2. Dustin R. Callway, Inside Servlets, Addison Wesley.
3. Mark Wutica, JAVA Enterprise Edition, QUE.
4. Steven Holzner, JAVA2 Black book, Dreamtech.

## CSE-241 DATABASE MANAGEMENT SYSTEMS

|                                  |   |
|----------------------------------|---|
| <b>Course Category</b>           | : Department Core (DC)  |
| <b>Pre-requisite Course</b>      | : NIL   |
| <b>Contact Hours/Week</b>        | : Lecture : 3, Tutorial : 1 , Practical: 2  |
| <b>Number of Credits</b>         | : 5   |
| <b>Course Assessment Methods</b> | : Continuous assessment through tutorials, attendance, home assignments, practical work, record, viva voce and One Mid Term Examination and Final Theory & Practical Examination  |
| <b>Course Outcomes</b>           | : The students are expected to be able to demonstrate the following knowledge, skills and attitudes after completing this course  |
|                                  | <ol style="list-style-type: none"><li>1. List and define the fundamental concepts of database management system.</li><li>2. Manually execute a given (simple) database design a transaction over it.</li><li>3. Manually infer the type of a given (simple) database transaction.</li><li>4. Implement (simple) algorithms and data structures as database transaction.</li><li>5. Design (large) databases that are modular and have reusable components.</li><li>6. Explain on a simple problem how to apply concurrency control over concurrent database transactions.</li></ol> |

### Topics Covered

#### UNIT-I 9

**Introduction:** An Overview of Database Management System, Database System vs File System Database System Concept and Architecture, Data Model Schema and Instances, Data Independence and Database Language and Interfaces, Data Definitions Language, DML, Overall Database Structure.

**Data Modeling using Entity Relationship Model:** ER Model Concepts, Notation for ER Diagram, Mapping Constraints, Keys, Concepts of Super Key, Candidate Key, Primary Key, Generalization, Aggregation, Reduction of An ER Diagrams to Tables, Extended ER Model, Relationship of Higher Degree.

#### UNIT-II 9

**Relational Data Model and Language:** Relational Data Model Concepts, Integrity Constraints, Entity Integrity, Referential Integrity, Keys Constraints, Domain Constraints, Relational Algebra, Relational Calculus, Tuple And Domain Calculus.

**Introduction on SQL:** Characteristics of SQL, Advantage of SQL. SQL Data Type and Literals. Types of SQL Commands. SQL Operators and their Procedure. Tables, Views and Indexes. Queries and Sub Queries. Aggregate Functions. Insert, Update and Delete Operations, Joins, Unions, Intersection, Minus, Cursors, Triggers, Procedures in SQL/PL SQL

#### UNIT-III

**Database Design & Normalization:** Functional Dependencies, Normal Forms, First, Second, 9 Third Normal Forms, BCNF, Inclusion Dependence, Loss Less Join Decompositions, Normalization using FD, MVD, and JDS, Alternative Approaches to Database Design.

## UNIT-IV

**Transaction Processing Concept:** Transaction System, Testing of Serializability, Serializability of Schedules, Conflict & View Serializable Schedule, Recoverability, Recovery from Transaction Failures, Log Based Recovery, Checkpoints, Deadlock Handling. **Distributed Database:** Distributed Data Storage, Concurrency Control, Directory System.

**Concurrency Control Techniques:** Concurrency Control, Locking Techniques for Concurrency Control, Time Stamping Protocols for Concurrency Control, Validation Based Protocol, Multiple Granularity, Multi Version Schemes, Recovery with Concurrent Transaction, Case Study of Oracle.

## EXPERIMENTS

1. Exercises to be based on Sybase / Oracle / Postgres / VB / Power Builder / DB2 / MS-Access.
2. Applications involving vendor development systems, stores management system, finance management etc.
3. Creation and querying of database tables for following cases. .
  - i. Write SQL queries using logical operations (=,<,>,etc)
  - ii. Write SQL queries using SQL operators
  - iii. Write SQL query using character, number, date and group functions
  - iv. Write SQL queries for relational algebra
  - v. Write SQL queries for extracting data from more than one table
  - vi. Write SQL queries for sub queries, nested queries
  - vii. Write program by the use of PL/SQL
  - viii. Concepts for ROLL BACK, COMMIT & CHECK POINTS
  - ix. Create VIEWS, CURSORS and TRGGERS & write ASSERTIONS.
  - x. Create FORMS and REPORTS
4. Design of tables by normalization and dependency analysis.
5. Writing application software with host language interface

## Textbooks

1. Date C J, An Introduction to Database Systems, Addison Wesley
2. Korth, Silbertz, Sudarshan, Database Concepts, McGraw Hill
3. Elmasri, Navathe, Fundamentals of Database Systems, Addison Wesley
4. O'Neil, Databases, Elsevier Pub.
5. Leon& Leon, Database Management Systems, Vikas Publishing House
6. Bipin C. Desai, An Introduction to Database Systems, Galgotia Publications
7. Majumdar & Bhattacharya, Database Management System, TMH
8. Ramkrishnan, Gehrke, Database Management System, McGraw Hill
9. Kroenke, Database Processing Fundamentals, Design and Implementation, Pearson Education.
10. J. D. Ulman, Principles of Database and Knowledge base System, Computer Science Press.
11. Maheshwari Jain. DBMS: Complete Practical Approach, Firewall Media, New Delhi

## Reference books

1. Ramon a. Mato-Toledo, Pauline K. Cushman, Database Management Systems, Schaums'Outline series, TMH, New Delhi Special Indian Edition 2007
2. Ivan Bayross, Mastering Database Technologies, BPB Publications, New Delhi - First Indian Edition 2006, Reprinted 2011

## **CSE-242 THEORY OF COMPUTATION**

- Course Category** : Department Core (DC)  
**Pre-requisite Course** : NIL  
**Contact Hours/Week** : Lecture : 3, Tutorial : 1 , Practical: 0  
**Number of Credits** : 4  
**Course Assessment Methods** : Continuous Assessment through Tutorials, Assignments, Quizzes and Three Minor Tests and One Major Theory Examination  
**Course Outcomes** : The students are expected to be able to demonstrate the following knowledge, skills and attitudes after completing this course.
1. Analyse and design finite automata, pushdown automata, Turing machines, formal languages, and grammars.
  2. Demonstrate the understanding of key notions, such as algorithm, computability, decidability, and complexity through problem solving.
  3. Prove the basic results of the Theory of Computation.
  4. State and explain the relevance of the Church-Turing thesis.

### **Topics Covered**

#### **UNIT-I**

Alphabets, Strings and Languages, Automata and Grammars, Deterministic Finite Automata (DFA)-Formal Definition, Simplified Notation: State Transition Graph, Transition Table, Language of DFA, Nondeterministic Finite Automata (NFA), NFA with Epsilon Transition, Equivalence of NFA and DFA, Minimization of Finite Automata, Myhill-Nerode Theorem

#### **UNIT-II**

Regular Expression (RE), Definition, Operators of Regular Expression and their Precedence, 9 Algebraic Laws for Regular Expressions, Kleen's Theorem, Regular Expression to FA, DFA to Regular Expression, Arden Theorem, Non Regular Languages, Pumping Lemma for Regular Languages. Application of Pumping Lemma, Closure Properties of Regular Languages, Decision Properties of Regular Languages, FA with Output: Moore and Mealy Machine, Equivalence of Moore and Mealy Machine, Applications and Limitation of FA.

#### **UNIT-III**

Context Free Grammar (CFG) and Context Free Languages (CFL): Definition, Examples, 9 Derivation, Derivation Trees, Ambiguity in Grammer, Inherent Ambiguity, Ambiguous to Unambiguous CFG, Useless Symbols, Simplification of CFGs, Normal Forms for CFGs: CNF and GNF, Closure Proper ties of CFLs, Decision Properties of CFLs: Emptiness, Finiteness and Membership, Pumping Lemma for CFLs.

Push Down Automata (PDA): Description and Definition, Instantaneous Description, Language of PDA, Acceptance by Final State, Acceptance by Empty Stack, Deterministic PDA, Equivalence of PDA and CFG, CFG to PDA and PDA to CFG, Two Stack PDA

## UNIT-IV

Turing Machines (TM): Basic Model, Definition and Representation, Instantaneous Description, 9 Language Acceptance by TM, Variants of Turing Machine, TM as Computer of Integer Functions, Universal TM, Church's Thesis, Recursive and Recursively Enumerable Languages, Halting Problem, Introduction to Undecidability, Undecidable Problems about TMs. Post Correspondence Problem (PCP), Modified PCP, Introduction to Recursive Function Theory.

### Textbooks

1. Micheal Sipser, "Introduction to the Theory of Computation", Thomson Learning

### Reference books

1. Hopcroft, Ullman, "Introduction to Automata Theory, Languages and Computation", Pearson Education
2. Peter Linz, "An Introduction to Formal Language and Automata", Narosa Publishing house
3. H R. Lewis and Christos H. Papadimitriou, "Elements of the theory of Computation", PHI Ltd

## CSE-243 COMPUTER ORGANIZATION & DESIGN

|                             |  |
|-----------------------------|--|
| <b>Course Category</b>      | : Department Core (DC)                                     |
| <b>Pre-requisite Course</b> | : NIL  |
| <b>Contact Hours/Week</b>   | : Lecture : 3, Tutorial : 1 , Practical: 2                 |
| <b>Number of Credits</b>    | : 5  |
| <b>Course Assessment</b>    |  |
| <b>Methods</b>              | :Continuous assessment through tutorials, attendance, home |

**Course Outcomes :** Assignments, practical work, record, viva voce and one Mid Term Examination, Final Examination & Practical ExaminationThe students are expected to be able to demonstrate the following knowledge, skills and attitudes after completing thiscourse.

1. To understand the basic structure and operation of digital computer.
2. To study the design of arithmetic and logic unit and implementation of fixed point and floating-point arithmetic operations
3. To study the two types of control unit techniques and the concept of Pipelining
4. To study the hierarchical memory system including cache memories and virtual memory
5. To study the different ways of communicating with I/O devices and standard I/O interfaces

### Topics Covered

## UNIT-I

Register Transfer Language, Bus and Memory Transfers, Bus Architecture, Bus Arbitration, 9 Arithmetic Logic, Shift Micro-Operation, Arithmetic Logic Shift Unit, Design of Fast Address, IEEE Standard for Floating Point Numbers.

## **UNIT-II**

Control Design: Hardwired & Micro Programmed Control Unit, .Processor Design: Processor Organization: General Register Organization, Stack Organization, Addressing Mode, Instruction Format, Data Transfer & Manipulations, Program Control, Reduced Instruction Set Computer, Pipelining

## **UNIT-III**

Arithmetic - Addition & Subtraction of Signed Numbers - Multiplication - Integer Division - 9 Floating Point Operations, Decimal Arithmetic Unit, Decimal Arithmetic Operations.

## **UNIT-IV**

Input-Output Organization: I/O Interface, Modes of Transfer, Interrupts & Interrupt Handling, 9 Direct Memory Access, Input-Output Processor, Serial Communication. Memory Organization: Memory Hierarchy, Main Memory (RAM and ROM Chips), Auxiliary Memory, Cache Memory, Virtual Memory

## **EXPERIMENTS**

1. Implementing HALF ADDER, FULL ADDER using basic logic gates
2. Implementing Binary -to -Gray, Gray -to -Binary code conversions.
3. Implementing 3-8 line DECODER.
4. Implementing 4x1 and 8x1 MULTIPLEXERS.
5. Verify the excitation tables of various FLIP-FLOPS.
6. Design of an 8-bit Input/ Output system with four 8-bit Internal Registers.
7. Design of an 8-bit ARITHMETIC LOGIC UNIT.
8. Design the data path of a computer from its register transfer language description.
9. Design the control unit of a computer using either hardwiring or microprogramming based on its register transfer language description.
10. Implement a simple instruction set computer with a control unit and a data path.

### **Textbooks**

1. Computer System Architecture - M. Mano
2. Carl Hamacher, Zvonko Vranesic, Safwat Zaky Computer Organization, McGraw-Hill, Fifth Edition, Reprint 2012
3. John P. Hayes, Computer Architecture and Organization, Tata McGraw Hill, Third Edition, 1998.

### **Reference books**

1. William Stallings, Computer Organization and Architecture-Designing for Performance, Pearson Education, Seventh edition, 2006.
2. Behrooz Parahami, "Computer Architecture", Oxford University Press, Eighth Impression, 2011. David A. Patterson and John L. Hennessy, "Computer Architecture-A Quantitative Approach", Elsevier, a division of reed India Private Limited, Fifth edition, 2012

## **CSE-351 PRINCIPLES OF OPERATING SYSTEMS**

|                                  |  |
|----------------------------------|--|
| <b>Course Category</b>           | : Department Core (DC)   |
| <b>Pre-requisite Course</b>      | : NIL  |
| <b>Contact Hours/Week</b>        | : Lecture : 3, Tutorial : 1 , Practical: 2   |
| <b>Number of Credits</b>         | : 5  |
| <b>Course Assessment Methods</b> | : Continuous assessment through tutorials, attendance, home assignments, practical work, record, viva voce and One Mid Term Examination and Final Theory & Practical Examination |
| <b>Course Outcomes</b>           | : The students are expected to be able to demonstrate the following knowledge, skills and attitudes after completing this course.  |

1. Understand the structure and functions of OS.
2. Learn about Processes, Threads and Scheduling algorithms.
3. Understand the principles of concurrency and Deadlocks.
4. Learn various memory management scheme.
5. Study I/O management and File systems.

### **Topics Covered**

#### **UNIT-I**

**Operating Systems Overview**-Components, Goals of Designer, System Structures, User Services, Interrupt Systems and Device Programming-Interrupt Sources and Priorities, Interrupt Service Routines, Hardware Support - Machine States, Context Switching, Privileged Instructions and Registers

#### **UNIT-II**

**Memory Management**-Major Issues: Fetch, Placement, Contiguity, Relocation Adjustment, 9 Paging and Virtual Memory, Translate-Look-Aside Buffer (Associative Memory), Single and Multi-Level Page Tables, Paging with Segmentation, Problems of Large Address Spaces and How They Are Addressed

**Virtual Storage Management**- Storage Hierarchy, Cache Usage, Partial Residency, Page Replacement Strategies, Working Sets

#### **UNIT-III**

**Concurrency Problems and Solutions**- Critical Section Problem, Process Synchronization and 9 Coordination, Semaphores, Special Instructions, Monitors, Inter-process Communication, Remote Procedure Calls, Special Problems of Transaction-Based Systems **Deadlock and Resource Conflict**- Prevention, Avoidance, Detection, Recovery,

**Process and Thread Management**-Process/Thread Creation and Termination, Process/Thread States and Their Transitions

CPU Scheduling Algorithms, Non-Preemptive Approaches, Preemptive Approach, Multi-Processor Considerations

## UNIT-IV

**Physical Storage Management**- Disk Scheduling Algorithms, Disk Performance Features, 9 Disk Reliability Concerns

**File System Organization** - The Boot Record - Where Things Start, Directory Organization, File Descriptors, Access Control Backup

**System Security**-Principle of Least Privilege, Threats and Vulnerabilities, Protection Mechanisms - Access and Capability Control, User (Course) Authentication, Levels of Security in "Trusted" Systems, Confinement Problem

## EXPERIMENTS

1. Study of hardware and software requirements of different operating systems (UNIX,LINUX,WINDOWS XP, WINDOWS7/8)
2. Execute various UNIX system calls for
  - a. Process management
  - b. File management
  - c. Input/output Systems calls
3. Implement CPU Scheduling Policies:
  - a. SJF
  - b. Priority
  - c. FCFS
  - d. Multi-level Queue
4. Implement file storage allocation technique:
  - a. Contiguous(using array)
  - b. Linked –list(using linked-list)
  - c. Indirect allocation (indexing)
5. Implementation of contiguous allocation techniques:
  - a. Worst-Fit
  - b. Best- Fit
  - c. First- Fit
6. Calculation of external and internal fragmentation
  - a. Free space list of blocks from system
  - b. List process file from the system
7. Implementation of compaction for the continually changing memory layout and calculate total movement of data
8. Implementation of resource allocation graph (RAG)
9. Implementation of Banker's algorithm
10. Conversion of resource allocation graph (RAG) to wait for graph (WFG) for each type of method used for storing graph.
11. Implement the solution for Bounded Buffer (producer-consumer)problem using inter process communication techniques-Semaphores
12. Implement the solutions for Readers-Writers problem using inter process communication technique -Semaphore

## Textbooks

1. Abraham Silberschatz, Peter Baer Galvin and Greg Gagne, Operating System Concepts, John Wiley & Sons (ASIA) Pvt. Ltd, Seventh Edition, 2005
2. Pramod Chandra and P. Bhatt, “An Introduction to Operating Systems Concepts and Practice”, Prentice Hall India,3rd Edition,2010

## Reference books

1. Milenekovie, Operating System Concept, McGraw Hill.
2. Harvey M. Deitel, Paul J. Deitel, and David R. Choffnes, Operating Systems, Prentice Hall, Third edition, 2003
3. Petersons, "Operating Systems", Addison Wesley
4. Andrew S. Tannenbaum & Albert S. Woodhull, "Operating System Design and Implementation", Prentice Hall , 3rd Edition, 2006
5. William Stallings, Operating Systems – internals and design principles, Prentice Hall, 7thEdition, 2011
6. Gary J. Nutt, "Operating Systems", Pearson/Addison Wesley, 3rd Edition 2004.
7. Andrew S. Tannenbaum, "Modern Operating Systems", Prentice Hall, 3<sup>rd</sup> Edition, 2007.

## CSE-352 COMPUTER GRAPHICS

|                                  |   |
|----------------------------------|---|
| <b>Course Category</b>           | : Department Core (DC)  |
| <b>Pre-requisite Course</b>      | : NIL   |
| <b>Contact Hours/Week</b>        | : Lecture : 3, Tutorial : 1 , Practical: 2  |
| <b>Number of Credits</b>         | : 5   |
| <b>Course Assessment Methods</b> | : Continuous assessment through tutorials, attendance, home assignments, practical work, record, viva voce and One Mid Term Examination and Final Theory & Practical Examination  |
| <b>Course Outcomes</b>           | : The students are expected to be able to demonstrate the following knowledge, skills and attitudes after completing this course. <ol style="list-style-type: none"><li>1. Have a basic understanding of the core concepts of computer graphics.</li><li>2. Be capable of using OpenGL to create interactive computer graphics.</li><li>3. Understand a typical graphics pipeline.</li><li>4. Have made pictures with their computer.</li></ol> |

## Topics Covered

### UNIT-I

9

**BASICS OF COMPUTER GRAPHICS-** Introduction, Area of Computer Graphics, Design and Drawing, Animation Multimedia Applications, Simulation, How are Pictures Actually Stored and Displayed, Difficulties for Displaying Pictures.

**GRAPHIC DEVICES-** Cathode Ray Tube, Quality of Phosphors, CRTs for Color Display, Beam Penetration CRT, Shadow - Mask CRT, Direct View Storage Tube, Tablets, Light Pen, Three Dimensional Devices. C Graphics Basics Graphics Programming, Initializing Graphics, C Graphical Functions, Simple Programs.

**SIMPLE LINE DRAWING METHODS-** Point Plotting Techniques, Qualities of Good Line Drawing Algorithms, Digital Differential Analyzer(DDA), Bresenham's Algorithm, Generation of Circles

### UNIT-II

9

**TWO DIMENSIONAL TRANSFORMATIONS and CLIPPING AND WINDOWING-** What is Transformation?, Matrix Representation of Points, Basic Transformation, Need for

Clipping and Windowing, Line Clipping Algorithms, Midpoint Subdivision Method, Other Clipping Methods, Sutherland - Hodgeman Algorithm, Viewing Transformations.

**GRAPHICAL INPUT TECHNIQUES-** Graphical Input Techniques, Positioning Techniques, Positional Constraints, Rubber Band Techniques.

**EVENT HANDLING AND INPUT FUNCTIONS-** Introduction, Polling, Event Queue, Functions for Handling Events, Polling Task Design, Input Functions, Dragging and Fixing, Hit Detection, OCR.

### **UNIT-III**

**9**

**THREE DIMENSIONAL GRAPHICS-** Need for 3-Dimensional Imaging, Techniques for 3 Dimensional Displaying, Parallel Projections, Perspective Projection, Intensity Cues, Stereoscope Effect, Kinetic Depth Effect, Shading.

**CURVES AND SURFACES-** Shape Description Requirements, Parametric Functions, Bezier Methods, Bezier Curves, Bezier Surfaces, B-Spline Methods

### **UNIT-IV**

**9**

**SOLID AREA SCAN CONVERSION-**Three Dimensional Transformations Solid Area Scan Conversion, Scan Conversion of Polygons, Algorithm Singularity, Three Dimensional Transformation, Translations, Scaling, Rotation, Viewing Transformation, Perspective, Algorithms, Three Dimensional Clipping, Perspective View of Cube.

**HIDDEN SURFACE REMOVAL-**Need For Hidden Surface Removal, Depth - Buffer Algorithm, Properties that Help in Reducing Efforts, Scan Line Coherence Algorithm, Span - Coherence Algorithm, Area-Coherence Algorithms, Warnock's Algorithm, Priority Algorithms

### **EXPERIMENTS**

Develop program to

1. Understand the basic concepts of computer graphics.
2. Design scan conversion problems using C/C++ programming.
3. Apply clipping and filling techniques for modifying an object.
4. Understand the concepts of different type of geometric transformation of objects in 2D and 3D.
5. Understand the practical implementation of modeling, rendering, viewing of objects.

### **Textbooks**

1. Z. Xiang, R. Plastock, Schaum's outlines Computer Graphics, 2<sup>nd</sup> Ed., TMH
2. B M Havaladar, C Graphics & Projects, Anmol Publications Pvt. Limited, 01-Jan-2005
3. Hearn and Baker Computer Graphics with OpenGL, 3e, Prentice Hall, 2004.
4. Asthana and Sinha, Computer Graphics for Scientists and Engineers, New Age International, 01-Jan-2007

### **Reference books**

1. Foley, Vandam, Feiner, Hughes, Computer Graphics principles, 2<sup>nd</sup>Ed., Pearson Education
2. W. M. Newman, R. F. Sproull, Principles of Interactive computer Graphics, TMH.

## CSE-353 DESIGN & ANALYSIS OF ALGORITHMS

|                                  |  |
|----------------------------------|--|
| <b>Course Category</b>           | : Department Core (DC)   |
| <b>Pre-requisite Course</b>      | : NIL  |
| <b>Contact Hours/Week</b>        | : Lecture : 3, Tutorial : 1 , Practical: 2   |
| <b>Number of Credits</b>         | : 5  |
| <b>Course Assessment Methods</b> | : Continuous assessment through tutorials, attendance, home assignments, practical work, record, viva voce and One Mid Term Examination and Final Theory & Practical Examination |
| <b>Course Outcomes</b>           | : The students are expected to be able to demonstrate the following knowledge, skills and attitudes after completing this course.  |

1. Define the basic concepts of algorithms and analyze the performance of algorithms.
2. Discuss various algorithm design techniques for developing algorithms.
3. Discuss various searching, sorting and graph traversal algorithms.
4. Understand NP completeness and identify different NP complete problems.
5. Discuss various advanced topics on algorithm

### Topics Covered

#### UNIT-I 9

Introduction: Algorithms, Analyzing Algorithms, Complexity of Algorithms, Growth of Functions, Performance Measurements, Sorting and Order Statistics - Shell Sort, Quick Sort, Merge Sort, Heap Sort, Comparison of Sorting Algorithms, Sorting in Linear Time. Divide And Conquer with Examples such as Sorting, Matrix Multiplication, Convex Hull and Searching.

#### UNIT-II 9

Greedy Methods with Examples such as Optimal Reliability Allocation, Knapsack, Minimum Spanning Trees – Prim's and Kruskal's Algorithms, Single Source Shortest Paths – Dijkstra's and Bellman Ford Algorithms.

Dynamic Programming with Examples such as Multistage Graphs, Knapsack, All Pair Shortest Paths –Warshal's and Floyd's Algorithms, Resource Allocation Problem.

#### UNIT-III 9

Backtracking, Branch and Bound with Examples such as Travelling Salesman Problem, Graph Coloring, N-Queen Problem, Hamiltonian Cycles and Sum Of Subsets Advanced Data Structures: Red-Black Trees, B – Trees, Binomial Heaps, Fibonacci Heaps.

#### UNIT-IV 9

Selected Topics: String Matching, Text Processing- Justification of Text, Theory of NP-Completeness, Approximation Algorithms And Randomized Algorithms, Algebraic Computation, Fast Fourier Transform.

## EXPERIMENTS

1. To analyze time complexity of Insertion sort.
2. To analyze time complexity of Quick sort.
3. To analyze time complexity of Merge sort.
4. To Implement Largest Common Subsequence.
5. To Implement Matrix Chain Multiplication.
6. To Implement Strassen's matrix multiplication Algorithm, Merge sort and Quick sort.
7. To implement Knapsack Problem.
8. To implement Activity Selection Problem.
9. To implement Dijkstra's Algorithm.
10. To implement Warshall's Algorithm.
11. To implement Bellman Ford's Algorithm.
12. To implement Naïve String Matching Algorithm.
13. To implement Rabin Karp String Matching Algorithm
14. To implement Prim's Algorithm.
15. To implement Kruskal's Algorithm.

### Textbooks

1. Thomas H. Cormen, Charles E. Leiserson and Ronald L. Rivest, Introduction to Algorithms, PHI.
2. RCT Lee, SS Tseng, RC Chang and YT Tsai, "Introduction to the Design and Analysis of Algorithms", McGraw Hill, 2005.
3. Ellis Horowitz and Sartaj Sahni, *Fundamentals of Computer Algorithms*, Computer Science Press, Maryland, 1978
4. Berman, Paul, "Algorithms", Cengage Learning.
5. Aho, Hopcraft, Ullman, "The Design and Analysis of Computer Algorithms" Pearson Education, 2008.

### Reference books

1. Berlion, P. Izard, P., Algorithms-The Construction, Proof and Analysis of Programs, 1986. Johan Wiley & Sons.
2. Bentley, J.L., Writing Efficient Programs, PHI
3. Ellis Horowitz, Sartaj Sahni, and Sanguthevar Rajasekaran, *Computer Algorithms*, W. H. Freeman, NY, 1998
4. Goodman, S.E. & Hedetnien, introduction to Design and Analysis of Algorithm 1997, MGH.
5. Knuth, D.E , Fundamentals of Algorithms: The Art of Computer Programming Vol, 1985

## CSE-354 ADVANCED COMPUTER ARCHITECTURE

|                                  |  |
|----------------------------------|--|
| <b>Course Category</b>           | : Department Core (DC)   |
| <b>Pre-requisite Course</b>      | : NIL  |
| <b>Contact Hours/Week</b>        | : Lecture : 3, Tutorial : 1 , Practical: 2   |
| <b>Number of Credits</b>         | : 5  |
| <b>Course Assessment Methods</b> | : Continuous assessment through tutorials, attendance, home Assignments, practical work, record, viva voce and One Mid Term Examination and Final Theory & Practical Examination |

**Course Outcomes :** The students are expected to be able to demonstrate the following knowledge, skills and attitudes after completing this course.

1. Understand the advanced concepts of computer architecture.
2. Exposing the major differentials of RISC and CISC architectural characteristics.
3. Investigating modern design structures of Pipelined and Multiprocessors systems.
4. Become acquainted with recent computer architectures and I/O devices, as well as the low-level language required to drive/manage these types of advanced hardware.
5. Preparing selected reports that imply some emergent topics supporting material essence.

## **Topics Covered**

### **UNIT-I**

RISC Processors, Characteristics of RISC Processors, RISC vs CISC, Classification of 9 Instruction Set Architectures, Review of Performance Measurements, Basic Parallel Processing Techniques: Instruction Level, Thread Level and Process Level, Classification of Parallel Architectures.

### **UNIT-II**

Basic Concepts of Pipelining, Arithmetic Pipelines, Instruction Pipelines, Hazards in A Pipeline: 9 Structural, Data, and Control Hazards, Overview of Hazard Resolution Techniques, Dynamic Instruction Scheduling, Branch Prediction Techniques, Instruction-Level Parallelism using Software Approaches, Superscalar Techniques, Speculative Execution.

### **UNIT-III**

Basic Concept of Hierarchical Memory Organization, Main Memories, Cache Design and 9 Optimization, Virtual Memory Design and Implementation, Memory Protection, Evaluating Memory Hierarchy Performance, RAID, Centralized vs. Distributed Shared Memory.

### **UNIT-IV**

Interconnection Topologies, Synchronization, Memory Consistency, Review of Modern 9 Multiprocessors, Distributed Computers, Clusters, Grid, Mainframe Computers, Bus Structures and Standards, Types and Uses of Storage Devices, Interfacing I/O to The Rest of the System, Reliability and Availability, I/O System Design

## **EXPERIMENTS**

1. Write an algorithm and program to perform matrix multiplication of two  $n * n$  matrices on the 2-D mesh SIMD model.
2. Write an algorithm and program to perform matrix multiplication of two  $n * n$  matrices on Hypercube SIMD Model
3. Write an algorithm and program for Block oriented Matrix Multiplication on multiprocessor system
4. Study of Scalability for Single board Multi-board, multi-core, multiprocessor using Simulator
5. Study of various computer Architecture (MIPS, Power etc.) using simulator.
6. Study of Memory and system controllers, Interrupt and DMA controllers using simulator.

## Textbooks

1. Hennessey and Patterson, Computer Architecture: A quantitative Approach, Morgan Kaufman.
2. Kai Hwang, Advanced Computer Architecture: Parallelism, Scalability, Programmability, McGraw-Hill.
3. SIMA, Advanced Computer Architectures, Addison-Wesley.

## Reference books

1. H.S. Stone, High-performance Computer Architecture, 3rd edition, Addison-Wesley, 1993.  
Patterson, D. A. and Hennessey, J. L., Computer Organization and Design: The Hardware/Software Interface, Morgan Kaufmann, 1998

## CSE-361 PRINCIPLE OF COMPILER DESIGN

- Course Category** : Department Core (DC)
- Pre-requisite Course** : NIL
- Contact Hours/Week** : Lecture : 3, Tutorial : 1 , Practical: 2
- Number of Credits** : 5
- Course Assessment** : Continuous assessment through tutorials, attendance, home assignments, practical work, record, viva voce and
- Methods** : One Mid Term Examination and Final Theory & Practical Examination
- Course Outcomes** : The students are expected to be able to demonstrate the following knowledge, skills and attitudes after completing this Course.
1. Define the phases of a typical compiler, including the front--- and back--- end.
  2. Identify tokens of a typical high--- level programming language; define regular expressions for tokens and design; implement a lexical analyzer using a typical scanner generator.
  3. Explain the role of a parser in a compiler and relate the yield of a parse tree to a grammar derivation; design and implement a parser using a typical parser generator.
  4. Apply an algorithm for a top--- down or a bottom--- up parser construction; construct a parser for a small context--- free grammar.
  5. Explain the role of a semantic analyzer and type checking; create a syntax--- directed definition and an annotated parse tree; describe the purpose of a syntax tree.
  6. Explain the role of different types of runtime environments and memory organization for implementation of typical programming languages.
  7. Describe the purpose of translating to intermediate code in the compilation process.
  8. Design and implement an intermediate code generator based on given code patterns

## Topics Covered

### UNIT-I

9

Compiler Structure: Analysis-Synthesis Model of Compilation, Various Phases of A Compiler, Tool Based Approach to Compiler Construction Lexical Analysis: Interface with Input, Parser and Symbol Table, Token, Lexeme and Patterns, Difficulties in Lexical Analysis, Error Reporting, and Implementation. Regular Definition, Transition Diagrams, LEX.

## **UNIT-II**

9

Syntax Analysis: Context Free Grammars, Ambiguity, Associativity, Precedence, Top Down Parsing, Recursive Descent Parsing, Transformation on the Grammars, Predictive Parsing, Bottom Up Parsing, Operator Precedence Grammars, LR Parsers (SLR, LALR, LR), YACC.

## **UNIT-III**

9

Syntax Directed Definitions: Inherited and Synthesized Attributes, Dependency Graph, Evaluation Order, Bottom Up and Top Down Evaluation Of Attributes, L- and S-Attributed Definitions.

Type Checking: Type System, Type Expressions, Structural and Name Equivalence of Types, Type Conversion, Overloaded Functions and Operators, Polymorphic Functions. Intermediate Code Generation: Intermediate Representations, Translation of Declarations, Assignments Intermediate Code Generation For Control Flow, Boolean Expressions and Procedure Calls, Implementation Issues.

## **UNIT-IV**

9

Symbol Table Management, Runtime Environments, Source Language Issues, Storage Organization, Storage Allocation Strategies, Access to Non-Local Names, Parameter Passing. Code Optimization, Peephole Optimization, Source of Optimizations, Optimization of Basic Blocks, Loops, Global Dataflow Analysis, Introduction to Code Generation.

## **EXPERIMENTS**

1. Write a program using Lex to calculate the number of characters, number of words and the number of lines present in the given text file as input.
2. Write a program using Lex to implement the set of regular expression and indicates the acceptance of a given string for a particular regular expression.
3. Write a C program to implement the conversion of regular expression to non-deterministic finite automation
4. Write a program using Yacc to check whether a string belong to the given grammar or not.
5. Write a C program to compute FIRST and FOLLOW of the non-terminals of given grammar.
6. Write a C program to check the given grammar is Left recursive and remove Left recursion.
7. Write Syntax Directed Translation actions using Yacc to generate Parse Tree for the grammar for arithmetic expressions.
8. Write Syntax Directed Translation actions using Yacc to translate arithmetic expressions into Post-fix form.
9. Write Syntax Directed Translation actions using Yacc to translate arithmetic expressions into three address code.

## **Textbooks**

1. A.V. Aho, M.S. Lam, R. Sethi, and J.D. Ullman, Compilers: Principles, Techniques, and Tools, Pearson Education, 2007 (second ed.).
2. K.D. Cooper, and L. Torczon, Engineering a Compiler, Elsevier, 2004.

## **Reference books**

1. AW Appel, J Palsberg, Modern Compiler Implementation in JAVA, Cambridge University Press, 2002
2. AW Appel, M Ginsburg, Modern Compiler Implementation in C, Cambridge University Press.

## **CSE-362 ARTIFICIAL INTELLIGENCE**

**Course Category** : Department Core (DC)  
**Pre-requisite Course** : NIL  
**Contact Hours/Week** : Lecture : 3, Tutorial : 1 , Practical: 2  
**Number of Credits** : 5  
**Course Assessment Methods** : Continuous assessment through tutorials, attendance, home assignments, practical work, record, viva voce and One Mid Term Examination and Final Theory & Practical Examination

**Course Outcomes** : The students are expected to be able to demonstrate the following knowledge, skills and attitudes after completing this course.

1. The intelligent agents--software or hardware entities that perform useful tasks with some degree of autonomy.
2. An understanding of the basic areas of artificial intelligence including problem solving, knowledge representation, reasoning, decision making, planning, perception and action, and learning -- and their applications (e.g., data mining, information retrieval)
3. Design and implement key components of intelligent agents of moderate complexity in JAVA and /or Lisp or Prolog and evaluate their performance.
4. Develop familiarity with current research problems, research methods, and the research literature in AI

### **Topics Covered**

#### **UNIT-I** **9**

Artificial Intelligence Introduction, Intelligent Agents, Solving Problems by Searching Beyond Classical Search Adversarial Search Constraint Satisfaction Problems

#### **UNIT-II** **9**

Knowledge and Reasoning Logical Agents First-Order Logic Inference in First-Order Logic Classical Planning and Acting in the Real World Knowledge Representation Uncertain Knowledge and Reasoning Quantifying Uncertainty Probabilistic Reasoning Probabilistic Reasoning over Time 16 Making Simple Decisions Making Complex Decisions

#### **UNIT-III** **9**

Planning and Acting in the Real World Definition of Classical Planning Algorithms for Planning as State-Space Search Planning Graphs Classical planning as Boolean Satisfiability Representing temporal and resource constraints Planning and Acting in Nondeterministic Domains. Knowledge Representation Acting under Uncertainty Probabilistic Reasoning Time and Uncertainty Learning from Examples Knowledge in Learning Probabilistic Models Reinforcement Learning

#### **UNIT-IV** **9**

Forms of Learning Supervised Learning, Decision Trees Evaluating and Choosing the Best Hypothesis A Logical Formulation of Learning Statistical Learning with Complete Data Natural Language Processing Communicating, Perceiving, and Acting Natural Language Processing Natural Language for Communication Perception Robotics

## EXPRIMENTS

1. Write the program to solve the water jug problem using production rule set.
2. Write the program to solve the water jug problem using A\* ALGORITHM.
3. Write the program to solve the 8 puzzle problem using A\* ALGORITHM.
4. Write the program to solve the salesman problem using A\* ALGORITHM.
5. Write the program to solve the farmer transfer three belonging form one side of the river to other side using AO\* ALGORITHM.
6. Write the program to solve the DISEASE problem using Bayesian reasoning.
7. Write the program to solve the Object finding problem using Bayesian reasoning.
8. Write the program to solve the Object finding problem using D S theory
9. Write the program to solve the Decision Trees Evaluating.
10. Write the program for walk, drive, take the bus, take a cab, and fly problem using mean end analysis.

## Textbooks

1. S. Russel and P. Norvig, “Artificial Intelligence – A Modern Approach”, Second Edition, Pearson Education, 2012

## Reference books

2. David Poole, Alan Mackworth, Randy Goebel, Computational Intelligence: a logical approach, Oxford University Press, 2012.
3. G. Luger, “Artificial Intelligence: Structures and Strategies for complex problem solving”, Fourth Edition, Pearson Education, 2012
4. J. Nilsson, “Artificial Intelligence: A new Synthesis”, Elsevier Publishers, 1998

## CSE-363 WEB TECHNOLOGIES

- Course Category** : Department Core (DC)
- Pre-requisite Course** : NIL
- Contact Hours/Week** : Lecture : 3, Tutorial : 1 , Practical: 2
- Number of Credits** : 5
- Course Assessment** : Continuous assessment through tutorials, attendance, home assignments, practical work, record, viva voce and
- Methods** : One Mid Term Examination and Final Theory & Practical Examination
- Course Outcomes** : The students are expected to be able to demonstrate the following knowledge, skills and attitudes after completing this course.
1. Identify common design mistakes when creating a web based application.
  2. Discuss the process of editing a web page using text editors and web page editors
  3. Cover commonly used HTML tags and discuss how this knowledge is important to a web designer
  4. Demonstrate an understanding of basic CSS, XML, JAVA Script, JSP, ASP.NET and PHP.

## Topics Covered

### UNIT-I

**Introduction to WWW-** World Wide Web, WWW Architecture, Web Search Engines, Web 9 Crawling, Web Indexing, Web Searching, Search Engines Optimization and Limitations, Web Mining: Web Content Mining, Web Structure Mining, Web Usage Mining

### UNIT-II

**Markup Language Basics: SGML, HTML, CSS And XML** 9

**SGML:** Standard Generalized Markup Language (SGML) -Structures, Elements, Content Models, DTD, Attributes Entities.

**HTML:** Designing Web Pages With HTML-Use Of Tags, Hyperlinks, URLs, Tables, Text Formatting, Graphics & Multimedia, Imagemap, Frames and Forms in Web Pages.

**CSS:** Use of Cascading Style Sheet in Web Pages.

**XML:** Extensible Markup Language (XML): Introduction using User-Defined Tags in Web Pages, Displaying XML Contents, XML Dtds, Use of XSL

### UNIT-III

**Client-Side Scripting using JAVA Script** 9

JAVA script Overview; Constants, Variables, Operators, Expressions & Statements; User-Defined & Built-in Functions; Client-Side Form Validation; Using Properties and Methods of Built-in Objects

### UNIT-IV

**Server-Side Scripting Using JSP, ASP.NET And PHP** 9

**JSP :**Introduction to JSP, JSP Architecture, JSP Directives, JSP Scripting Elements, Default Objects in JSP, JSP Actions, JSP with Beans and JSP with Database, Error Handling in JSP, Session Tracking Techniques in JSP, Introduction to Custom Tags.

**ASP.NET :** ASP.Net Coding Modules, ASP.NET Page Directives, Page Events and Page Life Cycle , Postback and Crosspage Posting ASP.NET Server Controls , HTML Controls, Validation Controls, Building Databases .

**PHP**(Hypertext Preprocessor)-Introduction, Syntax, Variables, Strings, Operators, If-Else, Loop, Switch, Array, Function, Form ,Mail, File Upload, Session, Error, Exception, Filter, PHP-ODBC

### EXPERIMENTS

1. Create a HTML static web page which shows the use of different tags in that.
2. Insert an image and create a link such that clicking on image takes user to other page.
3. Prepare a sample code to illustrate three types of lists in HTML.
4. Use tables to provide layout to your HTML page describing your university infrastructure
5. Use frames such that page is divided into 3 frames 20% on left to show contents of pages, 60% in center to show body of page, remaining on right to show remarks.
6. Create a simple form that will show all the INPUT METHODS available in HTML.

7. Create a sample code to illustrate the Embedded, External and Inline style sheets for your web page.
8. Write down simple JAVA Script using timeout such that image will be changed after every 1 ms at a specified position.
9. Design a registration form and validate its field by using JAVA script.
10. Write an XML example of given tree that demonstrates the creation of user-designed tags and display it in a browser.
11. college, employee, fname, lname, joindate, bdate, age, salary (with atleast 3 elements)
12. Write a program in XML for creation of DTD which specifies a particular set of rules.
13. Create a bean student with attributes (first name, last name, age, class). In another JSP page display the bean values using <jsp:usebean>.
14. Write a program to use JDBC connectivity program for maintaining database by sending queries through JSP Page.
15. Use ad-rotator to change advertisements on client side request.(ASP.NET)
16. Implement Session tracking using user authentication in ASP.NET.
17. Write a PHP script to create a database Student DB.
18. Write a PHP program to store page views count in SESSION, to increment the count on each refresh, and to show the count on web page.

### **Textbooks**

1. Uttam K. Roy, **Web Technologies, 1/e**, Oxford University Press, USA
2. M. Srinivasan, Web Technology: Theory and Practice, Pearson Education India
3. Deitel, Deitel and Nieto, Internet and Worldwide Web - How to Program, 5th Edition, PHI, 2011.
4. Ralph Moseley & M. T. Savaliya , Developing Web Application- Second Edition, Wiley
5. Miller/Kirst, Web Programming Step by Step, Stepp, 2nd edition, 2009
6. Ullman , PHP for the Web: Visual Quick Start Guide, Pearson Education, 4th edition, 201
7. [www.w3c.org](http://www.w3c.org)
8. [www.w3schools.com](http://www.w3schools.com)

### **Readings:**

Various journal and conference articles, research reports, and book excerpts as appropriate

### **Reference books**

1. Ivan Bayross , Web Enabled Commercial Application Development Using HTML, DHTML, JAVA Script, Perl & CGI, BPB Publication, 2005
2. Hans Bergsten, JAVA Server Pages, O'Reilly.

# CSE-364 COMPUTER NETWORKS

**Course Category** : Department Core (DC)  
**Pre-requisite Course** : NIL  
**Contact Hours/Week** : Lecture : 3, Tutorial : 1 , Practical: 2

**Number of Credits** : 5

**Course Assessment** : continuous assessment through tutorials, attendance, home assignments, practical work, record, viva voce and One Mid Term Examination and Final Theory Practical Examination

**Methods** : The students are expected to be able to demonstrate the following knowledge, skills and attitudes after completing this course

## Course Outcomes

- Understand the concepts of communication architecture and protocols
1. Identify different types of communication mediums and techniques
  2. Define and identify different types of multiplexing, data encoding, modulation, and switching techniques
  3. Illustrate different standards of Local Area Network in terms of technologies and hardware used
  4. Illustrate network addressing and analysis techniques
  5. Understand the Wide Area Network technologies
  6. Understand the network routing concepts
  7. Understand the internetworking concepts and architectures
  8. Understand the TCP/IP protocols and design architectures

## Topic Covers

### UNIT-I 9

**Introductory Concepts:** Goals and Applications of Networks, Network Structure and Architecture, OSI Reference Model, Services, Networks Topology, Physical Layer-Transmission, Switching Methods, LAN Inter Connection Devices, Integrated Services Digital Networks.

### UNIT-II 9

**Medium Access Sub Layer:** Channel Allocations, LAN Protocols, ALOHA Protocols- Pure ALOHA, Slotted ALOHA, Carrier Sense Multiple Access Protocols, CSMA with Collision Detection, Collision Free Protocols, IEEE Standards, Ethernet, FDDI, Data Link Layer- Basic Design Issues, Error Correction & Detection Algorithms, Elementary Data Link Layer Protocols, Sliding Window Protocols, Error Handling, High Level Data Link Control

### UNIT-III 9

**Network Layer:** Packet Switched Networks – IP – ARP – RARP –DHCP – ICMP – Queuing Discipline – Routing Algorithms, Congestion Control Algorithms, Internetworking, TCP/IP Protocol, IP Addresses, Ipv4 and Ipv6.

**Transport Layer:** Design Issues, Connection Management, Internet Transport Protocol (UDP), Transmission Control Protocol. (TCP) -**Adaptive Retransmission Congestion Control**

**Congestion Avoidance – QOS.**

**Application Layer:** Domain Name System, Electronic Mail (**Email**), File Transfer Protocol, Hyper Text Transfer Protocol, Introduction To Cryptography and Network Security.

### EXPERIMENTS

1. To create scenario and study the performance of CSMA/CD protocol through simulation.
2. To create scenario and study the performance of token bus and token ring protocols through simulation.
3. Implementation of Error detection and correction algorithms.
4. Implementation and study of 1-bit sliding window viz., stop and wait protocol.
5. Implementation and study of Go back-N protocol.
6. Implementation and study of selective repeat protocol.
7. To get the MAC or Physical address of the system using Address Resolution Protocol.
8. Implementation of distance vector routing algorithm.
9. Implementation of link state routing algorithm.
10. To write a client-server application for chat using TCP.
11. To write a C program to develop a DNS client server to resolve the given hostname.

### Textbooks

1. Forouzan, Data Communication and Networking, TMH
2. A. S Tanenbaum, Computer Networks, 4<sup>th</sup> Edition, Pearson education

### Reference books

1. W. Stallings , Data and Computer Communication , Macmillan Press
2. Comer , Computer Networks & Internet with Internet Applications, Pearson Education
3. Comer, Internetworking with TCP/IP, 6<sup>th</sup> Edition, PHI
4. W Stallings, Computer Networks with Internet Protocols, Pearson Education
5. W Stallings, Local and Metropolitan Area Networks, 6th edition, Pearson Education

## **CSE-365 SOFTWARE ENGINEERING**

|                                  |  |
|----------------------------------|--|
| <b>Course Category</b>           | : Department Core (DC)   |
| <b>Pre-requisite Course</b>      | : NIL  |
| <b>Contact Hours/Week</b>        | : Lecture : 3, Tutorial : 1 , Practical: 2   |
| <b>Number of Credits</b>         | : 5  |
| <b>Course Assessment Methods</b> | : Continuous assessment through tutorials, attendance, home assignments, practical work, record, viva voce and One Mid Term Examination and Final Theory & Practical Examination   |
| <b>Course Outcomes</b>           | : The students are expected to be able to demonstrate the following knowledge, skills and attitudes after completing this course.<br><ol style="list-style-type: none"><li>1. Enhance the Software Project Management skills.</li><li>2. Develop functioning software which benchmarks to the international standards.</li></ol> |

### **Topics Covered**

#### **UNIT-I 9**

Software Process– Introduction, S/W Engineering Paradigm , Life Cycle Models (Waterfall, Incremental, Spiral, Evolutionary, Prototyping), Software Requirements –Functional And Non-Functional–Software Document– Requirement Engineering Process–Feasibility Studies – Software Prototyping–Prototyping in Software, Process–Data–Functional and Behavioral Models– Structured Analysis And Data Dictionary.

#### **UNIT-II 9**

Basic Concept of Software Design, Architectural Design, Low Level Design: Modularization, Design Structure Charts, Pseudo Codes, Flow Charts, Coupling and Cohesion Measures, Design Strategies: Function Oriented Design, Object Oriented Design, Top-Down and Bottom-Up Design. Software Measurement and Metrics: Various Size Oriented Measures: Halstead's Software Science, Function Point (FP) Based Measures, Cyclomatic Complexity Measures: Control Flow Graph.

#### **UNIT-III 9**

Software Testing – Taxonomy of S/W Testing Levels - Black Box Testing – Testing Boundary Conditions – Structural Testing — Regression Testing– S/W Testing Strategies, Unit Testing, Integration Testing, Validation Testing, System Testing and Debugging.

#### **UNIT-IV 9**

Measures and Measurements – Zipf's Law, Software Cost Estimation – Function Point Models, 9 COCOMO Model. Delphi Method – Scheduling – Earned Value Analysis – Error Tracking – Software Configuration Management – Program Evolution Dynamics – Software Maintenance – Project Planning – Project Scheduling– Risk Management – Case Tools

## EXPERIMENTS

1. Identifying the Requirements from Problem Statements
2. Estimation of Project Metrics
3. Modeling UML Use Case Diagrams and Capturing Use Case Scenarios
4. E-R Modeling from the Problem Statements
5. Identifying Domain Classes from the Problem Statements
6. State chart and Activity Modeling
7. Modeling UML Class Diagrams and Sequence diagrams
8. Modeling Data Flow Diagrams
9. Estimation of Test Coverage Metrics and Structural Complexity
10. Designing Test Suites

### Textbooks

1. R. S. Pressman, "Software Engineering - A practitioners approach", 3rd Edition, McGraw Hill International editions, 1992.

### Reference books

1. IAN Sommerville, Software Engineering, Pearson Education Asia, VI Edition, 2000.
2. Pankaj Jalote, "An Integrated Approach to software Engineering", Springer Verlag, 1997

## CSE-471 INTRODUCTION TO MACHINE LEARNING

**Course Category** : Department Core (DC)

**Pre-requisite Course** : NIL

**Contact Hours/Week** : Lecture : 3, Tutorial : 1 , Practical: 2

**Number of Credits** : 5

**Course Assessment** : Continuous assessment through tutorials, attendance, home assignments, practical work, record, viva voce and

**Methods** : One Mid Term Examination and Final Theory & Practical Examination

**Course Outcomes** : The students are expected to be able to demonstrate the following knowledge, skills and attitudes after completing this course.

1. To explain theory underlying machine learning
2. To construct algorithms to learn linear and non-linear models
3. To implement data clustering algorithms
4. To construct algorithms to learn tree and rule-based models
5. To apply reinforcement learning techniques

### Topics Covered

#### UNIT-I

9

**FOUNDATIONS OF LEARNING-** Components of Learning – Learning Models – Geometric Models – Probabilistic Models – Logic Models – Grouping and Grading – Learning Versus Design – Types of Learning – Supervised – Unsupervised – Reinforcement – Theory of Learning

– Feasibility of Learning – Error and Noise – Training versus Testing – Theory of Generalization

– Generalization Bound – Approximation- Generalization Tradeoff – Bias and Variance

– Learning Curve

## UNIT-II

9

**LINEAR MODELS**-Linear Classification–Univariate Linear Regression–Multivariate Linear Regression–Regularized Regression– Logistic Regression–Perceptron–Multilayer Neural Networks –Learning Neural Networks Structures – Support Vector Machines–Soft Margin SVM– Going Beyond Linearity – Generalization and Over Fitting – Regularization– Validation

## UNIT-III

9

**DISTANCE-BASED MODELS**-Nearest Neighbour Models–K-Means–Clustering around Medoids–Silhouettes–Hierarchical Clustering–K-D Trees–Locality Sensitive Hashing–Non-Parametric Regression–Ensemble Learning–Bagging And Random Forests–Boosting–Meta Learning

## UNIT-IV

9

**TREE AND RULE MODELS**- Decision Trees – Learning Decision Trees – Ranking and Probability Estimation Trees – Regression Trees – Clustering Trees – Learning Ordered Rule Lists – Learning Unordered Rule Lists – Descriptive Rule Learning – Association Rule Mining – First-Order Rule Learning

## UNIT-V

**REINFORCEMENT LEARNING**-Passive Reinforcement Learning – Direct Utility Estimation

– Adaptive Dynamic Programming – Temporal-Difference Learning – Active Reinforcement Learning – Exploration – Learning an Action-Utility Function – Generalization in Reinforcement Learning – Policy Search – Applications in Game Playing – Applications in Robot Control

## EXPERIMENTS

1. A simple *linear regression* attempts to draw a straight line that will best minimize the residual sum of squares between the observations and the predictions in python program language
2. Linear Regression Logistic Regression in python program language
3. Decision Tree in python program language
4. SVM in python program language
5. Naive Bayes in python program language
6. KNN in python program language
7. K-Means in python program language
8. Random Forest in python program language
9. Dimensionality Reduction Algorithms in python program language
10. Gradient Boost & Adaboost in python program language

### Textbooks

- 1 Ethem Alpaydin -Introduction to Machine Learning Third Edition, MIT Press, 2004

### Reference books

1. Y. S. Abu-Mostafa, M. Magdon-Ismail, and H.-T. Lin, Learning from Data, AML Book Publishers, 2012.
2. P. Flach, Machine Learning: The art and science of algorithms that make sense of data, Cambridge University Press, 2012.

3. K. P. Murphy, Machine Learning: A probabilistic perspective, MIT Press, 2012.
4. C. M. Bishop, Pattern Recognition and Machine Learning, Springer, 2007.
5. D. Barber, Bayesian Reasoning and Machine Learning, Cambridge University Press, 2012.
6. M. Mohri, A. Rostamizadeh, and A. Talwalkar, Foundations of Machine Learning, MIT Press, 201
7. T. M. Mitchell, Machine Learning, McGraw Hill, 1997.
8. S. Russel and P. Norvig, Artificial Intelligence: A Modern Approach, Third Edition, Prentice Hall, 2009.

## **CSE-472      PARALLEL & DISTRIBUTED COMPUTING**

|                                  |  |
|----------------------------------|--|
| <b>Course Category</b>           | : Department Core (DC)   |
| <b>Pre-requisite Course</b>      | : NIL  |
| <b>Contact Hours/Week</b>        | : Lecture : 3, Tutorial : 1 , Practical: 2   |
| <b>Number of Credits</b>         | : 5  |
| <b>Course Assessment Methods</b> | : Continuous assessment through tutorials, attendance, home assignments, practical work, record, viva voce and One Mid Term Examination and Final Theory & Practical Examination   |
| <b>Course Outcomes</b>           | : The students are expected to be able to demonstrate the following knowledge, skills and attitudes after completing this course.  |
|                                  | <ol style="list-style-type: none"> <li>1. understand and account for models, limitations, and fundamental concepts in the area of message passing and shared memory concurrency, and apply this understanding to example systems and algorithms</li> <li>2. adapt, and design algorithms for execution in parallel and distributed settings, and analyze the algorithms for correctness, reliability, security, and performance</li> </ol> |

### **Topics Covered**

#### **UNIT-I 9**

Parallel Computing, Parallel Computer Model, Parallel Architectural Classification Schemes, Multiprocessor System and Interconnection Networks. Theoretical Foundation For Distributed System: Limitation of Distributed System, Absence of Global Clock, Shared Memory, Logical Clocks, Lamport's & Vectors Logical Clocks, Causal Ordering of Messages, Global State, Termination Detection.

#### **UNIT-II 9**

Distributed Mutual Exclusion: Classification of Distributed Mutual Exclusion, Requirement of Mutual Exclusion Theorem, Token Based and Non Token Based Algorithms, Performance Metric for Distributed Mutual Exclusion Algorithms.

#### **UNIT-III 9**

Distributed Deadlock Detection: System Model, Resource vs Communication Deadlocks, 9Deadlock Prevention, Avoidance, Detection & Resolution, Centralized Dead Lock Detection, Distributed Dead Lock Detection, Path Pushing Algorithms, Edge Chasing Algorithms. Agreement Protocols: Introduction, System Models, Classification of Agreement Problem, Byzantine Agreement Problem, Consensus Problem, Interactive Consistency Problem, Solution to Byzantine Agreement Problem, Application of Agreement Problem.

## UNIT-IV

9

Distributed File Systems: File Service Architecture, Sun Network File System, The Andrew File System, Recent Advances.

Distributed Algorithms: Introduction to Communication Protocols, Balanced Sliding Window Protocol, Routing Algorithms, Destination Based Routing, APP Problem, Deadlock Free Packet Switching, Introduction to Wave & Traversal Algorithms, Election Algorithm, CORBA Case Study: CORBA RMI, CORBA Services.

### EXPERIMENTS

1. Write a program to simulate the functioning of Lamport's logical clock in 'C'.
2. Write a program to simulate the Distributed Mutual Exclusion in „C’.
3. Write a program to implement a Distributed chat server using TCP sockets in „C’.
4. Implement RPC mechanism for a file transfer across a network in „C’.
5. Write a JAVA code to implement „JAVA RMI' mechanism for accessing methods of remote systems.
6. Write a code in „C’ to implement sliding window protocol.
7. Implement corba mechanism by using c++ program at one end and JAVA program at the other.
8. Write a code in „C’ to Increment a counter in shared memory.

### Textbooks

1. Singhal Mukesh & Shivaratri N. G., Advanced Concepts in Operating Systems, TMH

### Reference books

2. D. Culler, J. P. Singh, A. Gupta, Parallel Computer Architecture, Elsevier
3. Andrew S. Tanenbaum and Maarten Van Steen, Distributed Systems Principles and Paradigms, PHI
4. Tanenbaum, A. S. Distributed Operating Systems, Prentice Hall 199
5. Tanenbaum, A. S. Modern Operating Systems, 2nd Edition, Prentice Hall 2001.
6. Bacon, J., Concurrent Systems, 2nd Edition, Addison Wesley 1998.
7. Silberschatz, A., Galvin, P. and Gagne, G., Applied Operating Systems Concepts, 1st Edition, Wiley 2000.
8. Coulouris, G. et al, Distributed Systems: Concepts and Design, 3rd Edition, Addison Wesley 2001.
9. Galli, D.L., Distributed Operating Systems: Concepts and Practice, Prentice-Hall 2000

## **CSE-481 MOBILE COMPUTING**

|                             |   |
|-----------------------------|---|
| <b>Course Category</b>      | : Department Core (DC)  |
| <b>Pre-requisite Course</b> | : NIL   |
| <b>Contact Hours/Week</b>   | : Lecture : 3, Tutorial : 1 , Practical: 2  |
| <b>Number of Credits</b>    | : 5   |
| <b>Course Assessment</b>    | : Continuous assessment through tutorials, attendance, home assignments, practical work, record, viva voce and                    |
| <b>Methods</b>              | One Mid Term Examination and Final Theory & Practical Examination.  |
| <b>Course Outcomes</b>      | : The students are expected to be able to demonstrate the following knowledge, skills and attitudes after completing this course. |

1. Demonstrate the actual meaning of power and energy management in wireless mobile networks.
2. Outline knowledge on Mobile IP.
3. Be familiar with the network protocol stack
4. Learn the basics of mobile telecommunication system
5. Be exposed to Ad-Hoc networks
6. Gain knowledge about different mobile platforms and application development

### **Topics Covered**

#### **UNIT-I 9**

Introduction, Issues in Mobile Computing, Overview of Wireless Telephony: Cellular Concept,

GSM: Air-Interface, Channel Structure, Location Management: HLR, VLR, Hierarchical, Handoffs, Channel Allocation In Cellular Systems, CDMA, GPRS.

#### **UNIT-II 9**

Wireless Networking, Wireless LAN Overview: MAC Issues, IEEE 802.11, Blue Tooth, Wireless Multiple Access Protocols, TCP Over Wireless, Wireless Applications, Mobile IP, WAP: Architecture, Protocol Stack, Application Environment, Applications, Wireless mark Up Language (WML).

#### **UNIT-III 9**

Data Management Issues, Data Replication for Mobile Computers, Adaptive Clustering for Mobile Wireless Networks, File System, Disconnected Operations, Mobile Agents Computing, Security and Fault Tolerance.

#### **UNIT-IV 9**

Adhoc Networks, Localization, MAC Issues, Routing Protocols, Global State Routing (GSR), Destination Sequenced Distance Vector Routing (DSDV), Dynamic Source Routing (DSR), Ad Hoc On Demand Distance Vector Routing (AODV), Temporary Ordered Routing Algorithm (TORA), QOS in Ad Hoc Network.

## **EXPERIMENTS**

1. Develop an application that uses GUI components, Font and Colours
2. Develop an application that uses Layout Managers and event listeners.
3. Develop a native calculator application.
4. Write an application that draws basic graphical primitives on the screen.
5. Implement an application that implements Multi threading
6. Develop a native application that uses GPS location information.
7. Implement an application that writes data to the SD card.
8. Implement an application that creates an alert upon receiving a message.
9. Write a mobile application that creates alarm clock

### **Textbooks**

1. Asoke K Taukder, Roopa R Yavagal, Mobile Computing, Tata McGraw Hill Pub. Co., New Delhi, 2005.
2. J. Schiller, Mobile Communication, Addison Wesley, 2000.

### **Reference books**

1. Ivan Stojmenovic, Handbook of Wireless Networks and Mobile Computing, John Wiley & sons Inc, Canada, 2002.
2. William Stallings, “Wireless Communication and Networks”, Pearson Education, 2003.
3. Yi-Bing Lin & Imrich Chlamtac, Wireless and Mobile Networks Architectures, John Wiley & Sons, 2001.
4. Raj Pandya, “Mobile and Personal Communication systems and services”, Prentice Hall of India, 2001.
5. Hansmann, “Principles of Mobile Computing”, Wiley Dreamtech, 2004.
6. Ray Rischpater, “Wireless Web Development”, Springer Publishing, 2000.
7. P. Stavronlakis, “Third Generation Mobile Telecommunication systems”, Springer Publishers, 2001.
8. Burkhardt , Pervasive Computing, Pearson
9. P. Stavronlakis, Third Generation Mobile Telecommunication systems, Springer Publishers.

# MANAGEMENT (M)

## **BSH-242 MANAGEMENT INFORMATION SYSTEM**

- Course category** : Management (M)  
**Pre-requisite Course** : NIL  
**Contact hours/week** : Lecture : 2, Tutorial : 1 , Practical: 0  
**Number of Credits** : 3  
**Course Assessment methods** : Continuous assessment through tutorials, attendance, home assignments, and One Mid Term Examination and Final Theory Examination  
**Course Outcomes** : The students are expected to be able to demonstrate the following knowledge, skills and attitudes after completing this course

1. Understands the concept, its development and management supports for the Management Information System
2. Ability to define needs and dimensions of MIS, steps for short and long range plans and budget for MIS
3. Analyses the elements and data sources, constraints and develops formats and documents of MIS
4. Develops methods, planning for implementation and process of evaluation of MIS

### **Topics Covered**

#### **UNIT-I**

Meaning and role of Management Information System, Development of Management Information system, Organisation for Management Information System, Systems and user training; Top Management Support for Management Information System 6

#### **UNIT-II**

Meaning, needs and dimension of Management information system Plan, Strategic Planning for Management Information System, Step in Planning; Information System; Steps in Planning Information needs for short and long-range plans budgeting for management information system 6

#### **UNIT-III**

Information elements and data sources; constraints in Management Information System design, Information flow charts; Documentation and Formats in Management Information System, Alternative Approaches to Design. 6

#### **UNIT-IV**

Methods and tasks in implementation, Planning for implementation, Behavioural implications in Management Information System, Approaches and process of evaluation of Management Information System. Case Study 6

### Books & References

1. Brein James, Computer in Business Management An Introduction
2. Murdick, Robert G, Information System for Modern Management
3. Contar Jesome, Management Information System
4. Bentley Trevoi, Management Information System and Data Process
5. Davis Gozdam B. & Dason, Modern Information System
6. Jawedekar W.S., Management Information System
7. Schulthesis, Management Information System.

### BSH-351 ENGINEERING AND MANEGERIAL ECONOMICS

**Course category** : Management (M)

**Pre-requisite Course** : NIL

**Contact hours/week** : Lecture : 2, Tutorial : 1 , Practical: 0

**Number of Credits** : 3

**Course Assessment methods** : Continuous assessment through tutorials, attendance, home assignments, and One id Term Examination and Final Theory Examination

**Course Outcomes** : The students are expected to be able to demonstrate the following knowledge, skills and attitudes after completing this course

1. Students will acquire basic knowledge in Engineering & managerial economics, which allows students to gain theoretical and empirical skill of economics.
2. To make Engineering students prepared for economic empowerment so that they could manage their wealth, help them in starting their own business or during managerial period.
3. Students will develop Interdisciplinary skills which can help them to thrive in the life-long changing environment in various fields of Industry of Economics.
4. Students will acquire practical knowledge of economics, the kind of markets, cost theory, various issues of demand and other major economic concepts.
5. Able to explain succinctly the meaning and definition of managerial economics; elucidate on the characteristics and scope of managerial economics.
6. Able to describe the techniques of managerial economics.
7. Able to explain the applications of managerial economics in various aspects.
8. To learn about the management and economics of the industrial environment

### Topics Covered

#### UNIT-I

Introduction: Meaning, Nature and Scope of micro Economics, Macro Economics and Managerial Economics, Decision making Process with reference to Managerial economics, Managerial Economics and its application in engineering perspective, 6

#### UNIT-II

Concepts of Demand and Supply: Demand Analysis, Law of Demand, Determinants of Demand, Elasticity of Demand: Price, Income and cross Elasticity. Uses of concept of elasticity of demand in managerial decision 6

Demand Forecasting: Meaning, significance and methods of demand forecasting, Law of Supply, Determinants and Elasticity of supply

### UNIT-III

Production function, Laws of returns to scale & Law of Diminishing returns scale. 6  
Overview of cost: fixed cost, variable cost, average cost, marginal cost, Opportunity cost, An overview of Short and Long run cost curves  
Profit analysis and concept of profit, Theories of Profits

### UNIT-IV

Market Structure: Perfect Competition, Imperfect competition – Monopolistic, Oligopoly, duopoly 6  
sorberent features of price determination and various market conditions.  
National Income: Concept and Measurement of National Income. Inflation: Meaning, Types, causes & prevention methods, Business Cycles and Phases

### Books & References

1. Mote, Paul and Gupta, Managerial Economics, T M H, New Delhi.
2. H L Ahuja, Managerial Economics, S Chand & Co. New Delhi
3. P.L. Mehta, Managerial Economics, Analysis, Problems and Cases, Sultan Chand Sons, New Delhi.
4. Prof. D.N. Kakkar , Managerial Economics for Engineering, PHI publication, New Delhi
5. Varshney and Maheshwari, Managerial Economics, Sultan Chand and Sons, New Delhi.

## HUMANITIES & SOCIAL SCIENCE CORE (HSSC)

### BSH-113 PROFESSIONAL COMMUNICATION

**Course category** : Humanities & Social Science Core (HSSC)  
**Pre-requisite Course** : NIL  
**Contact hours/week** : Lecture : 3, Tutorial : 1 , Practical: 0  
**Number of Credits** : 4  
**Course Assessment methods** : Continuous assessment through tutorials, attendance, home assignments, One Mid Term Examination and Final Theory Examination  
**Course Outcomes** : The students are expected to be able to demonstrate the following knowledge, skills and attitudes after completing this course

1. Use of various facets of communication skills, such as, Reading, Writing, Listening and speaking skills.
2. To identify, formulate and solve the real life problems with positive attitude.
3. To inculcate the habit of learning and developing the communication and soft skills by practice.

### Topics Covered

#### UNIT-I

9

## **Communication**

Principles of Communication – Communication as coding and decoding – signs and symbols – verbal and non-verbal symbols – Language AND communication; language VS communication, language as a tool of communication – media/channels for communication : Types of Communication- functional, situational, verbal and non-verbal, interpersonal, group, interactive, public, mass line, dyadic – with illustrations LSRW in Communication – Listening – active vs passive (Talk less, listen more); Speaking - Speech vs. enunciation (mind your tone); Reading – Focus on the structure not on the theme alone, Technical Communication, General Communication, Barriers of Communication, Levels of Communication

9

## **UNIT-II**

### **Language Acquisition through Grammar, Usage and Mechanics of Writing**

Vocabulary, Phrase, Clause, Parts of Speech: Types ,Examples with Use Gender, Singular, Plural, Article, Sequence of Tenses, Use of Modifiers, Sentence-Loose Sentence, Periodical Sentence, Topic Sentence, Paragraph-Different Orders and Methods of Paragraph Writing, Inductive Method, Deductive Method, Spatial Method, Question and Answer Method, Chronological Method, Expository Method, Common Errors, Antonyms, Synonyms, One- word Substitutes, Homophone, Homonym, Comprehension and Précis, Words Frequently Misspelt, Punctuation and Capitalization, Abbreviations and Numerals ,Proofreading, Using the Library

9

## **UNIT-III**

### **Technical Writing**

Report Writing: Meaning, Types, Structure, Methods and Models of Report Writing, Technical Proposal; Concept, Kinds, Layout, and Examples of Technical Proposal, Definitions, Characteristics, Structure, Letter Writing: Importance, Types, Layout, and examples of letters, Scientific and Technical Writing: Features, Methods, Examples, Project, Thesis and Dissertation Writing

9

## **UNIT-IV**

### **Spoken and Presentation Skills**

Impromptu speech – tackling hesitation, shyness and nervousness in speaking – Public speaking, academic and professional presentations – Group discussions – facilitators and impediments Planning, preparing and delivering a presentation, essentials of presentation - etiquette; clarity; lively delivery – Speech generation; speech rhythm; speech initiators body language – voice, posture and gesture; eye contact; dress codes; verbal crutches; stresses, pronunciation – contextualization – creating and understanding contexts, Speech Drill.

### **Books & References**

1. Complete Course in English - Dixon Robert J., Prentice Hall of India, New Delhi
2. A Practical English Grammar - Thomson and Martinet, ELBS
3. English Pronouncing Dictionary - Jones Daniel, Paperback
4. Spoken English - Bansal ,R.K. & Harrison J.B., Orient Longman, India
5. Handbook of Pronunciation of English Words - Sethi J. & Jindal D.V.A, Prentice Hall of India, New Delhi
6. Word Power Made Easy - Lewis, Norman, Pocket Books
7. Business Correspondence and Report Writing - Sharma R.C. & Mohan Krishna, Tata McGraw Hill
8. Business Communication - Chhabra T.N., Sun India Publication, New Delhi

## **BSH-124 HUMAN VALUES & PROFESSIONAL ETHICS**

|                                  |  |
|----------------------------------|--|
| <b>Course category</b>           | : Humanities & Social Science Electives (HSSE)   |
| <b>Pre-requisite Course</b>      | : NIL  |
| <b>Contact hours/week</b>        | : Lecture : 2, Tutorial : 1 , Practical: 0   |
| <b>Number of Credits</b>         | : 3  |
| <b>Course Assessment methods</b> | : Continuous assessment through tutorials, attendance, home assignments, One Mid Term Examination and Final Theory Examination   |
| <b>Course Outcomes</b>           | : The students are expected to be able to demonstrate the following knowledge, skills and attitudes after completing this course |

1. To create conducive environment for professionals to grow as good and responsible human beings imbibing values and ethics.
2. Understanding the significance of environment.
3. Developing humanitarian outlook.

### **Topics Covered**

#### **UNIT-I** 6

Origin, Meaning, and Definition of Value, Types of Values, Individual Value, Family Value, Societal Value, Human Value, Value in Education System, Understanding Happiness and Prosperity, Self Exploration and Natural Acceptance.

#### **UNIT-II** 6

Harmony in family, Harmony in Society, Values Leading to Harmony, Creating a world family, Harmony in Nature, Environment and Sustainable Developmental, Legal aspects of Environment, Holistic Perspectives of Values, Existence and Co-existence.

#### **UNIT-III** 6

Origin, Meaning and Definition of Ethics, Ethics: The science of the Morality of The Art of Correct Living ,Ethics in Human Acts, Ethics and Religion, Ethical Norms and Laws ,Ethics in Literature, Ethics in Science and Technology.

#### **UNIT-IV** 6

Ethical Approaches:- Theistic Approach, Atheistic Approach, General and Special Ethics, Professional Ethics: Ethics at work place, Ethics as Skill, Values and Ethics, Ethics with Value Education, Managerial and Business & Corporate Ethics, Corporate Social Responsibilities.

### **Books & References**

1. Bangaria ,G.P et.al A foundation course in Human Values and Professional Ethics, Excel books.
2. Govindrajan, M Professional Ethics and Human Values, Eastern Economy Edition
3. Naagrazan, R.S. Textbook on Professional Ethics and Human Values, New age International.
4. Misra, Anuranjan and Shukla, Dr. R.K. Human values and Professional Ethics, Amazon(Paper Back).
5. Fernando, A.C Business Ethics: An Indian Perspective, Pearson,India.

## **BSH-125 INDUSTRIAL PSYCHOLOGY**

|                                  |  |
|----------------------------------|--|
| <b>Course category</b>           | : Humanities & Social Science Electives (HSSE)   |
| <b>Pre-requisite Course</b>      | : NIL  |
| <b>Contact hours/week</b>        | : Lecture : 2, Tutorial : 1 , Practical: 0   |
| <b>Number of Credits</b>         | : 3  |
| <b>Course Assessment methods</b> | : Continuous assessment through tutorials, attendance, home assignments, One Mid Term Examination and Final Theory Examination   |
| <b>Course Outcomes</b>           | : The students are expected to be able to demonstrate the following knowledge, skills and attitudes after completing this course |

1. Use of various facets of psychology, its problems and understanding.
2. To identify, formulate and solve the real life problems with positive attitude.
3. To inculcate the habit of learning and developing the industrial problems from psychological eyes.

### **Topics Covered**

|   |   |
|---|---|
| <b>UNIT-I</b>   | 6 |
| <b>Introduction to Industrial Psychology and its basic concepts</b><br>Nature, Importance and scope of Industrial Psychology, Scientific management, Time and motion study and human relations school   |   |
| <b>UNIT-II</b>  | 6 |
| <b>Individual in workplace</b><br>Motivation and job satisfaction, Stress management, Organisational culture, Leadership and group-dynamic.   |   |
| <b>UNIT-III</b>   | 6 |
| <b>Work environment, Recruitment and selection</b><br>Engineering Psychology, Fatigue and boredom, Work environment, Accident and safety, Job-analysis, Recruitment and selection, Psychological tests. |   |
| <b>UNIT-IV</b>  | 6 |
| <b>Performance management and training</b><br>Performance appraisal, Importance and Methods of Performance appraisal, Training and development- Concepts and Benefits to the organization.              |   |

### **Books & References**

1. Miner, J. B. (1992). Industrial/Organizational Psychology. N Y: McGraw Hill
2. Blum & Naylor (1962). Industrial Psychology. Its Theoretical & Social Foundations CBS Publication
3. Aamodt, M. G. (2007). Industrial/Organization Psychology: A Applied Approach (5e) Wadsworth /Thompson: Belmont, C. A.
4. Aswathappa K. (2008). Human Resource Management (Fifth edition) New Delhi: Tata McGraw Hill
5. Archana Deshpande (2010). Industrial Psychology, Sun India Publications, New Delhi.

## **BSH-126 INDUSTRIAL SOCIOLOGY**

|                             |  |
|-----------------------------|--|
| <b>Course category</b>      | : Humanities & Social Science Electives (HSSE) |
| <b>Pre-requisite Course</b> | : -  |
| <b>Contact hours/week</b>   | : Lecture : 2, Tutorial : 1 , Practical: 0     |
| <b>Number of Credits</b>    | : 3  |

- Course Assessment methods** : Continuous assessment through tutorials, attendance, home assignments, One Mid Term Examination and Final Theory Examination
- Course Outcomes** : The students are expected to be able to demonstrate the following knowledge, skills and attitudes after completing this course

1. Use of various facets of sociology, its problems and understanding.
2. To identify, formulate and solve the real life problems with positive attitude.
3. To inculcate the habit of learning and developing the industrial problems from sociological perspectives.

### Topics Covered

|  |   |
|--|---|
| <b>UNIT-I</b>  | 6 |
| <b>Introduction to Industrial Sociology</b><br>Nature, Scope and importance of Industrial Sociology, Development of Industrial Sociology and other social sciences. Understanding social structure and social processes: Perspectives of Marx, Weber & Durkheim  |   |
| <b>UNIT-II</b>   | 6 |
| <b>Rise and development of industry</b><br>Early industrialisation- Types of productive systems- Evolution of Productive system and Development of Industry, Primitive Stage, Agrarian economy Stage, Handicrafts Stage, Guild System, Feudal or Manorial System, Putting out System, Industrial Revolution, Industrialisation- Causes and Consequences.   |   |
| <b>UNIT-III</b>  | 6 |
| <b>Contemporary issues in Industrial Sociology Industrial Policy Resolutions</b><br>Social change in contemporary India: Modernization and globalization, Secularism and communalism, Nature of development, Processes of social exclusion and inclusion, Changing nature of work and organization, Industrial Grievances, Industrial conflicts, Industrial disputes in India, Strike and Lock-out, Promote industrial Peace. Industrial Policy Resolutions. |   |
| <b>UNIT-IV</b>   | 6 |
| <b>Industrial relations machinery in India</b><br>Tripartite and Bipartite Machinery, Code of discipline and standing orders and Trade unionism, The National Commission on Labour, Industrial Relations and Technology, Sociological Approach to Industrial relations   |   |

### Books & References

1. Durand, Pravin. (2013). Dorling. Kindersley (India) P. Ltd. Pearson education in South Asia.
2. Archana Deshpande (2010). Industrial Sociology., Sun India Publications, New Delhi.
3. Ramaswamy, E.A. and Ramaswamy, U. (1981), Industry and Labour, OU Press
4. Dhanagare, D.N. , Themes and Perspectives in Indian Sociology, Rawat
5. Chandoke, Neera & Praveen Priyadarshi (2009), Contemporary India: Economy, Society and Politics, Pearson

# PROJECT (P)

## CSE-473 PROJECT PART- I

|                             |   |
|-----------------------------|---|
| <b>Course category</b>      | : Department Core (DC)                      |
| <b>Pre-requisite Course</b> | : NIL                                       |
| <b>Contact hours/week</b>   | : Lecture : 0, Tutorial : 0 , Practical: 10 |
| <b>Number of Credits</b>    | : 5   |

**Course Assessment methods** : Continuous assessment through three viva voce/presentation, preliminary project report, effort and regularity and end semester presentation

**Course Outcomes** : The students are expected to be able to demonstrate the following knowledge, skills and attitudes after completing this course

1. Learning of latest trends and technology in selected field of interest.
2. Apply the acquired knowledge to practical situations.
3. Develop self-interest to explore the selected technical field of interest in future.
4. Acquire presentation skills.
5. Develop better interpersonal communication skills and increase self confidence

## **CSE-482 PROJECT PART-II**

**Course category** : Department Core (DC)

**Pre-requisite Course** : Project Part-I (CSE-473)

**Contact hours/week** : Lecture : 0, Tutorial : 0 , Practical: 10

**Number of Credits** : 5

**Course Assessment methods** : Continuous assessment through three viva voce/presentation, final project report, contribution made to literary world and Final examination

**Course Outcomes** : The students are expected to be able to demonstrate the following knowledge, skills and attitudes after completing this course

1. B. Tech. project is designed to allow students to work with faculty members on one long project that may require effort over two semesters. The final year project gives students an excellent opportunity to develop and demonstrate their innovation skills, design skills and research interests. These projects quite often lead to publications of their original work.

Develops ability of report writing.

Develops ability to be aware of current trends in specific area of interest

## **PROGRAMME ELECTIVE 1 & 2**

### **CPE-471 ADVANCE JAVA**

**Course Category** : Program Elective (PE1&PE2)

**Pre-requisite Course** : NIL

**Contact Hours/Week** : Lecture : 3, Tutorial : 1 , Practical: 0

**Number of Credits** : 4

**Course Assessment Methods** : Continuous assessment through tutorials, attendance, home assignments, One Mid Term Examination and Final Theory Examination

**Course Outcomes** : The students are expected to be able to demonstrate the following knowledge, skills and attitudes after completing this course.

1. Be proficient in using JAVA Servlets and related Web development tools
2. Identify different components of client/server Architecture on Internet computing
3. Design, develop and implement interactive Web applications
4. Know how to develop and deploy applications and applets in JAVA

5. Know how to design and develop GUI using JAVA Swing and AWT

## Topics Covered

### UNIT-I

**Collections:** Collection Interfaces, Concrete Collections, Collections Framework. 9

**Multithreading :** Creating Thread and Running it, Multiple Thread Acting on Single Object, Synchronization, Thread Communication, Thread Group, Thread Priorities, Daemon Thread, Life Cycle of Thread.

### UNIT-II 9

**Networking:** Internet Addressing, Internet address, Factory Methods, Instance Methods, TCP/IP Client Sockets, URL, URL Connection, TCP/IP Server Sockets, Datagrams

**Enterprise JAVA Bean:** Preparing a Class to be a JAVA bean, Creating a JAVA bean, JAVA bean Properties, Types of Beans, Stateful Session Bean, Stateless Session Bean, Entity Bean

### UNIT-III

**JAVA Database Connectivity (JDBC):** 9

Merging Data from Multiple Tables: Joining, Manipulating Databases with JDBC, Prepared Statements, Transaction Processing, Stored Procedures C

**Servlets:** Servlet Overview and Architecture, Interface Servlet and Servlet Life Cycle, Handling HTTP Get Requests, Handling HTTP Post Requests, Redirecting Requests to Other Resources, Session Tracking, Cookies, Session Tracking with Http session.

### UNIT-IV 9

**JAVA Server Pages (JSP):** Introduction, JAVA server Pages Overview, A First JAVA server Page Example, Implicit Objects, Scripting, Standard Actions, Directives, Custom Tag Libraries

**Remote Method Invocation:** Defining Remote Interface, Implementing Remote Interface, Compiling and Executing Server and Client.

**Common Object Request Broker Architecture (CORBA):** Technical/Architectural Overview, CORBA Basics, CORBA Services

**Introduction Smart Phone Application Development:** Introduction to Android Platform, Creating Application Template, Adding Activity, Intent, Services to Application, Using Google Map API

## Textbooks

1. H. M. Deitel, P. J. Deitel, S. E. Santry , Advanced JAVA 2 Platform HOW TO PROGRAM, Prentice Hall

## Reference books

2. Antonio Goncalves, Beginning 70 JAVA™ EE 6 Platform with Glass Fish 3 From Novice to Professional.

## **CPE-472 .NET TECHNOLOGY**

|                             |   |
|-----------------------------|---|
| <b>Course Category</b>      | : Program Elective (PE1&PE2)                            |
| <b>Pre-requisite Course</b> | : NIL   |
| <b>Contact Hours/Week</b>   | : Lecture : 3, Tutorial : 1 , Practical: 0              |
| <b>Number of Credits</b>    | : 4   |
| <b>Course Assessment</b>    | : Continuous Assessment through Tutorials, Assignments, |

**Methods** : One Mid Term Examination and Final Theory Examination

**Course Outcomes** : The students are expected to be able to demonstrate the following knowledge, skills and attitudes after completing this course.

1. Understand the most important features of .NET Framework technology
2. Use Visual Studio .NET and .NET Framework SDK to design, run and debug simple C# console applications
3. Write programs that use fundamental C# programming tools.
4. Use advanced OOP tools when designing C# programs.
5. Design web forms using ASP.Net

### **Topics Covered**

#### **UNIT-I**

The .Net Framework: Introduction, Origin of .Net Technology, Common Language Runtime 9 (CLR), Common Type System (CTS), Common Language Specification (CLS), Microsoft Intermediate Language (MSIL), Just-in –Time Compilation, Framework Base Classes.

C -Sharp Language (C#): Introduction, Data Types, Identifiers, Variables, Constants, Literals, Array And Strings, Object And Classes.

#### **UNIT-II**

C -Sharp Language (C#) (Cont.): Inheritance and Polymorphism, Operator Overloading, 9 Interfaces, Delegates and Events. Type Conversion.

### C# Using Libraries: Namespace- System, Input-Output, Multi-Threading **UNIT-III**

Managing Console I/O Operations, Windows Forms, Error Handling. 9  
Advanced Features Using C#: Web Services, Window Services, Unsafe Mode, Graphical Device Interface With C#, Introduction About Generic.

### **UNIT-IV**

ASP .Net: Web Forms in ASP.NET, States, Validation, Login, ASP.NET Administrative Tasks, 9  
Learning about SQL Basics and Advanced Queries, ADO.NET, ASP.NET Data Controls, Ajax Extensions, LINQ, Working With XML Data, Web Services.

### **Textbooks**

1. Deitel et al. Visual C# 2012 How to program. Prentice-Hall Inc., 2014, Fifth Edition
2. Aitken, Peter G. .NET Graphics and Printing Optimax Publishing, 2003
3. Prosis, Jeff. Programming Microsoft .NET Microsoft Press, 2002

### **Reference books**

1. Wrox, Beginning Visual C# 2008, Wiley
2. Fergal Grimes, Microsoft .Net for Programmers. SPI
3. Balaguruswamy, Programming with C#, TMH
4. Mark Michaelis, Essential C# 3.0: For .NET Framework 3.5, 2/e, Pearson Education
5. Shibi Parikkar, C# with .Net Frame Work, Firewall Media
6. Wrox, Beginning ASP.NET 4.5 in C# and VB, 2012
7. Lippman, Stanley B. C# Primer - A Practical Approach Addison-Wesley, 2012

## **CPE-473 LAMP TECHNOLOGY**

|                             |   |
|-----------------------------|---|
| <b>Course Category</b>      | : Program Elective (PE1&PE2)  |
| <b>Pre-requisite Course</b> | : NIL   |
| <b>Contact Hours/Week</b>   | : Lecture : 3, Tutorial : 1 , Practical: 0  |
| <b>Number of Credits</b>    | : 4   |
| <b>Course Assessment</b>    | : Continuous assessment through tutorials, attendance, home assignments, One Mid Term Examination and Final Theory Examination    |
| <b>Methods</b>              |   |
| <b>Course Outcomes</b>      | : The students are expected to be able to demonstrate the following knowledge, skills and attitudes after completing this course. |
|                             | 1. Use Open Source Operating system and its distributions like Fedora, Google chrome OS, Ubuntu.                                  |
|                             | 2. To comprehend framework of BSD (Berkley System Distribution) and its installation  |
|                             | 3. Study of Web technologies based on open Software's LAMP (Linux Apache MySql and PHP/Python)                                    |
|                             | 4. To Learn HTML, XHTML, PHP and JAVA Script  |
| <b>Topics Covered</b>       |   |

### **UNIT-I**

Introduction to LAMP Terminologies, Two Tier and Three Tier Web based Application 9  
Architecture; Advantages of using LAMP based Technologies, Linux: Distributions – Fedora and Ubuntu; Installation – Disk Partitioning, Boot Loader, Etc; Using Linux – Shell, File System Familiarity; Linux 72Administration – Managing Users, Services

and Software; Network Connectivity and Configurations; Security.

## UNIT-II

**Apache:** Web Server Conceptual Working, Web Browser, HTTP, Installation and Configuration; *Httpd. Conf* File; Logging; Security; Running Website 9

## UNIT-III

**Mysql:** Database Management System, ER Diagram, Relational Database, Installation Configuration, Administration, Common SQL Queries – Create, Describe, Select, Insert, Delete, Update, Etc. 9

## UNIT-IV

**PHP:** Dynamic Content, Server Side Scripting, Installation, Configuration, Administration, Language Syntax, Built-in Functions, PHP and Mysql Connectivity, Installation, Configuration and Administration of All Four LAMP Components Namely Linux, Apache Web Server, Mysql and PHP, Testing with Any Project Example. 9

### Textbooks

1. Eric Rosebrock, Setting Up LAMP, Sybex Publishers.
2. James Lee, Brent Ware, Open Source Development with LAMP, Addison-Wesley Professional.
3. Jason Gerner, Elizabeth Naramore, Professional LAMP, John Wiley & Sons.

### Reference books

1. Ben Laurie, Peter Laurie, Apache – Definitive Guide, O'Reilly Publications.
2. Paul DuBois, MySQL, Addison-Wesley.
3. Rasmus Lerdorf, Kevin Tatroe, Programming PHP, O'Reilly Publications.

## CPE-474 NETWORK PROGRAMMING

### Course Category

**Pre-requisite Course** Program Elective (PE1&PE2) NIL

**Contact Hours/Week** : Lecture : 3, Tutorial : 1 , Practical: 0

**Number of Credits** : 4

**Course Assessment** : Continuous assessment through tutorials, attendance, home assignments, One Mid Term Examination and Final Theory Examination

**Course Outcomes** : The students are expected to be able to demonstrate the following knowledge, skills and attitudes after completing this course.

1. To write socket API based programs
2. To design and implement client-server applications using TCP and UDP sockets
3. To analyze network programs

### Topics Covered

## UNIT-I

Introduction, Overview of UNIX OS, Environment of a UNIX Process, Process Control, Process 9 Relationships, Signals, Inter-process Communication, Overview of TCP/IP Protocols.

## UNIT-II

**Elementary TCP Sockets-** Introduction to Socket Programming: Introduction to Sockets, 9 Socket Address Structures, Byte Ordering Functions, Address Conversion Functions, Elementary TCP Sockets, socket, connect, bind, listen, accept, read, write, close functions, Iterative Server, Concurrent Server.

## UNIT-III

TCP Echo Server, TCP Echo Client, Posix Signal Handling, Server with Multiple Clients, 9 Boundary Conditions: Server Process Crashes, Server Host Crashes, Server Crashes and Reboots,

Server Shutdown, I/O Multiplexing, I/O Models, Select Function, Shutdown Function, TCP Echo Server (with Multiplexing), Poll Function, TCP Echo Client (with Multiplexing).

## UNIT-IV

Socket Options, Getsocket and Setsocket Functions, Generic Socket Options, IP Socket options, 9 ICMP Socket Options ,TCP Socket Options, Elementary UDP Sockets, UDP Echo Server, UDP Echo Client, Multiplexing TCP and UDP Sockets, Domain Name System, Gethost by name Function, Ipv6 Support in DNS, Gethostbyadr Function, Getserv by name and Getserv by port Functions.

### Textbooks

1. W. Richard Stevens, S.A Rago, Programming in the Unix environment, 2nd edition, Pearson, 2005.

### Reference books

1. W. Richard Stevens, B. Fenner, A.M. Rudoff, Unix Network Programming – The Sockets Networking API, 3rd edition, Pearson, 2004.
2. W. Richard Stevens, TCP/IP Illustrated, Volume 1: The Protocols, Addison-Wesley, 1994

## CPE-475 MOBILE APPLICATION PROGRAMMING

|                             |   |
|-----------------------------|---|
| <b>Course Category</b>      | : Program Elective (PE1&PE2)  |
| <b>Pre-requisite Course</b> | : NIL   |
| <b>Contact Hours/Week</b>   | : Lecture : 3, Tutorial : 1 , Practical: 0  |
| <b>Number of Credits</b>    | : 4   |
| <b>Course Assessment</b>    | : Continuous assessment through tutorials, attendance, home assignments, One Mid Term Examination and Final Theory Examination    |
| <b>Methods</b>              |   |
| <b>Course Outcomes</b>      | : The students are expected to be able to demonstrate the following knowledge, skills and attitudes after completing this course. |

1. Know the components and structure of mobile application development frameworks for Android and windows OS based mobiles.
2. Understand how to work with various mobile application development frameworks.
3. Learn the basic and important design concepts and issues of development of mobile applications.
4. Understand the capabilities and limitations of mobile devices.

## Topics Covered

### UNIT-I 9

Android Development, Android Operation System, Important Android Components, Security and Permissions, Android SDK, Eclipse, Create an Android Emulator Device, Design, Develop and Deploy Application on a Real Device.

### UNIT-II 9

Introduction to Windows Phone 7, Type of applications that can be built- using Silverlight and XNA, Developer tools to be used for building apps

### UNIT-III 9

Introduction to App Makr, Creating a Developer Account on App Hub: using a Dream Spark Account, App Certification Guidelines for the Windows Phone Marketplace

### UNIT-IV 9

iOS overview, iOS Application Life Cycle, Design, Develop and Deploy Applications for iPhone, iPad and iPod Touch, Human Interface and use of Sensors for App Development.

#### Textbooks

1. Jeff Mcwherter, Scott Gowell, Professional Mobile Application Development, Wrox Publisher (2012), 1e

#### Reference books

1. Lauren Darcy, Shane Conder, Sams Teach Yourself Android Application Development in 24 Hrs, 1e
2. Himanshu Dwivedi, Chris Clark, David Thiel, Mobile Application Security, Tata McGraw Hill (2010), 1e

## CPE-476 DATABASE ADMINISTRATION WITH ORACLE

- Course Category** : Program Elective (PE1&PE2)  
**Pre-requisite Course** : NIL  
**Contact Hours/Week** : Lecture : 3, Tutorial : 1 , Practical: 0  
**Number of Credits** : 4  
**Course Assessment Methods** : Continuous Assessment through Tutorials, Assignments, Quizzes and Three Minor Tests and One Major Theory Examination  
**Course Outcomes** : The students are expected to be able to demonstrate the following knowledge, skills and attitudes after completing this course.
1. Gain a conceptual understanding of the Oracle database architecture and how its components work and interact with one another.
  2. will also learn how to create an operational database and properly manage the various structures in an effective and efficient manner including performance monitoring, database security, user management, and backup/recovery techniques

3. Establish and in depth understanding of Database Administration using the DBMS Interfaces
4. Create and understand the application of user rolls, privileges, and the security of the database.
5. Discuss and understand the concepts of Backup and Recovery Procedures

## **Topics Covered**

### **UNIT-I 9**

Introduction: DBMS Architecture and Data Independence, DBA Roles and Responsibilities, SQL \*PLUS Overview: SQL Plus Fundamentals, Producing More Readable Outputs, Accepting

Values At Uruntime, Using Isql \*Plus, Modifying Data: Introduction to DML Statements, Truncating A Table, Transaction Control Language, Managing Constraints: Creating Constraints, Dropping Constraints, Enabling and Disabling Constraints, Deferring Constraints Checks

### **UNIT-II 9**

Managing Views: Creating and Modifying Views, Using Views, Inserting, Updating and Deleting Data through Views, User Access and Security: Creating and Modifying Use Accounts, Creating and Using Roles, Granting and Revoking Privileges, Managing User Groups with Profiles, Oracle Overview and Architecture: An Overview of Logical and Physical Storage Structures, Oracle Memory Structures, Oracle Background Processes, Connecting to Oracle Instance, Processing SQL Command., Managing Oracle: Starting Up the Oracle Instance, Managing Sessions, Shutting Down the Oracle Instance, Instances Messages and Instance Alerts.

### **UNIT-III 9**

Control and Redo Log Files: Managing the Control Files, Maintaining and Monitoring Redo Log Files, Managing Tables, Indexes and Constraints: Storing Data (Create, Alter, Analyzing, Querying Table Information), Managing Indexes, Managing Constraints, Managing Users and Security: Profiles, Managing Users, Managing Privileges, Managing Roles, Querying Role Information, Introduction to Network Administration: Network Design Considerations, Network Responsibilities for the DBA, Network Configuration, Overview of Oracle Net Features, Oracle Net Stack Architecture

### **UNIT-IV 9**

Backup and Recovery Overview: Database Backup, Restoration and Recovery, Types of Failure in Oracle Environment, Defining A Backup and Recovery Strategy, Testing the Backup and Recovery Plan, Introduction to Performance Tuning: Brief Overview of Tuning Methodology, General Tuning Concepts

## **Textbooks**

2. Chip Dawes, Biju Thomas, Introduction to Oracle 9i SQL, BPB, 2002
3. Bob Bryla, Biju Thomas, Oracle 9i DBA Fundamental I, BPB, 2002
4. Doug Stums, Matthew Weshan, Oracle 9i DBA Fundamental I, BPB, 2002
5. Joseph C. Johnson, Oracle 9i Performance Tuning., BPB, 2002

**Reference books**

1. Loney and Koch, Oracle Database 10g: The Complete Reference, McGraw-Hill Osborne Media
2. Joseph C. Johnson, Oracle 9i Performance Tuning., BPB, 2002

**CPE-477 DATA WAREHOUSING & DATA MINING**

|                                  |   |
|----------------------------------|---|
| <b>Course Category</b>           | : Program Elective (PE1&PE2)  |
| <b>Pre-requisite Course</b>      | : NIL   |
| <b>Contact Hours/Week</b>        | : Lecture : 3, Tutorial : 1 , Practical: 0  |
| <b>Number of Credits</b>         | : 4   |
| <b>Course Assessment Methods</b> | : Continuous assessment through tutorials, attendance, home assignments, One Mid Term Examination and Final Theory Examination    |
| <b>Course Outcomes</b>           | : The students are expected to be able to demonstrate the following knowledge, skills and attitudes after completing this course. |

1. Approach business problems data-analytically by identifying opportunities to derive business value from data.
2. know the basics of data mining techniques and how they can be applied to extract relevant business intelligence

**Topics Covered**

**UNIT-I 9**

**Introduction to Data Mining:** Motivation for Data Mining, Data Mining-Definition & Functionalities, Classification of DM Systems, DM Task Primitives, Integration of a Data Mining System with A Database or A Data Warehouse, Major Issues in Data Mining. Data Warehousing .Overview of Concepts Like Star Schema, Fact and Dimension Tables, OLAP Operations, from OLAP to Data Mining. Data Pre Processing: Why? Descriptive Data Summarization, Data Cleaning: Missing Values, Noisy Data, Data Integration and Transformation. Data Reduction: Data Cube Aggregation, Dimensionality Reduction, Data Compression, Numerosity Reduction, Data Discretization and Concept Hierarchy Generation for Numerical and Categorical Data.

**UNIT-II 9**

**Mining Frequent Patterns, Associations and Correlations:** Market Basket Analysis, Frequent Item Sets, Closed Item Sets, and Association Rules, Frequent Pattern Mining, Efficient and Scalable Frequent Item Set Mining Methods, The Apriori Algorithm for Finding Frequent Item Sets Using Candidate Generation, Generating Association Rules from Frequent Item Sets, Improving the Efficiency of Apriori, Frequent Item sets without Candidate Generation using FP Tree, Mining Multilevel Association Rules, Mining

Multidimensional Association Rules, from Association Mining to Correlation Analysis, Constraint-Based Association Mining. Issues Regarding Classification and Prediction: Classification Methods: Decision Tree, Bayesian Classification, Rule Based Prediction: Linear and Non Linear Regression Accuracy and Error Measures, Evaluating the Accuracy of A Classifier or Predictor.

### UNIT-III

9

**Cluster Analysis:** Types of Data in Cluster Analysis, Categories of Clustering Methods, Partitioning Methods K-Means, K-Medoids Hierarchical Clustering-Agglomerative and Divisive Clustering, BIRCH and ROCK Methods, DBSCAN, Outlier Analysis Stream Data Classification, Clustering Association Mining in Stream Data. Mining Sequence Patterns in Transactional Databases

### UNIT-IV

9

**Spatial Data and Text Mining:** Spatial Data Cube Construction and Spatial OLAP, Mining Spatial Association and Co-location Patterns, Spatial Clustering Methods, Spatial Classification and Spatial Trend Analysis. Text Data Analysis and Information Retrieval, Dimensionality Reduction for Text, Text Mining Approaches Web Mining Introduction, Web Content Mining, Web Structure Mining, Web Usage Mining, Automatic Classification of Web Documents. Data Mining for Business Applications like Balanced Scorecard, Fraud Detection, Click Stream Mining, Market Segmentation, Retail Industry, Telecommunications Industry, Banking & Finance and CRM etc.

### Textbooks

1. Han, Kamber, "Data Mining Concepts and Techniques", Morgan Kaufmann 2nd Edition
2. P. N. Tan, M. Steinbach, Vipin Kumar, .Introduction to Data Mining., Pearson Education

### Reference books

1. MacLennan Jamie, Tang Zhao Hui and Crivat Bogdan, .Data Mining with Microsoft SQL Server 2008, Wiley India Edition.
2. G. Shmueli, N.R. Patel, P.C. Bruce, .Data Mining for Business Intelligence: Concepts, Techniques, and Applications in Microsoft Office Excel with XL Miner, Wiley India.
3. Michael Berry and Gordon Linoff .Data Mining Techniques., 2nd Edition Wiley Publications
4. Alex Berson and Smith, .Data Mining and Data Warehousing and OLAP, McGraw Hill Publication.
5. E. G. Mallach, .Decision Support and Data Warehouse Systems", Tata McGraw Hill.
6. Michael Berry and Gordon Linoff .Mastering Data Mining- Art & science of CRM., Wiley Student Edition
7. Arijay Chaudhary & P. S. Deshpande, Multidimensional Data Analysis and Data Mining Dreamtech Press
8. Vikram Pudi & Radha Krishna, .Data Mining, Oxford Higher Education.

## CPE-478 ANALYTICS AND SYSTEMS OF BIG DATA

|                             |  |
|-----------------------------|--|
| <b>Course Category</b>      | : Program Elective (PE1&PE2)               |
| <b>Pre-requisite Course</b> | : NIL                                      |
| <b>Contact Hours/Week</b>   | : Lecture : 3, Tutorial : 1 , Practical: 0 |
| <b>Number of Credits</b>    | : 4  |

**Course Assessment Methods** : Continuous assessment through tutorials, attendance, home assignments, One Mid Term Examination and Final Theory Examination

**Course Outcomes** : The students are expected to be able to demonstrate the following knowledge, skills and attitudes after completing this course.

- 1.
2. Demonstrate the knowledge of big data, data science, data analytics, distributed file systems, parallel Map Reduce paradigm, NoSQL, machine learning, etc
3. Program and implement examples of big data and NoSQL applications using open source Hadoop, HDFS, Map Reduce, Hive, Pig, Mahout, etc
4. Read current research papers and implement example research group project in big data

## Topics Covered

### UNIT-I 9

Big Data, Complexity of Big Data, Big Data Processing Architectures, Big Data Technologies, Big Data Business Value, Data Warehouse, Re-Engineering the Data Warehouse, Workload Management in the Data Warehouse, New Technology Approaches. integration of Big Data and Data Warehouse, Data Driven Architecture, Information Management and Lifecycle, Big Data Analytics, Visualization and Data Scientist, Implementing the "Big Data" Data. Choices in Setting Up R for Business Analytics, R Interfaces, Manipulating Data, Exploring Data, Building Regression Models, Clustering and Data Segmentation, Forecasting and Time Series Models

### UNIT-II 9

Writing Hadoop Map Reduce Programs, Integrating R and Hadoop, Using Hadoop Streaming with R, Learning Data Analytics with R and Hadoop, Understanding Big Data Analysis with Machine Learning. Big Data, Web Data, A Cross-Section of Big Data Sources and the Value They Hold, Taming Big Data, The Evolution of Analytic Scalability.

### UNIT-III 9

The Evolution of Analytic Processes, The Evolution of Analytic, Processes the Evolution of Analytic Tools and Methods. Legacy Data, Hypothesis Testing, Prediction, Software, Complexity, Business problems suited to Big Data Analytics.

### UNIT-IV 9

High Performance Appliances for Big Data Management using Graph Analytics, The New Information Management Paradigm, Big Data's Implication for Businesses, Big Data Implications for Information Management, Splunk's Basic Operations on Big Data.

## Textbooks

1. Anand Rajaraman, Jure Leskovec, and Jeffrey D. Ullman, Mining of Massive Data Sets, Cambridge University Press. 2011.
2. Michael Berthold, David J. Hand, Intelligent Data Analysis, Springer, 2007.

## Reference books

1. Viktor Mayer Schönberger, Kenneth Cukier, Big Data: A Revolution That Will Transform How We Live, Work, and Think, John Murray 2013

2. Pramod J. Sadalage, Martin Fowler, NoSQL Distilled: A Brief Guide to the Emerging World of Polyglot Persistence, Addison Wesley
3. Eric Sammer, Hadoop Operation, O'Reilly 2012
4. Donald Miner, Adam Shook, MapReduce Design Patterns: Building Effective Algorithms and Analytics for Hadoop and Other Systems, O'Reilly 2012
5. "Big Data Now", by O'Reilly Media Inc., O'Reilly 2012

## **PROGRAMME ELECTIVE 3 &4) VIIIth Semester**

### **CPE-481 ADVANCE PROGRAMMING TECHNIQUES**

|                                  |   |
|----------------------------------|---|
| <b>Course Category</b>           | : Program Elective (PE3 & PE4)  |
| <b>Pre-requisite Course</b>      | : NIL   |
| <b>Contact Hours/Week</b>        | : Lecture : 3, Tutorial : 1 , Practical: 0  |
| <b>Number of Credits</b>         | : 4   |
| <b>Course Assessment Methods</b> | : Continuous assessment through tutorials, attendance, home assignments, One Mid Term Examination and Final Theory Examination    |
| <b>Course Outcomes</b>           | : The students are expected to be able to demonstrate the following knowledge, skills and attitudes after completing this course. |

1. Develop algorithms from user problem statements.
2. Express the solutions to computer oriented problems using pseudo code.
3. Proficiently transform designs of problem solutions into a standard programming language.
4. Use an integrated programming environment to write, compile, and execute programs involving a small number of source files.
5. Apply debugging and testing techniques to locate and resolve errors, and to determine the effectiveness of a program.
6. Apply standard/structured programming techniques including design approaches, use of functions/methods, use of documentation, and avoidance of excessive branching.
7. Proficiently use fundamental programming elements including: variable declaration, use of data types and simple data structures (arrays and objects), decision structures, loop structures, input and output for console and text files, and functions/methods.

#### **Topics Covered**

#### **UNIT-I**

**9**

Introduction-History of Computers, Components of a Computer, Programming Languages, Compilation vs. Interpretation, Basic Program Structure and the Integrated Development Environment-Essential Program Structure, Documentation and Standard Programming Practices, Integrated Development Environment(IDE) Overview, Editing (with the IDE), Compilation (with the IDE), Execution (with the IDE), Debugging (with the IDE)

## **UNIT-II**

**9**

Algorithm Development using Psuedo-code-Software Engineering Method, Procedural Problem Solving Approaches, Assignments, Conditionals, Loops, Classic Formula Problems, Classic Aggregate Problems (E.G., Maximum, Minimum, Sum, Average), Basic Input And Output-Console Output including Basic Data Formatting, Console Input Variables and Expressions-Variable Declarations including Common Data Types (E.G. Int, Float, String), Arithmetic, Expressions Including Precedence and Associativity, Assignment Statements (Numeric and String Data), Library Functions, Standard Programming Practices for Variables and Assignments, Case Problems Using Variables and Expressions

## **UNIT-III**

**9**

Decision Structures-Boolean Expressions, Single Alternative Conditional Statements (E.G., If), Double Alternative Conditional Statements (E.G., If/Else), Multi-Way Statements (E.G., Case), Nested Conditional Structures, Standard/ Structures Programming Practices for Decision Structures, Case Problems using Decisions Structures Loop Structures-Loop Control Variables, Initialization, Test and Modifications, Pre-Test Loop (E.G., While Loop), Post-Test Loop (E.G., Do-While Loop), Counting Loop (E.G., For Loop), Nested Loop Structures, Standard/ Structures Programming Practice for Loop Structures, Case Problems using Loop Structures Input and Output using Files-Input Streams from Files, Priming Read Loop, Output Streams to Files, Case Problems using File Input and Output

## **UNIT-IV**

**9**

Simple Data Structures-One Dimensional Arrays, Strings as Arrays, Multi-Dimensional Arrays, Records (E.G., Objects/Entities), Case Problems using Arrays and Records Functions-Argument Passing, Returning Results, Recursion, Testing A Program System, Standard/Structures Programming Practices for Functions, Case Problems using Functions Introduction to the Object Oriented Approach-Class Declarations, Instance Variables, Methods, Object Instantiation, Standard/Structures Programming Practice for Classes, Case Problems using Objects

### **Textbooks**

1. Gaddis Tony, Starting Out with C++: From control structures through objects, 7th Edition, Addison-Wesley Publishing, 2012.

### **Reference books**

1. Deitel & Deitel, JAVA: How to Program, 9th Edition, Prentice Hall, 2012.
2. Deitel & Deitel, C++ How to Program: Late Objects Version, 7th Edition, Prentice Hall, 2011.
3. Gaddis, Tony, Starting Out with JAVA: Control Structures to Objects, 2nd Edition, Pearson, 2012.
4. Horstmann, Cay, JAVA Concepts, 6th Edition, Wiley, 2009.
5. Liang, Y. Daniel, Introduction to Programming with JAVA, 8th Edition, Pearson, 2010.
6. Liang, Y. Daniel, Introduction to Programming with C++, 2nd Edition, Pearson, 2010.
7. Lewis, John, and Loftus, William, JAVA Software Solutions: Foundations of Program Design, 7th Edition, Pearson, 2012.

8. Malik, D. S., JAVA Programming: From Problem Analysis to Program Design, 5th Edition, Course Technology, 2011.
9. Malik, D. S., C++ Programming: From Problem Analysis to Program Design, 5th Edition, Course Technology, 2010.
10. Savitch, Walter, Absolute JAVA, 4th Edition, Addison Wesley, 2009.
11. Stroustrup, Bjarne, Programming: Principles and Practice Using C++, Addison-Wesley Professional, 2008.

## **CPE-482 SOFTWARE REUSE**

|                                  |   |
|----------------------------------|---|
| <b>Course Category</b>           | : Program Elective (PE3 & PE4)  |
| <b>Pre-requisite Course</b>      | : NIL   |
| <b>Contact Hours/Week</b>        | : Lecture : 3, Tutorial : 1 , Practical: 0  |
| <b>Number of Credits</b>         | : 4   |
| <b>Course Assessment Methods</b> | : Continuous assessment through tutorials, attendance, home assignments, One Mid Term Examination and Final Theory Examination    |
| <b>Course Outcomes</b>           | : The students are expected to be able to demonstrate the following knowledge, skills and attitudes after completing this course. |

1. To provide a solid background knowledge about software Reuse.
2. To educate Metrics used in software reuse.
3. To provide Knowledge about various frameworks and COTS.

### **Topics Covered**

#### **UNIT-I**

**9**

**INTRODUCTION:** Software Reuse and Software Engineering –State of Art and the Practice Aspects of Software Reuse- Software Reuse Organizations – Support Services – Institutionalizing Reuse.

**DOMAIN ENGINEERING:** Building Reusable Assets – Domain Analysis: Basic Concepts – Domain Scoping – Domain vs Application Requirements – Domain Analysis Methods – Domain Analysis Tools- Programming Paradigms and Reusability.

#### **UNIT-II**

**9**

**OBJECT ORIENTED DOMAIN ENGINEERING:**A Pragmatic Introduction to Object Orientation: Introduction- the Tenets of Object Oriented Programming. Abstraction and Parameterization Techniques in Object Orientation: Abstraction Techniques in Object Oriented Modeling – Abstraction Techniques in Object Oriented Programming Languages, Meta-programming – Design Patterns.

### UNIT-III

9

**FRAMEWORKS AND APPLICATION ENGINEERING**-Application Frameworks: Framework – Fulfilling the Framework Contract–Building Frameworks-SWING Framework. Architectural Frameworks: Architecture–Architecture and Reuse–CORBA – Application Engineering – Component Storage and Retrieval – Reusable Asset Integration.

### UNIT-IV

9

**MANAGERIAL ASPECTS OF SOFTWARE REUSE** Software Reuse Metrics – Software Reuse Cost Estimation – Software Reuse Return on Investment – Component Based Software Engineering – Product-Line Engineering – COTS Based Development.

#### Textbooks

1. Hongji Yang and Xiaodong Liu, Software Reuse in the Emerging Cloud Computing Era, IGI Publishing Hershey, PA, USA, 2012.
2. Hafedh Mili, Ali Mili, Sherif Yacoub, Edward Addy, Reuse-Based Software Engineering: Techniques, Organizations, and Control”, John Wiley & Sons, 2002.

#### Reference books

1. Carma McClure, Software Reuse: A Standards-Based Guide, IEEE, 2001.
2. Wayne C. Lim, Managing Software Reuse, Prentice Hall, 2004.
3. Ivar Jacobson, Martin Gres, Patrick Johnson, Software Reuse, Pearson Education, 2004.

### CPE-483 SOFTWARE VERIFICATION & VALIDATION

**Course Category :** Program Elective (PE3 & PE4)

**Pre-requisite Course :** NIL

**Contact Hours/Week :** Lecture : 3, Tutorial : 1 , Practical: 0

**Number of Credits :** 4

**Course Assessment Methods :** Continuous assessment through tutorials, attendance, home assignments, One Mid Term Examination and Final Theory Examination

**Course Outcomes :** The students are expected to be able to demonstrate the following knowledge, skills and attitudes after completing this course.

1. Understand the concepts and theory related to software testing.
2. Understand different testing techniques used in designing test plans, developing test suites, and evaluating test suite coverage
3. Understand the relationship between black-box and white-box testing and know how to apply as appropriate.
4. Learn to use automated testing tools in order to measure code coverage.
5. Understand how software developers can integrate a testing framework into code development in order to incrementally develop and test code.

**UNIT-I** **9**

An Introduction to Software Verification and Validation/Basic Concepts, Methods for Evaluating Software for Correctness and Reliability including Code, Inspections, Program Proofs, System Test Categories, Code inspections and their role in software verification.

**UNIT-II** **9**

Review of Software Engineering Methods and Challenges, Role of Verification and Validation. Economics of Verification and Validation, Software Reviews and Inspections, Conducting Reviews and Inspection, Software Quality Metrics

**UNIT-III** **9**

Review of Software Configuration Management, Software Testing Overview, Functional & Structural Testing, Integration and System Testing

**UNIT-IV** **9**

Software validation metrics, Assessing and Improving the Validation Process, Improving the development Process

**Textbooks**

1. Stephen H Kan, Metric and Model in Software Quality Engineering, Pearson Education
2. William Perry, Effective methods for Software Testing, Wiley Publication
3. Dorotny Graham, Erik Van Veenendaal, Foundation of Software Testing By: CENGAGE learning,
4. Dr. K.V.K. Prasad, Software Testing Tools, Dreamtech Press
5. *Pankaj Jalote*, An Integrated Approach To *Software Engineering*, Springer Verlag, NY, 1991
6. Rajib Mall, Fundamentals of Software Testing, PHI Publication

**Reference books**

1. Steven R. Raktitin, Software Verification and Validation for Practitioners and Managers, ed. Artech House, 2<sup>nd</sup> Edition

**CPE-484 SOFTWARE DESIGN & CONSTRUCTION**

|                                  |   |
|----------------------------------|---|
| <b>Course Category</b>           | : Program Elective (PE3 & PE4)  |
| <b>Pre-requisite Course</b>      | : NIL   |
| <b>Contact Hours/Week</b>        | : Lecture : 3, Tutorial : 1 , Practical: 0  |
| <b>Number of Credits</b>         | : 4   |
| <b>Course Assessment Methods</b> | : Continuous assessment through tutorials, attendance, home assignments, One Mid Term Examination and Final Theory Examination    |
| <b>Course Outcomes</b>           | : The students are expected to be able to demonstrate the following knowledge, skills and attitudes after completing this course. |

1. Understand Architectural styles and <sup>84</sup> Quality Attributes.

2. Understand common tools and terminology related to software design and construction.
3. Understand the role of the Software Architect with a development project.
4. Use methods for constructing and evaluating architectures.
5. Understand Advance Concepts in design and construction.

### **Topics Covered**

#### **UNIT-I 9**

Software Architecture –Architecture Structures and Views – Importance of Software Architecture – Predicting System Quality-Influencing Organizational Structure – Improving Cost and Schedule estimates – Context of Software architecture.

#### **UNIT-II 9**

Understanding Quality Attributes – Availability – Interoperability – Modifiability - Performance and Security – Testability - Usability – Quality Attribute Modeling and Analysis.

#### **UNIT-III 9**

Architecture in Agile Projects – Architecture and Requirements – Designing an Documentatio– Implementation and Testing – Architecture Reconstruction and Conformance.

#### **UNIT-IV 9**

Economic Analysis of Architecture – Architecture Competence– Architecture and Software Product Lines – Case Studies, Architecture in Cloud - Cloud Definition – Service Model – Economic Justification – Base Mechanism – Architecture for Edge – Edge Document System – SDLC – Metropolis Model.

### **Textbooks**

1. Len Bass, Paul Clements, Rick Kazman, Software Architecture in Practice, 3 rd edition Pearson, 2013.
2. Mary Shaw, David Garlan, Software Architecture: Perspectives on an Emerging Discipline, Prentice Hall, 1996.

### **Reference books**

1. Taylor R. N, Medvidovic N, Dashofy E. M, Software Architecture: Foundations, Theory, and Practice, Wiley, 2009.
2. Booch G, Rumbaugh J, Jacobson I, The Unified Modeling Language User Guide, Addison-Wesley, 1999

## **CPE-485 SOFTWARE QUALITY MANAGEMENT**

|                             |  |
|-----------------------------|--|
| <b>Course Category</b>      | : Program Elective (PE3 & PE4)   |
| <b>Pre-requisite Course</b> | : NIL  |
| <b>Contact Hours/Week</b>   | : Lecture : 3, Tutorial : 1 , Practical: 0   |
| <b>Number of Credits</b>    | : 4  |
| <b>Course Assessment</b>    | : Continuous assessment through tutorials, attendance, home assignments, One Mid Term Examination and Final Theory Examination |
| <b>Methods</b>              |  |

**Course Outcomes** : The students are expected to be able to demonstrate the following knowledge, skills and attitudes after completing this course.

1. Define quality assurance plans
2. Apply quality assurance tools & techniques
3. To learn about standards and certifications
4. To describe procedures and work instructions in software organizations

## **Topics Covered**

### **UNIT-I** **9**

**INTRODUCTION:** Software Quality Challenge - Software Quality Factors - Components of the Software Quality Assurance System. Pre-Project Software Quality Components - Contract Review - Development and Quality Plans

### **UNIT-II** **9**

**SQA COMPONENTS IN THE PROJECT LIFE CYCLE :** Integrating Quality Activities in the Project Life Cycle – Reviews - Software Testing – Strategies - Software Testing – Implementation - Assuring the Quality of Software Maintenance - Assuring The Quality of External Participants' Parts - Case Tools and their effect on Software Quality.

### **UNIT-III** **9**

**SOFTWARE QUALITY INFRASTRUCTURE COMPONENTS:** Procedures and Work Instructions - Supporting Quality Devices - Staff Training, Instructing and Certification - Preventive and Corrective Actions - Configuration Management - Documentation and Quality Records Controls.

### **UNIT-IV** **9**

**SOFTWARE QUALITY MANAGEMENT COMPONENTS & STANDARDS:** Project Progress Control - Components of Project Progress Control- Progress control of internal projects and external participants- Implementation of Project Progress Control, ISO 9001 Certification - Software Process Assessment. Organizing for Quality Assurance -Management and its Role in Quality Assurance - Software Quality Assurance Unit - SQA Trustees and Committees

## **Textbooks**

1. Daniel Galin, Software Quality Assurance: From Theory to Implementation, Pearson Addison-Wesley, 2012.
2. Jeff Tian, Software Quality Engineering (SQE), Wiley-Interscience, 2005
3. Stephen H Kan, Metrics & Models in Software Quality Engineering, Pearson Education
4. Kshirasagar Naik & Priyadarshi Tripathi, Software Testing & Quality Assurance, Wiley India Edition
5. Stephen H. Kan, Metrics and models in software quality Engineering, Addison – Wesley, 1955.
6. Roger S. Pressman , Software Engineering-A Practitioner's Approach, McGraw Hill publication

## Reference books

1. Mordechai Ben – Menachem and Garry S. Marliss, “Software Quality”, Thomson Asia Pte Ltd, 2003.
2. Allen Gilles, “Software quality: Theory and management” - International Thomson - Computer press, 1997.

## CPE-486 FUNDAMENTALS OF CLOUD COMPUTING

|                                  |   |
|----------------------------------|---|
| <b>Course Category</b>           | : Program Elective (PE3 & PE4)  |
| <b>Pre-requisite Course</b>      | : NIL   |
| <b>Contact Hours/Week</b>        | : Lecture : 3, Tutorial : 1 , Practical: 0  |
| <b>Number of Credits</b>         | : 4   |
| <b>Course Assessment Methods</b> | : Continuous assessment through tutorials, attendance, home assignments, One Mid Term Examination and Final Theory Examination    |
| <b>Course Outcomes</b>           | : The students are expected to be able to demonstrate the following knowledge, skills and attitudes after completing this course. |

1. Understand the concept of Existing Hosting Platforms and computing paradigms currently being used in industry and academia
2. Identify the issues related to Cloud Computing. To analyse IASS/ PAAS and SAAS services along with Cloud models.
3. Understand the concepts of various Cloud Platforms with comparative analysis and the concepts of virtualization with the advantages in Cloud.

### Topics Covered

#### UNIT-I

9

**Introduction:** Basics of Emerging Cloud Computing Paradigm, Cloud Computing History and Evolution, Cloud Enabling Technologies, Practical Applications of Cloud Computing for Various Industries, Economics and Benefits of Cloud Computing

**Cloud Computing Architecture:** Cloud Architecture Model, Types of Clouds: Public Private & Hybrid Clouds, Resource Management and Scheduling, QOS (Quality Of Service) and Resource Allocation, Clustering

#### UNIT-II

9

**Classification of Cloud Implementations-** Amazon Web Services - IaaS, Elastic Compute Cloud (EC2), Simple Storage Service (S3), Simple Queuing Services (SQS), VMware vCloud - IaaS, vCloud Express, Google AppEngine - PaaS, JAVA Runtime Environment

#### UNIT-III

9

**Data Center :** Classic Data Center, Virtualized Data Center (Compute, Storage, Networking and Application) , Business Continuity in VDC

**Virtualization:** Virtualization, Advantages and disadvantages of Virtualization, Types of Virtualization: Resource Virtualization i.e. Server, Storage and Network virtualization, Migration of processes, VMware vCloud – IaaS

#### UNIT-IV

9

**Cloud Security and Privacy:**Infrastructure Security: Infrastructure Security: The Network Level, Infrastructure Security: The Host Level, Infrastructure Security: The Application Level, Data Security and Storage: Aspects of Data Security, Data Security Mitigation, Provider Data and Its Security. Privacy: Data Life Cycle, Key Privacy Concerns in the Cloud, Responsibility for Protecting Privacy, Changes to Privacy Risk Management and Compliance in Relation to Cloud Computing, Legal and Regulatory Implications

### **Textbooks**

1. Dr. Kumar Saurabh, Cloud Computing, Wiley
2. Arshdeep Bahga, Vijay Madiseti, Cloud Computing: A Hands-on Approach, Universities Press
3. Tim Mather, Subra Kumaraswamy, Shahed Latif, Cloud Security and Privacy, O'Reilly Media

### **Reference books**

1. Gerard Blokdiik, Ivanka Menken , The Complete Cornerstone Guide to Cloud Computing Best Practices, Second Edition, Emereo Pty Ltd, 2009
2. Anthony Velte, Toby Velte and Robert Elsenpeter, Cloud Computing: A practical Approach, Tata McGraw Hill
3. Raj Kumar Buyya, James Broberg, Andrezei M. Goscinski, Cloud Computing: Principles and Paradigms, , John Wiley and Sons2011
4. Michael Miller, Cloud Computing, Pearson Education India, 2008
5. Judith Hurwitz, Robin Illor, Marcia Kaufmann, Fern Halper, Cloud Computing for Dummies, Wiley, 2009

## **CPE-487 CRYPTOGRAPHY AND INFORMATION SECURITY**

|                             |   |
|-----------------------------|---|
| <b>Course Category</b>      | : Program Elective (PE3 & PE4)  |
| <b>Pre-requisite Course</b> | : NIL   |
| <b>Contact Hours/Week</b>   | : Lecture : 3, Tutorial : 1 , Practical: 0  |
| <b>Number of Credits</b>    | : 4   |
| <b>Course Assessment</b>    | : Continuous assessment through tutorials, attendance, home assignments, One Mid Term Examination and Final Theory Examination.   |
| <b>Methods</b>              |   |
| <b>Course Outcomes</b>      | : The students are expected to be able to demonstrate the following knowledge, skills and attitudes after completing this course. |

1. Encryption techniques and key generation techniques.
2. Authentication and security measures.
3. Intrusion and filtering analysis.

### **Topics Covered**

#### **UNIT-I**

**9**

Introduction to Cryptography, Attacks, Services and Mechanism, Conventional Encryption Model, Classical Encryption Techniques- Substitution Ciphers and Transposition Ciphers, Cryptanalysis, Steganography, Stream and Block Ciphers, Modern Block Ciphers: Block Ciphers Principals, Data Encryption Standard (DES), Strength of DES, Differential and Linear Crypt Analysis of DES, Block Cipher Modes of Operations, Triple DES, IDEA Encryption and Decryption, Strength of IDEA, Confidentiality using Conventional

Encryption, Traffic Confidentiality, Key Distribution, Random Number Generation.

**UNIT-II** **9**

Introduction to Graph, Ring and Field, Prime and Relative Prime Numbers, Modular Arithmetic, Fermat's and Euler's Theorem, Euclid's Algorithm, Chinese Remainder Theorem. Principals of Public Key Crypto Systems, RSA Algorithm, Security of RSA, Key Management, Diffie-Hellman Key Exchange Algorithm, Elganel Encryption.

**UNIT-III** **9**

Message Authentication and Hash Function: Authentication Requirements, Authentication Functions, Message Authentication Code, Hash Functions, Birthday Attacks, Security of Hash Functions and MACS, MD5 Message Digest Algorithm, Secure Hash Algorithm (SHA). Digital Signatures: Digital Signatures, Authentication Protocols, Digital Signature Standards (DSS), Authentication Applications: Kerberos, Electronic Mail Security-Pretty Good Privacy (PGP), S/MIME.

**UNIT-IV** **9**

IP Security: Architecture, Authentication Header, Encapsulating Security Payloads, Combining Security Associations, Key Management. Web Security: Secure Socket Layer and Transport Layer Security, Secure Electronic Transaction (SET), System Security: Intruders, Viruses and Related Threads, Firewall Design Principals, Trusted Systems.

**Textbooks**

1. William Stallings, Cryptography and Network Security: Principals and Practice, Pearson Publication.
2. Johannes A. Buchmann, Introduction to Cryptography, Springer-Verlag.
3. Bruce Schiener, Applied Cryptography, John Wiley and Sons, 1996
4. Behrouz A. Frouzan, Cryptography & Network Security, Tata McGraw Hill
5. Bruce Schiener, Applied Cryptography, John Wiley & Sons
6. Atul Kahate, "Cryptography and Network Security" Tata McGraw Hill

**Reference books**

1. Charlie Kaufman, Radia Perlman, Mike Speciner, Network Security, Private communication in public world, PHI Second Edition, 2002
2. Douglas R Simson, Cryptography – Theory and practice, CRC Press, First Edition, 1995

**CPE-488 INTRODUCTION TO REAL TIME SYSTEM**

|                             |  |
|-----------------------------|--|
| <b>Course Category</b>      | : Program Elective (PE3 & PE4)   |
| <b>Pre-requisite Course</b> | : NIL  |
| <b>Contact Hours/Week</b>   | : Lecture : 3, Tutorial : 1 , Practical: 0   |
| <b>Number of Credits</b>    | : 4  |
| <b>Course Assessment</b>    | : Continuous assessment through tutorials, attendance, home assignments, One Mid Term Examination and Final Theory |
| <b>Methods</b>              |  |

## Examination

**Course Outcomes** : The students are expected to be able to demonstrate the following knowledge, skills and attitudes after completing this course.

1. Real-time scheduling and schedulability analysis
2. Formal specification and verification of timing constraints and properties
3. Design methods for real-time systems
4. Development and implementation of new techniques to advance the state-of-the-art real-time systems research

## Topics Covered

### UNIT-I

9

Introduction- Issues in Real Time Computing, Structure of A Real Time System. Task Classes, Performance Measures for Real Time Systems, Estimating Program Run Times. Task Assignment and Scheduling - Classical Uniprocessor Scheduling Algorithms, Uniprocessor Scheduling of IRIS Tasks, Task Assignment, Mode Changes, and Fault Tolerant Scheduling.

### UNIT-II

9

Programming Language and Tools – Desired Language Characteristics, Data Typing, Control Structures, Facilitating Hierarchical Decomposition, Packages, Run-Time (Exception) Error Handling, Overloading and Generics, Multitasking, Low Level Programming, Task Scheduling, Timing Specifications, Programming Environments, Run-Time Support.

### UNIT-III

9

Real Time Databases - Basic Definition, Real Time vs General Purpose Databases, Main Memory Databases, Transaction Priorities, Transaction Aborts, Concurrency Control Issues, Disk Scheduling Algorithms, Two-Phase Approach to Improve Predictability, Maintaining Serialization Consistency, Databases for Hard Real Time Systems.

### UNIT-IV

9

Real-Time Communication - Communications Media, Network Topologies Protocols, Fault Tolerant Routing. Fault Tolerance Techniques - Fault Types, Fault Detection. Fault Error Containment Redundancy, Data Diversity, Reversal Checks, Integrated Failure Handling. Reliability Evaluation Techniques - Obtaining Parameter Values, Reliability Models for Hardware Redundancy, Software Error Models. Clock Synchronization - Clock, A Non-Fault-Tolerant Synchronization Algorithm, Impact of Faults, Fault Tolerant Synchronization in Hardware, Fault Tolerant Synchronization in Software

## Textbooks

1. Alan C. Shaw, Real – Time Systems and software; John Wiley & Sons Inc
2. Rajib Mall, Real Time Systems: Theory and Practice by -Pearson Education, 2007
3. Jane W S Liu, Real Time Systems, Pearson

## Reference books

1. Stuart Bennett, Real Time Computer Control-An Introduction”, Second edition Prentice Hall PTR, 1994.
2. Peter D. Lawrence, Real time Micro Computer System Design – An Introduction, McGraw Hill, 1988
3. S.T. Allworth and R.N. Zobel, Introduction to real time software design”, Macmillan, II Edition, 1987.
4. R.J.A Buhur, D.L. Bailey, An Introduction to Real-Time Systems”, Prentice-Hall International, 1999.
5. Philip. A. Laplante Real Time System Design and Analysis” PHI, III Edition, April2004.
6. C.M. Krishna, Kang G. Shin, Real-Time Systems”, McGraw-Hill International Editions, 1997.
7. Other materials required for the class will be made available during the course.

## **CPE-489 NEURAL NETWORK & FUZZY SYSTEM**

|                                  |   |
|----------------------------------|---|
| <b>Course Category</b>           | : Program Elective (PE3 & PE4)  |
| <b>Pre-requisite Subject</b>     | : NIL   |
| <b>Contact Hours/Week</b>        | : Lecture : 3, Tutorial : 1 , Practical: 0  |
| <b>Number of Credits</b>         | : 4   |
| <b>Course Assessment Methods</b> | : Continuous assessment through tutorials, attendance, home assignments, quizzes and Three Minor tests and One Major Theory Examination |
| <b>Course Outcomes</b>           | : The students are expected to be able to demonstrate the following knowledge, skills and attitudes after completing this course.       |

1. Basics of ANN and its learning algorithms.
2. Fuzzy principles and relations.
3. Genetic algorithms and its applications.
4. Hybrid systems and usage of MATLAB toolbox

### **Topics Covered**

#### **UNIT-I**

Neural Networks-1(Introduction &Architecture) Neuron, Nerve Structure and Synapse, Artificial Neuron and its Model, Activation Functions, Neural Network Architecture: Single Layer and Multilayer Feed Forward Networks, Recurrent Networks, Various Learning Techniques; Perception and Convergence Rule, Auto-Associative and Hetro-Associative Memory

#### **UNIT-II**

Neural Networks-II (Back Propagation Networks) Architecture: Perceptron Model, Solution, Single Layer Artificial Neural Network, Multilayer Perception Model; Back Propagation Learning Methods, Effect of Learning Rule Co-Efficient ;Back Propagation Algorithm, Factors Affecting Back-propagation Training, Applications.

#### **UNIT-III**

Fuzzy Logic-I (Introduction) Basic Concepts of Fuzzy Logic, Fuzzy Sets and Crisp Sets, Fuzzy Set Theory and Operations, Properties of Fuzzy Sets, Fuzzy and Crisp Relations, Fuzzy to Crisp Conversion, Membership Functions, Interference in Fuzzy Logic, Fuzzy If-Then Rules, Fuzzy Implications and Fuzzy Algorithms, Fuzzyfications & Defuzzificataions, Fuzzy Controller, Industrial Applications. 9

#### **UNIT-IV**

Genetic Algorithm(GA) Basic Concepts, Working Principle, Procedures of GA, Flow Chart of GA, Genetic Representations, (Encoding) Initialization and Selection, Genetic Operators, Mutation, Generational Cycle, Applications 9

#### **Textbooks**

1. S. Rajsekaran& G.A. Vijayalakshmi Pai, Neural Networks, Fuzzy Logic and Genetic Algorithm: Synthesis and Applications, Prentice Hall of India.
2. N. P. Padhy, Artificial Intelligence and Intelligent Systems, Oxford University Press.
3. Siman Haykin, Neural NetwOrks, Prentice Hall of India
4. Timothy J. Ross, Fuzzy Logic with Engineering Applications, Wiley India.
5. S.N. Sivanandam & S.N. Deepa, Principles of Soft Computing, John Wiley & Sons, 01-Jun-2007

#### **Reference books**

1. Hertz J. Krogh, R.G. Palmer, Introduction to the Theory of Neural Computation, Addison-Wesley, California, 1991
2. Freeman J.A. & D.M. Skapura, Neural Networks: Algorithms, Applications and Programming Techniques, Addison Wesley, Reading, Mass, (1992).

## **OPEN ELECTIVE (OE)**

### **COE-481 DATABASE MANAGEMENT SYSTEM, DATA MINING & WAREHOUSING**

**Course Category** : For Other Department

**Pre-requisite Course** : NIL

**Contact Hours/Week** : Lecture : 3, Tutorial : 1 , Practical: 0

**Number of Credits** : 4

**Course Assessment Methods** : Continuous assessment through tutorials, attendance, home assignments, midterm examination and Theory Examination

**Course Outcomes** : The students are expected to be able to demonstrate the following knowledge, skills and attitudes after completing this course

1. To educate students with fundamental concepts of Database Management System, Data Models, Different Data Base Languages.
2. To analyze Database design methodology.
3. To understand the basic principles, concepts and applications of data warehousing and data mining
4. To introduce the task of data mining as an important phase of knowledge recovery process
5. Ability to do Conceptual, Logical, and Physical design of Data Warehouses OLAP applications and OLAP deployment
6. Have a good knowledge of the fundamental concepts that provide the foundation of data mining

#### **Topics Covered**

#### **UNIT-I**

**Introduction:** An Overview of Database Management System, Database System vs File System, Database System Concept and Architecture, Data Model Schema and Instances, Data Independence and Database Language and Interfaces, Data Definitions Language, DML, Overall Database Structure. 9

**Data Modeling using Entity Relationship Model:** ER Model Concepts, Notation for ER Diagram, Mapping Constraints, Keys, Concepts of Super Key, Candidate Key, Primary Key, Generalization, Aggregation, Reduction of an ER Diagrams to Tables, Extended ER Model, Relationship of Higher Degree.

#### UNIT-II

**Relational Data Model and Language:** Relational Data Model Concepts, Integrity Constraints, Entity Integrity, Referential Integrity, Keys Constraints, Domain Constraints, Relational Algebra, Relational Calculus, Tuple and Domain Calculus. 9

**Introduction on SQL:** Characteristics of SQL, Advantage of SQL. SQL Data Type and Literals. Types of SQL Commands. SQL Operators and their Procedure. Tables, Views and Indexes. Queries and Sub Queries. Aggregate Functions. Insert, Update and Delete Operations, Joins, Unions, Intersection, Minus, Cursors, Triggers, Procedures in SQL/PL SQL

#### UNIT-III

**Transaction Processing Concept:** Transaction System, Testing of Serializability, Serializability of Schedules, Conflict & View Serializable Schedule, Recoverability, Recovery from Transaction Failures, Log Based Recovery, Checkpoints, Deadlock Handling. 9

**Distributed Database:** Distributed Data Storage, Concurrency Control, Directory System.

**Concurrency Control Techniques:** Concurrency Control, Locking Techniques for Concurrency Control, Time Stamping Protocols for Concurrency Control, Validation Based Protocol, Multiple Granularity, Multi Version Schemes, Recovery with Concurrent Transaction, Case Study of Oracle.

#### UNIT-IV

9

**Data Mining & Warehousing:** Introduction to Data Warehouse, Building A Data Warehouse, Data Warehouse Architecture, OLAP Technology, Introduction to Data Mining, Data Pre-Processing, Mining Association Rules, Classification and Prediction, Cluster Analysis, Advanced Techniques of Data Mining and its Applications.

#### Textbooks

1. Korth, Silbertz, Sudarshan, Database Concepts, McGraw Hill
2. Jiawei Han, Micheline Kamber, Data Mining Concepts & Techniques, Elsevier
3. Elmasri, Navathe, Fundamentals of Database Systems, Addison Wesley

#### Reference books

1. Date C J, An Introduction to Database Systems, Addison Wesley
2. J. D. Ulman, Principles of Database and Knowledge base System, Computer Science Press.
3. M. H. Dunham, Data Mining: Introductory and Advanced Topics. Pearson Education
4. Mallach, Data Warehousing System, McGraw –Hill

#### COE-482 OBJECT ORIENTED TECHNIQUES & JAVA PROGRAMMING

**Course Category** : Program Elective (EC) Electrical Engineering  
**Pre-requisite Course** : NIL  
**Contact Hours/Week** : Lecture : 3, Tutorial : 1 , Practical: 0  
**Number of Credits** : 4

**Course Assessment Methods** : Continuous assessment through tutorials, attendance, home assignments, One Mid Term Examination and Final Theory Examination

**Course Outcomes** : The students are expected to be able to demonstrate the following knowledge, skills and attitudes after completing this course

1. Knowledge of how to develop and deploy applications and applets in JAVA.
2. Knowledge of how to develop and deploy GUI using JAVA Swing and AWT.
3. Design, develop and implement interactive web applications.
4. Be able to implement, compile, test and run JAVA programs comprising more than one class and to address a particular software problem.
5. Develop programs using the JAVA Collection API as well as the JAVA standard class library.

### **Topics Covered**

#### **UNIT-I**

**Introduction:** Introduction to Programming Languages, The Evolution of JAVA, Object-Oriented Programming Concepts and JAVA, Differences between C++ and JAVA, Primary Characteristics of JAVA, The Architecture, Programming with JAVA, Operator, Data type, Variable, Arrays, Control Statements, Methods. 9

#### **UNIT-II**

**Core JAVA:** Classes, Inheritance, Package and Interface, Exception Handling, Multithread Programming, I/O, JAVA Applet, String Handling, Networking, Event Handling, Introduction to AWT, AWT Controls, Layout Managers. 9

#### **UNIT-III**

**JAVA Swing:** Creating a Swing Applet and Application, Programming using Panes, Pluggable Look and Feel, Labels, Text Fields, Buttons, Tabbed Panes. 9

#### **UNIT-IV**

**JDBC:** Connectivity Model, JDBC/ODBC Bridge, JAVA.SQL Package, Connectivity to Remote Database, **JAVA Beans:** Application Builder Tools, The Bean Developer Kit(BDK), JAR files, Introspection, Developing a Simple Bean, **Servlet:** Introduction to JAVA Servlet: Servlet Basics, Servlet API Basic, Life Cycle of a Servlet, Running Servlet. 9

#### **Textbooks**

1. Naughton, Schildt, The Complete Reference JAVA2, TMH Publication
2. Balaguruswamy E, Programming in JAVA, TMH Publication

#### **Reference books**

1. Margaret Levine Young, The Complete Reference Internet, TMH Publication
2. Dustin R. Callway, Inside Servlets, Addison Wesley.
3. Mark Wutica, JAVA Enterprise Edition, QUE. teven Holzner, JAVA2 Black book, Dreamtech

### **COE-483 INTRODUCTION TO WEB TECHNOLOGY**

**Course Category** : Program Elective (EC) Computer Science Engineering  
**Pre-requisite Course** : NIL  
**Contact Hours/Week** : Lecture : 3, Tutorial : 1 , Practical: 0  
**Number of Credits** : 4

**Course Assessment Methods** : Continuous assessment through tutorials, attendance, home assignments, One Mid Term Examination and Final Theory Examination

**Course Outcomes** : The students are expected to be able to demonstrate the following knowledge, skills and attitudes after completing this course

#### Topics Covered

#### UNIT-I

**Introduction:** 8 Introduction and Web Development Strategies, History of Web and Internet, Protocols governing Web, Writing Web Projects, Connecting to Internet, Introduction to Internet services and tools, Introduction to client-server computing. Core Java: Introduction, Operator, Data type, Variable, Arrays, Methods & Classes, Inheritance, Package and Interface, Exception Handling, Multithread programming, I/O, Java Applet, String handling, Event handling, Introduction to AWT, AWT controls, Layout managers.

#### UNIT-II

**Web Page Designing:** 8 HTML: list, table, images, frames, forms, CSS, Document type definition, XML: DTD, XML schemes, Object Models, presenting and using XML, Using XML Processors: DOM and SAX, Dynamic HTML.

#### UNIT-III

**Scripting:** 8 Java script: Introduction, documents, forms, statements, functions, objects; introduction to AJAX, VB Script, Introduction to Java Beans, Advantage, Properties, BDk, Introduction to EJB, Java Beans API.

#### UNIT- IV

**Server Site Programming:** 8 . Introduction to active server pages (ASP), Introduction to Java Server Page (JSP), JSP Application Design, JSP objects, Conditional Processing, Declaring variables and methods, Sharing data between JSP pages, Sharing Session and Application Data, Database Programming using JDBC, development of java beans in JSP, Introduction to Servlets, Lifecycle, JSDK, Servlet API, Servlet Packages, Introduction to COM/DCOM/CORBA.

#### UNIT-V

PHP (Hypertext Preprocessor): 8 Introduction, syntax, variables, strings, operators, if-else, loop, switch, array, function, form, mail, file upload, session, error, exception, filter, PHP-ODBC.

#### Text books:

1. Burdman, Jessica, "Collaborative Web Development" Addison Wesley
2. Xavier, C, " Web Technology and Design" , New Age International
3. Ivan Bayross," HTML, DHTML, Java Script, Perl & CGI", BPB Publication
4. Bhave, "Programming with Java", Pearson Education
5. Herbert Schieldt, "The Complete Reference:Java", TMH. Hans Bergsten, "Java Server Pages", SPD O'Reilly
6. Ullman, "PHP for the Web: Visual QuickStart Guide", Pearson Education
7. Margaret Levine Young, "The Complete Reference Internet", TMH
8. Naughton, Schildt, "The Complete Reference JAVA2", TMH
9. Balagurusamy E, "Programming in JAVA", TMH

# Audit Course (AC)

## **BSH-114 ENVIRONMENT & ECOLOGY**

|                                  |  |
|----------------------------------|--|
| <b>Course category</b>           | : Basic Sciences & Maths (BSM)   |
| <b>Pre-requisite Course</b>      | : NIL  |
| <b>Contact hours/week</b>        | : Lecture : 2, Tutorial : 1 , Practical: 0   |
| <b>Number of Credits</b>         | : 3  |
| <b>Course Assessment methods</b> | : Continuous assessment through tutorials, attendance, home assignments, One Mid Term Examination and Final Theory Examination   |
| <b>Course Outcomes</b>           | : The students are expected to be able to demonstrate the following knowledge, skills and attitudes after completing this course |

1. Students will acquire basic knowledge in Environment and Ecology, which allows students to gain qualitative and quantitative skills.
2. Students will be aware of environmental pollution and control methods along with quality standards of air, water etc along with waste management.
3. Students will be able to give systematic account of natural resources uses and their exploitation.
4. How to achieve sustainable development through strategies and its threats.

### **Topics Covered**

#### **UNIT-I**

6

The Multidisciplinary nature of environmental studies, Definition, scope and importance, Need for public awareness. Natural Resources, Renewable and non-renewable resources, Natural resources and associated problems

- (a) Forest resources: Use and over-exploitation, deforestation, Timber extraction, mining.
- (b) Water resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams-benefits and problems.
- (c) Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources,
- (d) Food resources: World food problem, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity.
- (e) Energy resources: Growing energy needs, renewable and non renewable energy sources, use of alternate energy sources.

#### **UNIT-II**

6

## **Ecosystems**

Concept of an ecosystem, Structure and function of an ecosystem, Producers, consumers and decomposers, Energy flow in the ecosystem, Ecological succession, Food chains, food webs and ecological pyramids

Introduction, types, characteristic features, structure and function of the following ecosystem: (a) Forest ecosystem (b) Grassland Ecosystem (c) Aquatic ecosystems (ponds, rivers, oceans)

## **Biodiversity**

Introduction- Definition : genetic, species and ecosystem diversity, Biogeographically classification of India, Value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values, Biodiversity at global, National and local levels, India as a mega-diversity nation, Hot-spots of biodiversity, Threats to biodiversity: habitat loss, Endangered and endemic species of India, Conservation of biodiversity:

## **UNIT-III**

6

Environmental Pollution Causes, effects and control measures of-

(a) Air Pollution. (b) Water Pollution. (c) Solid Pollution (d) Marine Pollution. (e) Noise Pollution. (f) Thermal Pollution.

Solid waste Management: Causes, effects and control measures of urban and industrial wastes.

Role of an individual in prevention of pollution

Global warming and green house effect, Acid Rain, Ozone Layer depletion

## **UNIT-IV**

6

Environmental Protection- Role of Government, Legal aspects, Initiatives by Non-governmental Organizations (NGO), Environment Protection Act, Air (Prevention and Control of Pollution) Act, Water (Prevention and control of Pollution) Act, Wildlife Protection Act, Forest Conservation Act, Issues involved in enforcement of environmental legislation, Public awareness.

Human Population and the Environment

Population growth, Population explosion- Family Welfare Programme, Environment and human health, Environmental Education, Women Education., Women and Child Welfare

## **Books & References**

1. Environmental Studies - J Krishnaswamy , R J Ranjit Daniels, Wiley India
2. Environmental Science - Bernard J. Nebel, Richard T. Right, 9780132854467, Prentice Hall
3. Environment and Ecology - R K Khandal, 978-81-265-4277-2, Wiley India
4. Environmental Science – 8<sup>th</sup> edition ISV, Botkin and Keller, 9788126534142, Wiley India
5. Environmental Studies - Soli. J Arceivala, Shyam, R Asolekar, McGrawHill India, 2012
6. Environmental Studies - D.L. Manjunath, 9788131709122 Pearson Education India, 2007

## **BSH-127 FUNDAMENTALS OF ELECTRONICS ENGINEERING**

**Course category** : Engineering Fundamentals (EF)

**Pre-requisite Course** : NIL

**Contact hours/week** : Lecture : 3, Tutorial : 1 , Practical: 2

**Number of Credits** : 5

**Course Assessment methods** : Continuous assessment through tutorials, attendance, home assignments, Midterm Examination , practical work, record, viva voce & Final Practical and theory Examination

**Course Outcomes** : The students are expected to be able to demonstrate the following knowledge, skills and attitudes after completing this course

1. Able to identify schematic symbols and understand the working principles of electronic devices, e.g., Diode, Zener Diode, LED, BJT, JFET and MOSFET etc.
2. Able to understand the working principles of electronic circuits e.g. Rectifiers, Clipper, Clamper, Filters, Amplifiers and Operational Amplifiers etc. also understand methods to analyse and characterize these circuits
3. Able to understand the functioning and purposes of Power Supplies, Test and Measuring equipments such as multimeters, CROs and function generators etc.
4. Able to rig up and test small electronics circuits.

### Topics Covered

#### UNIT-I

Semiconductor materials and properties: electron-hole concepts, Basic concepts of energy bands in materials, concept of forbidden gap, Intrinsic and extrinsic semiconductors, donors and acceptor impurities, Junction diode, p-n junction, depletion layer, v-i characteristics, diode resistance, capacitance, diode ratings (average current, repetitive peak current, non-repetitive current, peak- inverse voltage). Diode Applications in rectifier, filters, voltage multipliers, load regulators, clipper and clamper circuits, Breakdown mechanism (Zener and avalanche), breakdown characteristics, Zener resistance, Zener diode ratings, Zener diode application as shunt regulator

#### UNIT-II

Transistors(BJT and FET);Basic construction, transistor action, CB, CE and CC configurations, input/output characteristics, Biasing of transistors-fixed bias, emitter bias, potential divider bias, comparison of biasing circuits. Transistor Amplifier: Graphical analysis of CE amplifier, concept of voltage gain, current gain, h- parameter model (low frequency), computation of  $A_i$ ,  $A_v$ ,  $R_i$ ,  $R_o$  of single transistor CE and CC amplifier configurations. Field Effect Transistors(JFET and MOSFET): Basic construction, transistor action, concept of pinch off, maximum drain saturation current, input and transfer characteristics, characteristic equation CG, CS and CD configurations, fixed & self-biasing.

MOSFET: depletion and enhancement type MOSFET-construction, operation and characteristics.

Computation of  $A_v$ ,  $R_i$ ,  $R_o$  , of single FET amplifiers using all the three configurations

#### UNIT-III

**Switching theory and logic design:** Number systems, conversion of bases, Boolean algebra, logic gates, concept of universal gate, canonical forms, Minimization using K-map

#### Operational Amplifiers

Concept of ideal operational amplifiers, ideal op-amp parameters, inverting, non-inverting and

unity gain amplifiers, adders, difference amplifiers, integrators

## REE- 231 Management of Canal Irrigation System 3 (2+1)

### Theory

Purpose benefits and ill effects of irrigation; typical network of canal irrigation system and its different physical components; canal classification based on source of water, financial output, purpose, discharge and alignment; canal alignment: general considerations for alignment; performance indicators for canal irrigation system evaluation, Estimation of water requirements for canal command areas and determination of canal capacity; water duty and delta, relationship between duty, base period and delta, factors affecting duty and method of improving duty; silt theory: Kennedy's theory, design of channels by Kennedy's theory, Lacey's regime theory and basic regime equations, design of channels by Lacey's theory, maintenance of unlined irrigation canals, measurement of discharge in canals, rostering (canal running schedule) and warabandhi, necessity of canal lining: advantages and disadvantages, types of canal lining and desirable characteristics for the suitability of lining materials; design of lined canals; functions of distributary head and cross regulators; canal falls, their necessity and factors affecting canal fall; sources of surplus water in

canals and types of canal escapes; requirements of a good canal outlet and types of outlet.

### **Practical**

Estimation of water requirement of canal commands; determination of canal capacity; layout of canal alignments on topographic maps, drawing of canal sections in cutting, full banking and partial cutting and partial banking; determination of longitudinal section of canals; design of irrigation canals based on silt theories; design of lined canals; formulation of warabandhi; Study of canal outlets, regulators, escapes and canal falls.

### **Suggested Readings**

Arora, K.R. 2001. Irrigation, Water Power and Water Resources Engineering. Standard Publishers Distributors, Delhi.

Garg S. K. 2014. Irrigation Engineering and Hydraulic Structures, Khanna Publishers New Delhi.

Sahasrabudhe SR. 2011. Irrigation Engineering and Hydraulic structures. SK Kataria & Sons Reprint 2015.

Minor Irrigation and Command Area Development 3(2+1)

### **Theory**

Factors affecting performance of irrigation projects; types of minor irrigation systems in India; lift irrigation systems: feasibility, type of pumping stations and their site selection, design of lift irrigation systems; tank Irrigation: grouping of tanks, storage capacity, supply works and sluices; command area development (CAD) programme- components, need, scope, and development approaches, historical perspective, command area development authorities-functions and responsibilities; on farm development works, reclamation works, use of remote sensing techniques for CAD works; water productivity: concepts and measures for enhancing water productivity; Farmers' participation in command area development;

### **Practical**

Preparation of command area development layout plan; Irrigation water requirement of crops; Preparation of irrigation schedules; Planning and layout of water conveyance system; design of surplus weir of tanks; determination of storage capacity of tanks; design of intake pipe and pump house.

### **Suggested Readings**

Arora, K.R. 2001. Irrigation, Water Power and Water Resources Engineering. Standard Publishers Distributors, Delhi.

Garg S. K. 2014. Irrigation Engineering and Hydraulic Structures, Khanna Publishers New Delhi.

Michael A.M. 2012. Irrigation: Theory and Practice. Vikas Publishing Vikas Publ.House New Delhi.

Sahasrabudhe SR. 2011. Irrigation Engineering and Hydraulic structures. SK Kataria & Sons Reprint 2015.

## **SWE-231 Information Technology for Land and Water 3(2+1)**

### **Theory**

Concept of Information Technology (IT) and its application potential. Role of IT in natural resources management. Existing system of information generation and organizations involved in the field of land and water management. Application and production of multimedia. Internet application tools and web technology. Networking system of information. Problems and prospects of new information and communication technology. Development of database concept for effective natural resources management. Application of remote sensing, geographic information system (GIS) and GPS. Rational data base management system. Object oriented approaches. Information system, decision support systems and expert systems. Agricultural information management systems - use of mathematical models and programmes. Application of decision support systems, multi sensor data loggers and overview of software packages in natural resource management. Video-conferencing of scientific information.

### **Practical**

Multimedia production. Internet applications: E-mail, voice mail, web tools and technologies. Handling and maintenance of new information technologies and exploiting their potentials. Exercises on database management using database and spreadsheet programmes. Usage of remote sensing, GIS and GPS survey in information generation and processing. Exercises on running computer software packages dealing with water balance, crop production, land development, land and water allocation, watershed analysis etc. Exercises on<sup>99</sup>simple decision support and expert systems for

management of natural resources. Multimedia production using different softwares. Exercises on development of information system on selected theme(s). Video-conferencing of scientific information.

### **Suggested Readings**

- Climate-Smart Agriculture – Source Book. 2013. Food and Agriculture Organization, Rome. Daniel P. Loucks and Eelco van Beek. 2005. Water Resources Systems Planning and Management - An Introduction to Methods, Models and Applications. UNESCO, Paris.
- Dipak De and Basavaprabhu Jirli (Eds.). 2010. Communication Support for Sustainable Development. Ganga Kaveri Publishing House, Varanasi – 221001.
- FAO. 1998. Land and Water Resources Information Systems. FAO Land and Water Bulletin 7, Rome.
- Fuling Bian and Yichun Xie (Eds.). 2015. Geo-Informatics in Resource Management and Sustainable Ecosystem. Springer, New York.
- ICFAI Business School (IBS). 2012. Information Technology and Systems. IBS Centre for Management Research, Hyderabad.
- Robert Malliva and Thomas Missimer. 2012. Arid Lands Water Evaluation and Management. Environmental Science. Springer, New York.
- Sarvanan. R. 2011. Information and Communication Technology for Agriculture and Rural Development. New India Publishing Agency, New Delhi.
- Soam, S.K., P.D. Sreekanth and N.H. Rao (Eds.). 2013. Geospatial Technologies for Natural Resources Management. New India Publishing Agency, Delhi.

## **SWE-232 Wasteland Development 3(2+1)**

### **Theory**

Land degradation – concept, classification - arid, semiarid, humid and sub-humid regions, denuded range land and marginal lands. Wastelands - factors causing, classification and mapping of wastelands, planning of wastelands development - constraints, agro-climatic conditions, development options, contingency plans. Conservation structures - gully stabilization, ravine rehabilitation, sand dune stabilization, water harvesting and recycling methods. Afforestation - agro-horti-forestry-silvipasture methods, forage and fuel crops - socioeconomic constraints. Shifting cultivation, optimal land use options. Wasteland development – hills, semi-arid, coastal areas, water scarce areas, reclamation of waterlogged and salt-affected lands. Mine spoils- impact, land degradation and reclamation and rehabilitation, slope stabilization and mine environment management. Micro-irrigation in wastelands development. Sustainable wasteland development - drought situations, socio-economic perspectives. Government policies. Participatory approach. Preparation of proposal for wasteland development and benefit-cost analysis.

Mapping and classification of wastelands. Identification of factors causing wastelands. Estimation of vegetation density and classification. Planning and design of engineering measures for reclamation of wastelands. Design and estimation of different soil and water conservation structures under arid, semiarid and humid conditions. Planning and design of micro-irrigation in wasteland development. Cost estimation of the above measures / structures. Visit to wasteland development project sites.

### **Suggested Readings**

- Abrol, I.P., and V.V. Dhruvanarayana. 1998. Technologies for Wasteland Development. ICAR, New Delhi.
- Ambast, S.K., S.K. Gupta and Gurcharan Singh (Eds.) 2007. Agricultural Land Drainage - Reclamation of Waterlogged Saline Lands. Central Soil Salinity Research Institute, Karnal, Haryana.
- Hridai Ram Yadav. 2013. Management of Wastelands. Concept Publishing Company. New Delhi.
- Karthikeyan, C., K. Thangaraja, C. Cinthia Fernandez and K. Chandrakandon. 2009. Dryland Agriculture and Wasteland Management. Atlantic Publishers and Distributors Pvt. Ltd., New Delhi.
- Rattan Lal and B.A. Stewart (Ed.). 2015. Soil Management of Smallholder Agriculture. Volume 21 of Advances in Soil Science. CRC Press, Taylor and Francis Group, Florida, USA.
- Robert Malliva and Thomas Missimer. 2012. Arid Lands Water Evaluation and Management. Springer Heidelberg, New York.
- Swaminathan, M.S. 2010. Science and Integrated<sup>100</sup>Rural Development. Concept Publishing

Company  
(P) Ltd., Delhi.

The Energy and Resources Institute. 2003. Looking Back to Think Ahead-Green India 2047. Growth with Resource Enhancement of Environment and Nature. New Delhi.

Virmani, S.M. (Ed.). 2010. Degraded and Wastelands of India: Status and Spatial Distribution. ICAR, New Delhi.

## **BSH-243      MICROPROCESSORS & APPLICATIONS**

|                                  |   |
|----------------------------------|---|
| <b>Course category</b>           | : Department Core (DC)  |
| <b>Pre-requisite Course</b>      | : Digital Electronics & Circuits (EPE-12)   |
| <b>Contact hours/week</b>        | : Lecture : 3, Tutorial : 1 , Practical: 2  |
| <b>Number of Credits</b>         | : 5   |
| <b>Course Assessment Methods</b> | : Continuous assessment through tutorials, attendance, home assignments, Midterm Examination , practical work, record, viva voce and Final Theory & Practical Examination |
| <b>Course Outcomes</b>           | : The students are expected to be able to demonstrate the following knowledge, skills and attitudes after completing this course  |

1. Acquired knowledge about Microprocessors and its need.
2. Ability to identify basic architecture of different Microprocessors.
3. Foster ability to write the programming using 8085 microprocessor.
4. Foster ability to understand the internal architecture and interfacing of different peripheral devices with 8085 Microprocessor.
5. Foster ability to write the programming using 8086 microprocessor.
6. Foster ability to understand the internal architecture and interfacing of different peripheral devices with 8086 Microprocessor.

### **Topics Covered**

#### **UNIT-I** 9

Introduction to Microprocessors: Evolution of Microprocessors, History of computers, Timing and control, memory devices: semiconductor memory organization, Category of memory, 8-bit Microprocessor (8085): Architecture, Instruction set, Addressing modes, Assembly Language Programming.

#### **UNIT-II** 9

Basic interfacing concepts, Interfacing output displays, Interfacing input devices, Memory mapped I/O, Flow chart symbols, Data Transfer operations, Arithmetic operations, Logic Operations, Branch operation, Writing assembly language programs, Programming techniques: looping, counting and indexing.

16-bit Microprocessors (8086/8088): Architecture, Physical address segmentation, memory organization, Bus cycle, Addressing modes, difference between 8086 and 8088, Introduction to 80186 and 80286, Assembly Language Programming of 8086/8088.

#### **UNIT-III** 9

Data Transfer Schemes: Introduction, Types of transmission, 8257 (DMA), 8255 (PPI), Serial Data transfer (USART 8251), Keyboard-display controller (8279), Programmable Priority Controller (8259) Programmable Interval Timer/ Counter (8253/8254): Introduction, modes, Interfacing of 8253, applications. ADC and DAC

#### **UNIT-IV** 9

Advanced Microprocessors: Introduction to 32-bit and 64-bit microprocessors, Power PC, Microcontroller (8051): Introduction, Architecture, Instruction set.

## **EXPERIMENTS**

1. Write a program using 8085 Microprocessor for Decimal addition and subtraction of two Numbers.
2. Write a program using 8085 Microprocessor for Hexadecimal addition and subtraction of two Numbers.
3. Write a program using 8085 Microprocessor for addition and subtraction of two BCD numbers.
4. To perform multiplication and division of two 8 bit numbers using 8085.
5. To find the largest and smallest number in an array of data using 8085 instruction set.
6. To write a program to arrange an array of data in ascending order.
7. To convert given Hexadecimal number into its equivalent ASCII number and vice versa using 8085 instruction set.
8. To write a program to initiate 8251 and to check the transmission and reception of character.
9. To interface 8253 programmable interval timer to 8085 and verify the operation of 8253 in six different modes.
10. To interface DAC with 8085 to demonstrate the generation of square, saw tooth and triangular waveforms.
11. Serial communication between two 8085 microprocessors through RS-232 C port.

## **Books & References**

1. R. Singh and B. P. Singh: Microprocessor Interfacing and Application, New Age International Publishers, 2nd Edition.
2. D. V. Hall: Microprocessors Interfacing, TMH (2nd Edition).
3. R. S. Gaunkar: Microprocessor Architecture, Programming and Applications with 8085/8080, Penram Publication
4. Y.C. Liu and G.A. Gibson: Microcomputer Systems: The 8086/8088 Family Architecture Programming and Design, PHI 2nd Edition,

## **BSH-127 FUNDAMENTALS OF ELECTRONICS ENGINEERING**

**Course category** : Engineering Fundamentals (EF)  
**Pre-requisite Course** : NIL  
**Contact hours/week** : Lecture : 3, Tutorial : 1 , Practical: 2  
**Number of Credits** : 5  
**Course Assessment methods** : Continuous assessment through tutorials, attendance, home assignments, Midterm Examination , practical work, record, viva voce and Final Theory & Practical Examination

**Course Outcomes** : The students are expected to be able to demonstrate the following knowledge, skills and attitudes after completing this course

1. Able to identify schematic symbols and understand the working principles of electronic devices, e.g., Diode, Zener Diode, LED, BJT, JFET and MOSFET etc.
2. Able to understand the working principles of electronic circuits e.g. Rectifiers, Clipper, Clamper, Filters, Amplifiers and Operational Amplifiers etc. also understand methods to analyse and characterize these circuits
3. Able to understand the functioning and purposes of Power Supplies, Test and Measuring equipments such as multimeters, CROs and function generators etc.
4. Able to rig up and test small electronics circuits.

### **Topics Covered**

#### **UNIT-I**

Semiconductor materials and properties: electron-hole concepts, Basic concepts of energy bands in materials, concept of forbidden gap, Intrinsic and extrinsic semiconductors, donors and acceptors impurities, Junction diode, p-n junction, depletion layer, v-i characteristics, diode resistance, capacitance, diode ratings (average current, repetitive peak current, non-repetitive current, peak- inverse voltage). Diode Applications in rectifier, filters, voltage multipliers, load regulators, clipper and clamper circuits, Breakdown mechanism (Zener and avalanche), breakdown characteristics, Zener resistance, Zener diode ratings, Zener diode application as shunt regulator

#### **UNIT-II**

Transistors(BJT and FET);Basic construction, transistor action, CB, CE and CC configurations, input/output characteristics, Biasing of transistors-fixed bias, emitter bias, potential divider bias, comparison of biasing circuits. Transistor Amplifier: Graphical analysis of CE amplifier, concept of voltage gain, current gain, h-parameter model (low frequency), computation of  $A_i$ ,  $A_v$ ,  $R_i$ ,  $R_o$  of single transistor CE and CC amplifier configurations.

Field Effect Transistors(JFET and MOSFET): Basic construction, transistor action, concept of pinch off, maximum drain saturation current, input and transfer characteristics, characteristic equation CG, CS and CD configurations, fixed & self-biasing.

MOSFET: depletion and enhancement type MOSFET-construction, operation and characteristics.

Computation of  $A_v$ ,  $R_i$ ,  $R_o$  , of single FET amplifiers using all the three configurations

#### **UNIT-III**

Switching theory and logic design: Number systems, conversion of bases, Boolean algebra, logic gates, concept of universal gate, canonical forms, Minimization using K-map

Operational Amplifiers

Concept of ideal operational amplifiers, ideal op-amp parameters, inverting, non-inverting and unity gain amplifiers, adders, difference amplifiers, integrators

## UNIT-IV

Electronics Instruments: Working principle of digital voltmeter, digital multimeter (block diagram approach), CRO (its working with block diagram), measurement of voltage, current, phase and frequency using CRO

### EXPERIMENTS

**Note:** Minimum Eight experiments are to be performed

- 1 To Plot the forward/Reverse Characteristics of SiP-N junction diode.
- 2 To Plot the forward/Reverse Characteristics of Zener diode
- 3 Study and plot the characteristic of Zener diode as voltage regulator
- 4 Study of half wave rectifier and draw the nature of input / output signal. Calculate the value of  $I_{dc}$ ,  $I_{rms}$  and ripple factor.
- 5 Study of Full wave rectifier and draw the nature of input / output signal. Calculate the value of  $I_{dc}$ ,  $I_{rms}$  and ripple factor.
- 6 Study of Bridge Rectifier and draw the nature of input / output signal. Calculate the value of  $I_{dc}$ ,  $I_{rms}$  and ripple factor.
- 7 Draw input output characteristic curve of n-p-n transistor in CE configuration
- 8 Draw input output characteristic curve of n-p-n transistor in CB configuration
- 9 Draw the drain and transfer curve of JFET
- 10 Study of OP-AMP (741) and calculate the gain in (i) Inverting mode and (ii) Non inverting mode
- 11 Study of OP-AMP as a (i) Summer (ii) Integrator (iii) Differentiator; and plot the nature of input & output waveform
12. Study of CRO and multi-meter measurement voltage, frequency, phase difference using CRO along with the testing of electronics component

### Books & References

1. Electronic Devices and Circuits-Boylestad and Nashelsky, 6e, PHI, 2001
2. Electronic Devices and Circuits, A Mottershead, PHI, 2000, 6e
3. Digital Computer Design, Morris Mano, PHI, 2003
4. Electronic Instrumentation-H.S. Kalsi, 2e, TMH, 2007

## BSH-352 DIGITAL SIGNAL PROCESSING

|                                  |   |
|----------------------------------|---|
| <b>Course category</b>           | : Department Core (DC)  |
| <b>Pre-requisite Course</b>      | : Signals and Systems (EPE-13)  |
| <b>Contact hours/week</b>        | : Lecture : 3, Tutorial : 1 , Practical: 0  |
| <b>Number of Credits</b>         | : 4   |
| <b>Course Assessment methods</b> | : Continuous assessment through tutorials, attendance, home assignments, Midterm Examination , record, viva voce and Final Theory Examination |
| <b>Course Outcomes</b>           | : The students are expected to be able to demonstrate the following knowledge, skills and attitudes after completing this course              |

1. Able to analyze signals using the discrete Fourier transform (DFT).
2. Understand circular convolution, its relationship to linear convolution, and how circular convolution can be achieved via the discrete Fourier transform.
3. Able to understand the decimation in time and frequency FFT algorithms for efficient computation of the DFT.
4. Able to design digital filters on paper and implement the design by using MATLAB.
5. Able to design a digital FIR filter using Window method.
6. Able to implement digital filters in a variety of forms: -Direct form I & II, Parallel, Cascade and lattice structure.

## Topics Covered

9

### UNIT-I

**Realization of Digital Systems:** Introduction, direct form realization of IIR systems, cascade realization of an IIR systems, parallel form realization of an IIR systems, Ladder structures: continued fraction expansion of  $H(z)$ , example of continued fraction, realization of a ladder structure, example of a ladder realization.

### UNIT-II

9

**Design of Infinite Impulse Response Digital Filters:** Introduction to Filters, Impulse Invariant Transformation, Bi-Linear Transformation, All Pole Analog Filters: Butterworth and Chebyshev, Design of Digital Butterworth and Chebyshev Filters.

### UNIT-III

9

**Finite Impulse Response Filter Design:** Windowing and the Rectangular Window, Other Commonly Used Windows, Examples of Filter Designs Using Windows, The Kaiser Window.

### UNIT-IV

9

**Discrete Fourier Transforms:** Definitions, Properties of the DFT, Circular Convolution, Linear Convolution

**Fast Fourier Transform Algorithms: Introduction, Decimation –In Time (DIT) Algorithm, Computational Efficiency, Decimation in Frequency (DIF) Algorithm.**

### Books & References

1. John G Prokias, Dimitris G Manolakis, “Digital Signal Processing”, Pearson Education.
2. Oppenheim & Schafer, “Digital Signal Processing” PHI
3. Johnny R. Johnson, “Digital Signal Processing”, PHI Learning Pvt Ltd., 2009.

## CSE-366 SEMINAR

**Course category** : Audit Course (AC)

**Pre-requisite Course** : NIL

**Contact hours/week** : Lecture : 0, Tutorial : 0 , Practical: 6

**Number of Credits** : 3

**Course Assessment methods** : Continuous assessment through quality of material, presentation, quality & extent of external response of question asked and participation in other seminars (attendance)

**Course Outcomes** : The students are expected to be able to demonstrate the following knowledge, skills and attitudes after completing this course

1. To expose students to the 'real' working environment and get acquainted with the organization structure, business operations and administrative functions.
2. Students will demonstrate the ability to distinguish opinions and beliefs from researched claims and evidence and recognize that kinds of evidence will vary from Course to Course.
3. Students will demonstrate the ability to evaluate, credit, and synthesize sources.

## **CSE-474 INDUSTRIAL / PRACTICAL TRAINING**

|                                  |   |
|----------------------------------|---|
| <b>Course category</b>           | : Audit Course (AC)   |
| <b>Pre-requisite Course</b>      | : NIL   |
| <b>Contact hours/week</b>        | : Lecture : 0, Tutorial : 0 , Practical: 2  |
| <b>Number of Credits</b>         | : 1   |
| <b>Course Assessment methods</b> | : Continuous assessment through technical quality of the work, attendance, discipline, involvement and interest, project work, viva voce, project report and presentation |
| <b>Course Outcomes</b>           | : The students are expected to be able to demonstrate the following knowledge, skills and attitudes after completing this Course.   |

1. The main objective of the Industrial Training is to experience and understand real life situations in industrial organizations and their related environments and accelerating the learning process of how student's knowledge could be used in a realistic way.
2. In addition to that, industrial training also makes one understand the formal and informal relationships in an industrial organization so as to promote favourable human relations and teamwork. Besides, it provides the exposure to practice and apply the acquired knowledge “hands - on” in the working environment.
3. Industrial training also provides a systematic introduction to the ways of industry and developing talent and attitudes, so that one can understand how Human Resource Development works. Moreover, students can gain hands-on experience that is related to the student understanding so that the student can relate to and widen the skills that have been learnt while being in university. Industrial training also exposes the students to the real career world and accustoms them to an organizational structure, business operation and administrative functions.
4. Furthermore, students implement what they have learned and learn more throughout this training. Besides, students can also gain experience to select the optimal solution in handling a situation. During industrial training students can learn the accepted safety practices in the industry.
5. Students can also develop a sense of responsibility towards society

### **List of Suggested Open Electives**

#### **For Interdisciplinary Courses offered by Other Departments**

### **MECHANICAL ENGINEERING**

#### **MOE-481 FUNDAMENTALS OF MECHANICAL ENGINEERING**

|                                  |   |
|----------------------------------|---|
| <b>Course category</b>           | : Open Elective Courses   |
| <b>Pre-requisite Course</b>      | : NIL   |
| <b>Contact hours/week</b>        | : Lecture : 3, Tutorial : 1 , Practical: 0  |
| <b>Number of Credits</b>         | : 4   |
| <b>Course Assessment methods</b> | : Continuous assessment through tutorials, attendance, home assignments, midterm examination, record, viva voce and Final Examination |
| <b>Course Outcomes</b>           | : The students are expected to be able to demonstrate the following knowledge, skills and attitudes after completing this course      |

## Topic Covered

### UNIT-I

9

#### Thermodynamics

First and second law of thermodynamics, statements of Second Law of Thermodynamics and their equivalence, Third law of thermodynamics, Steam properties, Steam processes at constant pressure, volume, enthalpy and entropy, Classification of steam boilers, Efficiency and performance analysis, Refrigeration, Vapour compression and vapour absorption cycles, Coefficient of performance (COP), Refrigerant properties

#### Reciprocating Machines

Steam engines, hypothetical and actual indicator diagrams, Carnot cycle, Otto and Diesel cycles, Working of two and four strokes petrol and diesel IC engines.

### UNIT-II

9

#### Measurement & Metrology

Introduction to measurement and measuring instruments, Types of sensors, Types of transducers and their characteristics, Measurement error and uncertainty analysis, Temperature, pressure, velocity, flow, strain, force and torque measurement, Measurement by dial gauges, slip gauges and sine bar

#### Engineering Materials

Classification, Ferrous and non ferrous metals, Composition of cast iron and carbon steel, mechanical properties, alloy steel and mechanical properties, Non-ferrous metals such as Cu, Al, Zn, Cr, Ni etc. and its applications.

### UNIT-III

#### Simple Stress and Strain

Introduction, Normal and shear stresses, Poisson's ratio, Elastic constants and their relationships, Generalized Hooke's law, Deflection of bars of uniform and varying cross-sections, Strain energy in members due to static loading, Statically determinate problems, Stress-strain diagrams for ductile and brittle materials

#### Mechanical Properties and Testing

Toughness, Hardness, Fracture, Fatigue and Creep, Strength and deformation testing, Bend/rebend testing, Hardness testing, Impact testing, Fatigue testing and creep testing, spring stiffness testing

### UNIT-IV

#### Beams

Introduction, Types of supports, Beams classification, Free body diagram, Shear force and bending moment, Analysis of beams, Continuous loading and discontinuous loading, Shear force and bending moment diagrams for statically determinate beams

Pure Bending of beams

Introduction, Assumptions, Simple bending Final, Stress of beams of different cross sections

Torsion of Circular shafts

Introduction, Torsion of circular shafts, Shear stress due to torsion, Polar modulus, Power transmission

### Books & References

1. Basic and Applied Thermodynamics-P. K. Nag (Tata McGraw Hill)
2. Applied Thermodynamics-Onkar Singh (New Age International)
3. Elements of Materials science and Engineering-Van Vlash (Jhon Wiley & Sons)
4. Material Science-V. Raghvan (Prentice Hall India Limited)
5. Mechanical Measurement-G. Beckwith Thomas (Narosa Publishing House)
6. Mechanical Measurement – Sirohi (New Age Publications)
7. Strength of Materials-S. Ramamurtham (Dhanpat rai Publishing Co.)
8. Strength of Materials-R. K. Rajput (S. Chand)
9. Strength of Materials–R. K. Bansal (Lakshmi Publications)

## **MOE-482            MANUFACTURING PROCESSES**

|                                  |  |
|----------------------------------|--|
| <b>Course category</b>           | : Open Elective Courses  |
| <b>Pre-requisite Course</b>      | : NIL  |
| <b>Contact hours/week</b>        | : Lecture : 3, Tutorial : 1 , Practical: 0   |
| <b>Number of Credits</b>         | : 4  |
| <b>Course Assessment methods</b> | : Continuous assessment through tutorials, attendance, home assignments, midterm examination and Final Examination               |
| <b>Course Outcomes</b>           | : The students are expected to be able to demonstrate the following knowledge, skills and attitudes after completing this course |

1. The students will be able to understand the basic manufacturing processes and different types of mechanical properties of ferrous, non-ferrous metals and alloys.
2. The basic knowledge of different forming and casting processes and foundry tools used for the manufacturing of different products.
3. The knowledge of different machine tools and machining processes, welding processes and their applications.
4. The knowledge of sheet metal processes and their applications, powder metallurgy process, basic heat treatment processes, nonmetallic materials and features of manufacturing establishment

### **Topics Covered**

#### **UNIT-I**

**9**

##### **Introduction**

Introduction and importance of Manufacturing processes, classification and overview of Manufacturing processes.

##### **Mechanical Properties of Materials**

Strength, elasticity, plasticity, stiffness, malleability, ductility ,brittleness, malleability, toughness hardness, resilience, hardness, machine ability, formability, weldability, Elementary ideas of fracture fatigue & creep.

##### **Steels and Cast Irons**

Carbon steels, their classification based on percentage of carbon as low, mild, medium & high carbon steel, their properties & applications. Wrought iron, Cast iron. Alloy steels: stainless steel, tool steel.

##### **Alloys of Non Ferrous Metals**

Common uses of various non-ferrous metals (Copper, Zink, Tin, Magnesium, Lead, Aluminum etc.) & alloys and its composition such as Cu-alloys: Brass, Bronze, Al-alloys.

#### **UNIT-II**

**9**

##### **Forming Processes**

Hot-working & cold-working, Basic metal forming operations & uses of such as: Forging, Rolling, Wire & Tube drawing and Extrusion, and their uses.

Press-work: Die & Punch assembly, cutting and forming, its applications.

##### **Casting**

Pattern making, Materials, pattern making tools, pattern types and allowances. Type and composition of Molding sands and their desirable properties. Foundry tools, Mould making with the use of a core. Gating system. Casting defects & remedies. Cupola Furnace. Brief description of various types of casting processes.

#### **UNIT-III**

**9**

##### **Machining**

Lathe-machine: principle, types, main parts, specifications and operations performed on it., Basic description of machines and operations of Shaper-Planer, Drilling, Milling & Grinding.

##### **Welding**

Introduction, classification of welding processes. Gas-welding, types of flames and their applications. Electric-Arc welding. Resistance welding. Soldering & Brazing processes and their uses.

**UNIT-IV** 9

**Sheet Metal Work** 9

Tools and equipments used in sheet metal work, metals used for sheets, standard specification for sheets, Types of sheet metal operations: shearing, drawing, bending

**Powder Metallurgy**

Introduction of powder metallurgy process: powder production, blending, compaction, Sintering

**Heat Treatment Processes**

Introduction to Heat- treatment of carbon steels: annealing, normalizing, quenching, tempering and case-hardening, Introduction to Galvanizing and Electroplating.

**Non-Metallic Materials**

Common types & uses of Wood, Cement-concrete, Ceramics, Rubber, Plastics and Composite-materials

**Manufacturing Establishment**

Plant location. Plant layout—its types. Types of Production. Production versus Productivity.

**Books & References**

1. Workshop Technology Vol-I-B. S. Raghubanshi (Dhanpat Rai and Sons)
2. Workshop Technology Vol-II-B. S. Raghubanshi (Dhanpat Rai and Sons)
3. Production Technology - R.K. Jain (Khanna publication)
4. Manufacturing Processes- H. N .Gupta, R. C. Gupta, Arun Mittal ( New Age publisher)
5. Manufacturing Science -Ghosh and Mallik (EWP)
6. Manufacturing processes – Santosh Bhatnagar (B S publication)
7. Production Technology – P. C. Sharma (S. Chand)
8. Manufacturing Technology – Machine Tools- P. N. Rao (TMH)
9. Manufacturing Technology – Foundry, Forming and Welding- P. N. Rao (TMH).
10. Manufacturing Engineering & Technology- Kalpakjian (Pearson)

**MOE-483 ENGINEERING MATERIAL**

|                                  |  |
|----------------------------------|--|
| <b>Course Category</b>           | : Open Elective Courses  |
| <b>Pre-requisite Course</b>      | : NIL  |
| <b>Contact Hours/Week</b>        | : Lecture : 3, Tutorial : 1 , Practical: 0   |
| <b>Number of Credits</b>         | : 4  |
| <b>Course Assessment Methods</b> | : Continuous assessment through tutorials, attendance, home assignments and Final Examination                                    |
| <b>Course Outcomes</b>           | : The students are expected to be able to demonstrate the following knowledge, skills and attitudes after completing this course |

- 1.The importance of numerous materials with their basic concepts including crystallography and imperfections.
- 2.The understanding about the advanced materials testing by different mechanical testing methods such as strength testing, hardness, fatigue, NDT, etc.
- 3.Different surface behavior studies of engineering materials including heat treatment processes, TTT diagram and other related processes.
- 4.Different concepts regarding materials and electrical, magnetic, electronic, etc. properties.

| <b>Topics Covered</b>  |   |
|--|---|
| <b>UNIT-I</b>  | 9 |
| <b>Introduction</b><br>Importance of materials, Brief review of modern & atomic concepts in Physics and Chemistry. Atomic models   |   |
| <b>Crystalline nature of solids</b><br>Crystal system unit cell space lattice, Bravais lattices, common crystal structures, Atomic packing factor and density. Miller indices, Imperfections, Defects & Dislocations in solids   |   |
| <b>UNIT-II</b>   | 9 |
| <b>Ferrous &amp; Non-ferrous material</b><br>Various types of carbon steels, alloy steels and cast irons, its properties, uses and applications, Heat Treatment: Various types of heat treatment processes such as Annealing, Normalizing, Quenching Tempering, and various case hardening processes. Time Temperature Transformation (TTT) diagrams. Diffusion: Diffusion of Solids, Fick's I and II law.   |   |
| <b>Non-Ferrous metals and alloys</b><br>Non-ferrous metals such as Cu, Al, Zn, Cr, Ni etc. and its applications  |   |
| <b>UNIT-III</b>  | 9 |
| <b>Dielectric &amp; Magnetic properties</b><br>Dielectric Materials and their applications, Concept of magnetism- Dia, para, ferro magnetic materials, Hysteresis, Soft and hard magnetic materials, Magnetic Storages   |   |
| <b>Electronic Properties</b><br>Energy band, concept of conductor, insulator and semi conductor. Intrinsic and extrinsic semi conductors, P-n junction and transistors, Basic devices and their applications. Bragg's law, Messier effect. Type I & II superconductors. High Temp. superconductors. Brief description of other material such as optical and thermal materials, Composite Materials and its uses, Smart materials & Nano-materials and their potential applications |   |

### **COE-483 INTRODUCTION TO WEB TECHNOLOGY**

|                                  |  |
|----------------------------------|--|
| <b>Course Category</b>           | : Open Elective Courses  |
| <b>Pre-requisite Course</b>      | : NIL  |
| <b>Contact Hours/Week</b>        | : Lecture : 3, Tutorial : 1 , Practical: 0   |
| <b>Number of Credits</b>         | : 4  |
| <b>Course Assessment Methods</b> | : Continuous assessment through tutorials, attendance, home assignments, Final Examination                                       |
| <b>Course Outcomes</b>           | : The students are expected to be able to demonstrate the following knowledge, skills and attitudes after completing this course |

#### **Topics Covered**

##### **UNIT-I**

**Introduction:** 8 Introduction and Web Development Strategies, History of Web and Internet, 9  
Protocols governing Web, Writing Web Projects, Connecting to Internet, Introduction to Internet services and tools, Introduction to client-server computing. Core Java: Introduction, Operator, Data type, Variable, Arrays, Methods & Classes, Inheritance, Package and Interface, Exception Handling, Multithread programming, I/O, Java Applet, String handling, Event handling, Introduction to AWT, AWT controls, Layout managers.

##### **UNIT-II**

**Web Page Designing:** 8 HTML: list, table, images, frames, forms, CSS, Document type definition, 9  
XML: DTD, XML schemes, Object Models, presenting and using XML, Using XML Processors: DOM and SAX, Dynamic HTML.

### **UNIT-III**

**Scripting:** 8 Java script: Introduction, documents, forms, statements, functions, objects; introduction 9 to AJAX, VB Script, Introduction to Java Beans, Advantage, Properties, BDK, Introduction to EJB, Java Beans API.

### **UNIT-IV**

**Server Site Programming:** 8 . Introduction to active server pages (ASP), Introduction to Java Server Page (JSP), JSP Application Design, JSP objects, Conditional Processing, Declaring variables and methods, Sharing data between JSP pages, Sharing Session and Application Data, Database Programming using JDBC, development of java beans in JSP, Introduction to Servlets, Lifecycle, JSDK, Servlet API, Servlet Packages, Introduction to COM/DCOM/CORBA.

### **UNIT-V**

**PHP (Hypertext Preprocessor):** 8 Introduction, syntax, variables, strings, operators, if-else, loop, switch, array, function, form, mail, file upload, session, error, exception, filter, PHP-ODBC.

#### **Text books:**

1. Burdman, Jessica, "Collaborative Web Development" Addison Wesley
2. Xavier, C, " Web Technology and Design" , New Age International
3. Ivan Bayross," HTML, DHTML, Java Script, Perl & CGI", BPB Publication
4. Bhave, "Programming with Java", Pearson Education
5. Herbert Schildt, "The Complete Reference:Java", TMH. Hans Bergsten, "Java Server Pages", SPD O'Reilly
6. Ullman, "PHP for the Web: Visual QuickStart Guide", Pearson Education
7. Margaret Levine Young, "The Complete Reference Internet", TMH
8. Naughton, Schildt, "The Complete Reference JAVA2", TMH
9. Balagurusamy E, "Programming in JAVA", TMH

#### **References:**

1. Ramesh Bangia, "Internet and Web Design" , New Age International
2. Ivan Bayross," HTML, DHTML, Java Script, Perl & CGI", BPB Publication
3. Deitel, "Java for programmers", Pearson Education
4. Chris Bates, "Web Programing Building Internet Applications", 2nd Edition, WILEY, Dreamtech
5. Joel Sklar , "Principal of web Design" Vikash and Thomas Learning
6. Horstmann, "CoreJava", Addison Wesley

## **ECTRONICS AND COMMUNICATION ENGINEERING**

### **EOE-481 NON-CONVENTIONAL ENERGY RESOURCES**

|                                  |  |
|----------------------------------|--|
| <b>Course Category</b>           | : Open Elective Courses  |
| <b>Pre-requisite Course</b>      | : NIL  |
| <b>Contact Hours/Week</b>        | : Lecture : 3, Tutorial : 1 , Practical: 0   |
| <b>Number of Credits</b>         | : 4  |
| <b>Course Assessment Methods</b> | : Continuous assessment through tutorials, attendance, home assignments, Final Examination                                       |
| <b>Course Outcomes</b>           | : The students are expected to be able to demonstrate the following knowledge, skills and attitudes after completing this course |

### **UNIT-I**

#### **Introduction**

Various non-conventional energy resources- Introduction, availability, classification, relative merits and demerits.

### **Solar Cells:**

Final of solar cells. solar cell materials, solar cell array, solar cell power plant, limitations.

### **UNIT-II**

**Solar Thermal Energy:** Solar radiation, flat plate collectors and their materials, applications and performance, focusing of collectors and their materials, applications and performance; solar thermal power plants, thermal energy storage for solar heating and cooling, limitations.

### **UNIT-III**

**Geothermal Energy:** Resources of geothermal energy, thermodynamics of geo-thermal energy conversion-electrical conversion, non-electrical conversion, environmental considerations.

**Magneto-hydrodynamics (MHD):** Principle of working of MHD Power plant, performance and limitations.

**Fuel Cells:** Principle of working of various types of fuel cells and their working, performance and limitations.

### **UNIT-IV**

**Thermo-electrical and thermionic Conversions:** Principle of working, performance and limitations.

**Wind Energy:** Wind power and its sources, site selection, criterion, momentum Final, classification of rotors, concentrations and augments, wind characteristics. performance and limitations of energy conversion systems.

### **UNIT-V**

**Bio-mass:** Availability of bio-mass and its conversion Final.

**Ocean Thermal Energy Conversion (OTEC):** Availability, Final and working principle, performance and limitations.

**Wave and Tidal Wave:** Principle of working, performance and limitations. Waste Recycling Plants.

### **Text/References Books:**

1. Raja etal, "Introduction to Non-Conventional Energy Resources" Scitech Publications.
2. John Twideu and Tony Weir, "Renewal Energy Resources" BSP Publications, 2006.
3. M.V.R. Koteswara Rao, " Energy Resources: Conventional & Non-Conventional " BSP Publications,2006.
4. D.S. Chauhan,"Non-conventional Energy Resources" New Age International.
5. C.S. Solanki, "Renewal Energy Technologies: A Practical Guide for Beginners" PHI Learning.
1. Peter Auer, "Advances in Energy System and Technology". Vol. 1 & II Edited by Academic Press

### **EOE-482 INDUSTRIAL ELECTRONICS**

|                                  |  |
|----------------------------------|--|
| <b>Course Category</b>           | : Open Elective Courses  |
| <b>Pre-requisite Course</b>      | : NIL  |
| <b>Contact Hours/Week</b>        | : Lecture : 3, Tutorial : 1 , Practical: 0   |
| <b>Number of Credits</b>         | : 4  |
| <b>Course Assessment Methods</b> | : Continuous assessment through tutorials, attendance, home assignments, Final Examination                                       |
| <b>Course Outcomes</b>           | : The students are expected to be able to demonstrate the following knowledge, skills and attitudes after completing this course |

**Thyrestor Characteristics,** Two-Transistor Model of Thyristor, thyristor Turn-On di/dt Protection, dv/dt Protection, Thyristor Turn-On, Series Operation of Thyristors, Parallel Operation of Thyristors, Snubber Circuits' Reverse Recovery Transients.

## Thyristor Commutation Techniques

Natural Commutation, Forced Commutation, Self Commutation, Impulse Commutation, resonant pulse commutation, complementary commutation, External Pulse commutation, Load side commutation, line side commutation.

## Controlled rectifiers

Introduction, principle of phase controlled converter operation, single-phase semiconverters, single phase full converters, single phase dual converters, single—phase series converters, three phase half wave converters three phase semiconverters, three phase full converters, three phase dual converters.

## AC Voltage Controllers

Introduction, principle of on—of control, principle of phase control, single-phase bidirectional controllers A S with resistive loads, single phase controllers with Inductive loads. Three phase half wave controllers, three phase full wave controllers, three phase bi—directional delta connected controllers, single phase transformer tap changers, cycloconverters, single phase cycloconverters, three phase cyclocon c onverters, reduction of output harmonics.

## DC Choppers

Introduction, principle of step-down operation, Step—down choppers with RL Load principle of step-up operation, performance parameters, switch-mode regulators, thyristor, chopper circuits? Impulse- commutated choppers, Effects of source and load inductance, Impulse—commutated three thyristor choppers, Resonant pulse choppers.

## Inverters

Introduction, principle of operation, performance parameters, single phase bridge Inverters, three phase inverters, voltage control of three phase inverter, Harmonic Reductions.

## Suggested Text Books & References

- Rasid , "Power Electronics", Prentice Hall
- Sen, P.C., "Power Electronics", Wiley eastern.
- Dubey, G.K., "Thermistor Engineering", Prentice Hall

## EOE-483                      PRODUCT DEVELOPMENT

|                                  |   |  |
|----------------------------------|---|--|
| <b>Course Category</b>           | : | Open Elective Courses  |
| <b>Pre-requisite Course</b>      | : | NIL  |
| <b>Contact Hours/Week</b>        | : | Lecture : 3, Tutorial : 1 , Practical: 0   |
| <b>Number of Credits</b>         | : | 4  |
| <b>Course Assessment Methods</b> | : | Continuous assessment through tutorials, attendance, home assignments, Final Examination                                       |
| <b>Course Outcomes</b>           | : | The students are expected to be able to demonstrate the following knowledge, skills and attitudes after completing this course |

### UNIT-1

Concept of Product, definition and scope. Design definitions, old and new design methods, design by evolution, examples such as evolution of sewing M/C, bicycle, safety razor etc., need based developments, technology based developments physical reliability & economic feasibility of design concepts.

### UNIT –II

Morphology of design, divergent, transformation and convergent phases of product design, identification of need, Analysis of need. Design criteria; functional, aesthetics, ergonomics, form, shape, size, colour. Mental blocks, Removal blocs, Ideation techniques, Creativity, Check list.

### UNIT –III

Transformations, Brainstorming & Synetics, Morphological techniques. Utility Concept, Utility Value, Utility Index, Decision making under Multiple Criteria. Economic aspects, Fixed and variable costs, Break-even analysis.

### UNIT- IV

Reliability considerations, Bath tub curve, Reliability of systems in series and parallel, Failure rate, MTTF and MTBF, Optimum spares from Reliability considerations. Design of display and controls, Man-machine interface, Compatibility of displays and controls. Ergonomic aspects, Anthropometric data and its importance in design. Application of Computers in Product development & design.

### UNIT- V

Existing techniques, such as work-study, SQC etc. for improving method & quality of product. Innovation versus Invention. Technological Forecasting. Use of Standards for Design.

#### Text/Reference Books:

1. A.K. Chitab & R.C. Gupta “Product design & Manufacturing” – Prentice Hall (EE)
2. R.P. Crawford, “The Technology of creation Thinking” Prentice Hall.
3. C.D. Cain, “Product Design & Decision” Business Books.
4. C.D. Cain, “Engg. Product Design” Business Books.

#### **BOE-481                      ENTREPRENEURSHIP DEVELOPMENT**

|                                  |  |
|----------------------------------|--|
| <b>Course Category</b>           | : Open Elective Courses  |
| <b>Pre-requisite Course</b>      | : NIL  |
| <b>Contact Hours/Week</b>        | : Lecture : 3, Tutorial : 1 , Practical: 0   |
| <b>Number of Credits</b>         | : 4  |
| <b>Course Assessment Methods</b> | : Continuous assessment through tutorials, attendance, home assignments, Final Examination                                       |
| <b>Course Outcomes</b>           | : The students are expected to be able to demonstrate the following knowledge, skills and attitudes after completing this course |

### UNIT -I

**Entrepreneurship-** definition. growth of small scale industries in developing countries and their positions vis-a-vis large industries; role of small scale industries in the national economy; characteristics and types of small scale industries; demand based and resources based ancillaries and sub-control types. Government policy for small scale industry; stages in starting a small scale industry.

### UNIT -II

**Project identification-** assessment of viability, formulation, evaluation, financing, field-study and collection of information, preparation of project report, demand analysis, material balance and output methods, benefit cost analysis, discounted cash flow, internal rate of return and net present value methods.

### UNIT -III

**Accountancy-** Preparation of balance sheets and assessment of economic viability, decision making, expected costs, planning and production control, quality control, marketing, industrial relations, sales and purchases, advertisement, wages and incentive, inventory control, preparation of financial reports, accounts and stores studies.

## UNIT -IV

### Project Planning and control:

The financial functions, cost of capital approach in project planning and control. Economic evaluation, risk analysis, capital expenditures, policies and practices in public enterprises. Profit planning and programming, planning cash flow, capital expenditure and operations. control of financial flows, control and communication.

## UNIT -V

Laws concerning entrepreneur viz, partnership laws, business ownership, sales and income taxes and workman compensation act. Role of various national and state agencies which render assistance to small scale industries.

### Text / Reference Books:

1. Forbat, John, "Entrepreneurship" New Age International.
2. Havinal, Veerbhadrappa, "Management and Entrepreneurship" New Age International
3. Joseph, L. Massod, "Essential of Management", Prentice Hall of India.

### **BOE-482 ENTERPRISE RESOURCE PLANNING**

|                                  |  |
|----------------------------------|--|
| <b>Course Category</b>           | : Open Elective Courses  |
| <b>Pre-requisite Course</b>      | : NIL  |
| <b>Contact Hours/Week</b>        | : Lecture : 3, Tutorial : 1 , Practical: 0   |
| <b>Number of Credits</b>         | : 4  |
| <b>Course Assessment Methods</b> | : Continuous assessment through tutorials, attendance, home assignments, Final Examination                                       |
| <b>Course Outcomes</b>           | : The students are expected to be able to demonstrate the following knowledge, skills and attitudes after completing this course |

### **Unit I**

#### **Manufacturing Industry-Management Characteristics and Information Requirements**

Industry classification, Product/Market/process Characteristics, Manufacturing planning and control techniques, ERP Concept & Evaluation History: MRP-1, MRP-II, EPR. Information Technology Advancement: Client server technology, RDBMS.

### **Unit II**

#### **Sales, Purchase & Inventory Control, Concepts**

Classification/coding of material & finished goods, sales enquire, quotation, order, invoicing, delivery, finished good valuation, purchase requisition, enquiry, supplier quotation, purchase order, Material receipts, Material issues, methods of issue valuation (FIFO/LIFO/Weighted Average Cost/Std. Cost ), Returns from operations, Returns of supplier, Stock Adjustments, Physical Stock verification, ABC analysis. Lot and Locations control, Replenishment order control (safety stocks, report point, economic order quantity)

#### **Manufacturing**

Product configuration, Bill of material, Master Production Scheduling, Material Requirement planning, capacity Requirement Planning, Loading and Scheduling. An over view of man power planning and customer manufacturing planning.

### **Unit III**

#### **Financial and Cost Accounting**

Basic accounting principles, Day book-Cash, Bank, Journal, Purchase and Sales. Ledger-General, Supplier, Customer, Advances, etc. Bank Reconciliation, Trial Balance, Profit & Loss/Income & Expenditure account and Balance **Unit IV**

## **Introduction to A Typical ERP Software**

Overview of ERP modules and tools of a software like BaaN.

### **Unit V**

#### **Distribution Module**

Module architecture-an overview, item data, Purchase ordering/control, Sales ordering/control, Replenishment order control, Electronic Data Interchange.

#### **Manufacturing Module**

Module

architecture-an overview, Capacity Requirement, Planning, Engineering change control, Engineering data Management, Master Production Scheduling Material requirement Planning, Product Classification/configuration , Production Planning/control, Repetitive Manufacturing.

#### **Finance Module**

Module architecture-an overview, Accounts payable, Accounts receivable, General ledger, Cost allocation, Cash management, Activity based costing, fixed assets, Financial budgeting system.

#### **Suggested Text Books and References**

1. Joseph Orlicky, “ Materials Requirement Planning, The New Way in Production and Inventory Management”. McGraw Hill book company, New Delhi, 1975.
2. BaaN Student Manuals, BaaN Education Centre, Hyderabad, 1996.

### **BOE-483**

### **E-COMMERCE & IT**

|                                  |   |  |
|----------------------------------|---|--|
| <b>Course Category</b>           | : | Open Elective Courses  |
| <b>Pre-requisite Course</b>      | : | NIL  |
| <b>Contact Hours/Week</b>        | : | Lecture : 3, Tutorial : 1 , Practical: 0   |
| <b>Number of Credits</b>         | : | 4  |
| <b>Course Assessment Methods</b> | : | Continuous assessment through tutorials, attendance, home assignments, Final Examination                                       |
| <b>Course Outcomes</b>           | : | The students are expected to be able to demonstrate the following knowledge, skills and attitudes after completing this course |

#### **Topic Covered**

### **UNIT 1**

#### **Introduction**

What is E-Commerce, Forces Behind E-Commerce Industry Framework, Brief history of E-Commerce, Inter Organization Commerce Intra Organization Commerce, and Consumer to Business Electron e-Commerce, Architectural Framework.

### **UNIT- II**

#### **Mobile Commerce**

Introduction to Mobile Commerce, Mobile Computing Application, Wireless Application Protocols, WAP Technology, Mobile Information Devices.

### **UNIT-III**

#### **Encryption**

World Wide Web & Security, Encryption, Transaction security, Secret Key Encryption,

Public Key Encryption, Virtual Private Network (VPM), Implementation Management Issues.

## UNIT-IV

### Electronic Payments

Overview of Electronics payments, Digital Token Based Electronics payment System, Smart Cards, Credit 1 Debit Card based EPS, Emerging Financial Instruments, Home Banking online Banking.

#### Reference books:

E.Turban, D. King, D. Viehland, J. Lee, "Electronic Commerce 2006: A Managerial P

Sheet. Fix Ed assets and depreciation. Budgeting-Revenue, Capital Cash, Cost Elements-Direct material, Direct Labour, Direct expenses and overheads. Margin at costing and Break even analysis, Standard Costing, Activity based costing .

1. Respective", Pearson education 2006
2. M. Khosrow-pour, Encyclopedia of E-Commerce, E Government, and Mobile Commerce, Idea Group, 2006. Nabeel Al-Qirim, Electronic Commerce in Small to Medium-Sized Enterprises: Frameworks, Issues, and Implications, Idea Group, 2004
3. P. Candace Deans (editor), E-Commerce and MCommerce Technologies, IRM Press, 2005.
- 5) Darie, C., Balanescu, E., and Bucica, M., Beginning PHP and PostgreSQL E-Commerce: from novice to professional, Apress, 2006.

### AOE-481 : Photovoltaic Technology and Systems 3(2+1)

#### Theory

Solar PV Technology: Advantages, Limitations, Current Status of PV technology, SWOT analysis of PV technology. Types of Solar Cell, Wafer based Silicon Cell, Thin film amorphous silicon cell Thin Cadmium Telluride (CdTe) Cell, Copper Indium Gallium Selenide (CiGS) Cell, Thin film crystalline silicon solar cell. Solar Photo Voltaic Module: Solar cell, solar module, solar array, series & parallel connections of cell, mismatch in cell, fill factor, effect of solar radiation and temperature on power output of module, I-V and power curve of module. Balance of Solar PV system: Introduction to batteries, battery classification, lead acid battery, Nicked Cadmium battery, comparison of batteries, battery parameters, Charge controller: types of charge controller, function of charge controller, PWM type, MPPT type charge controller, Converters: DC to DC converter and DC to AC type converter. Application of Solar PV system. Solar home lighting system, solar lantern, solar fencing, solar street light, solar water pumping system, Roof top solar photovoltaic power plant and smart grid.

#### Practical

Study of V-I characteristics of solar PV system, smart grid technology and application, manufacturing technique of solar array, different DC to DC and DC to AC converter, domestic solar lighting system, various solar module technologies, safe measurement of PV modules electrical characteristics and Commissioning of complete solar PV system.

#### Suggested Readings

Rai GD. 1998. Non-conventional Sources of Energy. Khanna Pub.

Rathore N.S., Kurchania A.K., Panwar N.L. 2006. Renewable Energy: Theory & Practice, Himanshu Publications,.

Solanki C.S. 2011. Solar Photovoltaic: Fundamentals, Technologies and Applications, PHI Learning Private Ltd.

Meinel & Meinel. Applied Solar Energy.

Derrick, Francis and Bokalders, Solar Photo-voltaic Products.

### **AOE-482: Remote Sensing and GIS Applications 3(2+1)**

#### **Theory**

Basic component of remote sensing (RS), advantages and limitations of RS, possible use of RS techniques in assessment and monitoring of land and water resources; electromagnetic spectrum, energy interactions in the atmosphere and with the Earth's surface; major atmospheric windows; principal applications of different wavelength regions; typical spectral reflectance curve for vegetation, soil and water; spectral signatures; different types of sensors and platforms; contrast ratio and possible causes of low contrast; aerial photography; types of aerial photographs, scale of aerial photographs, planning aerial photography- end lap and side lap; stereoscopic vision, requirements of stereoscopic photographs; air-photo interpretation- interpretation elements; photogrammetry-measurements on a single vertical aerial photograph, measurements on a stereo-pair- vertical measurements by the parallax method; ground control for aerial photography; satellite remote sensing, multispectral scanner- whiskbroom and push-broom scanner; different types of resolutions; analysis of digital data- image restoration; image enhancement; information extraction, image classification, unsupervised classification, supervised classification, important consideration in the identification of training areas, vegetation indices; microwave remote sensing. GI Sand basic components, different sources of spatial data, basic spatial entities, major components of spatial data, Basic classes of map projections and their properties, Methods of data input into GIS, Data editing, spatial data models and structures, Attribute data management, integrating data (map overlay) in GIS, Application of remote sensing and GIS for the management of land and water resources.

#### **Practical**

Familiarization with remote sensing and GIS hardware; use of software for image interpretation; interpretation of aerial photographs and satellite imagery; basic GIS operations such as image display; study of various features of GIS software package; scanning, digitization of maps and data editing; data base query and map algebra. GIS supported case studies in water resources management.

#### **Suggested Readings**

- Reddy Anji, M. 2006. Textbook of Remote Sensing and Geographical Information Systems. BS Publications, Hyderabad.
- Elangovan, K. 2006. GIS Fundamentals Applications and Implementations. New India Publication Agency, New Delhi.
- George Joseph. 2005. Fundamentals of Remote Sensing. 2nd Edition. Universities Press (India) Private Limited, Hyderabad.
- Jensen, J.R. 2013. Remote Sensing of the Environment: An Earth Resource Perspective. Pearson Education Limited, UK.
- Lillesand, T., R.W. Kiefer and J. Chipman. 2015. Remote Sensing and Image Interpretation. 7th Edition, John Wiley and Sons Singapore Pvt. Ltd., Singapore.
- Sabins, F.F. 2007. Remote Sensing: Principles and Interpretation. Third Edition, Waveland Press Inc., Illinois, USA.
- Sahu, K.C. 2008. Text Book of Remote Sensing and Geographic Information Systems. Atlantic Publishers and Distributors (P) Ltd., New Delhi.
- Shultz, G.A. and E.T. Engman. 2000. Remote Sensing in Hydrology and Water Management. Springer, New York

### **AOE-483: Human Engineering and Safety 3(2+1)**

#### **Theory**

Human factors in system development – concept of systems; basic processes in system development, performance reliability, human performance. Information input process, visual displays, major types and use of displays, auditory and factual displays. Speech communications. Biomechanics of motion, types of movements, Range of movements, strength and endurance, speed and accuracy, human control of systems. Human motor activities, controls, tools and related devices. Anthropometry: arrangement and utilization of work space, atmospheric conditions, heat exchange process and performance, air pollution. Dangerous machine (Regulation) act, Rehabilitation and compensation to accident victims, Safety gadgets for spraying, threshing, Chaff cutting and tractor & trailer operation etc.

## **Practical**

Calibration of the subject in the laboratory using bi-cycle ergo-meter. Study and calibration of the subject in the laboratory using mechanical treadmill; Use of respiration gas meter from human energy point of view. Use of Heart Rate Monitor. Study of general fatigue of the subject using Blink ratio method, Familiarization with electro-myograph equipment, anthropometric measurements of a selected subjects. Optimum work space layout and locations of controls for different tractors. Familiarization with the noise and vibration equipment. Familiarization with safety gadgets for various farm machines.

### **Suggested Readings**

Chapanis A. 1996. Human Factors in System Engineering. John Wiley & Sons, New York. Dul J. and Weerdmeester B.1993. Ergonomics for Beginners. A Quick Reference Guide. Taylor and Francis, London.

Mathews J. and Knight A. A. 1971. Ergonomics in Agricultural Equipment Design. National Institute of Agricultural Engineering.

Astrand P. And and Rodahl K. 1977. Textbook of Work Physiology. Mc Hill Corporation, New York.

Mark S. Sanders and Ernest James McCormick. 1993. Human Factors in Engineering and Design. Mc Hill Corporation, New York.

Keegan J J, Radke AO. 1964. Designing vehicle seats for greater comfort. SAE Journal;72:50~5.

Yadav R, Tewari V.K. 1998. Tractor operator workplace design-a review. Journal of Terra mechanics 35: 41-53.