NATIONAL ENGINEERING COLLEGE
(An Autonomous Institution Affiliated to Anna University Chennai)

K.R.NAGAR, KOVILPATTI – 628 503

REGULATIONS – 2011

DEPARTMENT OF
COMPUTER SCIENCE AND ENGINEERING

CURRICULUM AND SYLLABI OF
M.E. – COMPUTER SCIENCE AND ENGINEERING
# M.E. (COMPUTER SCIENCE AND ENGINEERING) REGULATIONS – 2011 CURRICULUM

<table>
<thead>
<tr>
<th>SL. NO</th>
<th>COURSE CODE</th>
<th>COURSE TITLE</th>
<th>L</th>
<th>T</th>
<th>P</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td><strong>SEMESTER I</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>THEORY</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>MME101</td>
<td>Operations Research</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>2</td>
<td>MCS101</td>
<td>Computer Architecture</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>3</td>
<td>MCS102</td>
<td>Data Structures and Algorithms</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>4</td>
<td>MCS103</td>
<td>Object Oriented Software Engineering</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>5</td>
<td>MCS104</td>
<td>Computer Networks and Management</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>PRACTICAL</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>MCS131</td>
<td>Data Structures Laboratory</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>7</td>
<td>MCS132</td>
<td>Networking Laboratory</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>TOTAL</strong></td>
<td>15</td>
<td>0</td>
<td>6</td>
<td>19</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>SEMESTER II</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>THEORY</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>MCS201</td>
<td>Database Technology</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>2</td>
<td>MCS202</td>
<td>Advanced Operating Systems</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>3</td>
<td>MCS203</td>
<td>Advanced System Software</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>4</td>
<td>MCS204</td>
<td>Information Security</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>5</td>
<td>MCS205</td>
<td>Web Technology</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>6</td>
<td>E1</td>
<td>Elective</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>PRACTICAL</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>MCS231</td>
<td>Operating System Laboratory</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>8</td>
<td>MCS232</td>
<td>Internet Programming Laboratory</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>TOTAL</strong></td>
<td>18</td>
<td>0</td>
<td>6</td>
<td>22</td>
</tr>
</tbody>
</table>
### SEMESTER III

<table>
<thead>
<tr>
<th></th>
<th>Course</th>
<th>Credits</th>
<th>Theory</th>
<th>Practical</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>E2</td>
<td>3</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>2</td>
<td>E3</td>
<td>3</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>3</td>
<td>E4</td>
<td>3</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>4</td>
<td>MCS331</td>
<td>0</td>
<td>0</td>
<td>12</td>
</tr>
</tbody>
</table>

**TOTAL** 9 0 12 15

### SEMESTER IV

<table>
<thead>
<tr>
<th></th>
<th>Course</th>
<th>Credits</th>
<th>Theory</th>
<th>Practical</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>MCS431</td>
<td>0</td>
<td>0</td>
<td>24</td>
</tr>
</tbody>
</table>

**TOTAL** 0 0 24 12

**TOTAL CREDITS TO BE EARNED FOR THE AWARD OF THE DEGREE – 68**
# M.E. (COMPUTER SCIENCE AND ENGINEERING)
## CURRICULUM I TO VI SEMESTERS (PART TIME)

### SEMESTER I (Part time)

<table>
<thead>
<tr>
<th>SL. NO</th>
<th>COURSE CODE</th>
<th>COURSE TITLE</th>
<th>L</th>
<th>T</th>
<th>P</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td><strong>THEORY</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>MME101</td>
<td>Operations Research</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>2</td>
<td>MCS101</td>
<td>Computer Architecture</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>3</td>
<td>MCS102</td>
<td>Data Structures and Algorithms</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>PRACTICAL</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>MCS131</td>
<td>Data Structures Laboratory</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>TOTAL</strong></td>
<td>9</td>
<td>0</td>
<td>3</td>
<td>11</td>
</tr>
</tbody>
</table>

### SEMESTER – II (Part time)

<table>
<thead>
<tr>
<th>SL. NO</th>
<th>COURSE CODE</th>
<th>COURSE TITLE</th>
<th>L</th>
<th>T</th>
<th>P</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td><strong>THEORY</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>MCS201</td>
<td>Database Technology</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>2</td>
<td>MCS202</td>
<td>Advanced Operating Systems</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>3</td>
<td>MCS203</td>
<td>Advanced System Software</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>PRACTICAL</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>MCS231</td>
<td>Operating System Laboratory</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>TOTAL</strong></td>
<td>9</td>
<td>0</td>
<td>3</td>
<td>11</td>
</tr>
</tbody>
</table>

### SEMESTER – III (Part time)

<table>
<thead>
<tr>
<th>SL. NO</th>
<th>COURSE CODE</th>
<th>COURSE TITLE</th>
<th>L</th>
<th>T</th>
<th>P</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td><strong>THEORY</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>MCS103</td>
<td>Object Oriented Software Engineering</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>2</td>
<td>MCS104</td>
<td>Computer Networks and Management</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>PRACTICAL</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>MCS132</td>
<td>Networking Laboratory</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>TOTAL</strong></td>
<td>6</td>
<td>0</td>
<td>3</td>
<td>8</td>
</tr>
</tbody>
</table>
### SEMESTER IV (Part time)

<table>
<thead>
<tr>
<th></th>
<th>Course Code</th>
<th>Course Title</th>
<th>Theory</th>
<th>Practical</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>MCS204</td>
<td>Information Security</td>
<td>3</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>2</td>
<td>MCS205</td>
<td>Web Technology</td>
<td>3</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>3</td>
<td>E1</td>
<td>Elective</td>
<td>3</td>
<td>0</td>
<td>3</td>
</tr>
</tbody>
</table>

**THEORY**

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>9</td>
</tr>
</tbody>
</table>

**PRACTICAL**

<table>
<thead>
<tr>
<th></th>
<th>Course Code</th>
<th>Course Title</th>
<th>Theory</th>
<th>Practical</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>MCS232</td>
<td>Internet Programming Laboratory</td>
<td>0</td>
<td>3</td>
<td>3</td>
</tr>
</tbody>
</table>

**TOTAL**

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>9</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>3</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>11</td>
</tr>
</tbody>
</table>

### SEMESTER V (Part time)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**THEORY**

<table>
<thead>
<tr>
<th></th>
<th>Course Code</th>
<th>Course Title</th>
<th>Theory</th>
<th>Practical</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>E2</td>
<td>Elective</td>
<td>3</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>2</td>
<td>E3</td>
<td>Elective</td>
<td>3</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>3</td>
<td>E4</td>
<td>Elective</td>
<td>3</td>
<td>0</td>
<td>3</td>
</tr>
</tbody>
</table>

**PRACTICAL**

<table>
<thead>
<tr>
<th></th>
<th>Course Code</th>
<th>Course Title</th>
<th>Theory</th>
<th>Practical</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>MCS331</td>
<td>Project Work (Phase I)</td>
<td>0</td>
<td>12</td>
<td>15</td>
</tr>
</tbody>
</table>

**TOTAL**

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>9</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>12</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>15</td>
</tr>
</tbody>
</table>

### SEMESTER VI (Part time)

**PRACTICAL**

<table>
<thead>
<tr>
<th></th>
<th>Course Code</th>
<th>Course Title</th>
<th>Theory</th>
<th>Practical</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>MCS431</td>
<td>Project Work (Phase II)</td>
<td>0</td>
<td>24</td>
<td>12</td>
</tr>
</tbody>
</table>

**TOTAL**

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>0</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>24</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>12</td>
</tr>
</tbody>
</table>

**TOTAL CREDITS TO BE EARNED FOR THE AWARD OF THE DEGREE – 68**
## LIST OF ELECTIVES FOR M.E.COMPUTER SCIENCE AND ENGINEERING

<table>
<thead>
<tr>
<th>S.NO</th>
<th>COURSE CODE</th>
<th>COURSE TITLE</th>
<th>L</th>
<th>T</th>
<th>P</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>MCS001</td>
<td>XML and Web Services</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>2</td>
<td>MCS002</td>
<td>Distributed Computing</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>3</td>
<td>MCS003</td>
<td>Digital Image Processing</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>4</td>
<td>MCS004</td>
<td>Network Routing Algorithms</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>5</td>
<td>MCS005</td>
<td>Internetworking Multimedia</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>6</td>
<td>MCS006</td>
<td>Soft Computing</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>7</td>
<td>MCS007</td>
<td>Mobile Computing</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>8</td>
<td>MCS008</td>
<td>Theory of Computation</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>9</td>
<td>MCS009</td>
<td>Multimedia Systems</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>10</td>
<td>MCS010</td>
<td>Software Quality Assurance</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>11</td>
<td>MCS011</td>
<td>Software Project Management</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>12</td>
<td>MCS012</td>
<td>Grid Computing</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>13</td>
<td>MCS013</td>
<td>Pattern Recognition</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>14</td>
<td>MCS014</td>
<td>Bio Informatics</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>15</td>
<td>MCS015</td>
<td>Ontology and Semantic Web</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>16</td>
<td>MCS016</td>
<td>Pervasive Computing</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>17</td>
<td>MCS017</td>
<td>Digital Imaging</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>18</td>
<td>MCS018</td>
<td>Information Retrieval Techniques</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>19</td>
<td>MCS019</td>
<td>Data Warehousing and Data Mining</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>20</td>
<td>MCS020</td>
<td>Performance Evaluation of Computer Systems and Networks</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>21</td>
<td>MCS021</td>
<td>Agent Based Intelligent Systems</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>22</td>
<td>MCS022</td>
<td>Visualization Techniques</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>23</td>
<td>MCS023</td>
<td>Advanced Databases</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>24</td>
<td>MCS024</td>
<td>Component Based Technology</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>25</td>
<td>MCE001</td>
<td>Communication Network Security</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>26</td>
<td>MCE010</td>
<td>Embedded Systems</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>27</td>
<td>MCC007</td>
<td>Adhoc Networks</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
</tbody>
</table>
MME101 OPERATIONS RESEARCH LTPC
3 0 0 3

Objectives:

1. To introduce the various queuing models of Operations Research.
2. Emphasize the important mathematical procedures of nonlinear programming search techniques.
3. To study about advanced topics in linear and non-linear programming.
4. Relate the course material to research activities.

UNIT I QUEUEING MODELS 9

UNIT II ADVANCED QUEUEING MODELS 9
Non- Markovian Queues – Pollaczek Khintchine Formula – Queues in Series – Open Queueing Networks – Closed Queueing Networks.

UNIT III SIMULATION 9
Discrete Even Simulation – Monte – Carlo Simulation – Stochastic Simulation – Applications to Queueing Systems.

UNIT IV LINEAR PROGRAMMING 9

UNIT V NON-LINEAR PROGRAMMING 9

TOTAL: 45

TEXT BOOKS:


REFERENCES:

MCS101   COMPUTER ARCHITECTURE   L T P C
                                       3  0  0  3

Objectives:
1. To have a thorough understanding of the basic structure and operation of a digital computer.
2. To study in detail the different types of control and concept of pipelining.
3. To study the different ways of communication with I/O devices and standard I/O interfaces.

UNIT I    FUNDAMENTALS OF COMPUTER DESIGN AND PIPELINING    9

UNIT II   INSTRUCTION LEVEL PARALLELISM WITH DYNAMIC APPROACHES    9

UNIT III   INSTRUCTION LEVEL PARALLELISM WITH SOFTWARE APPROACHES    9
Compiler techniques for exposing ILP – Static branch prediction – VLIW – Advanced compiler support – Hardware support for exposing more parallelism – Hardware versus software speculation mechanisms – Case studies.

UNIT IV    MULTIPROCESSORS AND MULTICORE ARCHITECTURES    9

UNIT V   MEMORY AND I/O    9

TOTAL: 45

REFERENCES:
MCS102    DATA STRUCTURES AND ALGORITHMS          L T P C
                                                     3 0 0 3

Objectives:

To gain a solid understanding of the following topics:

1. The fundamental design, analysis, and implementation of basic data structures and algorithms.
2. Principles for good program design, especially the uses of data abstraction and modular program composition.
3. Basic concepts in the specification and analysis of programs.

UNIT I    COMPLEXITY ANALYSIS & ELEMENTARY DATA STRUCTURES          9

UNIT II    HEAP STRUCTURES                                          9

UNIT III   SEARCH STRUCTURES                                      9

UNIT IV    GREEDY & DIVIDE AND CONQUER                            9

UNIT V     DYNAMIC PROGRAMMING AND BACKTRACKING                   9
Multistage graphs – 0/1 knapsack using dynamic programming – Flow shop scheduling – 8-queens problem – Graph coloring – Knapsack using backtracking

TOTAL: 45

REFERENCES:

MCS103  OBJECT ORIENTED SOFTWARE ENGINEERING  

Objectives:

1. To learn object-oriented (OO) analysis and design using UML and other techniques.
2. To learn how to OO languages support abstraction and polymorphism.
3. To learn an agile software process, with multiple iterations, design patterns, test-driven development & pair programming.
4. To improve analyzing skills in the context of software development.

UNIT I  INTRODUCTION  
9

UNIT II  ANALYSIS  
9

UNIT III  SYSTEM DESIGN  
9

UNIT IV  OBJECT DESIGN AND IMPLEMENTATION ISSUES  
9

UNIT V  MANAGING CHANGE  
9

TOTAL: 45

REFERENCES:

MCS104  COMPUTER NETWORKS AND MANAGEMENT  L T P C
3 0 0 3

Objectives:
1. To make the students to learn the basics of ATM and the features of Wireless LANs.
2. To provide an up-to-date survey of developments in High Speed Networks.
3. Enable the students to know techniques involved to support real-time traffic and congestion control.
4. To provide different levels of quality of service (QoS) to different applications.

UNIT I  HIGH SPEED NETWORKS  9

UNIT II  CONGESTION AND TRAFFIC MANAGEMENT  9

UNIT III  TCP AND ATM CONGESTION CONTROL  10

UNIT IV  INTEGRATED AND DIFFERENTIATED SERVICES  9

UNIT V  PROTOCOLS FOR QoS SUPPORT  8

TOTAL: 45

TEXT BOOK:

REFERENCES:
MCS131     DATA STRUCTURES LABORATORY     L T P C
                      0 0 3 2

Lab Objectives:
1. To learn how to implement some useful concepts of data structures.
2. To understand the effect of data structures on an algorithm’s complexity.

List of Experiments:
1. Min Heap
2. Deaps
3. Leftist Heap
4. AVL Tree
5. B-Tree
6. Tries
7. Quick Sort
8. Convex hull
9. 0/1 Knapsack using Dynamic Programming
10. Graph coloring using backtracking

TOTAL: 45

Required Software: Java, C++
MCS132     NETWORKING LABORATORY

Lab Objectives:
1. To study about various network programming and socket system calls.
2. To understand the concepts of data transfer between client and server.
3. To simulate various networking protocols.

List of Experiments:

1. Socket Programming
   a. TCP Sockets
   b. UDP Sockets
   c. Applications using Sockets
2. Simulation of Sliding Window Protocol
3. Simulation of Routing Protocols
4. Development of applications such as DNS/ HTTP/ E – Mail/ Multi – user Chat
5. Simulation of Network Management Protocols
6. Study of Network Simulator Packages – such as opnet, NS2, etc.

   TOTAL: 45

Required Software: C, Java, opnet, NS2
MCS201 DATABASE TECHNOLOGY

Objectives:
1. To know the different types of databases.
2. To understand the emerging systems.
3. To make awareness about current issues related to databases.

UNIT I DISTRIBUTED DATABASES

UNIT II OBJECT ORIENTED DATABASES

UNIT III EMERGING SYSTEMS

UNIT IV DATABASE DESIGN ISSUES

UNIT V CURRENT ISSUES

REFERENCES:
MCS202 ADVANCED OPERATING SYSTEMS L T P C

3 0 0 3

Objectives:
1. To introduce mechanisms for synchronization.
2. To study the distributed operating systems.
3. To know the distributed file systems.
4. To know how to recover the failures and basic approaches to recovery.

UNIT I INTRODUCTION

UNIT II DISTRIBUTED OPERATING SYSTEMS

UNIT III DISTRIBUTED RESOURCE MANAGEMENT

UNIT IV FAILURE RECOVERY AND FAULT TOLERANCE

UNIT V MULTIPROCESSOR AND DATABASE OPERATING SYSTEMS

TOTAL: 45

TEXT BOOK:
REFERENCES:

MCS203 ADVANCED SYSTEM SOFTWARE

L T P C
3 0 0 3

Objectives:
1. To study the basic compiler functions.
2. To study the symbol table structure and various optimization techniques.
3. To introduce virtual machines.

UNIT I

UNIT II

UNIT III

UNIT IV

UNIT V

TOTAL: 45

TEXT BOOKS:
2. James E Smith and Ravi Nair, “Virtual Machines”, Elsevier, 2005. (Units 4, 5) (Sections 1.0-1.6, 2.0-2.5, 2.8, 3.0-3.6, 4.2, 5.0-5.3, 5.5-5.6, 6.0-6.3, 6.5-6.6, 10.2, 10.3).
REFERENCES:

MCS204 INFORMATION SECURITY

Objectives:
1. To know the various information security policies.
2. To study the system design principles.
3. To know about intrusion detection.

UNIT I 9
An Overview of Computer Security, Access Control Matrix, Policy-Security policies, Confidentiality policies, Integrity policies and Hybrid policies.

UNIT II 9
Cryptography- Key management – Session and Interchange keys, Key exchange and generation, Cryptographic Key Infrastructure, Storing and Revoking Keys, Digital Signatures, Cipher Techniques.

UNIT III 9

UNIT IV 9
Malicious Logic, Vulnerability Analysis, Auditing and Intrusion Detection.

UNIT V 9

TOTAL: 45

TEXT BOOKS:

REFERENCES:
MCS205     WEB TECHNOLOGY     L T P C
                             3 0 0 3

Objectives:

1. To understand the client server concepts and study the markup languages.
2. To know about client side and server side programming.
3. To build web applications.

UNIT I                      9
Web essentials – Clients – Servers – Communication – Markup Languages – XHTML – simple
XHTML pages style sheets – CSS

UNIT II                      9
Client side programming – Java script language – Java script objects – Host objects: Browsers
and the DOM.

UNIT III                      9
Server side programming – Java servlets – Basics – Simple program – Separating Programming
and Presentation – ASP/JSP – JSP basics ASP/JSP objects – simple ASP/JSP pages.

UNIT IV                      9

UNIT V                      9
Building Web applications – Cookies – Sessions – Open source environment – PHP – MYSQL –
Case studies.

TOTAL: 45

TEXT BOOKS:


REFERENCES:

1. Deitel, Deitel, Goldberg, "Internet & World Wide Web How To Program", Third Edition,
II, Pearson Education, 2001
MCS231  OPERATING SYSTEM LABORATORY  L T P C
0 0 3  2

Objectives:
1. To implement semaphores and multithreading.
2. To implement the concurrency conflict that occurs between multiple client applications.
3. To identifying Local Area Network Hardware.
4. To explore Local Area Network Configuration Options.

LIST OF EXPERIMENTS:

MULTIPROCESSOR OPERATING SYSTEMS

Program 1 – Semaphores – Multiprocessor operating systems

Assume there are three processes: Pa, Pb, and Pc. Only Pa can output the letter A, Pb B, and Pc C. Utilizing only semaphores (and no other variables) the processes are synchronized so that the output satisfies the following conditions:

a) A,B must be output before any C's can be output.
b) B's and C's must alternate in the output string, that is, after the first B is output, another B cannot be output until a C is output. Similarly, once a C is output, another C cannot be output until a B is output.
c) The total number of B's and C's which have been output at any given point in the output string cannot exceed the number of A's which have been output up to that point.

Examples
AACB -- invalid, violates a)
ABACAC -- invalid, violates b)
AABCABC -- invalid, violates c)
AABCAAABC -- valid
AAAABCBC -- valid
AB -- valid

MULTITHREADING – MULTIPROCESSOR OPERATING SYSTEMS

Program 2 – The Cigarette Smokers Problem

Consider a simulation with three smoker threads and one agent thread. Each smoker continuously makes a cigarette and smokes it. But to make a cigarette, a smoker needs three ingredients: tobacco, paper, and matches. One of the smoker threads has only paper, another has only tobacco, and the third has only matches. The agent thread has an infinite supply of all three materials. The three smoker threads are initially blocked. The agent places two randomly chosen (different) ingredients on the table and unblocks the one smoker who has the remaining ingredient. The agent then blocks. The unblocked smoker removes the two ingredients from the table, makes a cigarette, and smokes it for a random amount of time, unblocking the agent on completion of smoking the cigarette. The agent then puts out another random two of the three ingredients, and the cycle repeats.
Write a multi-class multithreaded Java program that uses a monitor to synchronize the agent thread and the three smoker threads. **Do not mechanically translate semaphore code into monitor code!** The agent thread executes in an agent object created from an agent class. Each smoker thread executes in a smoker object. All smoker objects are created from one smoker class whose constructor is used to specify the ingredient possessed by the smoker object. A driver class with a main method constructs the objects and starts the threads. Use a single monitor object instantiated from a class Control for synchronization. Each of the four threads invokes a synchronized monitor method for its synchronization. No semaphores are allowed. No synchronized blocks are allowed, only synchronized methods. No busy waiting is allowed. No calls to nap inside a synchronized method are allowed (do not nap while holding the monitor object's lock, that is, while inside a synchronized method or while inside a method called by a synchronized method).

**Program 3 – Multiple sleeping barbers – Multiprocessor operating systems**

Write a multi-class multithreaded Java program that simulates multiple sleeping barbers, all in one barbershop that has a finite number of chairs in the waiting room. Each customer is instantiated from a single Customer class, each barber is instantiated from a single Barber class.

**NETWORK OPERATING SYSTEMS**

**Program 4 – Network operating systems**

Establish a Lab setup for the following network operating systems based programs based on the skills in networking on your own. E.g. for identifying networking hardware, identifying different kinds of network cabling and network interface cards can be done.

**Exercises**

1. Identifying Local Area Network Hardware.
2. Exploring Local Area Network Configuration Options.
4. Sharing Resources.
5. Testing LAN Connections.

**REAL TIME OPERATING SYSTEMS**

**Program 5 – Real time operating systems**

A real-time program implementing an alarm clock shall be developed. [Alarm clock, using C and Simple_OS]. The program shall fulfill the following requirements:

Clock with alarm functionality shall be implemented, It shall be possible to set the time, It shall be possible to set the alarm time, the alarm shall be enabled when the alarm time is set, the alarm shall be activated when the alarm is enabled, and when the current time is equal to the alarm time, an activated alarm must be acknowledged. Acknowledgement of an alarm shall lead to the alarm being disabled, the alarm is enabled again when a new alarm time is set, an alarm which is not acknowledged shall be repeated every 10 seconds. The program shall communicate with a graphical user interface, where the current time shall be displayed, and where the alarm time shall be displayed when the alarm is enabled. It shall be possible to terminate the program, using a command which is sent from the graphical user interface.
DATABASE OPERATING SYSTEMS

Program 6 – Transactions and Concurrency -Database operating systems

Exercises

Assume any application (e.g. banking) on your own and do the following exercises. Investigate and implement the Object Store's concurrency options.

Implement the concurrency conflict that occurs between multiple client applications. Observe and implement the implication of nested transactions.

DISTRIBUTED OPERATING SYSTEMS

Program 7 – Distributed operating systems

1. Design a RMI Lottery application. Each time you run the client program -- “java LotteryClient n”, the server program “LotteryServer” will generate n set of Lottery numbers. Here n is a positive integer, representing the money you will spend on Lottery in sterling pounds. Write this program in a proper engineering manner, i.e. there should be specifications, design (flow chart, FD, or pseudo code), coding, test/debug, and documentation.

2. Consider a distributed system that consists of two processes which communicate with each other. Let P be a state predicate on the local state of one process and Q be a state predicate on the local state of the other process. Assume that neither P nor Q are stable (i.e. closed).

Design a superimposed computation which detects that there exists an interleaving of underlying events in this system where at some state P ^Q holds. (A superposed computation is one that does not affect the underlying system; it may \read" but not \write" the state of the underlying system. Events in a superposed computation may occur in at the same instant as the underlying events and/or at different instants.) State any assumptions you make. [Hint: Use vector clocks.]

TOTAL: 45

Required Software: Java
MCS232     INTERNET PROGRAMMING LABORATORY       L T P C
                            0 0 3 2

Objectives:
1. To design Web Pages using Client Side Scripting and DHTML.
2. To develop web services and E-business applications.
3. To implement server side applications using JSP.

List of Experiments:
1. Designing Web Pages using Client Side Scripting and DHTML.
2. Client Server Scripting Programs.
5. XML and Databases.
6. Server Side Application Using JSP.
7. Web Customization.

TOTAL: 45

Required Software: Java, XML, HTML, Scripting languages
MCS001 XML AND WEB SERVICES L T P C
3 0 0 3

Objectives:
1. To introduce the XML technology.
2. To study and understand the web services technology.
3. To implement XML in E-business.
4. To know how to secure web services.

UNIT I XML TECHNOLOGY FAMILY

UNIT II ARCHITECTING WEB SERVICES

UNIT III WEB SERVICES BUILDING BLOCKS

UNIT IV IMPLEMENTING XML IN E–BUSINESS

UNIT V XML CONTENT MANAGEMENT AND SECURITY

TOTAL: 45

TEXTBOOKS:

REFERENCES:
MCS002 DISTRIBUTED COMPUTING L T P C 3 0 0 3

Objectives:
1. To introduce the various paradigms in distributed environment.
2. To know about distributed operating systems.
3. To study the file systems.
4. To understand the concepts of fault tolerance system.

UNIT I COMMUNICATION IN DISTRIBUTED ENVIRONMENT 8

UNIT II DISTRIBUTED OPERATING SYSTEMS 12

UNIT III DISTRIBUTED RESOURCE MANAGEMENT 10
Distributed Shared Memory – Data-Centric Consistency Models – Client-Centric Consistency Models – Ivy – Munin – Distributed Scheduling – Distributed File Systems – Sun NFS.

UNIT IV FAULT TOLERANCE AND CONSENSUS 7

UNIT V CASE STUDIES 8
Distributed Object-Based System – CORBA – COM+ – Distributed Coordination-Based System – JINI.

REFERENCES:

TOTAL: 45
MCS003  DIGITAL IMAGE PROCESSING  L T P C
             3  0  0  3

UNIT I  DIGITAL IMAGE FUNDAMENTALS  9
Elements of digital image processing systems, Elements of visual perception, brightness, contrast, hue, saturation, Mach Band effect, Image sampling, Quantization, Dither, Two dimensional mathematical preliminaries, Basic Principles of Tomography, Tomography, Projection, Image Reconstruction, Radon Transform, Central Slice Theorem.

UNIT II  IMAGE TRANSFORMS  9
1D DFT, 2D transforms – DFT, DCT, Discrete Sine, Walsh, Hadamard, Slant, Haar, KLT, SVD, Wavelet transform.

UNIT III  IMAGE ENHANCEMENT AND RESTORATION  9

UNIT IV  IMAGE SEGMENTATION AND RECOGNITION  9
Image segmentation, Edge detection, Edge linking and boundary detection, Region growing, Region splitting and Merging, Image Recognition, Patterns and pattern classes, Matching by minimum distance classifier, Matching by correlation, Neural networks, Back propagation network and training, Neural network to recognize shapes.

UNIT V  IMAGE REGISTRATION AND VISUALIZATION  9

TOTAL: 45

REFERENCES:
MCS004 NETWORK ROUTING ALGORITHMS  
3 0 0 3

UNIT I INTRODUCTION  
7

UNIT II INTERNET ROUTING  
10
Interior protocol : Routing Information Protocol (RIP), Open Shortest Path First (OSPF), Bellman Ford Distance Vector Routing. Exterior Routing Protocols: Exterior Gateway Protocol (EGP) and Border Gateway Protocol (BGP). Multicast Routing: Pros and cons of Multicast and Multiple Unicast Routing, Distance Vector Multicast Routing Protocol (DVMRP), Multicast Open Shortest Path First (MOSPF), MBONE, Core Based Tree Routing.

UNIT III ROUTING IN OPTICAL WDM NETWORKS  
10
Classification of RWA algorithms, RWA algorithms, Fairness and Admission Control, Distributed Control Protocols, Permanent Routing and Wavelength Requirements, Wavelength Rerouting- Benefits and Issues, Lightpath Migration, Rerouting Schemes, Algorithms- AG, MWPG.

UNIT IV MOBILE – IP NETWORKS  
9

UNIT V MOBILE AD –HOC NETWORKS  
9
Internet-based mobile ad-hoc networking communication strategies, Routing algorithms – Proactive routing: destination sequenced Distance Vector Routing (DSDV), Reactive routing: Dynamic Source Routing (DSR), Adhoc On-Demand Distance Vector Routing (AODV), Hybrid Routing: Zone Based Routing (ZRP).

TOTAL: 45

REFERENCES:

6. Canhui (Sam) Ou and Biswanath Mukherjee “Survivable Optical WDM Networks (Optical Networks)”, Springer, 2011.
MCS005 INTERNETWORKING MULTIMEDIA

UNIT I INTRODUCTION
Digital sound, video and graphics, basic multimedia networking, multimedia characteristics, evolution of Internet services model, network requirements for audio/video transform, multimedia coding and compression for text, image, audio and video. Multimedia communication in wireless network.

UNIT II SUBNETWORK TECHNOLOGY
Broadband services, ATM and IP, IPV6, High speed switching, resource reservation, Buffer management, traffic shaping, caching, scheduling and policing, throughput, delay and jitter performance.

UNIT III MULTICAST AND TRANSPORT PROTOCOL
Multicast over shared media network, multicast routing and addressing, scaping multicast and NBMA networks, Reliable transport protocols, TCP adaptation algorithm, RTP, RTCP.

UNIT IV MEDIA–ON–DEMAND
Storage and media servers, voice and Video Over IP, MPEG-2 over ATM/IP, indexing synchronization of requests, recording and remote control.

UNIT V APPLICATIONS
MIME, Peer-to-peer computing, shared application, video conferencing, centralized and distributed conference control, distributed virtual reality, light weight session philosophy.

REFERENCES:

TOTAL: 45
MCS006  SOFT COMPUTING

Objectives:
1. To introduce soft computing constituents.
2. To study the applications of Genetic algorithms.
3. To study the different classifications of neural networks.
4. To understand the fuzzy logic.

UNIT I  INTRODUCTION TO SOFT COMPUTING AND NEURAL NETWORKS 9

UNIT II  GENETIC ALGORITHMS 9
Introduction to Genetic Algorithms (GA) – Applications of GA in Machine Learning – Machine Learning Approach to Knowledge Acquisition.

UNIT III  NEURAL NETWORKS 9

UNIT IV  FUZZY LOGIC 9

UNIT V  NEURO-FUZZY MODELING 9

TOTAL: 45

TEXT BOOKS:

REFERENCES:
MCS007 MOBILE COMPUTING L T P C
3 0 0 3

Objectives:
1. To know the fundamentals of wireless communication.
2. To understand the telecommunication systems.
3. To study the different network layers.
4. To study about various protocols.

UNIT I WIRELESS COMMUNICATION FUNDAMENTALS 9

UNIT II TELECOMMUNICATION SYSTEMS 11

UNIT III WIRELESS NETWORKS 9

UNIT IV NETWORK LAYER 9

UNIT V TRANSPORT AND APPLICATION LAYERS 7

TOTAL: 45

TEXT BOOKS:

REFERENCES:
Objectives:
1. To know about the finite automata and transitions.
2. To study about regular expressions and languages.
3. To know the properties of context free grammar.
4. To understand the programming techniques for turing machines.

UNIT I AUTOMATA

UNIT II REGULAR EXPRESSIONS AND LANGUAGES
Regular Expression – FA and Regular Expressions – Proving Languages not to be regular – Closure Properties of Regular Languages – Equivalence and Minimization of Automata.

UNIT III CONTEXT FREE GRAMMAR AND LANGUAGES

UNIT IV PROPERTIES OF CONTEXT FREE LANGUAGES
Normal Forms for CFG – Pumping Lemma for CFL – Closure Properties of CFL – Turing Machines (TM) – Programming Techniques for TM.

UNIT V UNDECIDABILITY
A Language That Is Not Recursive Enumerable – An Undecidable Problem that Is RE – Undecidable Problems about TM – Post’s Correspondence Problem, The Class P And NP.

TEXT BOOK:

REFERENCES:
MCS009 MULTIMEDIA SYSTEMS L T P C 3 0 0 3

Objectives:
1. To study the concepts of operating systems.
2. To understand the traditional and multimedia file systems.
3. To know about the MBone applications.
4. To study the various Multimedia Synchronization Methods.

UNIT I INTRODUCTION AND QoS 9

UNIT II OPERATING SYSTEMS 9

UNIT III FILE SYSTEMS AND NETWORKS 9

UNIT IV COMMUNICATION 9

UNIT V SYNCHRONIZATION 9
Synchronization in Multimedia Systems-Presentation-Synchronization Types- Multimedia Synchronization Methods-Case Studies-MHEG-MODE-ACME.

TOTAL : 45

TEXT BOOK:

REFERENCES:
MCS010 SOFTWARE QUALITY ASSURANCE

Objectives:
1. To introduce the SQA components in project life cycle.
2. To study the basics of software testing.
3. To know about the testing strategies.
4. To know the hierarchical models of software quality.
5. To know the quality management standards.

UNIT I

UNIT II

UNIT III

UNIT IV

UNIT V

TOTAL : 45

REFERENCES:
MCS011 SOFTWARE PROJECT MANAGEMENT

Objectives:
1. To study the product life cycle.
2. To understand the emerging models relevance to project management.
3. To know the engineering and people issues in project management.

UNIT I BASIC CONCEPTS

UNIT II FORMAT PROCESS MODELS AND THEIR USE
Definition and Format model for a process – The ISO 9001 and CMM Models and their relevance to Project Management – Other Emerging Models like People CMM.

UNIT III UMBRELLA ACTIVITIES IN PROJECTS

UNIT IV INSTREAM ACTIVITIES IN PROJECTS
Project Initiation – Project Planning – Execution and Tracking – Project Wind up – Concept of Process/Project Database.

UNIT V ENGINEERING AND PEOPLE ISSUES IN PROJECT MANAGEMENT

REFERENCES:
MCS012  GRID COMPUTING  L T P C  3 0 0 3

Objectives:

1. To introduce the grid computing.
2. To study the technologies and tool kit for grid computing.
3. To know the high level grid services.

UNIT I  INTRODUCTION TO GRID COMPUTING  7

UNIT II  GRID COMPUTING ARCHITECTURE  8
Grid Computing anatomy – Next generation of Grid computing initiatives – Merging the Grid services architecture with Web services architecture.

UNIT III  GRID COMPUTING TECHNOLOGIES  11
OGSA – Sample use cases that drive the OGSA platform components – OGSI and WSRF–OGSA Basic Services – Security standards for grid computing.

UNIT IV  GRID COMPUTING TOOL KIT  10

UNIT V  HIGH LEVEL GRID SERVICES  9
High level grid services – OGSI .NET middleware Solution - Mobile OGSI.NET for Grid computing on Mobile devices.

TOTAL : 45

TEXT BOOK:

REFERENCES:
MCS013 PATTERN RECOGNITION  

Objectives:
1. To introduce pattern recognition and its applications.
2. To understand the clustering analysis, supervised and unsupervised learning.
3. To study the neural networks.

UNIT I INTRODUCTION TO PATTERN RECOGNITION  9
Patterns and pattern Recognition – Pattern Recognition System – significance – Configurations – Representation of Patterns and Machine recognition – Applications.

UNIT II SUPERVISED LEARNING  9

UNIT III CLUSTERING ANALYSIS AND UNSUPERVISED LEARNING, DIMENSIONALITY REDUCTION  9
Introduction to Clustering – Clustering with Unknown Number of Classes and Known Number of Classes – Evaluation of Clustering Results – Graph Theoretical Methods – Mixture Statistics and Unsupervised Learning – Dimensionality Reduction: Feature selection for Multivariate Gaussian Data – Feature Ordering – Canonical Analysis, Optimum Classification – Non-Parametric feature Selection.

UNIT IV NEURAL NETWORKS  9

UNIT V IMAGE UNDERSTANDING  9

TOTAL: 45

REFERENCES:
MCS014 BIO INFORMATICS L T P C
3 0 0 3

Objectives:
1. To introduce the process of search engines and data visualization.
2. To study the statistics concepts.
3. To know about the pattern matching and data mining.

UNIT I INTRODUCTORY CONCEPTS

UNIT II SEARCH ENGINES AND DATA VISUALIZATION

UNIT III STATISTICS AND DATA MINING

UNIT IV PATTERN MATCHING

UNIT V MODELING AND SIMULATION

TOTAL: 45

REFERENCES:
MCS015  ONTOLOGY AND SEMANTIC WEB  L T P C  3 0 0 3

Objectives:
1. To introduce the top level ontologies.
2. To know the languages for semantic web.
3. To introduce the tools for ontology.
4. To understand the ontology management.

UNIT I  INTRODUCTION  8

UNIT II  LANGUAGES FOR SEMANTIC WEB AND ONTOLOGIES  12

UNIT III  ONTOLOGY LEARNING FOR SEMANTIC WEB  12

UNIT IV  ONTOLOGY MANAGEMENT AND TOOLS  8

UNIT V  APPLICATIONS  5

TOTAL: 45

REFERENCES:


MCS016 PERVASIVE COMPUTING

**Objectives:**
1. To introduce the pervasive computing devices and interfaces.
2. To know the voice standards and speech applications.
3. To know the issues in pervasive computing.

**UNIT I**

**UNIT II**

**UNIT III**

**UNIT IV**

**UNIT V**

**TOTAL: 45**

**TEXT BOOKS:**

**REFERENCES:**
MCS017     DIGITAL IMAGING     L T P C
3 0 0 3

Objectives:
1. To study the fundamentals of image processing.
2. To study the various image enhancement techniques.
3. To know the various image compression standards.
4. To know the applications of image processing.

UNIT I     FUNDAMENTALS OF IMAGE PROCESSING
9

UNIT II     IMAGE ENHANCEMENT
9

UNIT III     IMAGE SEGMENTATION AND FEATURE ANALYSIS
9

UNIT IV     MULTI RESOLUTION ANALYSIS AND COMPRESSIONS
9

UNIT V     APPLICATIONS OF IMAGE PROCESSING
9

TOTAL: 45

REFERENCES:
MCS018 INFORMATION RETRIEVAL TECHNIQUES

Objectives:
1. To introduce the various information retrieval models.
2. To know about pattern matching.
3. To study the Query languages and data models.

UNIT I INTRODUCTION

UNIT II QUERYING

UNIT III TEXT OPERATIONS AND USER INTERFACE

UNIT IV MULTIMEDIA INFORMATION RETRIEVAL

UNIT V APPLICATIONS

TOTAL: 45

REFERENCES:
MCS019    DATA WAREHOUSING AND DATA MINING       L T P C
                          3 0 0 3

Objectives:
1. To introduce the basics of data warehousing.
2. To know the data mining functionalities.
3. To study the various classification methods.
4. To understand the concept of cluster analysis.

UNIT I

UNIT II

UNIT III
Classification and Prediction - Issues Regarding Classification and Prediction – Classification by Decision Tree Introduction – Bayesian Classification – Rule Based Classification – Classification by Back propagation – Support Vector Machines – Associative Classification – Lazy Learners – Other Classification Methods – Prediction – Accuracy and Error Measures – Evaluating the Accuracy of a Classifier or Predictor – Ensemble Methods – Model Section.

UNIT IV

UNIT V

TOTAL: 45

REFERENCES:
MCS020 PERFORMANCE EVALUATION OF COMPUTER SYSTEMS AND NETWORKS

Objectives:
1. To study the queuing models.
2. To know the mobile networks.
3. To study the performance evaluation methods.

UNIT I

UNIT II

UNIT III
Markovian FIFO Queuing Systems – M/M/1 – M/M/a – M/M/∞ – M/G/1 – M/M/m/m and other Markov – Non-Markovian and self similar models – Network of Queues – Burke’s Theorem – Jackson’s Theorem.

UNIT IV
Multi-User Uplinks/Downlinks – Capacity Regions – Opportunistic Scheduling for Stability and Max Throughput – Multi-Hop Routing – Mobile Networks – Throughput Optimality and Backpressure

UNIT V

TOTAL : 45

TEXT BOOKS:

REFERENCES:
**MCS021**  
**AGENT BASED INTELLIGENT SYSTEMS**  

<table>
<thead>
<tr>
<th>L</th>
<th>T</th>
<th>P</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
</tbody>
</table>

**Objectives:**
1. To study the constraint satisfaction problem.
2. To know about the planning agents.
3. To understand the process of higher level agents.

**UNIT I  
INTRODUCTION**
9

**UNIT II  
KNOWLEDGE REPRESENTATION AND REASONING**
9

**UNIT III  
PLANNING AGENTS**
9

**UNIT IV  
AGENTS AND UNCERTAINTY**
9

**UNIT V  
HIGHER LEVEL AGENTS**
9

**TOTAL: 45**

**TEXT BOOK:**

**REFERENCES:**
MCS022 VISUALIZATION TECHNIQUES L T P C

3 0 0 3

Objectives:
1. To introduce the issues and foundations for visualization.
2. To know the multidimensional visualization.
3. To perform case studies using various analysis methods….

UNIT I VISUALIZATION

UNIT II FOUNDATIONS FOR DATA VISUALIZATION
Visualization stages – Experimental Semiotics based on Perception Gibson’s Affordance theory – A Model of Perceptual Processing – Types of Data.

UNIT III COMPUTER VISUALIZATION

UNIT IV MULTIDIMENSIONAL VISUALIZATION

UNIT V CASE STUDIES
Small interactive calendars – Selecting one from many – Web browsing through a key hole – Communication analysis – Archival analysis

TOTAL: 45

TEXT BOOKS:

REFERENCE:
MCS023  ADVANCED DATABASES  L T P C
3 0 0 3

Objectives:
1. To understand the parallel and distributed databases and architectures.
2. To study the concepts of object and relational databases.
3. To study about XML, Mobile and multimedia databases.

UNIT I  PARALLEL AND DISTRIBUTED DATABASES  10
Database System Architectures: Centralized and Client-Server Architectures – Server System
Architectures – Parallel Systems – Distributed Systems – Parallel Databases - I/O Parallelism –
Inter and Intra Query Parallelism – Inter and Intra operation Parallelism – Distributed Database
Concepts – Distributed Data Storage – Distributed Transactions – Commit Protocols –

UNIT II  OBJECT AND OBJECT RELATIONAL DATABASES  10
Concepts for Object Databases: Object Identity – Object structure – Type Constructors –
Encapsulation of Operations – Methods – Persistence – Type and Class Hierarchies – Inheritance –
Complex Objects – Object Database Standards – Languages and Design: ODMG Model –
ODL – OQL – Object Relational and Extended – Relational Systems: Object Relational feature
sin SQL/Oracle – Case Studies.

UNIT III  XML DATABASES  8

UNIT IV  MOBILE DATABASES  8
Mobile Databases: Location and Handoff Management – Effect of Mobility on Data
Management – Location Dependent Data Distribution – Mobile Transaction Models –

UNIT V  MULTIMEDIA DATABASES  9
Databases – Audio Databases – Multimedia Database Design.

TOTAL : 45

REFERENCES:
   Education/Addison Wesley, 2007.
4. C.J.Date, A.Kannan and S.Swamynathan,”An Introduction to Database Systems”, 8th
MCS024 COMPONENT BASED TECHNOLOGY L T P C
3 0 0 3

Objectives:
1. To introduce the various software components and their fundamental properties.
2. To know the java component technologies.
3. To study the CORBA technologies.
4. To understand the component frame works and the development.

UNIT I INTRODUCTION 9
Software Components – objects – fundamental properties of Component technology – modules –
interfaces – callbacks – directory services – component architecture – components and
middleware.

UNIT II JAVA COMPONENT TECHNOLOGIES 9
reflection – object serialization – Enterprise Java Beans – Distributed Object models – RMI and
RMI-IIOP.

UNIT III CORBA TECHNOLOGIES 9
Java and CORBA – Interface Definition language – Object Request Broker – system object
model – portable object adapter – CORBA services – CORBA component model – containers –
application server – model driven architecture.

UNIT IV COM AND .NET TECHNOLOGIES 9
COM – Distributed COM – object reuse – interfaces and versioning – dispatch interfaces –
connectable objects – OLE containers and servers – Active X controls – .NET components –

UNIT V COMPONENT FRAMEWORKS AND DEVELOPMENT 9
Connectors – contexts – EJB containers – CLR contexts and channels – Black Box component
framework – directory objects – cross-development environment – component-oriented
programming – Component design and implementation tools – testing tools – assembly tools.

TOTAL : 45

TEXT BOOK:

REFERENCE:
MCE001 COMMUNICATION NETWORK SECURITY  

Objectives:
1. To know about Various Networks problem
2. To study the Network Security
3. To understand how to protect the data in Network

UNIT I INTRODUCTION ON SECURITY  

UNIT II SYMMETRIC & ASYMMETRIC KEY ALGORITHMS  
Substitutional Ciphers - Transposition Ciphers - Stream and Block Ciphers - Data Encryption Standards (DES) - Advanced Encryption Standard (AES) - RC4 - principle of asymmetric key algorithms - RSA Cryptosystem

UNIT III INTEGRITY, AUTHENTICATION AND KEY MANAGEMENT  

UNIT IV NETWORK SECURITY, FIREWALLS AND WEB SECURITY  

UNIT V WIRELESS NETWORK SECURITY  

REFERENCES:
MCE010                EMBEDDED SYSTEMS                     L T P C
                                3 0 0 3

UNIT I  EMBEDDED SYSTEM BASICS  9
Embedded Computers, Characteristics of Embedded Computing Applications, Challenges in
Embedded Computing system design, Embedded system design process, Overview of embedded
system development-embedded system IDE- ARM Family-Core Types,-Memory Mapping-and
ARM Based embedded development system.

UNIT II  ARM ARCHITECTURE  9
Organization of CPU – Bus architecture –Memory management unit: virtual memory to physical
memory address translation, TLB, Domains and memory access permission ,cache and write
buffer ,single stage and two stage cache accessing ,significance of co-processor 15 Fast Context
Switch Extension.

UNIT III  EMBEDDED PROGRAMMING AND COMPUTING PLATFORM  9
Basic Embedded system Development Tools-Embest embedded IDE for ARM-Embest, Study of
S3C3V40 based University Teaching Kit and Unet JTAG emulator.-Embedded software
development based on ARM including: ARM basic instruction set, Thumb instruction set-
assembly programming- ARM processor mode switching-embedded C programming- C and
assembly language mix programming.

UNIT IV  ARM BASIC PERIPHERAL INTERFACING  9
I/O interface concepts-interrupts-types of interrupts-ARM interrupts-serial communication real-
time clock and simple digital LED interface - LCD display interfacing- GLCD display interfacing
– TFT display interfacing -the keyboard interfacing-the touch screen interfacing.

UNIT V  ARM COMMUNICATION INTERFACING  9
Synchronous and asynchronous data transfer- UART based communication-I2C Protocol basics -
serial communication using I2C bus: RTC Interfacing, EEPROM data transfer Ethernet
communication – I2S voice bus interface communication.

TOTAL: 45

REFERENCES:
6. Embedded System Development and Labs for ARM, (Edited, revised and updated by
Radu Muresan).
MCC007 ADHOC NETWORKS

Objective:

1. To learn about the MAC address spoofing concepts and basics of networks
2. To learn about the routing principles and Adhoc network types.
3. To learn about the IEEE standards, MESH networks and its heterogeneous models.

UNIT I ADHOC MAC

UNIT II ADHOC NETWORK ROUTING AND TCP

UNIT III WSN – MAC

UNIT IV WSN ROUTING, LOCALIZATION AND QoS

UNIT V MESH NETWORKS

TOTAL: 45

REFERENCES: