PONDICHERRY UNIVERSITY
(A CENTRAL UNIVERSITY)

B.Sc. Computer Science
(Choice Based Credit System)

Regulations & Syllabus

2019-20 onwards
1. **Aim of the Course**

The B.Sc. (Computer Science) course aims to impart the students with fundamental and hands on knowledge of computers, science of computing and modern computer science technologies.

2. **Eligibility of Admission**

Candidates for admission to B.Sc.(CS), shall be required to have passed 10 + 2 system of Examination or equivalent with Mathematics / Business Mathematics / Computer Science / Computer Applications as one of the subjects of study.

3. **Lateral Entry Admission**

Candidates who have passed Diploma in Computer Science / Information Technology / Computer Technology / Computer Application in I Class (10+3 years of study) are eligible to apply for the lateral entry to the 2\textsuperscript{nd} year of the course subject to availability of seats, but limited to 10\% of the sanctioned intake.

4. **Duration of the course**

The course shall be of three years’ duration spread over six consecutive semesters. The maximum duration to acquire prescribed number of credits in order to complete the Programme of Study shall be twelve consecutive semesters (six years).

5. **Medium**

The medium of instruction shall be English.
6. Course Structure

<table>
<thead>
<tr>
<th>Category</th>
<th>Course Name</th>
<th>Number Of Papers</th>
<th>Credits Per Paper</th>
<th>Total Credits</th>
</tr>
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<tbody>
<tr>
<td>MIL</td>
<td>Modern Indian Languages</td>
<td>2</td>
<td>3</td>
<td>6</td>
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<tr>
<td>ENG</td>
<td>English</td>
<td>2</td>
<td>3</td>
<td>6</td>
</tr>
<tr>
<td>AECC</td>
<td>Ability Enhancement Compulsory Course</td>
<td>2</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>SEC</td>
<td>Skill Enhancement Course</td>
<td>4</td>
<td>2</td>
<td>8</td>
</tr>
<tr>
<td>GE</td>
<td>Generic Elective Course</td>
<td>2</td>
<td>3</td>
<td>6</td>
</tr>
<tr>
<td>DSC</td>
<td>Discipline Specific Core Course</td>
<td>Theory- 12</td>
<td>Practical - 9</td>
<td>12x3=36</td>
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<tr>
<td></td>
<td></td>
<td>Theory- 3</td>
<td>Practical - 2</td>
<td>9 x 2 = 18</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Project - 1</td>
<td>1 x 6 = 6</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Total = 60</td>
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<tr>
<td>DSE</td>
<td>Discipline Specific Elective Course</td>
<td>6</td>
<td>4</td>
<td>6 x 4 = 24</td>
</tr>
<tr>
<td>OE</td>
<td>Open Elective Course</td>
<td>2</td>
<td>3</td>
<td>2 x 3 = 6</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
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<td>Total = 120</td>
</tr>
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</table>

**MIL, ENG, AECC**

The crediting of MIL, ENG and AECC courses is as per Pondicherry University UG CBCS regulations.

**DSC and DSE**

At least 60% (72 credits) of the total minimum credit requirement must be earned by the student from DSC and DSE courses as follows in order to obtain the degree - 60 credits from Discipline Specific Core and 12 credits from Discipline Specific Elective courses.

**SEC**

Out of the 4 Skill Enhancement Courses, one course viz. - Online Course / In-Plant Training (2 weeks) / One month Internship / mini project is mandatory. The Online Course to be studied, the organization to be chosen for In-Plant Training or One month internship is to be
validated or approved by a panel of members comprising of the Department Faculty, before a student pursues the same.

For the remaining 3 SEC courses, any of the 2 credit Skill Enhancement Courses specified in the curriculum (B.Sc. CS) could be credited or substituted with Skill Enhancement Courses in the curriculum of other UG computer science courses or Skill Enhancement Courses of other UG Non-Computer Science Disciplines of study that constitute to skill development or an assortment of these without any overlap of courses.

**GE**

Any 2 of the 3 credit Generic Elective Courses specified in the curriculum (B.Sc. CS) could be credited to constitute the 6 credits or substituted with Generic Elective courses in the curriculum of other UG Computer Science Disciplines of study or UG Courses of Non-Computer Science Disciplines of study that add proficiency to the students - with the advice of the Faculty Advisor, or an assortment of these without any overlap of courses.

**DSE**

The six 4 credit papers to be credited under DSE can be credited from Discipline Specific Elective specialization stream courses as follows:

- a. Three of the 4 credit courses can be credited from one specialization streams, thus completing 2 specialization streams. (or)
- b. All six 4 credit papers can be credited from any specialization stream across the different specialization stream courses specified in the curriculum without any overlap of courses credited in above. (or)
- c. Another specialization stream courses or across the different specialization stream courses in the curriculum of other UG Computer Science Disciplines of study without any overlap of courses credited in above.

**OE**

Any 2 of the 3 credit Open Elective Courses specified in the curriculum (B.Sc. CS) could be credited to constitute the 6 credits or substituted with Open elective courses in the curriculum of other UG Computer Science disciplines of study or substituted with UG Courses of Non-Computer Science Disciplines of study that add proficiency to the students - with the advice of the Faculty Advisor or an assortment of these without any overlap of courses.
7. Faculty to Students Ratio

The Faculty to Student Ratio in all the practical / laboratory classes shall be maintained at 1:25.

8. Pattern of Examination

I. The End-Semester examination and internal assessments for MIL, ENG, AECC, DSC, GE and OE courses are as per Pondicherry University UG CBCS regulations.

II. All SEC courses (except Online Course / In-Plant Training (2 weeks) / One month Internship) to be treated as a practical / laboratory course and the End-Semester examination to be conducted as per Pondicherry University UG CBCS regulations.

III. The internal assessments for all practical / laboratory courses (for DSC, SEC courses) shall be as follows – 15 marks from two internal practical / laboratory assessment tests and 5 marks based on practical / laboratory course based mini application development.

IV. The internal assessment for DSE courses shall be conducted as follows - 12 marks from two internal assessment tests and 8 marks based only on two internal practical / laboratory assessment tests.

V. The attendance mark (5 marks) is applied to all courses and the awarding of attendance marks is as per Pondicherry University UG CBCS regulations.

VI. The Project work is to be evaluated as follows:

   i. The internal assessment (25 marks) is awarded as follows:

      a. 10 marks is awarded based on two internal project reviews conducted in periodic intervals by a panel comprising of members of the Department during the tenure of the project.

      b. The student’s project guide awards 10 marks for the project work and 5 marks for attendance (attendance marks as specified in the Pondicherry University UG CBCS regulations).

   ii. The End Semester Examination assessment (75 marks) is evaluated under two aspects viz – i)Project Work – (50 marks) ii)Project Report and Viva-Voce (25 marks)

Passing Minimum

Passing Eligibility and classification for the award of the Degree is as per Pondicherry University UG CBCS regulations.
Lateral Entry

The Lateral Entry students have to complete 81 credits from the DSC, DSE, GE, SE, OE courses as per curriculum (IIIrd to VIth semesters). In addition, they should complete the two AECC courses (4 credits) for the award of the degree. One MIL (3 credits) and one ENG (3 credit) courses also need to be completed, if it is not studied in the last three years of the course eligible for lateral entry admission.

Other aspects of CBCS not covered in this document by default conforms to the Pondicherry University UG CBCS regulations.

Programme Outcomes

B.Sc (CS) programme has been designed to prepare graduates for attaining the following specific outcomes:

PO1 – It provides an ability to apply knowledge of Mathematics, Computer software and hardware in practice. It enhances not only comprehensive understanding of the theory but practical also.

PO2 - The program prepares the young professionals in wide range of areas such as Digital logics and computer architecture, Algorithms, Programming, Networking, Software Engineering, Information Security, Web Designing, Micro-processors and micro-controllers.

PO3 - In order to enhance programming skills of the young IT professionals, the program has introduced the ability to identify a problem, isolate its key components, analyze and assess the salient issues, set appropriate criteria for decision making, and draw appropriate conclusions and implications for proposed solutions.

PO4 – The program equips to demonstrate the capabilities required to apply cross-functional business knowledge and technologies in solving real-world problems and to demonstrate use of appropriate techniques to effectively manage business challenges.

PO5 - curriculum is divided based on various streams specialization that is needed in the IT Domain. Hence a student can specialize himself/herself in a particular stream.

PO6 - It provides an opportunity to prepare for the competitive examination and also getting admission to Higher Education.

PO7 - Become employable in various IT companies as programmer, system engineer, software tester, junior programmer, web developer, system administrator, software developer etc.

PO8 – Ability to work in public sector undertaking and Government organizations.
# PONDICHERRY UNIVERSITY

**Bachelor of Computer Science**

**PROPOSED STRUCTURE OF THE COURSE UNDER CBCS 2019-2020**

## FIRST SEMESTER

<table>
<thead>
<tr>
<th>COURSE</th>
<th>SUBJECT CODE</th>
<th>Paper</th>
<th>CREDITS</th>
<th>HOURS</th>
</tr>
</thead>
<tbody>
<tr>
<td>MIL</td>
<td>LTAM/LHIN/ LARA/ LMAL/ LFRE 111</td>
<td>Language-I</td>
<td>3</td>
<td>3 2 0</td>
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<tr>
<td>ENG</td>
<td>ENGL112</td>
<td>English-I</td>
<td>3</td>
<td>3 2 0</td>
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<tr>
<td>DSC – 1</td>
<td>CSCS113</td>
<td>Introduction to Problem Solving using C</td>
<td>3</td>
<td>3 2 0</td>
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<tr>
<td>DSC – 2</td>
<td>CSCS114</td>
<td>Digital Logic and Computer Organization</td>
<td>3</td>
<td>3 2 0</td>
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<tr>
<td>AECC-1</td>
<td>PADM115</td>
<td>Public Administration</td>
<td>2</td>
<td>2 0 0</td>
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<tr>
<td>DSC – 1(lab)</td>
<td>CSCS116</td>
<td>Programming in C Lab</td>
<td>-</td>
<td>2* 0 0 4</td>
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<td>DSC – 2(lab)</td>
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<td>Digital Lab</td>
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## SECOND SEMESTER

<table>
<thead>
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<tr>
<td>MIL</td>
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<td>PYTHON Programming</td>
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<td>DSC – 4</td>
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<td>Data Structures and Algorithms</td>
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<td>GE – 1 (1 out of 2)</td>
<td>CSCS125</td>
<td>Mathematics for Computer Science</td>
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<td></td>
<td>CSCS126</td>
<td>Numerical Methods</td>
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<td>AECC-2</td>
<td>ENVS127</td>
<td>EVS</td>
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### THIRD SEMESTER

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<tr>
<td>DSC – 5</td>
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<td>Object Oriented Programming using Java</td>
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<tr>
<td>DSC – 6</td>
<td>CSCS232</td>
<td>Operating Systems</td>
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<td>DSC – 7</td>
<td>CSCS233</td>
<td>Computer Networks</td>
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<td>3</td>
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<td>DSC-8</td>
<td>CSCS234</td>
<td>Software Engineering</td>
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<td>GE-2 (1 out of 2)</td>
<td>CSCS235</td>
<td>Applied Statistics</td>
<td>3</td>
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<tr>
<td></td>
<td>CSCS236</td>
<td>Theory of Computations</td>
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<td>DSC – 6 (lab)</td>
<td>CSCS237</td>
<td>Java Lab</td>
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<td>DSC – 7 (lab)</td>
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<td>Computer Networks Lab</td>
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### FOURTH SEMESTER

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<tr>
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<td>Th Prac L T P</td>
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<tr>
<td>DSC – 9</td>
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<td>Programming with Visual Basic</td>
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<td>DSC – 10</td>
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<tr>
<td>DSE – 1 DSE – 2 (2 out of 5)</td>
<td>CSCS243</td>
<td>Client/Server Computing</td>
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<tr>
<td></td>
<td>CSCS244</td>
<td>Data Warehousing</td>
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<td></td>
<td>CSCS245</td>
<td>Object Oriented Systems Design</td>
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<td>CSCS246</td>
<td>Information Security</td>
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<tr>
<td></td>
<td>CSCS247</td>
<td>Principles of Programming languages</td>
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<td>OE-1</td>
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<td>DSC-9 (lab)</td>
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<td>Visual Programming &amp; DBMS Lab</td>
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<tr>
<td></td>
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<td>Th</td>
<td>Prac</td>
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<tr>
<td>DSC – 11</td>
<td>CSCS351</td>
<td>Web Technology</td>
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<td>DSE – 3</td>
<td>CSCS352</td>
<td>Distributed Systems</td>
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<td>DSE – 4</td>
<td>CSCS353</td>
<td>Data Mining</td>
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<td>CSCS354</td>
<td>Software Testing</td>
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<td></td>
<td>CSCS355</td>
<td>Network Security</td>
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<td></td>
<td>CSCS356</td>
<td>Systems Software</td>
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<td>OE-2</td>
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<td>DSC-11 (lab)</td>
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<td>Web Technology Lab</td>
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<td>SEC-III</td>
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<td>SEC-IV</td>
<td>Compulsory</td>
<td>Online Course(min-30 hrs)/Mini project /Internship (2-weeks)/In-plant Training (one-month)</td>
<td>2*</td>
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**TOTAL** 20 30

### SIXTH SEMESTER

<table>
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<th>Paper</th>
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<td>Th</td>
<td>Prac</td>
</tr>
<tr>
<td>DSC – 12</td>
<td>CSCS361</td>
<td>Microprocessors and Controllers</td>
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<td>DSC – 13</td>
<td>CSCS362</td>
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<td>DSE – 5</td>
<td>CSCS363</td>
<td>Cloud Computing</td>
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<td>Foundations of Data Analytics</td>
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<td>CSCS365</td>
<td>Software Quality Management</td>
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<td></td>
<td>CSCS366</td>
<td>Ethical Hacking</td>
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<td></td>
<td>CSCS367</td>
<td>Principles of Compiler Design</td>
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<tr>
<td>DSC-12 (lab)</td>
<td>CSCS368</td>
<td>Microprocessor Lab</td>
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**TOTAL** 19 30

* University Practical Exam/ Viva Should be conducted
Bachelor of Science (*COMPUTER SCIENCE*)

under *CHOICE-BASED CREDIT SYSTEM (CBCS)*

(Effective from the academic year 2019-2020)

<table>
<thead>
<tr>
<th>DISCIPLINE SPECIFIC CORES (DSC)</th>
<th>Semester</th>
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<tbody>
<tr>
<td>1 Introduction to Problem Solving using C</td>
<td>I</td>
</tr>
<tr>
<td>2 Digital Logic and Computer Organization</td>
<td>I</td>
</tr>
<tr>
<td>3 Python Programming</td>
<td>II</td>
</tr>
<tr>
<td>4 Data Structures and Algorithms</td>
<td>II</td>
</tr>
<tr>
<td>5 Object Oriented Programming using JAVA</td>
<td>III</td>
</tr>
<tr>
<td>6 Operating Systems</td>
<td>III</td>
</tr>
<tr>
<td>7 Computer Networks</td>
<td>III</td>
</tr>
<tr>
<td>8 Software Engineering</td>
<td>III</td>
</tr>
<tr>
<td>9 Database Management Systems</td>
<td>IV</td>
</tr>
<tr>
<td>10 Programming Using Visual Basic</td>
<td>IV</td>
</tr>
<tr>
<td>11 Web Technology</td>
<td>V</td>
</tr>
<tr>
<td>12 Microprocessors and Microcontrollers</td>
<td>VI</td>
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<tr>
<td>13 PROJECT</td>
<td>VI</td>
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<thead>
<tr>
<th>DISCIPLINE SPECIFIC ELECTIVES (DSE)-POOL</th>
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(Specialization Stream - I)

Software Engineering

<table>
<thead>
<tr>
<th>Course</th>
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<tbody>
<tr>
<td>1 Object Oriented System Design</td>
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<tr>
<td>2 Software Testing</td>
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<tr>
<td>3 Software Quality Management</td>
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(Specialization Stream - II)

Advanced Computing

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<tr>
<th>Course</th>
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<tbody>
<tr>
<td>1 Client/Server Computing</td>
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<tr>
<td>2 Distributed Computing</td>
</tr>
<tr>
<td>3 Cloud Computing</td>
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<tr>
<td>(Specialization Stream - III)</td>
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<tr>
<th>(Specialization Stream - IV)</th>
<th>BUSINESS INTELLIGENCE</th>
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<tr>
<td>2</td>
<td>Data Mining</td>
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<td>Foundation of Data Analytics</td>
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<tr>
<th>(Specialization Stream - V)</th>
<th>SCIENCE OF PROGRAMMING LANGUAGES STREAM</th>
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<tbody>
<tr>
<td>1</td>
<td>Principles of Programming Languages</td>
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<td>2</td>
<td>System Software</td>
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<td>3</td>
<td>Principles of Compiler Design</td>
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<th>OPEN ELECTIVES-POOL</th>
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<tr>
<td>1</td>
<td>Business Communication</td>
<td>CSCS701</td>
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<td>2</td>
<td>IT Enabled Services</td>
<td>CSCS702</td>
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<td>3</td>
<td>Total Quality Management</td>
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<td>4</td>
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<tr>
<td>5</td>
<td>Introduction to E-Business</td>
<td>CSCS705</td>
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<td>6</td>
<td>Fundamentals of Accountancy</td>
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<td>Principles of Management</td>
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<td>1</td>
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<td><strong>Office Automation</strong></td>
<td>CSCS802</td>
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<tr>
<td>3</td>
<td><strong>Introduction to C++</strong></td>
<td>CSCS803</td>
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<tr>
<td>4</td>
<td><strong>Multimedia Tools</strong></td>
<td>CSCS804</td>
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<tr>
<td>5</td>
<td><strong>Programming with PHP</strong></td>
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<td>6</td>
<td><strong>Mobile Application Development</strong></td>
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<td>7</td>
<td><strong>Online Course / mini project / Internship (2 weeks)/ In-Plant Training (2 weeks)</strong></td>
<td>CSCS807, CSCS808, CSCS809, CSCS810</td>
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**GENERIC ELECTIVES**

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<tbody>
<tr>
<td>1</td>
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**NON MAJOR ELECTIVES**

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<td><strong>Basics of Computers and Office Automation</strong></td>
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<td><strong>Fundamentals of Information Technology</strong></td>
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<td><strong>Fundamentals of ‘C’ Language</strong></td>
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<td><strong>Web Designing</strong></td>
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DISCIPLINE SPECIFIC CORE

Paper Code: CSCS113

INTRODUCTION TO PROBLEM SOLVING USING C

Prerequisite: - Basic knowledge of Mathematics and computers

Objectives:
- To learn the concepts of “C” Programming
- To develop software program using “C” language

Outcomes:
- In-depth understanding of various concepts of C language.
- Skill to write program code in C to solve real world problems and to debug a program

MODULE – I


MODULE – II

Character Set, Structure of a ‘C’ Program, Data Types, Operators, Expressions, Assignment Statement, Conditional Statements, Looping Statements, Nested Looping Statements, Multi Branching Statement (Switch), Break and Continue, Differences between Break and Continue, Unconditional Branching (Go to Statement)

MODULE – III


MODULE – IV

Arrays: Declaration and Initialization of one and two dimensional arrays – Multidimensional array – dynamic arrays - Character arrays and strings. Structure: Defining and processing. Structure initialization Operations on individual members Arrays of structure, Arrays within Structure, Structure and Functions- Passing to a function, Union.

MODULE – V

Pointers: Declarations and initialization of pointer variables ,Accessing pointer variables, Passing to a function. Operations on pointers, pointer and arrays. Array of pointers, Pointer to Functions. Data Files: Open, close, create, process unformatted data files.

TEXT BOOK
LIST OF EXERCISES

1. Simple C programs
2. Program to illustrate control statements
3. Program to illustrate FOR loop
4. Program to illustrate SWITCH & WHILE statements
5. Program to illustrate functions
6. Program to illustrate user-defined functions
7. Program to illustrate arrays
8. Program to illustrate usage of pointers
9. Program to illustrate character handling libraries.
10. Program to illustrate string manipulation
11. Program to illustrate creation of files.
12. Program to illustrate creation, reading & accessing files
Paper Code: CSCS114

DIGITAL LOGIC & COMPUTER ORGANIZATION

Prerequisite: Basic knowledge about computers

Objectives:
- To learn the fundamentals of digital logic and computer design.
- To learn combinational and sequential logic.

Outcomes:
- Skill to use the methods of systematic reduction of Boolean expression using K-Map. Ability to interpret logic gates and its operations.
- Familiarization with combinational and sequential logic circuits in electronics.

MODULE – I

MODULE – II

MODULE – III

MODULE – IV

MODULE – V
Register transfer logic Inter register transfer Arithmetic, Logic and shift micro operations Conditional control statements fixed point binary data overflow Arithmetic shifts Instruction codes Design of simple computer.

Text Books:
LIST OF EXERCISES

1. Study of Logic Gates
2. Design of Adder and Subtractor
3. Design and Implementation of Code Convertors
4. Design of 4-Bit Adder and Subtractor
5. Design and Implementation of Magnitude Comparator
6. 16 Bit Odd/Even Parity Checker and Generator
7. Design and Implementation of Multiplexer and De-multiplexer
8. Design and Implementation of Encoder and Decoder
9. Design and Implementation of Shift Register
10. Simulation of Logic Gates
11. Simulation of Adder and Subtractor
12. Design of 4-Bit Adder and Subtractor
Prerequisite: Knowledge of any programming language

Objectives:
- To learn basic python concept.
- To develop simple Python programs and code reusing with functions

Outcomes:
- Skill to write codes in Python to solve mathematical or real world problems.
- Ability to isolate and fix common errors in Python programs.

MODULE 1


MODULE 2

Control Structure -Selection Control- If Statement - Indentation in Python - Multi-Way Selection - Iterative Control - While Statement - Input Error Checking - Infinite loops - Definite vs. Indefinite Loops

MODULE 3

List Structures - Common List Operations - List Traversal - Lists (Sequences) in Python- Python List Type - Tuples- Sequences- Nested Lists - Iterating Over Lists (Sequences) in Python - For Loops - The Built-in range Function - Iterating Over List Elements vs. List Index Values-While Loops and Lists (Sequences) - Dictionaries and sets

MODULE 4

Defining Functions - Calling Value-Returning Functions - Calling Non-Value-Returning Functions - Parameter Passing - Keyword Arguments in Python Default Arguments in Python - Variable Scope - Recursive functions - Exception Handling - The Propagation of Raised Exceptions - Catching and Handling Exceptions - Exception Handling and User Input

MODULE 5

String Processing - String Traversal - String-Applicable Sequence Operations -String Methods - Using Text Files - Opening Text Files - Reading Text Files - Writing Text Files

TEXT BOOK


REFERENCE BOOKS


LIST OF EXERCISES

1. Create simple programs using arithmetic Boolean and logical operators
2. Develop program using control flow tools like IF.
3. Develop program using LOOP control structures
4. Data structures
   use list as stack
   use list as queue
   tuple, sequence
5. Write a program to read and write files, create and delete directories
6. Write a program with exception handling
7. Write a program using string handling and regular expressions
Pre-requisite: Knowledge of any programming language

Objectives:
- To acquaint students with data structures used for programming and manipulation of data.
- To make students to understand the basics of algorithms.

Outcomes:
- Skill to analyze data and to determine appropriate data structure. Knowledge of various data structures and their implementations.
- Ability to implement algorithms to perform various operations on data structures.

MODULE-I

MODULE-II
Queues: Representation, Operations on Queues, Implementation of queues using array. List representations, implementing the list operations, Doubly linked list representation. Polynomial - representations.

MODULE-III
Non Linear Data Structures: Trees: Basic terminology, Binary tree, Representation, Traversal, Binary search tree.

MODULE-IV
Graph: Definition and Terminology – Representation, Traversal – Depth First and Breadth First traversal techniques.

MODULE-V
Introduction to Algorithms: Algorithm Design Techniques – Iterative techniques: Bubble Sort, Insertion Sort, Divide and Conquer: Merge Sort, Quick Sort

TEXT BOOKS
LIST OF LAB EXERCISES

1. Linear Search
2. Binary Search
3. Implementation of Stack
4. Implementation of Evaluation of Expression
5. Implementation of Queue
6. Implementation of Singly Linked List
7. Implementation of tree traversal
8. Implementation of Graph traversal
9. Implementation of Bubble sort
10. Implementation of Insertion sort
11. Implementation of Quick sort
12. Implementation of Merge sort
OPERATING SYSTEMS

Pre-requisite: Knowledge of computers & computer organization

Objectives:
- To learn OS management functions.
- To learn Memory management, Processor management, Device Management and I/O Management

Outcomes:
- Understand how memory is utilized. Understand CPU scheduling algorithms to manage tasks.
- Knowledge of methods to prevention and recover from a system deadlock. Manages I/O devices.

MODULE –I

MODULE –II

MODULE –III

MODULE –IV

MODULE –V

Text Book
1. Stuart E.Madnick and John Donovan “Operating System”, TMH Fifth Reprint 2000. (Chapter 1,3,4,5,6)
OBJECT ORIENTED PROGRAMMING USING JAVA

**Prerequisite:** Basic knowledge of programming

**Objectives:**
- To learn the basic concepts of OOP
- To develop Java programs, Swing and Applets

**Outcomes:**
- Skill to write Java application programs using OOP principles and proper program structuring.
- Ability to create packages and interfaces. Ability to implement error handling techniques using exception handling.

**MODULE - I**
Concepts of OOP: Introduction OOP, Procedural Vs Object Oriented Programming, Principles of OOP, Benefits and applications of OOPS

**MODULE – II**
Introduction to java applications – Introduction to classes, objects, methods & Strings - Control statements – Arrays - constructor – function overloading & overriding - Inheritance - Polymorphism – Interface – package - exception handling

**MODULE – III**
GUI components –Overview of Swing components –Displaying Text and Images in a Window - Text Fields, Introduction to Event Handling- GUI Event Types and Listener Interfaces - layout manager, Swings Vs AWT

**MODULE – IV**
Files, Streams & I/O – Introduction – Files & Streams – Sequential Access Text Files

**MODULE – V**
Introduction to Multi-Threading, Thread life cycle, Thread priorities. Introduction – Applets & Java Web Start – applet life-cycle, HTML tags, a simple applet program

**Text Books:**
LIST OF EXERCISES

1. Program to illustrate class and objects.
2. Program to illustrate control structures (if-then, while, switch).
3. Program to illustrate arrays (creation, initialization and processing).
4. Program to illustrate Constructor and its overloading.
5. Program to illustrate Inheritance and Packages.
6. Program to illustrate Interface and static methods.
7. Program to illustrate Exception Handling Technique with IO streams.
8. Program to illustrate File handling technique.
9. Program to illustrate Swing Application.
10. Program to illustrate applets using HTML.
Pre-requisite: Basic Knowledge of Computers

Objectives:

- To educate the functions of various OSI layers in detail

Outcomes:

- Knowledge of OSI Layers in Computer Network.
- Ability to identify transmission media, types and topologies of network. Familiarization with the techniques of error detection and congestion control

MODULE –I

MODULE –II

MODULE –III
Data Link Layer: data link Layer Design issues, Error Detection and correction, Simplex Stop-and-wait protocol, Sliding window protocols

MODULE –IV

MODULE –V

TEXT-BOOK


REFERENCES

2. Data and Computer communications Seventh edition William Stallings PHI
Computing Networks Lab

Implementation using JAVA or PYTHON

1. Text Message Sending and Receiving
2. File Transmission
3. Basic Chat Application
4. Simple Mailing Application
5. Client Server Application
Pre-requisite: Basic knowledge of programming

Objectives:
- To gain knowledge about software development life cycle models, software design, implementation, and testing of software.
- To gain overall knowledge of how software is developed

Outcomes:
- Understanding of various methods or models for developing a software product.
- Ability to analyze existing system to gather requirements for proposed system. Skill to design and code a software.

MODULE -I


MODULE -II


MODULE -III


MODULE -IV

Implementation issues: Structures Coding Techniques - Coding Style - Standards and Guidelines - Documentation guidelines - Type Checking - Scoping Rules - Concurrency Mechanisms.

MODULE -V

Software testing – strategic approach to software testing – terminologies – functional testing – structural testing – levels of testing – validation testing – the art of debugging – testing tools

Text Book

PROGRAMMING WITH VISUAL BASIC

Pre-requisite: Knowledge of any programming language

Objectives:
- To introduce students Event Driven Programming.
- To help the students to find solution to real life problems using Visual Basic.NET
- Students will learn about connecting and accessing databases.

Outcomes:
- Understand Forms, module, components, menu editor and its concepts. Usage of controls such as text box, buttons, checkbox etc and control them through codes.
- Ability to develop simple project with database using data source.

MODULE I

MODULE II
Data Types, Keywords, Declaring Variables and Constants, Operators, Conditional Statements - Looping Statement. Arrays- Static and Dynamic. Functions and Procedures- Built-In Functions - Mathematical and String Functions. Object Oriented Programming- Creating Classes, Objects, Properties, Methods, Events, Constructors and destructors, Exception Handling.

MODULE III
Properties, Events and Methods of Form, Label, TextBox, ListBox, ComboBox, RadioButton, Button, CheckBox, Progress Bar, Date Time Picker, Calendar, Picture Box, HScrollBar, VScrollBar, Group Box, ToolTip, Timer.

MODULE IV
Menus and toolbars- Menu Strip, Tool Strip, Status Strip, Built-In Dialog Boxes –Open File Dialogs, Save File Dialogs, Font Dialogs, Color Dialogs, Print Dialogs, InputBox, MsgBox, Interfacing With End user- Creating MDI Parent and Child.

MODULE V
Introduction to ADO.NET: ADO.Net Object Model, Data Provider, DataSet, Connecting to database, Reading data into a data cell: the dataset class, finding tables, rows, column values, column definition, adding, deleting and updating rows, writing updates back to data source.

Text Books:

Reference Books:
1. Anne Bohem, Murach’s Beginning Visual basic .Net, Mike Murach & associates, 2002
Paper Code: CSCS242

DATABASE MANAGEMENT SYSTEM

Prerequisite: Knowledge of data structures and file-handling

Objectives:
- To learn the fundamental concepts of Database management systems.
- To learn SQL commands to manage data and PL/SQL.

Outcomes:
- Understand data modeling and database development process. Construct and normalize conceptual data models.
- Implement a relational database into a database management system. Become proficient in using database query language.

MODULE I:

   Introduction to Database System- Objectives- Entities and Attributes – Data Models

MODULE II:


MODULE III:


MODULE IV:


MODULE V:


TEXT BOOK

LIST OF EXERCISES:

1. Building simple applications.
2. Working with controls.
3. Application with multiple forms.
4. Application with dialogs
5. Application with Menus
6. Develop any TWO case studies listed below:
   i) Students marksheet processing
   ii) Electricity bill processing
   iii) Bank Transaction
   iv) Payroll processing
   v) Gas booking and delivery
   vi) Library information system
Pre-requisite: Knowledge of Operating system, computer network, DBMS, and Java.

Objectives:
- To gain knowledge in HTML and DHTML
- To design interactive web pages using Style sheets, Java-script and ASP.

Outcomes:
- Understand the various steps in designing Creative and dynamic website.
- Ability to write HTML, JavaScript, CSS and ASP.

MODULE – I

MODULE – II

MODULE – III
Introduction to DHTML – Introduction to style sheets – Setting the default style sheet language – Inline style information – External Style sheets – Cascading Style sheets.

MODULE – IV
Introduction to Java script - script tag, interactive data, DOM, A simple document, Add a form, Add a text input element, Add a button element, properties, methods and event handlers. Scripts and HTML.

MODULE – V
Introduction to ASP – Database Management with ASP: Database access with ADO, working with ADO’s Connection object, Using Command objects, Working with ADO’s Recordset Object.

TEXT BOOKS
1. Robert W. Sebesta, “Programming the World Wide Web”, Addison Wesley, 2011 (Chapter 1 only)
2. Elisabeth Freeman and Eric Freeman, “Head First HTML with CSS & XHTML (Head First”)O’Reilly , 2005
WEB TECHNOLOGY LAB

LIST OF EXPERIMENTS

LIST OF EXERCISES

1. Usage of Simple HTML commands, Graphics and image formats and hyperlinks
2. Usage of Tables, Frames, Forms, Background Graphics and Color
3. Simple application using HTML
4. Simple application using DHTML and Cascading style sheet
5. Simple application using Java script
6. Simple application using ASP (Any Application Of Student’s Choice)
Prerequisite: Knowledge of computer organization

Objectives:
- To understand the architectures and the instruction set of 8085 microprocessor
- To understand the architectures and the instruction set of 8051 microcontroller

Outcomes:
- Get clear idea about the architectures and instruction set of microprocessor and microcontroller.
- Do the arithmetic operation, logical operations and code conversion

MODULE – I
Intel 8085 Microprocessor: Introduction – Need for Microprocessors – Evolution – Intel 8085 Hardware – Architecture – Pin description – Internal Registers – Arithmetic and Logic Unit – Control Unit – Instruction word size

MODULE – II

MODULE – III
Data Transfer Techniques – Synchronous, Asynchronous and Direct Memory Access (DMA) and 8237 DMA Controller – 8253 Programmable Interval Timer.

MODULE – IV
Memory & I/O Interfacing: Types of memory – Memory mapping and addressing – Concept of I/O map – types – I/O decode logic – 8279 Interfacing key switches and LEDs – 8255 Programmable Peripheral Interface –

MODULE – V

Text Books:
LIST OF EXERCISES

1. Basic Arithmetic and Logical Operations  Addition
2. Basic Arithmetic and Logical Operations  Subtraction
3. Basic Arithmetic and Logical Operations  Multiplication
4. Basic Arithmetic and Logical Operations  Division
5. Move a Data Block Without Overlap
7. Code Conversions – Decimal to Hexadecimal
8. Code Conversion – Hexadecimal to Decimal
9. Floating Point Operations
10. Ascending & Descending operation
Objective
The objective of the project is to motivate them to work in emerging/latest technologies, help the students to develop ability, to apply theoretical and practical tools/techniques to solve real life problems related to industry, academic institutions and research laboratories.

Outcome
The course outcome is the ability of the student to apply Software Development Cycle to develop a software module. The student will be able to use the techniques, skills and modern software engineering tools necessary for software development. Develop a software product along with its complete documentation.

The project is of 2 hours/week for one (semester VI) semester duration and a student is expected to do planning, analyzing, designing, coding, and implementing the project. The initiation of project should be with the project proposal. The synopsis approval will be given by the project guides.

The project proposal should include the following:
- Title
- Objectives
- Input and output
- Details of modules and process logic
- Limitations of the project
- Tools/platforms, Languages to be used
- Scope of future application

The project work should be either an individual one or a group of not more than three members and submit a project report at the end of the semester. The students shall defend their dissertation in front of experts during viva-voce examinations.
DISCIPLINE SPECIFIC ELECTIVE (DSE) PAPERS

Specialization Stream – I [ADVANCED COMPUTING STREAM]

Paper Code: CSCS243

CLIENT/SERVER COMPUTING

Prerequisite: Knowledge of computer networks & DBMS

Objectives:
- To learn about objective evaluations and details of Client/Server development tools, used in operating system and database management system
- To learn the basics of middleware architecture

Outcomes:
- Understand the objective evaluations and details of Client/Server development tools, used in operating system and database management system
- Get an idea about the basics of middleware architecture

MODULE – I
Introduction – defining client/server computing – Classification of client/server systems – clients/server – advantages & disadvantages – driving forces behind client/server computing

MODULE – II

MODULE – III

MODULE – IV

MODULE - V
System development – hardware & software requirements – communication interface technology – client/server technology & web services – what are web services – web services & client/server/browser – server technology – client/server technology & web applications

Text Book:
Prerequisite: Knowledge of Database and Networks.

Objective
- To make the students to understand the collaborative operations of collections of computer systems.

Outcomes
- Understand the collaborative operations of collections of computer systems.

MODULE I

MODULE II

MODULE III
Remote Invocation – Introduction - Request-reply protocols - Remote procedure call - Remote method invocation - Group communication

MODULE IV
Publish-subscribe systems - Message queues - Shared memory approaches - Distributed objects - Case study

MODULE V
Distributed File Systems –Introduction - File service architecture - Distributed mutual exclusion – Elections

Text Book:
CLOUD COMPUTING

Prerequisite: Knowledge of operating system, distributed system.

Objectives:

- To impart the principles and paradigm of Cloud Computing
- To comprehend the Cloud Computing architecture and implementation

Outcomes

- Understand the principles and paradigm of Cloud Computing
- Get an idea about the Cloud Computing architecture and implementation

MODULE – I

MODULE – II
Cloud Deployment Models – Introduction - Private Cloud - Public Cloud- Hybrid Cloud - Cloud Service Models- Infrastructure as a Service- Platform as a Service- Software as a Service

MODULE – III
Virtualization - Approaches to Virtualization- Hypervisors

MODULE – IV
From Virtualization to Cloud Computing- Programming Models for Cloud Computing

MODULE – V
Software Development in Cloud Introduction - Different Perspectives on SaaS Development - New Challenges - Cloud-Aware Software Development Using PaaS Technology

Text Book:
DISCIPLINE SPECIFIC ELECTIVE (DSE) PAPERS

Specialization Stream – II [BUSINESS INTELLIGENCE STREAM]

Paper Code: CSCS244

DATA WAREHOUSING

Pre-requisite: Knowledge of database management system.

Objectives:
- To learn the fundamentals of data warehouses
- To study the architecture, design, hardware and planning of a data warehouse.

Outcomes:
- Acquire knowledge in the fundamental concepts, benefits and problem areas associated with data warehousing. Understand the various architectures and main components of a data warehouse.
- Ability to design a data warehouse, and be able to address issues that arise when implementing a data warehouse.

MODULE I

MODULE II

MODULE III

MODULE IV
Hardware and operational design: server hardware, network hardware, Client hardware – Physical layout: parallel technology, Disk technology, Database layout, File systems – Security – introduction to Service level Agreement.

MODULE V

TEXT BOOKS:
Prerequisite: Knowledge of Data Warehouse.

Objectives:
- To understand the concepts of Data Mining.
- To learn about Classification, prediction and cluster analysis techniques.

Outcomes:
- Acquire knowledge to compare and contrast OLAP and data mining as techniques for extracting knowledge from a data warehouse.
- Implement data mining techniques like clustering, association rule and decision tree etc on the real data set.

MODULE I
Introduction to Data Mining: Definition of data mining - Stages of the Data Mining Process – Basic data types – Major building blocks –Scope of Data Mining – Data Mining working – Data Mining Architecture – Data Mining implementation process – Data Mining Techniques – Advantages & Disadvantages.

MODULE II
Data: Types of Data, Data quality, Data preprocessing- Measures of similarity and dissimilarity – Exploring data: summary statistics, visualization, OLAP and multi-dimensional data analysis.

MODULE III
Data preprocessing: Data preprocessing introduction, Data cleaning - Data integration - Data reduction – Data transformation and data Discretization.

MODULE IV
Classification: Problem definition - General approach - Decision tree induction - Rule based classifiers – nearest neighbor - Bayesian classifiers - Pattern Mining – Introduction- pattern mining in multilevel, multi-dimensional space - Frequent Pattern Mining Model.

MODULE V
Cluster analysis basic concepts and methods: Introduction – requirements for cluster analysis – Over view of clustering methods. Data mining Applications – Data Mining Tools

TEXTBOOKS:
1. Data Mining: Concepts and Techniques by Jiawei Han and Micheline Kamber, Elsevier, 2010.
2. Introduction to Data Mining by Pang-Ning Tan, Michael Steinbach and Vipin Kumar, 2005.
FOUNDATIONS OF DATA ANALYTICS

Pre-requisite: Knowledge of Data Mining.

Objectives:
- To learn to explore data, sample and model them
- To gain knowledge about Big Data and analyse them.

Outcomes:
- Understand need for big data and its associated methodologies
- Understand the various techniques to analyze and learn from data

MODULE - I
Introduction to Data Science: Definition of Data Science, Need for Data Science, components of data science - Data science process – Introduction to NoSQL.

MODULE II

MODULE III
Big data Management - Operational Databases: importance of RDBMS in Big Data Environment, Non-Relational databases, key value pair database, document database, columnar database, graph database, spatial database

MODULE - IV
MapReduce Fundamentals: Tracing the Origins of MapReduce, Understanding the map Function, Adding the reduce Function, Putting map and reduce Together, Optimizing MapReduce Tasks.

MODULE V

TEXT BOOKS:
1. Davy Cielan, Arno D. B. Meysman, Mohamed Ali, “Introducing Data Science”, manning publications, 2016 (Chapter 1 to 3 for Module I & Module V)
2. “Data Science and Big Data Analytics”, EMC Education Service, Wiley. 2015 (Chapter 1 & Chapter 2 for module II)
3. Alan Nugent, Dr. Fern Halper, Marzia Kaufman, “Big Data for Dummies”, by Judith Hurwitz, , Wiley pub, 2013. (Chapter 7 & 8 for module III and IV)
DISCIPLINE SPECIFIC ELECTIVE (DSE) PAPERS

Specialization Stream – III [SOFTWARE ENGINEERING STREAM]

Paper Code: CSCS245

OBJECT ORIENTED SYSTEM DESIGN

**Prerequisite:** Knowledge of object oriented programming

**Objectives:**
- Understand software modeling and Architectural Concepts
- Understand and apply UML notations in designing software
- Gain knowledge about Static and Dynamic modeling

**Outcomes:**
- Ability to develop the design phase of software development using UML

**MODULE 1**

System development - object basics - development life cycle - methodologies - patterns - frameworks - unified approach - UML.

**MODULE 2**

Use - Case models - object analysis - object relations - attributes - methods, class and object responsibilities

**MODULE 3**

Design processes - design axioms- class design - object storage - object interoperability

**MODULE 4**

PO User interface design - view layer classes - micro - level processes - view layer interface

**MODULE 5**

Quality assurance tests - testing strategies - object orientation on testing - test cases - test plans - continuous testing - debugging principles - system usability - measuring user satisfaction - case studies.

**Text books:**
PRE-REQUISITE: Knowledge in Software Engineering.

Objectives:
- To understand the Concepts of Software Testing.
- Introducing about various Testing Tools.

Outcomes:
- Understand the problems of defects and need of Testing
- Acquire knowledge about various testing strategies that are used in the industries to test their products

MODULE – I

MODULE – II

MODULE- III

MODULE - IV

MODULE - V
Software Test Automation: Approaches to Automation: partial automation, full automation- Choosing the right tool - Challenges in software test automation.

Text Books
SOFTWARE QUALITY MANAGEMENT

Prerequisite: Knowledge of software engineering

Objectives

- To learn how to apply quality assurance tools & techniques
- To learn about standards and certifications

Outcomes:

- Able to understand the importance of quality and standards
- Understand various models of dealing with software quality

MODULE - I

Introduction, Environment, Characteristics, tasks and Goals, Software Quality Challenge
- Software Quality requirements, factors: McCall’s factor model,

MODULE - II

Integrating Quality Activities in the Project Life Cycle – Reviews - Assuring the Quality of Software Maintenance components - Case Tools and their effect on Software Quality.

MODULE - III

Software Quality Infrastructure Components - Procedures and Work Instructions – Staff Training and Certification – Software Configuration Management - Documentation Control.

MODULE - IV

Software Quality Management Components - Project Progress Control - components of project progress control- Progress control of internal projects and external participants- Implementation of project progress control

MODULE - V

Software Quality Metrics - Objectives of quality measurement- Classification - Product metrics – Implementation – limitation; scope of quality management standards: ISO 9000 family, CMM and CMMI.

TEXT BOOK


REFERENCE BOOKS

DISCIPLINE SPECIFIC ELECTIVE (DSE) PAPERS

Specialization Stream – IV [INFORMATION SECURITY STREAM]

Paper Code: CSCS246

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INFORMATION SECURITY

Prerequisite: Basic knowledge of computers

Objectives:
- To provide an understanding of principal concepts, major issues, technologies and basic approaches in information security.

Outcomes:
- Understand the history and the need for information security.
- Acquire knowledge about legal and ethical aspects of information security and risk control strategies.

MODULE – I

MODULE – II

MODULE – III

MODULE – IV

MODULE – V
Risk Control Strategies - Selecting a Risk Control Strategy - Quantitative Versus Qualitative Risk Control Practices - Risk Management Discussion Points

TEXT BOOK:
Prerequisite: Knowledge of computer networks.

Objectives:
- To learn Computer Network Vulnerabilities
- To learn how to deal with Network Security Challenges and counter measures

Outcomes:
- Familiarization with the benefits and issues regarding Network Security
- Ability to understand the threat and deal with vulnerabilities

MODULE – I

MODULE – II

MODULE – III

MODULE – IV

MODULE – V

TEXT BOOK

REFERENCES
ETHICAL HACKING

Pre-requisite: Knowledge of Networks

Objectives:
- Understanding need for Ethical Hacking
- Understanding the procedure for hacking and malware attacks

Outcomes:
- Acquire knowledge of ethical hacking, need and procedure.
- Understand various malwares and hacking methodologies.

MODULE I
Introducing Ethical Hacking: Defining hacker, Ethical Hacking, Understanding the Need to Hack Your Own Systems, Understanding the Dangers Your Systems Face, Nontechnical attacks Network-infrastructure attacks, Operating system attacks, Application and other specialized attacks, Obeying the Ethical hacking Commandments, Working ethically Respecting privacy Not crashing your systems, The Ethical hacking Process: Formulating your plan, Selecting tools Executing the plan, Evaluating results.

MODULE II

MODULE III
Hacking Methodology : Setting the Stage, Seeing What Others See, Gathering public information, Mapping the network, Scanning Systems, Hosts, Modems and open ports, Determining What’s Running on Open Ports, Assessing Vulnerabilities, Penetrating the System

MODULE IV

MODULE V

TEXT BOOK
1. Kevin Beaver, “Hacking for Dummies”, Wiley Publishing Inc, 6th edition 2018 (Chapters 1,2,3,4,5,14)
DISCIPLINE SPECIFIC ELECTIVE (DSE) PAPERS

Specialization Stream – V [SCIENCE OF PROGRAMMING LANGUAGE STREAM]

Paper Code: CSCS247

PRINCIPLES OF PROGRAMMING LANGUAGES

Prerequisite: Knowledge of programming

Objectives:
- To understand the constructs of programming language
- To know the different programming paradigms

Outcomes:
- Get the clear idea about the construction of Programming language
- Use different programming paradigms in and application

MODULE - I
The challenge of programming language design - Criteria for language design-some possible solutions - Defining syntax: General problem of describing syntax, formal methods of describing syntax, BNF, Syntax Graphs - Syntax and program Reliability.

MODULE - II
Variables, Expressions and statements - Variables and assignment statement, Binding Time and Storage Allocation, Constants and initialization, Expressions, Statements- Conditional, Iteration - GOTO and Labels – Types - Data types and Typing. Enumerated and elementary, pointer, structured Data types, Type coercion & Equivalence - Scope and Extent

MODULE - III
Procedures - General features, Parameter evaluation & passing, Call-By-Name, Specification of objects in a procedure, aliasing, Overloading, Generic functions, Co-routines - Abstract data types - concept of abstraction, Encapsulation, Introduction to data abstraction, design issues, parameterized abstract data types.

MODULE - IV
Exception Handling - Introduction, Exception Handling in PL/I, Exception Handling in Ada, Exception Handling in C++ - Concurrency - Basic concepts, subprogram-level concurrency, statement-level concurrency, semaphore, Monitors, Message passing.

MODULE - V

Text Books
Prerequisite: Knowledge of computer organization and programming

Objectives:
- To understand the functions of assemblers, loaders, linkers, macro-processors and compilers.

Outcomes:
- Understand the importance of assemblers, loaders, linkers, macro-processors and compilers
- Know the working principles of assemblers, loaders, linkers, macro-processors and compilers

Module – I
Introduction: System software and machine architecture, traditional (CISC) machines, RISC machines.

Module - II
Assemblers: Basic assembler functions, machine dependent and machine independent assembler features, one-pass assemblers, multi pass assemblers, MASM assembler, SPARC assembler.

Module - III
Loaders and Linkers: Basic loader functions, machine dependent and machine independent loader features, linkage editors, dynamic linking, bootstrap loaders.

Module - IV
Macro Processors: Basic macro processor functions, machine dependent and machine independent macro processor features, macro processor design options.

Module - V
Compilers: Basic compiler functions, machine-dependent compiler features, machine-independent compiler features, compiler design options the YACC compiler-compiler.

Text Books:
PRINCIPLES OF COMPILER DESIGN

Prerequisitete: Knowledge of system software and principles of programming

Objectives:
- To gain basic features of compilers
- To gain knowledge on data structures required for designing compilers

Outcomes:
- Understand the phases of compilers in detail
- Know how the data structures are used in compilers

MODULE - I

MODULE - II

MODULE - III

MODULE - IV

MODULE - V
Code generation – issues in the design of a code generator – runtime storage management – basic blocks and flow graph – register allocation and assignment – DAG representation of basic blocks, generating code from DAGs- introduction to code generation.

Text Book:
OPEN ELECTIVE-I

Paper Code: CSCS701

BUSINESS COMMUNICATION

Pre-requisite: Basic knowledge in English.

Objectives:

- To understand and learn to communicate effectively
- Learn to write business reports and letters

Outcomes:

- Understand the importance of communication and able to communicate business deals verbally and non-verbally
- Acquire knowledge to write efficient business reports and equip to appear for interviews

MODULE I

The fact and meaning of communication: the need for communication, the communication process, interpersonal communication, business communication, characteristics of business communication, many meaning of communication; direct communication, non-direct of written communication, non-method of communication, non-verbal communication, visual communication, audio-visual communication, Tele-communication.

MODULE II

Objectives of communication process, types of communication-internal and external communication, formal and informal channels, the grapevine, internal communication networks, downward communication, upward communication, horizontal communication, barriers to communication and how to handle them.

MODULE III

Public relations advertising- concepts and types, interviews: types and techniques, meetings, committees, conference and communication problems.

MODULE IV

Business reports, memoranda and representation, business correspondence: theory principles of business correspondence, parts of a letter, forms / formats of letters.

MODULE V

Business correspondence in practice- applications, reference, testimonials, appointments, confirmation, promotion, termination, resignation enquiries and replies, orders and acknowledgements, circulars, public speaking, precise writing.

TEXT BOOK

OPEN ELECTIVE - II

Paper Code: CSCS702

IT ENABLED SERVICES

Prerequisite: Knowledge of Information Technology

Objective:
- To understand importance of IT enabled services.
- To develop the ability to integrate various resources for optimization in the industry as well as for strategic utilization of IT enabled services and functions.

Outcomes:
- Understand the various IT business openings and strategies
- Acquire knowledge about various business models such as outsourcing

MODULE - I

MODULE – II

MODULE – III
Enterprise IT Architecture – Challenges of EITA, Defining EITA, Need for EITA study, Contents of Typical Enterprise IT Architecture and Standards for Enterprise IT Architecture.

MODULE - IV
IT Application Strategy: Introduction, Need, COTS, COTS package selection life cycle, COTS implementation Strategy, Post implementation support and management.

MODULE – V
IT sourcing strategy: Introduction, Imperatives for outsourcing, motivation and need to outsource, Outsourcing and associated risk, IT management layers and considerations for outsourcing, strategic Vs generic sourcing, Business process outsourcing, process to succeed outsourcing contract management and governance.

Text Books:
1. Sanjiva Shankar Dubey, “ IT strategy and Management”, PHI, fifth edition, 2016 (Chapters: 1, 2, 4, 5, 6, 10)
TOTAL QUALITY MANAGEMENT

Prerequisites: Knowledge of Software Engineering and Software Quality Assurance.

Objectives:
- To learn how to understand the customer’s perception and to satisfy the customer
- To understand process capability and Reliability concepts

Outcome:
- Understand the importance of quality from the customer perspective and translate to requirements
- Understand the significance of statistical tool in Quality

MODULE I

MODULE II

MODULE III

MODULE IV
Quality functions development (QFD) – Benefits, Voice of customer, information organization, House of quality (HOQ), building a HOQ, QFD process. Failure mode effect analysis (FMEA) – requirements of reliability, failure rate, FMEA stages, design, process and documentation. Seven Tools (old & new). Bench marking and POKA YOKE.

MODULE V

TEXT BOOKS

REFERENCES
OPEN ELECTIVE – IV

Paper Code: CSCS704

ARTIFICIAL INTELLIGENCE

Pre-requisite: Basic knowledge of algorithms.

Objectives:
- To study the concepts of Artificial Intelligence and Methods of solving problems using Artificial Intelligence

Outcomes:
- Understand concepts of artificial intelligence and underlying characteristics
- Learn various techniques of knowledge representation

MODULE-I
Introduction to Artificial Intelligence - definition - underlying Assumption - A.I Techniques - Space search - production system - control strategies - Heuristic search - problem characteristics - production system characteristics.

MODULE-II

MODULE-III
Representing simple facts in logic - representing instance and Isa relationship - computable functions and predicates - resolution – frames - strong slot and filler structure Conceptual Dependency – scripts- advanced problem solving system.

MODULE-IV
Game playing - minimax search procedure - adding alpha beta cuts offs - additional refinements.

MODULE-V

TEXT BOOK:

REFERENCE BOOK:
OPEN ELECTIVE - V

Paper Code: CSCS705

INTRODUCTION TO E-BUSINESS

Pre-requisite: Basic knowledge of Information Technology

Objectives:
- This course introduces students to various aspects and models of business.
- At the end of the course, students should have an understanding of the impacts which e-business is having on society, markets and commerce.

Outcomes:
- Understand the various E-Business solutions available today such as E-Commerce and its mechanisms
- Acquire knowledge from e-governance to e-learning

MODULE I

MODULE II

MODULE III

MODULE IV

MODULE V

TEXT BOOK
1. Electronic Commerce: A Managerial Perspective, Turban, E. et al., Prentice Hall 2008. Chapters(1.1,1.2,1.3,1.7,1.8,2.1,2.2,2.5,3.2,3.1-3.7, 4.1, 5.1,5.2,10.1-10.4)
OPEN ELECTIVE - VI

Paper Code: CSCS706

FUNDAMENTALS OF ACCOUNTANCY

Pre-requisites: Basic knowledge in mathematics

Objectives:
- To understand the basic Accountancy.
- To understand concepts of cash maintenance and Cost Accounting.

Outcomes:
- Acquire knowledge about basic account for maintaining record in a company.
- Understand to manage profit and loss and trading accounts so that the student can maintain an account register.

MODULE - I

MODULE - II
Double entry system-personal accounts, real accounts, nominal accounts-journal-ledger-preparation of trial balance-rectification of errors.

MODULE –III
Subsidiary books including cash book, bank Reconciliation statement

MODULE –IV
Preparation of trading account- preparation of profit and loss account and balance sheet- Final accounts with adjustments

MODULE –V

TEXT BOOKS
3. Pillai and Baghawati, “Cost Accounting”, 2010
OPEN ELECTIVE - VII

Paper Code: CSCS707

PRINCIPLES OF MANAGEMENT

Pre-requisites: No specific pre-requisite

Objectives:
- To understand the importance and functions of management
- To understand the purpose of planning and leadership

Outcomes:
- Understand the need for management and learn the nuances of management.
- Acquire knowledge about various form of organizations, their structure and scope

MODULE –I
Meaning, Definition and importance of Management-Functions of a Manager-Management process- Role of a Manager-Social responsibility of Management-Co-Ordination-Meaning and scope requirements of effective co-ordination-problems in co-ordination.

MODULE –II
Meaning and purpose of planning – steps in planning Process-Limitations-Types of plans, objectives, Strategies, policies, procedures, programmes, management by objectives (MBO) – Decision making- Types of decisions-process of decision making-difficulties in decision making

MODULE –III
Nature and purpose of organizations-different forms of organizations-merits and demerits – linear and staff concepts- organisational charts- departmentations - bases for departmentation - product, function and territory-span of management

MODULE –IV
Authority-responsibility-accountability-delegation of authority-principles of delegation-unity of command – centralization and decentralization –advantages and disadvantages

MODULE –V

TEXT BOOK
OPEN ELECTIVE - VIII

Paper Code: CSCS708

COMPUTER GRAPHICS

Prerequisite: Knowledge of computers and programming

Objectives:
- Gain knowledge about graphics hardware devices and software used.
- Understand the two dimensional graphics and their transformations.

Outcomes:
- Get an idea about graphics hardware devices and software used.
- Understand the two dimensional graphics and their transformations.

MODULE - I

MODULE - II

MODULE - III
2D Geometric Transformations: Basic Transformation – Matrix Representations – Composite Transformations – Window to View port Co-Ordinate Transformations - Clipping: Point Clipping – Line Clipping – Cohen-Sutherland Line Clipping - Polygon Clipping – Sutherland – Hodgman Polygon Clipping Curve Clipping – Text Clipping.

MODULE - IV
Graphical User Interfaces and Interactive Input Methods: The User Dialogue – Input of Graphical Data – Input Functions – Interactive Picture Construction Techniques.

MODULE - V

Text Book:
SKILL ENHANCEMENT COURSES (SEC)

Paper Code: CSCS801

SOFT SKILLS

Prerequisite: Basic knowledge of English language

Objectives:
- To enable learners to develop their communicative competence.
- To facilitate learners to improve their soft skills.
- To equip learners with employability skills to enhance their prospect of Placements.

Outcomes
- Develop their communicative competence.
- Understand employability skills to enhance their prospect of placements.

MODULE - I
Nature of technical communication: Stages of communication – Channels of communication – Nature of technical communication – Importance and need for technical communication – Technical communication skills - The Listening process: Types of listening – Listening with a purpose – Barriers to listening – The speech process – Conversion and oral skills – Body language.

MODULE - II

MODULE - III
Presentation Skills: Planning the presentation – Preparing the presentation – Organizing your presentation – Rehearsing the presentation – Improving delivery

Text Book:
SOFT SKILLS LAB – EXERCISES

1. ORAL PRESENTATION
   - TV violence.
   - Is the Fast-Food Industry Accountable Legally for poor health?
   - Intelligence depends more on the environment than genetic factors.
   - Environment vs. technology Impact of technology on learning
   - Learning does not eradicate ignorance
   - How WiFi improved your life?

2. GROUP DISCUSSION
   - NGOs - Do they serve peoples’ interests or are they pressure groups?
   - Role of women in development.
   - Kids today are not what they used to be.
   - Repeated elections - Should taxpayers pay for it?
   - In India, the whole is less than the parts - Do we lack in team spirit?
   - "Dot.com" companies - Is there room for everyone?
   - Artificial Intelligence - Will man be ever replaced by machines?

3. INTERVIEW SKILLS
   - How to make a good impression
   - Basic Interview Questions
   - Behavioural Interview Questions
INTRODUCTION TO OFFICE AUTOMATION

Pre-requisite: Basic use of computers.

Objectives:
- To practically learn to use Microsoft word, excel and power point

Outcomes:
- Students will be able to draft official and personal letters using various functions of MSWord.
- Understand, manipulate, represent data with MSExcel using formula and graphs
- Acquire knowledge to prepare presentation for presenting their data through PowerPoint

MODULE – I

MODULE – II
MS-EXCEL: Working with MS Excel - concepts of Workbook & Worksheets - Working with Data & Ranges - Different Views of Worksheets - Using different features with Data and Text - Use of Formulas, Calculations & Functions - Cell Formatting including Borders & Shading; Working with Different Chart Types - Printing of Workbook.

MODULE – III
MS-POWERPOINT: Creating and Viewing Presentations – Editing a Presentation – Working with Presentation, slide transitions and Special Effects

Text Books:

LIST OF LAB EXERCISES:
1. To create a personal letter using MS-WORD
2. To create company letter head using MS-WORD
3. To create a memo using MS-WORD
4. To create a greeting card using MS-WORD
5. To create a cover page of a project report.
6. To create letter using mail merge.
7. To create a spreadsheet for mark statement of students.
8. To create various graphs with respect to students’ academic details.
9. To create a slide show regarding our college and department.
INTRODUCTION TO C++

Prerequisite: Knowledge of C programming

Objectives:
- To learn the basics of C++ programming languages.
- To learn concepts of object oriented programming in developing solutions to problems demonstrating usage of data abstraction, encapsulation, and inheritance

Outcomes:
- Understand and Apply object oriented programming concepts in problem solving through C++.

MODULE - I
C++ Basics - Objects and Classes: Basics of object and class in C++, Private and public members, static data and function members, constructors and their types, destructors, operator overloading, type conversion

MODULE - II
Inheritance: Concept of Inheritance, types of inheritance: single, multiple, multilevel, hierarchical, hybrid, protected members, overriding, virtual base class- Polymorphism.

MODULE - III
Pointers in C++, Pointes and Objects, this pointer, virtual and pure virtual functions, implementing polymorphism

Text Books:

C++ LAB – LIST OF EXERCISES
1. Program to illustrate class and objects
2. Program to illustrate inline member function
3. Program to illustrate static data and member functions
4. Program to illustrate constructors.
5. Program to illustrate friend functions
6. Program to illustrate operator overloading (Unary and Binary)
7. Program to illustrate function overloading.
8. Program to illustrate inheritance
9. Program to illustrate pointer to objects
10. Program to illustrate virtual functions & exception handling.
Prerequisite: Familiarity with computers

Objectives:
- Understanding the key principles of animation and its applications.

Outcomes:
- Acquire knowledge of how to create animation using Flash.
- Acquire knowledge of how to create story board, work with files create movies and publish

MODULE – I
Action Scripting Using actions to control a timeline - Using frame labels - Creating button symbols - Creating animated buttons using movie clips – Movie Clip Controls – Browser / network.

MODULE - II
Advanced Animation Methods Creating movies playing within movies (movie clips and .swf) - Controlling multiple timelines (movies) through action scripting - Critique storyboards.

MODULE - III
Streamlining Files for Use on the Web, Publishing Files to the Internet & Pre-loaders- Controlling sound with script - Exploring types of output - Work on final project in class - Importing video - Publishing demo (video) reels on web - Publishing and exporting files.

REFERENCE BOOKS

LIST OF PRACTICAL
1. Creating Company Title
2. Create new Clip art Company Logo
3. Animated Buttons and Menus
4. Text Graphics
5. Morphing
6. Shape and Motion Tween
7. Creating an animated Web site
8. Working with Audio and video
PHP PROGRAMMING

Prerequisite: Knowledge of web Technology and DataBase programming.

Objectives:
- To learn the fundamentals of PHP language
- To learn how to use PHP language to create websites

Outcomes:
- Understand how to write code using PHP
- Acquire knowledge about web techniques

MODULE – I

MODULE – II
Functions – Strings – Arrays - Multidimensional Arrays- Extracting Multiple Values – Slicing an Array - Checking Whether an Element Exists - Traversing Arrays – Sorting - Objects – Terminology - Creating an Object - Accessing Properties and Methods - Declaring a Class – Introspection

MODULE – III
Web Techniques - HTTP Basics - Server Information - Processing Forms - Setting Response Headers - Maintaining State - Databases - Using PHP to Access a Database - Relational Databases

Text Book:

PHP Lab – List of Exercises

1. Create a PHP page using functions for comparing three integers and print the Largest number.
2. Write a function to calculate the factorial of a number (non-negative integer). The function accept the number as an argument.
3. WAP to check whether the given number is prime or not.
4. Create a PHP page which accepts string from user. After submission that page displays the reverse of provided string.
5. Write a PHP function that checks if a string is all lower case.
6. Write a PHP script that checks whether a passed string is palindrome or not? (A palindrome is word, phrase, or sequence that reads the same backward as forward, e.g., madam or nurses run)
7. WAP to sort an array.
8. Write a PHP script that removes the whitespaces from a string.
   Sample string : ‘The quick ” " brown fox’
   Expected Output : The quick””brownfox
9. Write a PHP script that finds out the sum of first n odd numbers.
10. Create a login page having user name and password. On clicking submit, a welcome message should be displayed if the user is already registered (i.e.name is present in the database) otherwise error message should be displayed.
MOBILE APPLICATION DEVELOPMENT

Prerequisite: Basic Understanding of Programming Concepts.

Objectives:
- To introduce students to the Mobile application development ecosystem.
- To impart mobile application development skills.

Outcomes:
- Understand the anatomy of Android app and develop small application
- Understand to use multimedia handling in android application


Text Book:

Web Resources:
- https://developers.google.com/training/android/#for-new-programmers

Lab Exercises:
- Design and develop a mobile app to compute Body Mass Index.
- Design and Develop a mobile app for an event registration form.
- Design and develop a mobile app for storage and retrieval of data.
- Design and develop a mobile app with multimedia components.
- Design and develop a mobile app to utilize various sensors.
- Design and develop a mobile app to utilize location services.
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Paper Code: CSCS807: ONLINE COURSE (Min 30 hrs)/

Paper Code: CSCS808: MINI PROJECT/

Paper Code: CSCS809: INTERNSHIP (2 Weeks)/

Paper Code: CSCS810: IN-PLANT TRAINING (1-month) /
GENERIC ELECTIVE - I

Paper Code: CSCS125

MATHEMATICS FOR COMPUTER SCIENCE

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**Prerequisite:** Knowledge of basic mathematics

**Objectives:**
- To learn rules and techniques to recognize valid logical argument
- To learn graphs with all types and trees with all algorithms

**MODULE - I**

**MODULE - II**
Principal conjunctive and disjunctive normal forms Inference calculus-validity of conclusion using truth table- Rules of inference.

**MODULE - III**
Graphs-Applications of graphs-Incident and degree-pendant and isolated vertices- Number of odd vertices in a graph-Isomorphism of graphs-sub graphs -Walks-paths and circuits - Connected graphs and related theorems & problems.

**MODULE - IV**
Euler graphs operations on complete graphs- More on Euler graphs – Konigsberg bridge problem- Hamilton paths and circuits.

**MODULE - V**
Trees-properties of Trees with proof-Pendant vertices in a Tree-Distance and Center in a Tree-rooted and binary trees-spanning trees- Fundamental Circuits-Distance between spanning trees shortest spanning trees- Kruskal’s algorithm.

**Text Books:**
GENERIC ELECTIVE - II

Paper Code: CSCS126

NUMERICAL METHODS
Prerequisite: Knowledge of basic mathematics

Objectives:
- To learn about linear interpolation methods
- To learn about numerical integration & Differentiation methods

Outcomes
- On successful completion of the course students will be able to:
  - Understand the linear interpolation methods.
  - Understand the numerical integration & Differentiation methods

MODULE - I
Roots of Non-Linear Equations - Iterative methods, Bisection methods, method of false position – Newton-Raphson method – Statement of Fixed Point Theorem – Fixed point iteration: \( x = g(x) \) method.

MODULE - II

MODULE - III
Curve Fitting Interpolation - Lagrangian Polynomials – Divided differences – Interpolating with a cubic spline – Newton’s forward and backward difference formulas.

MODULE – IV

MODULE - V

Text Books:

Reference Book:
GENERIC ELECTIVE -III

Paper Code: CSCS235

APPLIED STATISTICS

Objectives:
- To learn the basics of statistics concepts
- To learn solving correlation and regression problems

Outcomes:
- Ability to understand and represent data
- Ability to analyze and interpret data.

MODULE - I
Diagrammatic and Graphic Presentation: General Rules for Constructing Diagrams, Types of Diagrams, One Dimensional or Bar Diagrams, Types of Bar Diagrams, Two-Dimensional Diagrams, Limitations of Pie Diagrams.

MODULE - II
Measures of Central Value: Arithmetic Mean: Calculation of Simple Arithmetic Mean-Individual Observations, Calculation of Arithmetic Mean-Discrete Series, Calculation of Arithmetic Mean-Continuous Series, Merits and Limitations of Arithmetic Mean.
Median: Calculation of Median-Individual Observations, Computation of Median-Discrete Series, Calculation of Median-Continuous Series, Merits and Limitations of Median.
Mode :Calculation of Mode-Individual Observations, Calculation of Mode-Discrete Series, Calculation of Mode-Continuous Series, Merits and Limitations of Mode.

MODULE - III
Measures of Dispersion: Significance of Measuring Variation, Properties of a Good Measure of Variation, The Interquartile Range or the Quartile Deviation, Merits and Limitations, The Mean Deviation, Calculation of Mean Deviation, Calculation of Mean Deviation-Continuous Series, Merits and Limitations, The Standard Deviation, Difference Between Mean Deviation and Standard Deviation, Calculation of Standard Deviation, Merits and Limitations.

MODULE - IV
Correlation Analysis: Types of Correlation, Scatter Diagram Method, Merits and Limitations of the Method, Karl Pearson’s Coefficient of Correlation, Direct Method of Finding Out Correlation Coefficient, Origin is made and Problems, Rank Correlation Coefficient, Merits and Limitations of the Rank Method.

MODULE - V
Regression Analysis: Uses of Regression Analysis, Difference Between Correlation and Regression Analysis, Regression Lines, Regression Equations, Regression Equation of Y on X, Regression Equation of X on Y and Problems

TEXT BOOK

REFERENCE BOOK:
GENERIC ELECTIVE - IV

Paper Code: CSCS236

THEORY OF COMPUTATIONS
(Only statements and applications of Theorems)

Prerequisites:
Basic knowledge of programming languages and data structures

Objectives:
- To understand the foundation of computing
- To realize the theoretical knowledge behind the computation
- To understand the construction of formal languages

Outcomes:
1. Understand the basic computation and construction of formal languages
2. Gain the knowledge about automated system

MODULE - I

MODULE - II

MODULE - III
Turing Theory: Turing Machines – Computable Language and Functions – Techniques for TM Construction – Modification of TM.

MODULE - IV

MODULE – V
Linear Bounded Automata – Definition – Linear Bounded Automata and Context Sensitive Languages.

Text Books:
2. John E.Hopcraft and Jeffery D. Ullman, "Introduction to Automata theory, languages and computations", Narosa Publication. 1st edition
3 "K.L.P. Mishra & N. Chandrasekaran” Theory of Computer Science (Automata, Languages and Computation ), PHI.
Non-Major Elective Courses

Paper Code: CSCS171

BASICS OF COMPUTERS & OFFICE AUTOMATION

Pre-requisite: No specific pre-requisite.

Objectives:
- To understand how to use software packages viz MS-Word, Excel and Powerpoint for day-to-day activities.

Outcomes:
- Non computer science will be able to understand the basics of computers and understand the office automation tools such as word, excel and power point.

MODULE – I
DOS: Internal & External commands; Wildcard Character; file name; Creating/Editing file; batch file - MS Windows: Windows Basic - Introduction to Windows- Using My Computer; Using Windows Explorer - Printing- Introduction to Accessories and Control Panel

MODULE – II

MODULE – III
MS Excel - Introduction and area of use -Working with MS Excel - concepts of Workbook & Worksheets - Working with Data & Ranges - Different Views of Worksheets - Column Freezing, Labels, Hiding, Splitting etc.;-Using different features with Data and Text - Use of Formulas, Calculations & Functions-Cell Formatting including Borders & Shading; Working with Different Chart Types - Printing of Workbook & Worksheets with various options.

MODULE - IV
MS PowerPoint - Introduction & area of use- Working with MS PowerPoint-Creating a New Presentation-Working with Presentation; Using Wizards- Slides & it’s different views; Inserting, Deleting and Copying of Slides

MODULE – V
Working with Notes, Handouts, Columns & Lists- Adding Graphics, Sounds and Movies to a Slide-Working with PowerPoint Objects; Designing & Presentation of a Slide Show.

Text Books:
Paper Code: CSCS172

FUNDAMENTALS OF INFORMATION TECHNOLOGY

Pre-requisite: No specific pre-requisite.

Objective:
• To acquire the basic knowledge about computers

Outcomes:
• Understand the concepts and various components of computers. Acquire knowledge about internet and other applications

Module - I

Module - II
CPU and Memory - Secondary Story Devices - Input Devices - Output Devices.

Module - III
Introduction to Computer Software - Programming Language – Operating Systems - Introduction to Database Management System.

Module - IV
Computer Networks - WWW and Internet - Email - Web Design

Module - V

Text Books:
Paper Code: CSCS173

FUNDAMENTALS OF ‘C’ LANGUAGE

Pre-requisite: No specific pre-requisite.

Objective:
- To learn how to solve common types of computing problems.
- To learn about various programming constructs of C

Outcomes:
- Analyze a given problem and develop an algorithm to solve the problem
- Use the 'C' language constructs in the right way. Design, develop and test programs written in 'C'

MODULE - I
Introduction to Programming - How to develop a program, Algorithms, Flow-charts, Types of Programming Languages, Compiler and Linker, Testing and Debugging a program, Documentation. Constants, Variables & Data Types - Character set, C Tokens, Identifiers and Keywords, Constants, Variables, Data types - Operators & Expressions - Managing Input & output operations

MODULE - II
Decision Making – Branching & Looping - Arrays - One dimensional array: Array Manipulation, Different operations on one dimensional arrays, two dimensional array, operations on two dimensional arrays, multi-dimensional array- Handling of Character Strings.

MODULE - III
Functions - Top down approach of problem solving, standard library functions, passing values between functions, scope rules of functions, calling convention, return type of functions, call by value and call by reference, recursive functions

MODULE – IV
Storage Classes - Scope and extent, Storage Classes in a single source file: auto, extern and static, register,

MODULE - V
Structures and Unions - Defining a structure, Declaring Structure variables, accessing structure members, structure initialization, copying and comparing structure variables, operation on individual members, arrays of structures, arrays within structures, structures and functions, union, size of structure,

Text Books:
WEB DESIGNING

Pre-requisite:
- Knowledge of computers.

Objectives:
- To acquire the fundamental knowledge about internet & WWW.
- To learn how to develop static and dynamic web pages / websites for any organization.

Outcomes:
- Understand the scenario of web page development
- Ability to develop web pages using HTML and Cascading Style Sheets.

MODULE - I
Internet and the World Wide Web - Internet - Introduction to internet and its applications, E-mail, telnet, FTP, e-commerce, video conferencing, e-business. Internet service providers, domain name server, internet address, World Wide Web (WWW) - World Wide Web and its evolution, uniform resource locator (URL), browsers – internet explorer, Netscape navigator, opera, Firefox, chrome, Mozilla. search engine, web saver – apache, IIS, proxy server, HTTP protocol

MODULE – II
HTML5 – Introduction - formatting text by using tags, using lists and backgrounds, creating hyperlinks and anchors - Style sheets, CSS formatting text using style sheets, formatting paragraphs using style sheets.

MODULE – III
Page layout and navigation - Creating navigational aids: planning site organization, creating text based navigation bar, creating graphics based navigation bar, creating graphical navigation bar, creating image map, redirecting to another URL, creating division based layouts.

MODULE – IV
Tables, Forms and Media - Creating tables: creating simple table, specifying the size of the table, specifying the width of the column, merging table cells, using tables for page layout, formatting tables: applying table borders, applying background and foreground fills, changing cell padding, spacing and alignment

MODULE – V
Creating user forms: creating basic form, using check boxes and option buttons, creating lists, additional input types in HTML5, Incorporating sound and video: audio and video in HTML5, HTML multimedia basics, embedding video clips, incorporating audio on web page.

Text Book:
B.Sc DEGREE EXAMINATION  
Month and year  

Computer Science  

Time: Three hours  

Maximum: 75 marks  

SECTION – A (10 x 2 = 20 marks)  
Answer ALL the questions  
Totally 10 questions. 2 questions from each unit  

SECTION – B (5 x 5 = 25 marks)  
Answer ALL the questions, choosing either (a) or (b).  
11. a)  
   b)  
12. a)  
   b)  
13. a)  
   b)  
14. a)  
   b)  
15. a)  
   b)  
one question (a & b) from each Unit [Equal distribution for all 5 units]  

SECTION – C (3 x 10 = 30 marks)  
Answer any THREE questions.  
16.  
17.  
18.  
19.  
20.  
One question from each Unit