M.Sc., COMPUTER SCIENCE

(Choice Based Credit System)

HAND BOOK
2016 – 2017 ONWARDS
FACULTY OF SCIENCE
Division of Computer and Information Sciences

M.Sc. COMPUTER SCIENCE (CBCS - Choice Based Credit System)

REGULATIONS

Eligibility: A pass in B.Sc. Computer Science/B.Sc., Information Technology/B.Sc., Software Development/B.Sc., Software Engineering/B.C.A or an examination accepted by the syndicate as equivalent thereto.

MASTER PROGRAMME

A Master’s programme consists of a set of Core courses and Optional courses. Core courses are basic courses required for each programme. The number and distribution of credits for core courses will be decided by the respective faculties. Optional courses, suggested by the respective departments, may be distributed in all four semesters. A course is divided into five units to enable the students to achieve modular and progressive learning.

SEMESTERS

An academic year is divided into two semesters, Odd semester and Even semester. The normal semester periods are:
- Odd semester: July to November (90 working days)
- Even semester: December to April (90 working days)

CREDIT

The term credit is used to describe the quantum of syllabus for various programmes in terms of hours of study. It indicates differential weightage given according to the contents and duration of the courses in the curriculum design.

The minimum credit requirement for a two year Master’s Programme shall be 90. The core courses shall carry 70 credits and the optional courses shall carry 20 credits.

COURSES

A course carrying one credit for lectures, will have instruction of one period per week during the semester, if four hours of lecture is necessary in each week for that course then 4 credits will be the weightage. Thus normally, in each of the courses, credits will be assigned on the basis of the lecture, tutorials/laboratory work and other form of learning in a 15 week schedule:

I. One credit for each lecture period per week.
II. One credit for every three periods of laboratory or practical work per week

GRADING SYSTEM

The term Grading System indicates a 10 point scale of evaluation of the performance of students in terms of marks, grade points, letter grade and class.
DURATION

The duration for completion of a two year Master's Programme in any subject is four semesters.

STRUCTURE OF THE PROGRAMME

The Master's Programme will consist of:

I. Core courses which are compulsory for all students.
II. Optional courses which students can choose from amongst the courses offered by the other Department of a faculty as well as by the Departments of other faculties. (Arts, Science, Education and Indian Language)
III. The Optional subjects will be allotted by counseling by a committee of the respective Heads of the Department under the Chairmanship of the Dean of the Faculty.

ATTENDANCE

Every teaching faculty handling a course shall be responsible for the maintenance of attendance register for candidates who have registered for the course.

The teacher of the course must intimate the Head of the Department atleast Seven Calendar days before the last instruction day in the semester about the attendance particulars of all students.

Each student should earn 80% attendance in the courses of the particular semester failing which he or she will not be permitted to sit for the end-semester examination.

However, it shall be open to the authorities to grant exemption to a candidate who has failed to obtain the prescribed 80% attendance for valid reasons on payment of a Condonation fee and such exemptions should not under any circumstance be granted for attendance below 70%.

EXAMINATIONS

The internal assessment for each theory course carries 25% marks and practical course 40% of marks which is based on two sessional tests and a variety of assessment tools such as seminar and assignment. The pattern of question paper will be decided by the respective faculty. The tests are compulsory.

There will be one End Semester Examination (75% marks) of 3 hours duration for each theory course. The pattern of question paper will be decided by the respective faculty.

EVALUATION

The performance of a student in each course is valuated in terms of Percentage of Marks (PM) with a provision for conversion to Grade Point (GP). The sum total performance in each semester will be rated by GPA while the continuous performance from the 2nd Semester onwards will be marked by (OGPA).

MARKS AND GRADING

The student cannot repeat the assessment of Sessional test I and Sessional test II. However, if for any compulsive reason, the student could not attend the test, the prerogative of arranging a special test lies with the teacher in consultation with the
Head of the Department.

A student has to secure 50% minimum in the End Semester Examination.

The student who has not secured minimum of 50% of marks (sessional plus end semester examination) in a paper shall be deemed to have failed in that paper.

A candidate who has secured a minimum of 50% marks in all the papers prescribed in the programme and earned a minimum of 90 credits will be considered to have passed the Master’s Programme.

**GRADING**

A ten point rating scale is used for the evaluation of the performance of the student to provide letter grade for each course and overall grade for the Master’s Programme.

<table>
<thead>
<tr>
<th>Marks</th>
<th>Grade Points</th>
<th>Letter Grade</th>
<th>Class</th>
</tr>
</thead>
<tbody>
<tr>
<td>90+</td>
<td>10</td>
<td>S</td>
<td>Exemplary</td>
</tr>
<tr>
<td>85-89</td>
<td>9.0</td>
<td>D + +</td>
<td>Distinction</td>
</tr>
<tr>
<td>80-84</td>
<td>8.5</td>
<td>D +</td>
<td>Distinction</td>
</tr>
<tr>
<td>75-79</td>
<td>8.0</td>
<td>D</td>
<td>Distinction</td>
</tr>
<tr>
<td>70-74</td>
<td>7.5</td>
<td>A + +</td>
<td>First Class</td>
</tr>
<tr>
<td>65-69</td>
<td>7.0</td>
<td>A +</td>
<td>First Class</td>
</tr>
<tr>
<td>60-64</td>
<td>6.5</td>
<td>A</td>
<td>First Class</td>
</tr>
<tr>
<td>55-59</td>
<td>6.0</td>
<td>B</td>
<td>Second Class</td>
</tr>
<tr>
<td>50-54</td>
<td>5.5</td>
<td>C</td>
<td>Second Class</td>
</tr>
<tr>
<td>49 or Less</td>
<td></td>
<td>F</td>
<td>Fail</td>
</tr>
</tbody>
</table>

The successful candidates are classified as follows.

I – Class; 60% marks and above in overall percentage of marks (OPM)
II – Class; 50% marks in overall percentage of marks.

Candidates who obtain 75% and above but below 90% of marks (OPM) shall be deemed to have passed the examination in FIRST CLASS (Distinction) provided he/she passes all the course prescribed for the programme at the first appearance.

**Course-Wise Letter Grades**

The percentage of marks obtained by a candidate in a course will be indicated in a letter grade.

A student is considered to have completed a course successfully and earned the credits if he/she secures an overall letter grade other than F. A letter grade F in any course implies a failure in that course. A Course successfully completed cannot be repeated for the purpose of improving the Grade point.

The F grade once awarded stays in the grade card of the student and is not
deleted even when he/she completes the course successfully later. The grade acquired later by the student will be indicated in the grade sheet of the Odd/Even semester in which the candidate has appeared for clearance of the arrears. If the student secures F grade in the Project / Field Work / Practical Work / Dissertation, he/she shall improve it and resubmit it, if it involves only rewriting incorporating the clarification of the evaluators or he/she can re-register and carryout the same in the subsequent semesters for evaluation.

**SCHEME OF EXAMINATION**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course</th>
<th>Marks (E + IA)</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>FIRST SEMESTER</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PCSC101</td>
<td>Mathematical Foundations of Computer Science</td>
<td>75 + 25</td>
<td>5</td>
</tr>
<tr>
<td>PCSC102</td>
<td>Soft Skills Development</td>
<td>75 + 25</td>
<td>3</td>
</tr>
<tr>
<td>PCSC103</td>
<td>Microprocessor and Applications</td>
<td>75 + 25</td>
<td>5</td>
</tr>
<tr>
<td>PCSC104</td>
<td>Advanced Data Structure</td>
<td>75 + 25</td>
<td>5</td>
</tr>
<tr>
<td>PCSC105</td>
<td>Relational Database Management System</td>
<td>75 + 25</td>
<td>5</td>
</tr>
<tr>
<td>PCSP106</td>
<td>Programming Lab – I (Advanced Data structure)</td>
<td>60 + 40</td>
<td>2</td>
</tr>
<tr>
<td>PCSP107</td>
<td>Programming Lab – II (RDBMS Lab)</td>
<td>60 + 40</td>
<td>2</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td></td>
<td><strong>27</strong></td>
</tr>
<tr>
<td><strong>SECOND SEMESTER</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PCSC201</td>
<td>Advanced JAVA Programming</td>
<td>75 + 25</td>
<td>5</td>
</tr>
<tr>
<td>PCSC202</td>
<td>Operating System</td>
<td>75 + 25</td>
<td>4</td>
</tr>
<tr>
<td>PCSC203</td>
<td>Computer Networks</td>
<td>75 + 25</td>
<td>4</td>
</tr>
<tr>
<td>PCSC204</td>
<td>Advanced Software Engineering</td>
<td>75 + 25</td>
<td>5</td>
</tr>
<tr>
<td>PCSC205</td>
<td>Data Mining and Data Warehousing</td>
<td>75 + 25</td>
<td>4</td>
</tr>
<tr>
<td>PCSP206</td>
<td>Programming Lab – III (Advanced JAVA Programming Lab)</td>
<td>60 + 40</td>
<td>2</td>
</tr>
<tr>
<td>PCSP207</td>
<td>Programming Lab – IV (Network Lab)</td>
<td>60 + 40</td>
<td>2</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td></td>
<td><strong>26</strong></td>
</tr>
<tr>
<td><strong>THIRD SEMESTER</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PCSC301</td>
<td>.NET Framework</td>
<td>75 + 25</td>
<td>4</td>
</tr>
<tr>
<td>PCSC302</td>
<td>System Software</td>
<td>75 + 25</td>
<td>5</td>
</tr>
<tr>
<td>PCSC303</td>
<td>Web Technology</td>
<td>75 + 25</td>
<td>4</td>
</tr>
<tr>
<td>PCSC304</td>
<td>Artificial Intelligence And Expert Systems</td>
<td>75 + 25</td>
<td>5</td>
</tr>
</tbody>
</table>
### PCSE305 Elective – I (Cloud Computing)  
75 + 25  
3

PCSP306 Programming Lab – V (Web Technology)  
60 + 40  
2

PCSP307 Programming Lab – VI (Mini Project)  
60 + 40  
2

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Marks</th>
<th>Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td>PCSE305</td>
<td>Elective – I (Cloud Computing)</td>
<td>75 + 25</td>
<td>3</td>
</tr>
<tr>
<td>PCSP306</td>
<td>Programming Lab – V (Web Technology)</td>
<td>60 + 40</td>
<td>2</td>
</tr>
<tr>
<td>PCSP307</td>
<td>Programming Lab – VI (Mini Project)</td>
<td>60 + 40</td>
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**Total** 25

### FOURTH SEMESTER

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Marks</th>
<th>Credit</th>
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<tbody>
<tr>
<td>PCSC401</td>
<td>Soft Computing</td>
<td>75 + 25</td>
<td>4</td>
</tr>
<tr>
<td>PCSE402</td>
<td>Elective – II(Network Security)</td>
<td>75 + 25</td>
<td>3</td>
</tr>
<tr>
<td>PCSP403</td>
<td>Dissertation and Viva-Voce</td>
<td>60 + 40</td>
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</table>

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Marks</th>
<th>Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td>PCSC401</td>
<td>Soft Computing</td>
<td>75 + 25</td>
<td>4</td>
</tr>
<tr>
<td>PCSE402</td>
<td>Elective – II(Network Security)</td>
<td>75 + 25</td>
<td>3</td>
</tr>
<tr>
<td>PCSP403</td>
<td>Dissertation and Viva-Voce</td>
<td>60 + 40</td>
<td>5</td>
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</tbody>
</table>

**Total** 12

**Grand Total** 2400 90

### INTERNAL ASSESSMENT MARKS

<table>
<thead>
<tr>
<th>Theory</th>
<th>Marks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Internal Assessment Test-I</td>
<td>10</td>
</tr>
<tr>
<td>Internal Assessment Test-II</td>
<td>10</td>
</tr>
<tr>
<td>Assignment/Seminar</td>
<td>5</td>
</tr>
</tbody>
</table>

**Total** 25

### PRACTICAL MARKS

<table>
<thead>
<tr>
<th>Practical</th>
<th>Marks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test – I</td>
<td>15</td>
</tr>
<tr>
<td>Test – II</td>
<td>15</td>
</tr>
<tr>
<td>Record</td>
<td>10</td>
</tr>
</tbody>
</table>

**Total** 40

### ELECTIVES

Apart from the various courses offered in the curriculum of the branch of specialization, a student can choose two electives from any specialization under the faculty during the entire period of study, with the approval of the Head of the Department offering the course.
Elective Courses

Elective – I - PGCSE119

1. Mobile Computing
2. Cloud computing
3. Digital Image Processing

Elective – II - PGCSE123

1. Network Security
2. Genomics
3. Distributed Computing
SYLLABUS
FIRST SEMESTER
PGCS101 - Mathematical Foundations of Computer Science

Aim: To enable the student to learn the mathematical foundations of computer science.


Unit-IV - Mathematical Logic: Statements and Notations – Connectives – Consistency of Premises and Indirect Method of Proof – Automatic Theorem Proving.


Text Books and References:

PGCS102 - Soft Skills Development

Unit-I - Soft skills and developing positive Attitude - Soft skills: introduction – what are soft skills? - selling your soft skills - attribute regarded as soft skills – soft skills – social soft skills- thinking soft skills –Negotiating –exhibiting your soft skills - indentifying your soft skills- improving your soft skills - soft skills training –train yourself-top 60 soft skills - Developing positive attitude: introduction – meaning - features of attitudes- attitude and behavior formation of attitudes– change of
attitudes – what can you do to change attitude? - ways of changing attitude in a person – attitude in a workplace – the power of positive attitude - developing positive attitude - example of positive attitude - example of negative attitude - overcoming negative attitude - negative attitude and its result.

**Unit-II - Art of speaking and writing** - Art of speaking: Introduction - what make communication important? - Defining communication - special features of communication - communication process - channel of communication - importance of communication - tips for effective communication - tips for powerful presentation - art of public speaking - importance of public speaking - Art of writing: Introduction – importance of writing - creative writing - writing tips - drawbacks of writing communication.

**Unit-III - Body language** - Introduction – body talk – voluntary and involuntary body language - forms of body language - parts of body language - origin of body language - uses of body language - body language in building interpersonal relations – body language in building industrial relations – reason to study body language - improving your body language – types of body language - Gender differences - female interest and body language - shaking hands with women - interpreting body language - developing confidence with correct body language.

**Unit-IV - Group discussion** - Introduction – meaning of GD – why group discussion? - characters tested in a GD – tips on GD – types of GD - skills required in a GD - consequences of GD - behavior of a GD - essential elements of GD - different characters in GD - traits tested in a GD - GD etiquette - areas to be concentrated while preparing for a GD - imitating a GD - techniques to initiate a GD - Non-verbal communication in GD – movement and gestures to be avoided in a GD - topics for GD.


**Unit-V - Time management** - Introduction - the 80:20 rule - take a good look at the people around you - examine your work - sense of time management – time is money – features of time - three secrets of time management - time management matrix - analysis of time matrix - effective scheduling – grouping of activities – five steps to successful time management – difficulties in time management – evils of not planning – time management is a myth – overcoming procrastination – ways of find free time – time management tips for students – interesting facts about time – ideal way of spending a day – time wasters – time savers – realizing the value of time - time circle planner.

**Text Book:**

**Reference Books:**

**PGCS103 - Microprocessor and Applications**

**Aim:** To understand about Microprocessor and Microcontroller and design methods and Interfacing Techniques to digital systems.


**Unit-II - Microcontroller** - Intel 8031/8051 Architecture- Special Function Registers (SFR)- I/O pins- ports and circuits- Instruction set-Addressing Modes-Assembly language programming- Timer and counter programming- Connection to RS 232-Interrupts Programming- External Memory Interfacing- Introduction to 16 bit Microcontroller.


**Unit-IV - Peripherals and Interfacing** - Serial and parallel I/O (8251 and 8255) – Programmable DMA Controller (8257)-Programmable interrupt controller (8259)-Keyboard display ADC/DAC interfacing-Inter integrated circuits interfacing (I2C standard).

**Unit-V - Microprocessor based systems design-digital Interfacing** - Interfacing to alpha numeric displays- Interfacing to liquid crystal display (LCD 16x2 line) – High power Devices and Optical motor shaft encoders- Stepper motor interfacing – Analog interfacing and Industrial control –Microcomputer based small scale – Industrial process control system – Robotics and Embedded control – DSP and Digital Filters.

**Text Books:**

**Reference Books:**
PGCS104 - Advanced Data Structures

**Aim**: To enable the student to learn the advanced concepts in data structure and sorting methods.


**Unit-V - Advanced Data Structures** - B-trees - Definition - Basic Operations on B-trees - Deleting a key from B-tree - Fibonacci heaps - Structure - Mergeable heap operations - Decreasing a key and deleting a node - Bounding the maximum degree - Van Emde Boas Trees - Preliminaries - Recursive structures - Data structure for disjoint sets - Disjoint set operations - Linked list representation of disjoint sets.

**Text Book:**

**Reference Books:**

PGCS105 – Relational Database Management System

**Aim**: To enable the student to learn the concepts of relational database management system and to learn the designing concepts of relational database systems.

Unit-II - Relational Databases - Structure of the relational databases - Database schema - Keys - Schema diagrams - Relational query languages - Relational operations - Overview of SQL query language - SQL data definition - Basic structure of SQL queries - Additional basic operations - Set operations - Null values - Aggregate functions - Nested sub queries - Modification of the database.


Unit-IV - Indexing and Hashing - Basic Concepts - Ordered Indices - B+-Tree Index Files - B+-Tree Extensions - Multiple-Key Access - Static Hashing - Dynamic Hashing - Comparison of Ordered Indexing and Hashing - Bitmap Indices - Index Definition in SQL - Measures of Query Cost - Selection Operation - Sorting - Join Operation - Other Operations - Evaluation of Expressions.

Unit-V - Distributed Databases - Introduction - Homogeneous and Heterogeneous Databases - Distributed Data Storage - Distributed Transactions - Commit Protocols - Concurrency Control in Distributed Databases - Availability - Distributed Query Processing - Heterogeneous Distributed Databases - Cloud-Based Databases - Directory Systems.

Text Book:

Reference Books:

Second Semester
PGCS108 - Advanced JAVA Programming

Aim: To enable the student to learn the advanced programming concepts in java

Unit-I

Unit-II
AWT: Windows, Controls, Layout Managers and Menus – Swing. Multimedia: Images,
Animation and Audio – JDBC.

**Unit-III**

**Unit- IV**

**Unit-V**

**Text Book:**

**Reference Books:**

**PGCS109 - Operating System**

**Aim:** The basic objective of this lesson is to provide students with the understanding and knowledge of Operating System Concepts.


**Unit-III - Memory Management** – Background – Swapping – Contiguous Memory Allocation – Paging – Structure of the Page Table – Virtual Memory Background - Demand Paging – Copy-on-Write – Page Replacement – Allocation of Frames – Thrashing – Memory- Mapped Files – Allocating Kernel Memory – Other Considerations – Operating System Examples.

Unit-V

Text Book:

Reference Books:
3. https://android.googlesource.com

PGCS110 - Computer Networks

AIM: To study the various protocol models and Network services based on the Computer Networks.


Text Books:
Reference Books:

PGCS111 - Advanced Software Engineering

AIM: To create software based on a set of procedures so that it can comply with some predefined standards.


Text Book:
Reference Books:

PGCS112 - Data Mining and Data Warehousing

Aim: To understand the current trend and basics of Data Mining and Data Warehousing Concepts.

Unit-I - Introduction - Definition of data mining - data mining vs query tools - machine learning - taxonomy of data mining tasks - steps in data mining process - overview of data mining techniques.


Unit-III - Data Pre-Processing And Characterization - Data Cleaning - Data Integration and Transformation - Data Reduction - Discretization and Concept Hierarchy Generation - Primitives - Data Mining-Query Language - Generalization - Summarization - Analytical Characterization and Comparison - Association Rule - Mining Multi Dimensional data from Transactional Database and Relational Database.

Unit-IV - Classification - Classification - Decision Tree Induction - Bayesian Classification - Prediction - Back Propagation - Cluster Analysis - Hierarchical Method - Density Based Method - Grid Based Method - Outlier Analysis.

Unit-V - Cluster analysis - Types of data - Clustering Methods - Partitioning methods - Model based clustering methods - outlier analysis. Advanced topics: Web Mining - Web Content Mining - Structure and Usage Mining - Spatial Mining - Time Series and Sequence Mining - Graph Mining.

Text Books:
2. Jiawei Han, Micheline Kamber, Data Mining: Concepts and Techniques, Morgan Kaufman Publishers, 2006.

Reference Books
Third Semester
PGCS115 - C# and .NET Framework

Aim: To Provide the Knowledge of Windows Programming Using Visual Basic and Visual C++


Unit-II - Inheritance - Namespace - Polymorphism - Interface and Overloading - Multiple Inheritance - Property - Indexes - Delegates - Publish/Subscribe Design Patterns- Operator Overloading-Method Overloading.


Text Books:

Reference Books:

PGCS116 - System Software

Aim: To study the basic principles involved in Assemblers, Loaders and Linkers and System Software tools.

Unit-I Introduction - System software and machine architecture – The Simplified Instructional Computer (SIC) - Machine architecture - Data and instruction formats - addressing modes - instruction sets - I/O and programming.


**Unit-V - System Software Tools** - Text editors - Overview of the Editing Process - User Interface – Editor Structure. - Interactive debugging systems - Debugging functions and capabilities – Relationship with other parts of the system – User-Interface Criteria.

**Text Book:**

**Reference Books:**

**PGCS117 - Web Technology**

**Aim**: To enable the student to learn various Web Technology concepts.

**Unit-I - HTML & CSS**

**Unit-II - XML & Ajax**
Unit-III - JAVA Script

Unit-IV: PHP & MySQL
Why PHP and MySQL - Server-Side Web Scripting - Getting Started with PHP - Adding PHP to HTML - Syntax and Variables - Control and Functions - Passing Information between Pages – Strings – Arrays and Array Functions – Numbers – MySQL Database Administration - PHP/MySQL Functions - Displaying Queries in Tables - Building Forms from Queries.

Unit-V: Perl

Text Books:
2. Steven Hoizner, Ajax Bible, Wiley India private Ltd, NewDelhi-2007, Chapters Covers 1,8-11.

PGCS118 - Artificial Intelligence And Expert Systems

Aim : To enable the student to Understand the problem states and AI, state space methods, problem reduction search methods, predicate calculus and knowledge engineering in expert systems.


Unit-IV - Expert Systems – Architectural Components – Explanation facilities –
knowledge acquisition.


Text Books:

Reference Books:

Fourth Semester
PGCS121 - Soft Computing

Aim: To study to soft computing concepts and fuzzy logic principles.

Unit-I - Fundamentals of Neural Networks - Basic Concepts of Neural Network-Model of an Artificial Neuron-Neural Network Architectures-characteristics of Neural Networks-Learning Methods-Taxonomy-History of Neural Network-Early Neural Network Architectures.

Unit-II - Backpropagation Networks - Architecture of Backpropagation Network-Backpropagation Learning-Illustrations-applications-Effect of Tuning Parameters of the Backpropagation Neural Network-Selection of various parameters in Backpropagation Neural Network-Variations of Standard Backpropagation algorithms.

Unit-III - Adaptive Resonance Theory (ART) - Introduction- ART1- ART2-Applications


Text Books:

Reference Books:
Elective - I

Mobile Computing


Text Books:

Reference Books:
Cloud Computing

**Aim:** To understand the current trend and basics of cloud computing and to learn cloud services from different providers.


**Unit-III - Cloud Computing for Everyone** - Centralizing Email Communications – Collaborating on Schedules – Collaborating on To-Do Lists – Collaborating Contact Lists – Cloud Computing for the Community – Collaborating on Group Projects and Events – Cloud Computing for the Corporation.


**Unit-V - Other Ways to Collaborate Online** - Collaborating via Web-based Communication tool - Evaluating Web Mail Services - Evaluating Web Conference Tools - Collaborating via Social Networks and Groupware - Collaborating via Blogs and Wikis.

**Text Books and References:**

**Digital Image Processing**

**Aim:** To Provide the Knowledge of Image Processing concepts and mathematical background.


Unit-III - Segmentation: Thresholding – Edge Based Segmentation: Edge Image Thresholding, Border tracing - Region Based Segmentation – Matching – Shape Representation and Description: Region Identification – Contour Based Shape Representation and Description- Chain codes, Simple Geometric Border Representation - Region Based Shape Representation and Description, Simple Scalar Region Descriptors.


Text Books:

Reference Books:

Elective - II
Network Security

Aim: To understand the basics of Network Security and importance of Security.


Text book:

Reference Books:

Genomics

Unit-I - Definition of genomics - Rationale for mapping and sequencing genomes - Types of gene map - Genetic mapping using linkage analysis. Physical mapping – low and high resolution - Subdividing the genome using restriction enzymes, PFGE, FACs.
- Molecular markers for mapping – RFLPs, microsatellites and SNPs.

Unit-II – Assembling a physical map of the genome – chromosome walking and jumping. Restriction enzyme fingerprinting - Sequence tagged sites, radiation hybrid mapping, ESTs. Hybridization assays – hybridization mapping, hybridization reference library, in situ hybridization.

Unit-III - Conventional genome sequencing - Sequencing without mapping - STC
approach - Whole genome sequencing - cDNA sequencing - Hierarchical shotgun sequencing and shotgun sequencing - Analyzing sequence data – database searches - sequence analysis at whole genome level.


**Unit-V** - Genome Projects: genome sequence data of model organisms – E.coli - D.melanogaster - A.thaliana and mouse - The human genome project – goals - mapping strategies - markers - sequencing technologies, results of final sequence, potential benefits and risks - Ethical, legal and social issues (ELSI).


**Text and Reference Books:**


**Distributed Computing and Linux**


**Unit-II** - Interprocess Communication – The API for the Internet Protocols – External Data Representation and Marshalling – Client– Server Communication – Group Communication – Case Study – Distributed Objects and Remote Invocation – Communication between Distributed Objects – Remote Procedure Call – Events and Notifications– Case Study: Java RMI


Text Books:

Reference Books: