FACULTY OF ENGINEERING & TECHNOLOGY

SYLLABUS

FOR

MASTER OF COMPUTER APPLICATIONS
(5 YEARS INTEGRATED PROGRAMME)
(SEMESTER: V – VI)
(Credit Based Evaluation and Grading System)

MASTER OF COMPUTER APPLICATIONS
(5 YEARS & 6 MONTHS INTEGRATED PROGRAMME)
(SEMESTER: VII – XI)
(Credit Based Continuous Evaluation Grading System)

Session: 2019-20

GURU NANAK DEV UNIVERSITY
AMRITSAR

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Defaulters will be prosecuted.
(ii) Subject to change in the syllabi at any time.
Please visit the University website time to time.
## MCA (5 Years Integrated Programme) Semester System
(Credit Based Evaluation and Grading System)

### SCHEME

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Subject Code</th>
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| Sub Total:   | 16 4 2 |
| Grand Total: | 22     |

### List of Semester–I

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| Sub Total:   | 16 4 2 |
| Grand Total: | 22     |

### Note:

1. * Special Paper in lieu of Punjabi Compulsory, For those students who are not domicile of Punjab
2. ** Credits will not be included in SGPA, Student can opt this Paper whether in 1st or 2nd Semester.
3. PSL-003 ID Course Human Rights & Constitutional Duties (Compulsory Paper) Students can opt. this paper in any odd semester. This ID Paper is one of the total ID Papers of this course.
### Semester-II

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<td>CSL123</td>
<td>Data Structure &amp; File Processing</td>
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**Sub Total:** 16 4 2

**Grand Total:** 22

### List of Semester–II

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2. ** Credits will not be included in SGPA, Student can opt this Paper whether in 1st or 2nd Semester.
### MCA (5 Years Integrated Programme) Semester System
(Credit Based Evaluation and Grading System)

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* Credits of ESL-220 will not be included in SGPA.

**Note:**
PSL-003 ID Course Human Rights & Constitutional Duties (Compulsory Paper) Students can opt. this paper in any odd semester. This ID Paper is one of the total ID Papers of this course.

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### MCA (5 Years Integrated Programme) Semester System

(Credit Based Evaluation and Grading System)

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**Note:**
PSL-003 ID Course Human Rights & Constitutional Duties (Compulsory Paper) Students can opt. this paper in any odd semester. This ID Paper is one of the total ID Papers of this course.

|         |          | **Semester-VI**                  |   |   |   |
| 1.      | CSE320   | Major Project-I                  | 0 | 0 | 22 |
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Grand Total: 22

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### Semester-XI

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CSL110: PROGRAMMING LANGUAGE–I

Total Marks: 100

Mid Semester Examination: 20% weightage
End Semester Examination: 80% weightage

Instructions for the Paper Setters:
Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four Sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each Section. The fifth question may be attempted from any Section.

Note for Candidate:
Attempt five questions in all by selecting one question from each section and the fifth question may be attempted from any sections.

UNIT–I
Introduction to Computer Programming, Program Development life cycle, algorithms, flow chart, decision table & pseudo code

UNIT–II
Introduction to C language, data types, Operators and Expression, Input/output Functions, Structured programming elements, Control statements: Branching, Jumping, Looping Arrays.

UNIT–III
Pointers, Functions: Inbuilt Functions, User defined Functions, Recursion, Storage Classes in C, dynamic memory management.

UNIT–IV
Strings, Structure and union, Reference variables, basics of searching and sorting techniques, File handling in C

References:
CSL111: PERSONAL COMPUTING – OPERATING SYSTEMS & SOFTWARE

Total Marks: 100

Mid Semester Examination: 20% weightage
End Semester Examination: 80% weightage

Instructions for the Paper Setters:
Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four Sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each Section. The fifth question may be attempted from any Section.

Note for Candidate:
Attempt five questions in all by selecting one question from each section and the fifth question may be attempted from any sections.

UNIT-I

DISK OPERATING SYSTEM:
The basic fundamentals of DOS, Disk organization, understanding DOS prompt and Shell Screen using keyboard & mouse, Internal commands, Batch files, Using the screen editor, Printing images, ASCII files, Indirect Printing and spooling, Communicating with other devices, Parallel vs Serial communication, Optimizing DOS, CONFIG.SYS & AUTOEXEC.BAT files, Freeing up memory at boot time, Managing Extended and Expended memory, RAM Disk, Disk Caching, Defragmentation.

UNIT-II


UNIT-III

MS-EXCEL: Worksheet overview, Row, Columns, Cell, Menus, Creating worksheets, opening and saving worksheets, Formatting, Printing, Charts, Window, Establishing worksheet links, Macros, Database, Tables, Using files with other programs.
UNIT-IV

MS-POWERPOINT: PowerPoint Basics, Create Presentation, Insert and Modify text, Work with Graphics and Media, Final Presentations


References:
ECL191: ELECTRONICS FUNDAMENTALS

**Total Marks: 100**

**Mid Semester Examination: 20% weightage**

**End Semester Examination: 80% weightage**

**Instructions for the Paper Setters:**
Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four Sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each Section. The fifth question may be attempted from any Section.

**Note for Candidate:**
 Attempt five questions in all by selecting one question from each section and the fifth question may be attempted from any sections.

**UNIT-II**

**UNIT-III**

**UNIT-III**
Rectification by diode bridge filtering concepts. Component!>and function of an unregulated DC power supply. Zener diode and its use in 5MPS. Concept of transistor. IC, VLSI etc.
UNIT-IV

Electronic components and assembly using a printed circuit board. Conceptual concept of integrated circuits. Typical characteristics and use of an IC power amplifier.

Principles of Radio, FM & AM. Concept of tuning. Block diagram of a Radio. Frequency bands used for radio, TV and satellite communication.


References Books:

2. Electronic Devices & Circuits Theory by Boylested, Pearson Education.
3. Electronic Devices by Floyd. Pearson Education.
MTL111: MATHEMATICS–I

Total Marks: 100

Mid Semester Examination: 20% weightage
End Semester Examination: 80% weightage

Instructions for the Paper Setters:
Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four Sections (A–D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each Section. The fifth question may be attempted from any Section.

Note for Candidate:
Attempt five questions in all by selecting one question from each section and the fifth question may be attempted from any sections.

UNIT–I
Matrices and Determinants: Introduction and definition of matrix, types of matrices, matrix addition and scalar multiplication transpose and inverse of matrix, solution of system of linear equations, definition and properties of determinants (statements only), characteristics polynomial, eigen values, nature of eigen values, certain types of matrices, Cayley–Hamilton theorem. Canonical forms of matrices.

UNIT–II
Logic, Lattice and Boolean Algebra: Logic operators like AND, OR, NOT, etc. truth tables, logical identities, theory of inference and deduction, mathematical induction, predicate calculus predicates and quantifiers. Lattice as a partial ordered set, properties of lattice, Boolean algebra, representation and minimization of Boolean algebra, finite state machine.

UNIT–III
Probability and Statistics: Mathematical and statistical probability, axiomatic approach to probability, law of addition of probability, dependence of events, Baye’s theorem.
UNIT-IV

Origin and development of statistics, definition and scope of statistics, frequency distribution, graphical representation of frequency distribution.

**Probability and Statistics:**

Measures of central tendency, requisites for an ideal measure of central tendency, measure of dispersion, coefficient of dispersion, moments, skewness, kurtosis. Coefficient of co–relation, effect of change of origin in scale, rank co–relation coefficient, lines of regression, curve of regression, angle between the lines of regression.

**Books Recommended:**


CSP112: PROGRAMING LAB–I

Total Marks: 100

Programming assignments on C, Software Operating System and Personnel Computing Programming Languages-I
ENL-101: COMMUNICATIVE ENGLISH–I
Credits: 02 (L= 2, T=0, U=0)
Total Marks 50

Mid Semester Examination: 20% weightage
End Semester Examination: 80% weightage

Objective: To introduce students to the skills and strategies of reading and writing by identifying organizational patterns, spotting classification systems and understanding associations between ideas. This course will prepare students to read a variety of texts and also to communicate more effectively through writing. The course will also pay special attention to vocabulary building.

Instructions for the Paper Setters:-
Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four Sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each Section. The fifth question may be attempted from any Section.

Prescribed Text Books:
• The Written Word by Vandana R. Singh, Oxford University Press, New Delhi.

Section–A

Section–B

Section–C

Section–D
PBL 121: फील्ड रुझान - I

Mid Semester Examination: 20% weightage
End Semester Examination: 80% weightage

I. दे तंका (माध्यम: उपस्तिंति, विद्यालय, मूल गँगा मण्डली)
   उप मंत्र देव पुराणमको मूलांक, मूलमध्य देव भूमि सर पहुँचे बन्दी:
   (1) माध्यमिक स्तर
   (2) भूमि क्षेत्र
   (3) या विकास सिद्धांत

II. चुम्पारी अंगशेषाधीन हुन सार (पैठ, मूलपत्र, विचार, विचार उपादान)

I. दे तंका (माध्यम: उपस्तिंति, विद्यालय, मूल गँगा मण्डली)
   उप मंत्र देव पुराणमको मूलांक, मूलमध्य देव भूमि सर पहुँचे बन्दी:
   (1) माध्यमिक स्तर
   (2) भूमि क्षेत्र
   (3) या विकास सिद्धांत

II. देव कुला (सारको पैठ, मूलको अंग बाँध, विकास सिद्धांत)

I. दे तंका (माध्यम: उपस्तिंति, विद्यालय, मूल गँगा मण्डली)
   उप मंत्र देव पुराणमको मूलांक, मूलमध्य देव भूमि सर पहुँचे बन्दी:
   (1) माध्यमिक स्तर
   (2) भूमि क्षेत्र
   (3) या विकास सिद्धांत

II. अमूर्तक गैमवाड़ा (सारको पैठ, मूलको अंग बाँध, विकास सिद्धांत)

I. दे तंका (माध्यम: उपस्तिंति, विद्यालय, मूल गँगा मण्डली)
   उप मंत्र देव पुराणमको मूलांक, मूलमध्य देव भूमि सर पहुँचे बन्दी:
   (1) माध्यमिक स्तर
   (2) भूमि क्षेत्र
   (3) या विकास सिद्धांत

II. अमूर्तक गैमवाड़ा (सारको पैठ, मूलको अंग बाँध, विकास सिद्धांत)
MCA (5 Years Integrated Programme) Semester – I  
(Credit Based Evaluation and Grading System)

HSL–101: Punjab History & Culture (1450-1716)  
(Special paper in lieu of Punjabi Compulsory)  
(For those students who are not domicile of Punjab)

Credits: 2-0-0

Mid Semester Examination: 20% weightage  
End Semester Examination: 80% weightage

Instructions for the Paper Setters:
Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four Sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each Section. The fifth question may be attempted from any Section.

Section-A
1. Land and the People.
2. Bhakti Movement

Section-B
3. Life and Teaching of Guru Nanak Dev.

Section-C
5. Guru Hargobind.
6. Martyrdom of Guru Teg Bahadur

Section-D

Suggested Reading:
PBL-122: ਪੁਣੀਜੀ ਪਾਠਾਂ (In lieu of Punjabi Compulsory)

Credits: 2-0-0

Mid Semester Examination: 20% weightage
End Semester Examination: 80% weightage
MCA (5 Years Integrated Programme) Semester – I
(Credit Based Evaluation and Grading System)

DRUG ABUSE: PROBLEM, MANAGEMENT AND PREVENTION
(Student can opt this Paper in 1st or 2nd Semester)

SOA: 101–PROBLEM OF DRUG ABUSE

Time: 3 Hours
Credit 3-0-0

Mid Semester Examination: 20% weightage
End Semester Examination: 80% weightage

Instructions for the Paper Setters:
Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four Sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each Section. The fifth question may be attempted from any Section.

Section – A
Meaning of Drug Abuse:
2) Consequences of Drug Abuse for:
   Individual : Education, Employment, Income.
   Family : Violence.
   Society : Crime.
   Nation : Law and Order problem.

Section – B
Management of Drug Abuse:
(i) Medical Management: Medication for treatment and to reduce withdrawal effects.
(ii) Psychiatric Management: Counselling, Behavioural and Cognitive therapy.
(iii) Social Management: Family, Group therapy and Environmental Intervention.

Section – C
Prevention of Drug Abuse:
(i) Role of family: Parent child relationship, Family support, Supervision, Shaping values, Active Scrutiny.
(ii) School: Counselling, Teacher as role-model. Parent-teacher-Health Professional Coordination, Random testing on students.

Section – D
Controlling Drug Abuse:
(i) Media: Restraint on advertisements of drugs, advertisements on bad effects of drugs, Publicity and media, Campaigns against drug abuse, Educational and awareness program

CSC1: MCA (5 Years Integrated Programme) Semester – I (Electives)
References:

CSL121: NUMERICAL METHODS

Total Marks: 100

Credits
L   T   P
3   1   0

Mid Semester Examination: 20% weightage
End Semester Examination: 80% weightage

Instructions for the Paper Setters:
Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four Sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each Section. The fifth question may be attempted from any Section.

Note for Candidate:
Attempt five questions in all by selecting one question from each section and the fifth question may be attempted from any sections.

UNIT-I

Introduction
Numerical Methods, Numerical methods versus numerical analysis, Errors and Measures of Errors.

UNIT-II


UNIT-III


UNIT-IV

Numerical Integration and Different Trapezoidal Rule, Simpson’s 1/3 Rule, Simpson’s 3/8 Rule. Numerical differentiation by Polynomial Fit, Correlation and Regression Analysis.

Reference:
MCA (5 Years Integrated Programme) Semester – II
(Credit Based Evaluation and Grading System)

CSL122: DATA BASE MANAGEMENT SYSTEM

Total Marks: 100

Mid Semester Examination: 20% weightage
End Semester Examination: 80% weightage

Instructions for the Paper Setters:
Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four Sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each Section. The fifth question may be attempted from any Section.

Note for Candidate:
Attempt five questions in all by selecting one question from each section and the fifth question may be attempted from any sections.

UNIT–I
Overview: Database, Database Management System, Advantages and disadvantages of DBMS, DDL, DML, Data Dictionary, Database System Structure, DBA, responsibilities of DBA.

UNIT–II

UNIT–III
Relational Algebra, Relational Calculus, Introduction to SQL, Normalization: 1NF, 2NF, 3NF, BCNF. Concurrency Control and its management,

UNIT–IV
Security and recovery of database. Basic concepts of object–oriented DBMS, Comparison of RDBMS and OODBMS. Case study – MYSQL

References:
5. C.J.Date “Introduction to Database System”.
MCA (5 Years Integrated Programme) Semester – II
(Credit Based Evaluation and Grading System)

CSL123: DATA STRUCTURES AND FILE PROCESSING

Total Marks: 100

Mid Semester Examination: 20% weightage
End Semester Examination: 80% weightage

Instructions for the Paper Setters:
Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four Sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each Section. The fifth question may be attempted from any Section.

Note for Candidate:
Attempt five questions in all by selecting one question from each section and the fifth question may be attempted from any sections.

UNIT–I

Basic Data Structures
Introduction to elementary Data Organization and its operations, complexity of Algorithms and Time space trade off, string processing, Arrays, Stacks, Linked Lists.

Searching Techniques
Linear and Binary Search

UNIT–II

Queues: Description of queue structure, implementation of queue using arrays and linked lists, description of priorities queues. Applications of queues – Operating system simulations

Graphs: Description of graph structure, implementing graphs in memory using adjacency matrix or adjacency lists, various graphs traversing algorithms, finding shortest path between two nodes, Dijkstra’s shortest path algorithm., finding biconnected component, strongly connected component and finding cycles in the graphs.

UNIT–III

Trees: Description of tree structure and its terminology, binary search tree, implementing binary search tree using linked lists, various operations on binary search trees, AVL Trees, Threaded Binary Trees, B–Trees, B+ trees

Sorting Techniques
Bubble Sort, selection sort, insertion sort, quick sort, merge sort, heap sort.
UNIT–IV

File Organization
Concept of field, record, file, blocking and compaction.

File Organization Techniques
Sequential indexed, indexed sequential, Direct, Hashing, Concept of master and transaction files.

Text / References:

1. Data Structure – Seymour Lipschutz, Schaum Outline Series.
2. File Structures & Data Structures by E.Loomis
3. Data Structures by Trabley & Soreuson.
MCA (5 Years Integrated Programme) Semester – II
(Credit Based Evaluation and Grading System)

CSL124: OBJECT ORIENTED PROGRAMMING C++

Total Marks: 100

Mid Semester Examination: 20% weightage
End Semester Examination: 80% weightage

Instructions for the Paper Setters:
Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four Sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each Section. The fifth question may be attempted from any Section.

Note for Candidate:
Attempt five questions in all by selecting one question from each section and the fifth question may be attempted from any sections.

UNIT–I

Getting Started:
Introduction. A brief history of C++, Variable, Constant, Expression, Statements, Comments and keywords of C++,

Operator: Arithmetic, Relational, Logical, Assignment, Increment/Decrement, Conditional, Precedence of Operators., Data type, Type conversion, library function.

Input/Output Statements: Inputting using cin and outputting using cout statements, Preprocessor directives

Basic Program construction: A complete C++ program: invoking Turbo C++, naming your program, using the editor, saving your program, compiling and linking, running the program

Errors: Compiler, linker and runtime.

Other IDE features: Compiling and linking, shortcut exiting from IDE, examining files, opening an existing file, DOS shell.
UNIT–II

Decision Making and Looping statement
If statement, if....else statement, nesting of if statement, switch statement, conditional operator statement. While loop, do loop, for loop, nesting of loops, break and continue statement, go to statement.

Arrays:
Defining an array, array type, array elements, Accessing & initializing array, Programming of C++ with array, String handling, array of strings

Functions
What is a function?Declaring and defining function, Local, global variables, execution of function, Passing argument to function, Return values, Reference arguments, Overloading functions, Inline function and default parameter, Variable and storage classes.

UNIT–III

Object Oriented Programming
Objects & Classes, Constructor & Destructor

Operator Overloading: Overloading unary operators, Overloading binary operators, Data conversion, Pitfalls operator overloading and conversion

Inheritance: Derived class and Base Class, Derived Class Constructors, Overriding member functions, class hierarchies, Public & Private inheritance, Levels of inheritance Polymorphism: Problems with single inheritance, Multiple inheritance.

UNIT–IV

Structures: A simple structure, specifying the structure, defining a structure variable
Accessing Structure member
Other structure features, Structure within structure, Structure and classes, Arrays of structure

Pointers: Addresses and pointers, Pointers and Arrays, Pointers and Functions, Pointers and Strings, Pointer to objects, Pointer to pointers.

Files & Streams: Overview of streams, String I/O, character I/O, Object I/O, I/O with multiple objects, File Pointers, Disk I/O with member functions, Redirections, Error handling, Command–line Argument

Books:
1. C++ & Graphics by Vijay Mukhi’s
2. Turbo C++ by Robert Lafore
3. Mastering C++
4. C++ Programming language by Saucham’s outline series
CSP120: PROGRAMMING LABORATORY–II

Total Marks: 100

Based on C++ Programming language,
Based on numerical methods and statistical techniques using C/C++
Implementation of Data Structures using C++
DBMS – MYSQL: Introduction to SQL & Database Administration
COMMUNICATIVE ENGLISH–II

Subject Code- ENL-151  
Credits: 02 (L= 2, T=0, U=0)  
Total Marks-50

Mid Semester Examination: 20% weightage  
End Semester Examination: 80% weightage

Instructions for the Paper Setters:
Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four Sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each Section. The fifth question may be attempted from any Section.

Objective: To introduce students to the skills and strategies of reading and writing by identifying organizational patterns, spotting classification systems and understanding associations between ideas. This course will prepare students to read a variety of texts and also to communicate more effectively through writing. The course will also pay special attention to vocabulary building.

Prescribed Text books:

SECTION–A
Practical question on Note Making, Summarizing and Abstracting as given in *The Written Word* by Vandana R. Singh

SECTION–B
Practical question on Paragraph writing as prescribed in *The Written Word* by Vandana R. Singh

SECTION–C
Theoretical questions based on ABC of Good Notes as prescribed in *The Written Word* by Vandana R. Singh.


SECTION–D
Practical question on Essay writing from *The Written Word* by Vandana R. Singh
PBL 131: भीषण लक्षण–II

Credit: 2-0-0

Mid Semester Examination: 20% weightage
End Semester Examination: 80% weightage

मैक्समल-दी

I. दे ग्रेग (मैनु, उपमर्न सिद्ध विद्वान, धीमान सिद्ध मरवरीश्वर)

जल तालाब देे वलीदहामी, अभिनवसद हिसें धे लिखे बवाजीवाद :
(ए) तालाब सिद्ध : क्रमांक
(ब) बॉलसू सिद्ध समावेश : वारी की सी भी
(स) मंडळ सिद्ध से : पैकी दे हिन्दिए
(वराहवाड़ दे नील, वगसी मात, धिमा-धमु, वगसी बस्त)

II. भीषण महाबोध घटना : पूण्य सुद्र, हफ्तु (महोढ़, दिनिंद्र, दिनिंद्रत पहे तुमुदती), महाम।

मैक्समल-धी

I. दे ग्रेग (मैनु, उपमर्न सिद्ध विद्वान, धीमान सिद्ध मरवरीश्वर)

जल तालाब देे वलीदहामी, अभिनवसद हिसें धे लिखे बवाजीवाद :
(ए) ममता सिद्ध : गुरां न रुप
(ब) बॉलसू सिद्ध हुआ : वै वी चट्टा दा अग्निश
(वराहवाड़ दे नील, वगसी मात, धिमा-धमु, वगसी बस्त)

II. पूण्य तुलना : वद्यन दिच्च 10 दिशिपं (महिमागद, फहिमत गौ उमतीतु) 'दे पूण्य तुलना दे अविशाल वटलई॥

मैक्समल-धी

I. दे ग्रेग (मैनु, उपमर्न सिद्ध विद्वान, धीमान सिद्ध मरवरीश्वर)

लग सात देे वलीदहामी, अभिनवसद हिसें धे लिखे बवाजीवाद :
(ए) बॉलसू सिद्ध हिंदु : यहदी टेक्स टेक्स
(ब) तालाब सिद्ध : भूमी नव मेव बेटी गारी
(स) पूण्य अग्नि : खिंडी
(वराहवाड़ दे कील, वगसी मात, धिमा-धमु, वगसी बस्त)

II. म्हणजे उर अभास (अभास उर भूमिशहर वें मिला) 200 म्हणजें उर 100 अभासत उर वालां दिच्च दक्षम

मैक्समल-धी

I. दे ग्रेग (मैनु, उपमर्न सिद्ध विद्वान, धीमान सिद्ध मरवरीश्वर)

लग सात देे वलीदहामी, अभिनवसद हिसें धे लिखे बवाजीवाद :
(ए) बॉलसू सिद्ध हिंदु : नाडु निर्दल
(ब) हर्षिक तें टिकाट : में वेय मनकर
(वराहवाड़ दे नील, वगसी मात, धिमा-धमु, वगसी बस्त)

II. म्हणजे मूलस्वर : तांड, उत्तलस्थ, दिमेश्वर, विश्वर, जिमेश्वर, दिमेश्वर, मंदिर

अभ्यास भी उर पृष्ठभाग लक्षी उपादितव

1. भूमि धातु दे उर वन ने जोड़े। उर वन दिच्च दे पृथु दिच्च सटोज़ी।
2. हिमिस्वर्णी दे दुध मे पृथु बरख उर जोड़े। उर वन दिच्च दिच्च पृथु भीमान दी।
3. पृथु धातु दे पृथु दिच्च दिच्च सटोज़ी।
4. ज्ञान मैं वन दे पृथु ने जोड़े उर पृथु दे उर धातु में पृथु-पृथु दिच्च दिच्च दिच्च दिच्च सटोज़ी।
MCA (5 Years Integrated Programme) Semester – II
(Credit Based Evaluation and Grading System)

HSL–102: Punjab History & Culture (1717-1947)
(Special paper in lieu of Punjabi Compulsory)
(For those students who are not domicile of Punjab)

Credits: 2-0-0

Mid Semester Examination: 20% weightage
End Semester Examination: 80% weightage

Instructions for the Paper Setters:
Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four Sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each Section. The fifth question may be attempted from any Section.

Section-A
1. Sikh Struggle for Sovereignty.
2. Ranjit Singh: Conquests, Administration and the Anglo-Sikh Relations.

Section-B
3. Anglo-Sikh Wars and the Annexation.

Section-C
5. Economic Changes: Agricultural

Section-D
8. Fairs and Festivals.

Suggested Readings:
Mid Semester Examination: 20% weightage
End Semester Examination: 80% weightage

Instructions for the Paper Setters:
Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four Sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each Section. The fifth question may be attempted from any Section.

PBL-132: ਪੁਰਾਣੀ ਪ੍ਰਦਰਸ਼ਨ
(In lieu of Punjabi Compulsory)
Credits: 2-0-0

Mid Semester Examination: 20% weightage
End Semester Examination: 80% weightage

Instructions for the Paper Setters:
Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four Sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each Section. The fifth question may be attempted from any Section.
SOA–101: PROBLEM OF DRUG ABUSE

Time: 3 Hours
Credit 3-0-0

Mid Semester Examination: 20% weightage
End Semester Examination: 80% weightage

Instructions for the Paper Setters:
Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four Sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each Section. The fifth question may be attempted from any Section.

Section – A

Meaning of Drug Abuse:
2) Consequences of Drug Abuse for:
   Individual : Education, Employment, Income.
   Family : Violence.
   Society : Crime.
   Nation : Law and Order problem.

Section – B

Management of Drug Abuse:
i. Medical Management: Medication for treatment and to reduce withdrawal effects.
ii. Psychiatric Management: Counselling, Behavioural and Cognitive therapy.
iii. Social Management: Family, Group therapy and Environmental Intervention.

Section – C

Prevention of Drug Abuse:
i. Role of family: Parent child relationship, Family support, Supervision, Shaping values, Active Scrutiny.
i. School: Counselling, Teacher as role-model. Parent-teacher-Health Professional Coordination, Random testing on students.

Section – D

Controlling Drug Abuse:
i. Media: Restraint on advertisements of drugs, advertisements on bad effects of drugs, Publicity and media, Campaigns against drug abuse, Educational and awareness program
References:

CSL210: OPERATING SYSTEM

Total Marks: 100

Mid Semester Examination: 20% weightage
End Semester Examination: 80% weightage

Instructions for the Paper Setters:
Eight questions of equal marks (specified in the syllabus) are to be set, two in each of the four Sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each Section. The fifth question may be attempted from any Section.

Note for Candidate:
Attempt five questions in all by selecting one question from each section and the fifth question may be attempted from any sections.

Objectives
To enable the students to have understanding of the role & importance of Operating system in computing.

UNIT - I

Basic Contents: History & evolution of operating system, OS as resource manager, Various views of OS.


UNIT-II

Memory Management: Basic Memory Management Schemes, Partition Memory Management, Demand Paged Memory Management, Segmented Memory Management, Swapping, Hierarchy of Memory.


UNIT-III


UNIT-IV

Case Studies

References:
CSL212: INFORMATION SYSTEMS

Total Marks: 100

Mid Semester Examination: 20% weightage
End Semester Examination: 80% weightage

Instructions for the Paper Setters:
Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four Sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each Section. The fifth question may be attempted from any Section.

Note for Candidate:
Attempt five questions in all by selecting one question from each section and the fifth question may be attempted from any sections.

UNIT–I
Information Systems in Organizations: organizations and Information systems, competitive Advantage, careers in Information System

UNIT–II
Building and Maintaining Information Systems, Information System Security and Control

UNIT–III

UNIT–IV
Knowledge Management systems: Fundamentals of Knowledge Based Decision Support; Artificial Intelligence and Expert systems, Expert System & its integration with DSS.
Other Information Systems like Supply chain management, Customer Relationship Management (CRM), Electronic Commerce and Mobile Commerce
References:


CSL213: OBJECT ORIENTED PROGRAMMING IN JAVA

Total Marks: 100

Mid Semester Examination: 20% weightage
End Semester Examination: 80% weightage

Instructions for the Paper Setters:
Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four Sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each Section. The fifth question may be attempted from any Section.

Note for Candidate:
Attempt five questions in all by selecting one question from each section and the fifth question may be attempted from any sections.

UNIT-I

Evolution of Java
Importance of JAVA to Internet, Features of JAVA, Bytecode, Object Oriented Approach.

Data Types, Variables and Arrays
Data types, Declaration of Variable, Type Conversion and Casting, One Dimensional and Multidimensional arrays, String handling.

UNIT-II

Operators and Control Structures
Arithmetic, Bitwise, Relational, Boolean, Assignment Operators, Operator precedence, Selection Statements, Iteration Statements, Jump statements.

Classes
Class Fundamentals, Declaring objects, introducing methods, constructors, this keyword, Overloading constructors, Recursion, Nested and Inner classes.

UNIT-III

Inheritance
Basics, Creating Multilevel hierarchy, Method Overriding, Abstract Classes.

Packages and Interface
Packages, Access Protection, Importing Packages, Interfaces, Defining, Implementing, Applying Interfaces, Extending Interfaces
UNIT-IV

Exception Handling
Fundamentals, Exception Types, uncaught exceptions, try and catch,

Input / Output
Stream, InputStream and OutputStream, InputStream and OutputStream hierarchies.

References:

CSL215: COMPUTER ORGANIZATION AND ARCHITECTURE

Total Marks: 100

Mid Semester Examination: 20% weightage
End Semester Examination: 80% weightage

Instructions for the Paper Setters:
Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four Sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each Section. The fifth question may be attempted from any Section.

Note for Candidate:
Attempt five questions in all by selecting one question from each section and the fifth question may be attempted from any sections.

**UNIT-I**

**Digital Fundamentals:** Digital Logic Circuits: Digital Computers, Logic gates, Boolean Algebra, Map Simplification, Combinational Circuits, Sequential Circuits.

**Digital Components** – Decoders, Encoders, Multiplexers, Register, Shift registers, Binary counters, Memory Unit.

**UNIT-II**

**Data Representation** – Data types, complements, Fixed-point representation, Floating pt. Representation, Error detection codes.

**Basic Computer Organization** - Design, Register Transfer Language & Operations, Various Arithmetic, Logic & Shift micro-operations, instruction codes, computer registers, instructions, timing & control, instruction cycle, design of a complete basic computer & its working.

**UNIT-III**

**Programming & controlling the basic computer** – Machine & Assembly Language.

**CPU Architecture** – General register & stack organization, instruction formats and addressing modes, RISC & CISC.
UNIT-IV

Memory Organization – Memory hierarchy, Main auxiliary, Cache memory, Virtual memory, Paging and Segmentation.

Reference:

1. Morris Mano: Computer System Architecture, PHI
4. Tanenbaum: Structured Computer Organization, PHI
CSP214: PROGRAMMING LAB-III (USING JAVA)

Total Marks: 100

Practical based on Java
MTL211: COMPUTER BASED OPTIMIZATION TECHNIQUES

**Total Marks: 100**

Mid Semester Examination: 20% weightage
End Semester Examination: 80% weightage

**Instructions for the Paper Setters:**
Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four Sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each Section. The fifth question may be attempted from any Section.

**Note for Candidate:**
Attempt five questions in all by selecting one question from each section and the fifth question may be attempted from any sections.

**UNIT-I**

**UNIT-II**
Integer, Dynamic and Goal Programming: Integer programming problem, Branch and found techniques, Dynamic programming: Recursive equation approach, Characteristics, Tabular Method Deterministic & Probabilistic.

**UNIT-III**
Goal programming: Model Formulation, Weighted goals, Graphical Method, Interpretation & Optimal modified simplex solutions.

**UNIT-IV**
Non-Linear Programming: General Non-LPP, Optimizing Non-Linear functions, Search & Gradient Methods, Graphical solution, Quadratic programming.

**BOOKS RECOMMENDED:**
ESL-220: ENVIRONMENTAL STUDIES

Credits: 4-0-0

Teaching Methodologies
The Core Module Syllabus for Environmental Studies includes classroom teaching and field work. The syllabus is divided into 8 Units [Unit-I to Unit-VII] covering 45 lectures + 5 hours for field work [Unit-VIII]. The first 7 Units will cover 45 lectures which are classroom based to enhance knowledge and attitude to environment. Unit-VIII comprises of 5 hours field work to be submitted by each candidate to the Teacher in-charge for evaluation latest by 15 December, 2018.

Exam Pattern:
- End Semester Examination- 75 marks
- Project Report/Field Study- 25 marks [based on submitted report]
- Total Marks- 100

The structure of the question paper being:

Part-A, Short answer pattern with inbuilt choice – 25 Marks
 Attempt any five questions out of seven distributed equally from Unit-I to Unit-VII. Each question carries 5 marks. Answer to each question should not exceed 2 pages.

Part-B, Essay type with inbuilt choice – 50 Marks
 Attempt any five questions out of eight distributed equally from Unit-I to Unit-VII. Each question carries 10 marks. Answer to each question should not exceed 5 pages.

Project Report / Internal Assessment:

Part-C, Field work – 25 Marks [Field work equal to 5 lecture hours]
The candidate will submit a hand written field work report showing photographs, sketches, observations, perspective of any topic related to Environment or Ecosystem. The exhaustive list for project report/area of study are given just for reference:

1. Visit to a local area to document environmental assets: River / Forest / Grassland / Hill / Mountain / Water body / Pond / Lake / Solid Waste Disposal / Water Treatment Plant / Wastewater Treatment Facility etc.
2. Visit to a local polluted site – Urban / Rural / Industrial / Agricultural
3. Study of common plants, insects, birds
4. Study of tree in your areas with their botanical names and soil types
5. Study of birds and their nesting habits
6. Study of local pond in terms of wastewater inflow and water quality
7. Study of industrial units in your area. Name of industry, type of industry, Size (Large, Medium or small scale)
8. Study of common disease in the village and basic data from community health centre
9. Adopt any five young plants and photograph its growth
10. Analyze the Total dissolved solids of ground water samples in your area.
11. Study of Particulate Matter (PM$_{2.5}$ or PM$_{10}$) data from Sameer website. Download from Play store.
12. Perspective on any field on Environmental Studies with secondary data taken from Central Pollution Control Board, State Pollution Control Board, State Science & Technology Council etc.
Unit-I
The multidisciplinary nature of environmental studies
Definition, scope and importance, Need for public awareness

(2 lectures)

Unit-II
Natural Resources: Renewable and non-renewable resources:
Natural resources and associated problems.
(a) Forest resources: Use and over-exploitation, deforestation, case studies. Timber extraction, mining, dams and their effects on forests and tribal people.
(b) Water resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams-benefits and problems.
(c) Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies.
(d) Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies.
(e) Energy resources: Growing energy needs, renewable and non-renewable energy sources, use of alternate energy sources, case studies.
(f) Land resources: Land as a resource, land degradation, man induced landslides, soil erosion and desertification.
• Role of an individual in conservation of natural resources.
• Equitable use of resources for sustainable lifestyles.

(8 Lectures)

Unit-III
Ecosystems
• Concept of an ecosystem
• Structure and function of an ecosystem
• Producers, consumers and decomposers
• Energy flow in the ecosystem
• Ecological succession
• Food chains, food webs and ecological pyramids
• Introduction, types, characteristic features, structure and function of the following ecosystem: Forest ecosystem, Grassland ecosystem, Desert ecosystem, Aquatic ecosystems (ponds, streams, lakes, rivers, ocean estuaries)

(6 Lectures)

Unit-IV
Biodiversity and its conservation
• Introduction – Definition: genetic, species and ecosystem diversity
• Biogeographical classification of India
• Value of biodiversity: consumptive use, productive use, social, ethical aesthetic and option values
• Biodiversity at global, national and local levels
• India as a mega-diversity nation
• Hot-spots of biodiversity
• Threats to biodiversity: habitat loss, poaching of wildlife, man wildlife conflicts
• Endangered and endemic species of India
• Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity

(8 Lectures)

Unit-V
Environmental Pollution:
Definition:
- Causes, effects and control measures of Air pollution, Water pollution, Soil pollution, Marine pollution, Noise pollution, Thermal pollution, Nuclear pollution
- Solid waste management: Causes, effects and control measures of urban and industrial wastes.
- Role of an individual in prevention of pollution
- Pollution case studies
- Disaster management: floods, earthquake, cyclone and landslides

(8 Lectures)

Unit-VI

Social Issues and the Environment
- From unsustainable to sustainable development
- Urban problems and related to energy
- Water conservation, rain water harvesting, watershed management
- Resettlement and rehabilitation of people; its problems and concerns. Case studies.
- Environmental ethics: Issues and possible solutions
- Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust. Case studies.
- Wasteland reclamation
- Consumerism and waste products
- Environmental Protection Act, 1986
- Air (Prevention and Control of Pollution) Act, 1981
- Water (Prevention and control of Pollution) Act, 1974
- Wildlife Protection Act
- Forest Conservation Act
- Issues involved in enforcement of environmental legislation
- Public awareness

(7 Lectures)

Unit-VII

Human Population and the Environment
- Population growth, variation among nations
- Population explosion – Family Welfare Programmes
- Environment and human health
- Human Rights
- Value Education
- HIV / AIDS
- Women and Child Welfare
- Role of Information Technology in Environment and Human Health
- Case Studies

(6 Lectures)
Unit-VIII

Field Work
- Visit to a local area to document environmental assets river/forest/grassland/hill/mountain
- Visit to a local polluted site – Urban / Rural / Industrial / Agricultural
- Study of common plants, insects, birds
- Study of simple ecosystems-pond, river, hill slopes, etc

(Field work equal to 5 lecture hours)

References:
2. Down to Earth, Centre for Science and Environment, New Delhi.
9. State of India’s Environment 2018 by Centre for Sciences and Environment, New Delhi
CSL220: DATA COMMUNICATIONS

Total Marks: 100

Mid Semester Examination: 20% weightage
End Semester Examination: 80% weightage

Instructions for the Paper Setters:
Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four Sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each Section. The fifth question may be attempted from any Section.

Note for Candidate:
Attempt five questions in all by selecting one question from each section and the fifth question may be attempted from any sections.

UNIT-I
Introduction to computer networks, LAN, MAN, WAN and network topologies, Concepts of Layer protocols and layer interfaces, OSI reference model and TCP/IP reference model.

UNIT-II
Transmission Media, Communication Satellites, Multiplexing.

UNIT-III
Data Link Layer Design Issues: Framing, Error Control and Flow control.

UNIT-IV
LAN Protocols: Ethernet, Token bus, and Token ring.

Comparison of Virtual-Circuit and Datagram subnets, Concepts of routing and congestion control, Simple routing algorithms.

References:
2. Fourozan: Data communications, Tata McGraw Hill
3. Lehner: Internet 101, 1st Ed., Pearson Education
CSL226: SOFTWARE ENGINEERING

Total Marks: 100

Mid Semester Examination: 20% weightage
End Semester Examination: 80% weightage

Instructions for the Paper Setters:
Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four Sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each Section. The fifth question may be attempted from any Section.

Note for Candidate:
Attempt five questions in all by selecting one question from each section and the fifth question may be attempted from any sections.

UNIT-I

Introduction

UNIT-II

Requirements’ Analysis & Design

UNIT-III

Coding & Testing
Common Coding Errors, Coding Process, Testing Fundamentals, Software Quality Models – Product Models (McCabe’s Quality Model, McCall’s Quality Model), Process Models (Capability Maturity Model)
UNIT-IV

Software Maintenance

Introduction, significance, types of maintenance, a case study to identify different types of maintenance using change logs of a (open source) software project.

References:
Note for Paper Setter:
There will be eight questions of equal marks, two in each of the four sections (Section A to D), corresponding to the distribution of the syllabus. The paper setters are requested to make sub-section (not exceeding 4) of the questions and allocate appropriate marks to each sub section.

Note for Candidate:
Attempt five questions in all by selecting one question from each section and the fifth question may be attempted from any sections.

UNIT-I

Basic Definitions
Operations on Languages: Closure properties of Language classes, Context Free Language: Chomsky & Greibach Normal forms, Linear Grammars and Regular Language, Regular Expressions, Context Sensitive Languages

UNIT-II
The Kuroda normal Form, One sided context Sensitive Grammars, LR (k) Grammars
Unrestricted Languages: Normal form and Derivation Graph, Automata & their Languages

UNIT-III
Finite Automata, Pushdown Automata, 2-pushdown Automata
Turing machines, the equivalence of the automata and appropriate grammars, the Dyck Language.

UNIT-IV
Undecidability: Recursive and Recursively Enumerable Languages, Rice Theorem, Post’s Correspondence Problem.

References:
CSL223: RDBMS USING ORACLE (SQL, PL/SQL)

Total Marks: 100

Mid Semester Examination: 20% weightage
End Semester Examination: 80% weightage

Instructions for the Paper Setters:
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Note for Candidate:
Attempt five questions in all by selecting one question from each section and the fifth question may be attempted from any sections.

UNIT-I
Concept of functional dependencies, multivalued dependencies, 1NF, 2NF, 3NF, BCNF, Higher Normal Forms, Database system architecture, data independence, normalization & normal forms.

UNIT-II
Managing Databases
Creating, defining and modifying table structure, Data constants, Oracle functions, Joins, subqueries, indexes, views, sequences, Granting & revoking permissions.

UNIT-III
PL/SQL
Introduction, execution environment, syntax, block structure, Oracle transactions.

UNIT-IV
Advance concepts of PL/SQL

References:
CSL225: MICROPROCESSOR AND ITS APPLICATIONS

Total Marks: 100
Mid Semester Examination: 20% weightage
End Semester Examination: 80% weightage

Instructions for the Paper Setters:
Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four Sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each Section. The fifth question may be attempted from any Section.

Note for Candidate:
Attempt five questions in all by selecting one question from each section and the fifth question may be attempted from any sections.

UNIT-I
Introduction: Introduction to Microprocessor, Microcontroller and Microcomputer.
Architecture of a Microcomputer: General Architecture of a microcomputer system. Microprocessor unit, input unit, output unit, memory unit and auxiliary storage unit.
Architecture of 8086/ 8088 Microprocessor: internal architecture of the 8086 / 8088 microprocessor, Description of various pins, configuring the8086/8088 microprocessor for minimum and maximum mode systems, system clock, bus cycle.

UNIT-II
Memory Interface of 8086/8088Microprocessor
Address space and data organization, hardware organization of memory address space, memory bus status code, memory control signals, read/write bus cycles, program and data storage memory, dynamic RAM system.

UNIT-III
Input/Output Interface of the 8086/8088 Microprocessor
I/O interface, I/O address space and data transfer, I/O instructions, Output ports, 8255A Programmable Peripheral Interface (PPI), Serial communication interface (USART and UART) – the RS-232 C interface.
Interrupt Interface of 8086/8088 Microprocessor
Types of Interrupt, Interrupt Vector Table (IVT).
UNIT-IV

8086/8088 assembly language programming: General structure of an assembly language program, steps in the development of an assembly language program, addressing modes, Instruction set: data movement instructions, arithmetic instructions, logical instructions, shift and rotate instructions, jumping and looping instructions, string processing, interrupt instructions and stack operations.

References:

CSP224: PROGRAMMING LAB-IV

Credits

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Total Marks: 100

Practical based on RDBMS (Relational Database Management Systems)
Note for Paper Setter:
There will be eight questions of equal marks, two in each of the four sections (Section A to D), corresponding to the distribution of the syllabus. The paper setters are requested to make subsection (not exceeding 4) of the questions and allocate appropriate marks to each sub section.

Note for Candidate:
Attempt five questions in all by selecting one question from each section and the fifth question may be attempted from any sections.

UNIT–I
Elements of Computer Graphics: Introduction to computer graphics; graphics display devices; interactive control devices; output devices; display processors.
2D Graphics
Elementary Drawing Algorithms: Line drawing using direct method, simple DDA, integer DDA, incremental method, and Bresenham’s algorithm; Circle drawing using incremental method and Bresenham’s algorithm, drawing arcs, sectors, etc. Flood Fill Algorithms, Boundary Fill Algorithms

UNIT–II
Geometric Transformations: Translation, rotation, scaling, reflection and shear; concept of homogenous coordinates, Building composite transformations.
Viewing Transformations: Concept of windows & viewport, window–to–viewport mapping, clipping operations – point clipping, line clipping algorithms (Cohen – Sutherland, mid–point subdivision), Sutherland – Hodgman polygon clipping algorithm.

UNIT–III
3D Graphics
Drawing 3D Shapes: Coordinate systems, representation of 3D shapes, designing curves and surfaces (Hermite, Bezier, and B–Spline).
Geometric Transformations: Translation, rotation, scaling and reflection.
Projective Transformations: Parallel projections – orthographic, axonometric (isometric, diametric and trimetric), oblique projections; and perspective projections (one, two and three vanishing points).
Viewing Transformations: Viewing a 3D object, 3D clipping (extension of specified 2D algorithms to handle 3D objects).
UNIT-IV


References:
CSL311: ARTIFICIAL INTELLIGENCE

**Total Marks: 100**

**Note for Paper Setter:**
There will be eight questions of equal marks, two in each of the four sections (Section A to D), corresponding to the distribution of the syllabus. The paper setters are requested to make sub-section (not exceeding 4) of the questions and allocate appropriate marks to each sub-section.

**Note for Candidate:**
Attempt five questions in all by selecting one question from each section and the fifth question may be attempted from any sections.

**UNIT-I**

**Knowledge**
Introduction and Importance of Knowledge, Knowledge based systems, Knowledge Representation, First Order Predicate Logic (FOPL).

**Natural Language Processing (NLP)**

**UNIT-II**

**Pattern Recognition**
Introduction, Recognition and Classification Process, Learning Classification patterns, recognizing and understanding speech.

**UNIT-III**

**Expert System**
Introduction, Rule-Based Architectures, Nonproduction system architectures, Expert System Shells, Knowledge acquisition and Validation.

**Learning**
Introduction, Role of Learning, Types of Learning, General Learning Model, Performance Measures.
UNIT-IV

Machine Learning
Introduction, linear classification, perceptron update rule, Perceptron convergence, generalization, Maximum margin classification, Classification errors, regularization, logistic regression, Linear regression, estimator bias and variance, active learning, Support vector machine (SVM)

References :
Note for Paper Setter:
There will be eight questions of equal marks, two in each of the four sections (Section A to D), corresponding to the distribution of the syllabus. The paper setters are requested to make sub-section (not exceeding 4) of the questions and allocate appropriate marks to each sub section.

Note for Candidate:
Attempt five questions in all by selecting one question from each section and the fifth question may be attempted from any sections.

UNIT-I

Pre-requisites
Concepts of Programming Languages and Finite Automata.

Preliminaries
Basics of Compilers, Lexical Analysis.

Syntax Analysis
Parsers, top-down parsers, bottom-up parsers.

UNIT-II

Symbol Table Handling
Symbol table contents, operations on Symbol Tables, Organizations of Symbol Tables.

Syntax-Directed Translation: Syntax-Direction definitions, Evaluation of SDD, Dependency graphs.

UNIT-III

Storage Management
Static Storage Management, Dynamic Storage Management.

Code Generation
Code Generator, Code generation of simple programming constructs.
UNIT-IV

Code Optimization

Local optimization, Machine independent optimizations.

Introduction to Compiler-Compilers, incremental compilers, Case study : YACC.

References:


CSL313: ADVANCED JAVA TECHNOLOGIES

Note for Paper Setter:
There will be eight questions of equal marks, two in each of the four sections (Section A to D), corresponding to the distribution of the syllabus. The paper setters are requested to make sub-section (not exceeding 4) of the questions and allocate appropriate marks to each sub section.

Note for Candidate:
Attempt five questions in all by selecting one question from each section and the fifth question may be attempted from any sections.

UNIT-I
Multithreading: Creating Threads, Thread Life Cycle, Synchronization, Thread Communication, Thread Priorities.
AWT Components.

UNIT-II
Swing Components.
Applets: Life cycle of an applet, passing parameters to an applet, Event Handling

UNIT-III
Networking: Internet Addressing, TCP/IP Client Sockets, URL, URL connection, TCP/IP Server Sockets, Datagram
Java Database Connectivity (JDBC): Merging data from Multiple tablets, joining, Manipulation: Database with JDBC, Prepared Statements, Transaction processing.

UNIT-IV
Servlets: Overview & Architecture, Life Cycle, Handling HTTP get request, Handling HTTP post requests session tracking, cookies.
Java Server Paves (JSP): Introduction to JSP

References:

MCA (5 Years Integrated Programme) Semester – V
(Credit Based Continuous Evaluation Grading System)

CSP315: PROGRAMMING LAB-V

Total Marks: 100

Practical based on

Advanced Java
Computer Graphics
CSE320: MAJOR PROJECT-I

Total Marks: 600

Ist synopsis (containing mainly literature survey corresponding to the problem taken up for the project work and line of attack to solve the problem) within one month (upto 31st March) of joining the training.

IInd synopsis (containing essentially the progress of work in comparative details) with in three months (upto 15th May) of joining the training.

Final report submission: upto 30th June
CSL-450: DESIGN AND ANALYSIS OF ALGORITHMS

Total Marks: 100

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Note for Paper Setter:
The paper setters are requested to make subsection (not exceeding 4) of the questions and allocate appropriate marks to each sub-section.

Note for Candidate:
Attempt five questions in all by selecting one question from each section and the fifth question may be attempted from any sections.

UNIT-I

A Revision of Algorithm concepts: Asymptotic notation, Design of efficient algorithms, complexity analysis of sorting and searching Algorithms, Complexity analysis of Iterative and Recursive algorithm.


UNIT-II

Greedy Method: Knapsack problem, Huffman coding, Job Sequencing with Deadline, Optimal Merge Pattern, Prim’s Algorithm and Kruskal’s Algorithm.

Dynamic Programming: Matrix Chain multiplication, 0/1 knapsack problem, Longest Common Subsequence, Travelling Salesman problem, Multistage Graph, All pair shortest path, optimal binary search trees.

UNIT-III

Back-tracking: 8 Queen’s problem, Hamiltonian Circuit, Graph Coloring, Sum of subset.

UNIT-IV

Algorithms on Graphs: Depth/Breadth First search, Dijkstra Algorithm and Bellman Ford Algorithm

Problem Classes: P, NP, NP-Hard and NP-Complete.

References:
CSL455: Design of Programming Languages

Total Marks: 100

Note for Paper Setter:
There will be eight questions of equal marks, two in each of the four sections (Section A to D), corresponding to the distribution of the syllabus. The paper setters are requested to make subsection (not exceeding 4) of the questions and allocate appropriate marks to each sub section.

Note for Candidate:
Attempt five questions in all by selecting one question from each section and the fifth question may be attempted from any sections.

UNIT-I

Study of Programming Languages: Brief History, Feature of a good language
Programming Language Processor: Translator and software simulator computer, syntax semantics and virtual computers.
Specifications and Implementation of Elementary and Structured Data Types. Type equivalence, checking and conversion. Vectors and Arrays, Lists, Structures, Sets, Files.

UNIT-II

Abstraction, encapsulation and information hiding subprograms, type definitions, abstract data types
Sequence control with Expressions, Conditional Statements, Loops, Exception handling.
Subprogram definition and activation, simple and recursive subprogram, subprogram environment.

UNIT-III

Scope – Static and Dynamic, Block structures, Local Data and Shared Data, Parameters and Parameter Transmission. Local and Common Environments, Tasks and Shared Data.
Static and Stack-Based Storage management. Fixed and Variable size heap storage management, Garbage Collection.

UNIT-IV

Syntax and Translation: Syntactic elements of a language, stages in translation, formal definition of syntax
Operating and Programming Environment: Batch processing, interactive, embedded, programming environments

Text/References:
1. Programming languages: design and implementation, Terrence W. Pratt., Pearson
3. Programming Language Pragmatics, Scott, ELSEVIER
CSL-452: SYSTEM SOFTWARE

Total Marks: 100

CREDITS

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Note for Paper Setter:
There will be eight questions of equal marks, two in each of the four sections (Section A to D), corresponding to the distribution of the syllabus. The paper setters are requested to make sub-section (not exceeding 4) of the questions and allocate appropriate marks to each sub section.

Note for Candidate:
Attempt five questions in all by selecting one question from each section and the fifth question may be attempted from any sections.

UNIT-I
Introduction to System Software
Evolution of System Software, components of system software, Translators, loaders, interpreters, compiler, assemblers.

Assemblers
Overview of assembly process, design of one pass and two assemblers.

UNIT-II
Macroprocessors
Macro definition and expansion, concatenation of macro parameters, generations of unique labels, conditional macro expansion, Recursive macro expansion.

UNIT-III
Compilers
Phases of compilation process, lexical analysis, parsing, storage management optimisation. Incremental compilers, cross compilers, P code compilers.

UNIT-IV
Loaders and Linkage editors
Basic loader functions. Relocation, program linking, linkage, editors, dynamic linking, bootstrap loaders.
Operating System, Text Editor, Interactive debugging systems.

Other System Software

References:
MCA (5 Years and 6 Months Integrated Programme) Semester – VII
(Credit Based Continuous Evaluation Grading System)

CSL-453: SYSTEM SIMULATION

Total Marks: 100

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Note for Paper Setter:
The paper setters are requested to make sub-section (not exceeding 4) of the questions and allocate appropriate marks to each sub section.

Note for Candidate:
Attempt five questions in all by selecting one question from each section and the fifth question may be attempted from any sections.

UNIT-I
Introduction: Concept of a system, stochastic activities, continue and discrete system, system modeling, mathematical modeling, principle used in modeling.

Simulation of Systems: Concepts of simulation of continuous systems with the help of two examples; use of integration formulas; concepts of discrete system simulation with the help of two examples, Generation of random numbers, Generation of non-uniformly distributed numbers.

UNIT-II

UNIT-III
Simulation in Inventory Control and Forecasting: Elements of inventory theory, inventory models, Generation of Poisson and Erlang variants, forecasting and regression analysis.
Design and Evaluation of Simulation Experiments: Experimental layout and validation.

UNIT-IV
Simulation Languages: Continuous and discrete simulation languages, Block-Structured continuous simulation languages, expression based languages, discrete system simulation languages, Simscript, GPSS, SIMULA, factors in selection of a discrete system simulation languages.

References:
CSP-454: PROGRAMMING LAB-VII

**Total Marks: 100**

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Practical based on Design and Analysis of Algorithms.
Examples on: Sorting and Searching Algorithm, Brute Force Method, Divide and Conquer Technique, Greedy Method, Dynamic Programming, Backtracking method, Branch and Bound Method, Graph Problems.

Programming Languages

System Software
CSL465: DISTRIBUTED SYSTEMS

Total Marks: 100

Note for Paper Setter:
There will be eight questions of equal marks, two in each of the four sections (Section A to D), corresponding to the distribution of the syllabus. The paper setters are requested to make sub-section (not exceeding 4) of the questions and allocate appropriate marks to each sub section.

Note for Candidate:
Attempt five questions in all by selecting one question from each section and the fifth question may be attempted from any sections.

Goals:
- To understand how large-scale computational systems are built
- To study the key design principles of distributed systems to understand the challenges of large systems.
- To realize the importance of coordination in distributed systems.
- To learn to create secure and reliable systems

Pre-requisites: Operating System, Computer System Architecture, Computer Networks

Unit -I
Distributed Systems – Basic characteristics, benefits over centralized systems, challenges, Design Issues, fallacies; System Models – physical, architectural, and fundamental, client-server and peer to peer systems; Role of middleware;

Unit-II
communication - message passing and distributed shared memory; Inter process communication – direct, multicast, indirect, RPC, RMI, IPC in Unix.

Unit-III
Operating System support; Time and Global states; Coordination and agreement; Distributed transactions and concurrency control; Replication;
Security challenges – perimeter defence, authentication schemes, access control technologies;
Unit-IV

Reliable distributed computing – why do systems fail, how to overcome failures; Computing in the clouds, Google as a case study.

Prescribed Text:

References:
CSL-466: WEB TECHNOLOGIES

Total Marks: 100

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Note for Paper Setter:
There will be eight questions of equal marks, two in each of the four sections (Section A to D), corresponding to the distribution of the syllabus. The paper setters are requested to make sub-section (not exceeding 4) of the questions and allocate appropriate marks to each sub section.

Note for Candidate:
Attempt five questions in all by selecting one question from each section and the fifth question may be attempted from any sections.

UNIT–I
Web Essentials, Markup languages, CSS
Basics of Client side programming, Java script language, java script objects, host objects, Browsers and DOM

UNIT–II
Basics of Server side programming, Java servlets- Life cycle, Servlet API, Reading Servlet parameters, Handling HTTP requests and responses, Cookies and Session Tracking
ASP/JSP, Basics of ASP/JSP objects, simple ASP and JSP pages

UNIT–III
Representing Web data, Data base connectivity, JDBC, Dynamic web pages, XML, DTD, XML schema, DOM, SAX, XQuery, Building web applications, cookies, sessions, open source environment

UNIT–IV
Introduction to PHP, basics, PHP File handling, file upload, cookies, error handling, PHP MySQL introduction
Middleware technologies, Ecommerce architecture and technologies, Ajax, Advanced web technologies and tools

Case Studies: PHP and MySQL case studies.

References:
Note for Paper Setter:
There will be eight questions of equal marks, two in each of the four sections (Section A to D), corresponding to the distribution of the syllabus. The paper setters are requested to make subsection (not exceeding 4) of the questions and allocate appropriate marks to each sub section.

Note for Candidate:
Attempt five questions in all by selecting one question from each section and the fifth question may be attempted from any sections.

UNIT-I
Introduction of various Network Operating Systems (Windows 9x/XP/2000, Unix, Sun Solaris)
Introduction to Windows NT server, Window NT features, Hardware requirements, planning the network, Windows NT network security model, special purpose servers, licensing.

UNIT-II
Planning storage strategies, options, working with disk administrator and backup.
Networking and Network protocols Configuration of Windows NT.

UNIT-III
Windows NT services Architecture and security Architecture, planning and managing group and user accounts File services

UNIT-IV
Distributed file system, remote administration, remote access services, Internet & Intranet.
Printing and supporting network clients, performance tuning.

Text / References:
3. Computer Networks & Distributed Processing By Martin, PHI.
5. Electronic Mail: An Introduction To X 400 Message Handling Standards By Sara Redicans, Mcgraw Hill.
6. Internet The Complete Reference By Harley Hahn, Mcgraw Hill.
CSL-467: DATA COMMUNICATION – II

Total Marks: 100

Note for Paper Setter:
There will be eight questions of equal marks, two in each of the four sections (Section A to D), corresponding to the distribution of the syllabus. The paper setters are requested to make sub-section (not exceeding 4) of the questions and allocate appropriate marks to each sub section.

Note for Candidate:
Attempt five questions in all by selecting one question from each section and the fifth question may be attempted from any sections.

UNIT-I
Internet Protocol: Internetworking, Logical Addressing – Classful and Classless, IPv4 and IPv6, ICMP, ARP, RARP, DHCP

UNIT-II
Network Trouble Shooting: Using Ping, Trace route, IP Config, Netstat, nslookup
Transport Layer: Addressing, Process-to-Process Delivery, Transmission Control Protocol (TCP) and User Datagram Protocol (UDP), Error and Flow Control

UNIT-III
Presentation Layer: Data Compression: Lossless and Lossy
Application Layer: DNS, E-mail, FTP, HTTP, HTTPS, WWW

UNIT-IV
Cryptography: Symmetric key cryptography and Asymmetric Key Cryptography
Network Security: IPSec, SSL and TLS

References:
1. B.A. Forouzan, Data Communication & Networking.
5. Mastering Windows NT Server 4 - Mark Mainasi, Christa Andrerson, Elizabeth.
CSP464: PROGRAMMING LAB-VIII

Total Marks: 100

Programming Exercises based on Web Technologies

Implementing LAN using workgroup model & windows 95, Implementing LAN using Windows NT Domain model, Using user manager forDomains in Administration, Assigning user rights and permission on different objects,

Applications related to Internet.
Note for Paper Setter:
There will be eight questions of equal marks, two in each of the four sections (Section A to D), corresponding to the distribution of the syllabus. The paper setters are requested to make sub-section (not exceeding 4) of the questions and allocate appropriate marks to each sub section.

Note for Candidate:
Attempt five questions in all by selecting one question from each section and the fifth question may be attempted from any sections.

UNIT – I
Software Project Management:

UNIT – II
Software Re-engineering: Introduction Re-engineering, Restructuring and Reverse Engineering, Re-engineering existing systems, Data Re-engineering and migration, Software Reuse and Re-engineering.

UNIT – III
Object-Oriented (OO) Measurements:
Introduction, Why metrics ?, Classification of OO metrics, Study of Design Metrics- method size, method internals, class size, class inheritance, Method inheritance, class intervals and class externals.

Object-Oriented Analysis and Design:
OOAD Methodologies (Booch, Rumbaugh and Jacobson), Unified Software Development Process (Rational Unified Process)
UNIT – IV

Component Based Software Engineering:

References:
CSL535: SOFT COMPUTING

Total Marks: 100

Note for Paper Setter:
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Note for Candidate:
Attempt five questions in all by selecting one question from each section and the fifth question may be attempted from any sections.

Unit–I

Unit–II

Unit–III
Basics of Neural Networks: Fundamental concept, Model of an Artificial Neuron, Neural Network Architectures, Various types of Learning and Activation Functions. Supervised Learning: Perceptron learning, Linear Separability, Delta Rule or Widrow Hoff Rule, Back Propagation algorithm, ADALINE, MADALINE and Associative Memories.
Unit-IV

References:

CSL – 536: DATA WAREHOUSING AND DATA MINING

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Total Marks: 100

Note for Paper Setter:
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Note for Candidate:
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UNIT – I

Data Warehousing: Concepts of Data Warehousing, Difference between operational database systems and Data warehousing, Need of a separate Data Warehouse. Multidimensional Data Model.

Data Warehousing Architecture: Steps for Design and Construction of Data-Warehouses, Three-Tier Data Warehouse Architecture, Characteristics of Data Warehousing Data, Data Marts and its types, OLAP Servers: ROLAP, MOLAP, HOLAP

Data Warehouse Implementation: Efficient Computation of Data Cubes, Indexing OLAP Data, Efficient Processing of OLAP Queries, Metadata Repository, Data Warehouse Back-End Tools and Utilities

UNIT -II

Data Mining: Data Preprocessing, Data Mining Primitives, Data Mining Query Languages. Applications and Trends in Data Mining.

Data Mining Techniques: Classification and Prediction: Issues regarding classification and prediction, Classification by Decision Tree induction, Bayesian Classification, Classification by Back propagation, Associative Classification, Other Classification Methods.

UNIT-III

Data Mining Techniques: Cluster Analysis: Types of Data in cluster Analysis, Categorization of Major Clustering Methods, K- means Partitioning Methods, Hierarchical Methods, Density-Based Methods, Grid Based Methods, Model-Based Clustering Methods

Outlier Detection: Distance Based Outlier Detection, Deviation Based Outlier Detection.
UNIT-IV

Data Science: Extracting meaning from data with data science – meaning, the data science process, three basic machine learning algorithms – Linear regression, K-Nearest Neighbours, K-means, spam-filtering, recommendation engines.

References:
1. Han, Kamber “Data Mining: Concepts and Techniques” Morgan Kaufmann
5. Doing Data Science by Rachel Schutt and Cathy O’Neil, Published by O’Reilly Media, 2014.
CSL537: Digital Image Processing

Total Marks: 100

Note for Paper Setter:
There will be eight questions of equal marks, two in each of the four sections (Section A to D), corresponding to the distribution of the syllabus. The paper setters are requested to make sub-section (not exceeding 4) of the questions and allocate appropriate marks to each sub section.

Note for Candidate:
Attempt five questions in all by selecting one question from each section and the fifth question may be attempted from any sections.

UNIT-I


UNIT-II

Wavelets and Multi-Resolution Processing: Wavelet functions, Wavelet transformations in one and two dimensions, fast wavelet transform.

UNIT-III
Image Compression: Image Compression Models, Data Redundancies, Lossy Compression Techniques, Lossless Compression Techniques, Image Compression standards.

Image segmentation: Pont, Line and Edge Detection, Edge linking and boundary detection, Thresholding, region based segmentation.
UNIT-IV

**Representation and Description:** Image Representation, Boundary and Regional Descriptors, Relational Descriptors.

**Object Recognition:** Pattern and pattern classes, recognition based on Decision Theoretic Methods, Structural Methods.

**References:**
CSP -536: PROGRAMMING LAB IX
(DIGITAL IMAGE PROCESSING)

Total Marks: 100

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DIGITAL IMAGE PROCESSING LAB

Practical based on Digital Image Processing.

REFERENCE :

CSL-542: ADVANCED COMPUTER ARCHITECTURE

**Total Marks: 100**

**Note for Paper Setter:**
There will be eight questions of equal marks, two in each of the four sections (Section A to D), corresponding to the distribution of the syllabus. The paper setters are requested to make sub-section (not exceeding 4) of the questions and allocate appropriate marks to each sub section.

**Note for Candidate:**
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**UNIT – I**

**Introduction to Computers:** Basic Computer Organization: System Buses, Instruction Cycles

**CPU Organization:** Design specifications for a Simple CPU, Fetching Instructions from Memory, Decoding Instructions, Executing Instructions, Design of a Simple ALU, Designing the Control Unit Using Hardwired Control and Microprogrammed control approach.

Memory Subsystem Organization and Interfacing, Types of Memories

I/O Subsystem Organization and Interfacing

**UNIT – II**

**Parallelism in Uniprocessor Systems:** Trends in parallel processing, Basic Uniprocessor Architecture, Parallel Processing Mechanism.

**Parallel Computer Structures:** Pipeline Computers, Array Computers, Multiprocessor Systems

**Architectural Classification Schemes:** Multiplicity of Instruction-Data Streams, Serial versus Parallel Processing, Parallelism versus Pipelining

**Pipelining:** An overlapped Parallelism, Principles of Linear Pipelining, Classification of Pipeline Processors, General Pipelines and Reservation Tables

**Principles of Designing Pipelined Processors:** Instruction Prefetch and Branch Handling, Data Buffering and Busing Structures, Internal Forwarding and Register Tagging, Hazard Detection and Resolution

**UNIT – III**

**Superscalar and Superpipeline Design:** Superscalar Pipeline Design, Superpipelined Design

**Structures and Algorithms for Array Processors:** SIMD Array Processors, SIMD Computer Organizations, Masking and Data Routing Mechanisms, Inter-PE Communications

**SIMD Interconnection Networks:** Static versus Dynamic Networks, Mesh-Connected Illiac Network, Cube Interconnection Networks
UNIT – IV

System Interconnect Architectures: Network Properties and Routing, Static Connection Networks, Dynamic Connection Networks

Multiprocessor Architecture: Functional Structures: Loosely Coupled Multiprocessors, Tightly Coupled Multiprocessors

Interconnection Networks: Time Shared for Common Buses, Crossbar Switch and Multiport Memories.

References:


Note for Paper Setter:
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Note for Candidate:
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UNIT – I

Introduction to Big Data
Unstructured and Structured data

Introduction to data analytics, big data analytics, Big Data Management, Characteristics of Big Data, Importance of Big Data, Big data use cases, Big data and business, Sources for Big data, Techniques for analysis of Big data.

UNIT – II

Prediction Methods- Introduction, Multiple linear regression, explanatory versus predictive modeling, estimating the regression equation and prediction.

Classification Methods-Introduction, variable selection in linear regression, KNN classifier.

Business case studies for data classification, K-mean Clustering, Bradley-Fayyad-Reina algorithm, Fuzzy C- means Clustering.

UNIT – III

UNIT – IV


Case Studies for Business Intelligence.

References:


CSL-547: CYBER ETHICS

**Total Marks: 100**

**Note for Paper Setter:**
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**Note for Candidate:**
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**UNIT-I**

**UNIT-II**

**UNIT-III**

**UNIT-IV**

**REFERENCES:**
CSL548: Computational Problem Solving Using Python

**Total Marks: 100**

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**Note for Paper Setter:**
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**Note for Candidate:**
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**Unit – I**

**Introduction to Python:** Process of Computational Problem Solving, Python Programming Language

**Data and Expressions:** Literals, Variables and Identifiers, Operators, Expressions, Statements and Data Types

**Control Structures:** Boolean Expressions (Conditions), Logical Operators, Selection Control, Nested conditions, Debugging

**Unit – II**

**Lists:** List Structures, Lists (Sequences) in Python, Iterating Over Lists (Sequences) in Python

**Functions:** Fundamental Concepts, Program Routines, Flow of Execution, Parameters & Arguments

**Iteration:** While statement, Definite loops using For, Loop Patterns, Recursive Functions, Recursive Problem Solving, Iteration vs. Recursion

**Unit – III**

**Dictionaries:** Dictionaries and Files, Looping and dictionaries, Advanced text parsing

**Files:** Opening Files, Using Text Files, String Processing, Exception Handling

**Objects and Their Use:** Introduction to Object Oriented Programming

**Modular Design:** Modules, Top-Down Design, Python Modules

**Unit – IV**

**Using Databases and SQL:** Database Concepts, SQLite Manager Firefox Add-on, SQL basic summary, Basic Data modeling, Programming with multiple tables
Reference Books:

1. Python for Informatics, Charles Severance, version 0.0.7
Note for Paper Setter:
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Note for Candidate:
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UNIT-I
Introduction to Mobile Communications and Computing: Introduction to mobile computing, applications, limitations, and architecture. Frequency reuse, GSM (Global system for mobile Communication) : Mobile services, System architecture, Protocols, Localization and calling, Handover, Security, and data services.

UNIT-II

UNIT-III
Mobile Ad hoc Networks (MANETs): Overview, Properties of a MANET, spectrum of MANET applications, routing and various routing algorithms, security in MANETs.

UNIT-IV
Mobile Agents:-Introduction to Mobile Agents, Mobile Agent Architecture, Mobile Agent Applications, Elements of Mobile Agent Systems.

References:
4. Jochen Schiller - Mobile Communications - Addison-Wesley.
5. William R Cockayne and Micheal Zyda – Mobile Agents – Printice Hall PTR.
MCA (5 Years and 6 Months Integrated Programme) Semester – X
(Credit Based Continuous Evaluation Grading System)

CSP-546: PROGRAMMING LAB X

Time: 3 Hours.

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Total Marks: 100

Lab exercises based on
Computational Problem Solving using Python
Network Programming
CSD–690: MAJOR PROJECT

Total Marks: 500

A candidate should work on the project for 5 months and 6-8 hours on each working day.

1\textsuperscript{st} synopsis (containing mainly literature survey corresponding to the problem taken up for the project work and line of attack to solve the problem) within one month of joining the training is to be submitted and will be evaluated for 4 credits.

2\textsuperscript{nd} synopsis (containing essentially the progress of work in comparative details) within three months of joining the training is to be evaluated will be evaluated for 4 credits.

Credits for Final Project Report & Viva Voce: 14

The evaluation shall be done as per the common ordinances for courses under Credit Based Continuous Evaluation Grading System