TEMPLATE FOR COURSE SYLLABUS FOR NEP IMPLEMENTATION

Discipline: Science ☑ Arts, Humanities & Social Science ☐

Commerce ☐ BBA ☐ BCA ☐

Subject Name: Computer Science

Subject Code: (Will be provided by the University)

Semester: Semester I ☑ Semester II ☐ Semester III ☐ Semester IV ☐

Semester V ☐ Semester VI ☐ Semester VII ☐ Semester VIII ☐

Course Name: Programming in C

Course Code: UCMSMAJ11001 (Will be provided by the University)

Course Credit: Theoretical 3 Practical/Tutorial 1

Marks Allotted: Theoretical 40 Practical/Tutorial 20

Continuing Evaluation 10 Attendance 5

Course Type (tick the correct alternatives):

Major Core	☑	AEC	☐
Interdisciplinary/ DSE	☐	SEC	☐
Minor / Generic Elective	☐	VAC	☐
Research Project/Dissertation	☐	Vocational	☐

Is the course focused on employability / entrepreneurship? YES ☑ NO ☐

Is the course focused on imparting life skill? YES ☑ NO ☐

Is the course based on Activity ? YES ☐ NO ☑

Remarks by Chairman, UG BOS, if any

The syllabus may be modified from time to time on the basis of the requirements in future.

UG BOS Meeting Reference Number: 180/UG-23 Date: 05/07/23

Prepared by CIRM

Course Code: UCMSMAJ11001

Course Name: Programming in C

Brief Course Description:

This course deals with basic programming skills and techniques. It deals with a fundamental programming language called C, its syntax and its various constructs.

Prerequisite(s) and/or Note(s):

(1) High school mathematics.
(2) Note(s): Syllabus changes yearly and may be modified during the term itself, depending on the circumstances. However, students will be evaluated only on the basis of topics covered in the course.

Course Objectives:

Knowledge acquired:

(1) idea about how computers work

(2) Knowledge about program development and implementation

(3) Syntax of C programming language

(4) Knowledge about how humans interact with computers through a language.

Skills gained:

(1) Problem solving skills

(2) Logical thinking to approach a problem

(3) Building programs for different problems at hand.

Competency Developed:

(1) Applying the skills learnt to model real world problems
(2) Facility in solving real life problems by thinking logically and outside of box.
(3) Ease of switching to any other programming language

Course Syllabus Overview:

UCMSMAJ11001: Programming in C [Credits: 3, Lectures: 45]

Unit 1: Introduction to C (7 Lectures)

Overview of Procedural Programming, using main function, structure of a C program, Compiling and Executing Simple Programs in C, use of #include, #define.

Unit 2: Data Types, Variables, Constants, Operators and Basic I/O (7 Lectures)

Declaring, Defining and Initializing Variables, Scope and extent of Variables, Using Named Constants, Keywords, DataTypes, Casting of Data Types, Operators (Arithmetic, Logical, Relational, Increment/Decrement, Conditional, Bitwise, and special operators), Using Comments in programs, Formatted and Console I/O, storage classes; auto, extern, register.

Unit 3: Expressions, Conditional Statements, and Iterative Statements (10 Lectures)

Understanding Operator Precedence and associativity in Expressions, Conditional Statements (if construct, switch-case construct), Understanding syntax and utility of Iterative Statements (while, do-while, and for loops), Use of break and continue in Loops, UsingNested Statements (Conditional as well as Iterative)

Unit 4: Understanding Functions (6 Lectures)

Utility of functions, Types of Functions, Functions returning value, Void functions, Inline Functions, Return type of functions, Parameters of functions; (formal and actual), Declaration and Definition of Functions, Command Line Arguments, Parameters in Functions, Functions with variable number of Arguments, Call by Value, Call by Reference,

Unit 5: Implementation of Arrays and Strings (7 Lectures)

Creating and Using One Dimensional Arrays (Declaring and Defining an Array, Initializing an Array, accessing individual elements in an Array, manipulating array elements using loops), Types of arrays (integer, float and character arrays / Strings), Two-dimensional Arrays (Declaring, Defining and Initializing Two-Dimensional Array, Working with Rows and Columns), Introduction to Multi-dimensional arrays

Unit 6: User-defined Data Types (Structures and Unions) (4 Lectures)

Understanding utility of structures and unions, Declaring, initializing, and using simple structures and unions, manipulating individual members of structures and unions, Array of Structures, Individual data members as structures, Passing and returning structures from functions, Structure with union as members, Union with structures as members.

Unit 7: File I/O (4 Lectures)

Opening and closing a file, Reading and writing Text Files, Using put(), get(), read() and write() functions,Random access in files,

Suggested Readings

- "The C Programming Language ANSI C Version", Kernighan & Ritchie, Prentice Hall SoftwareSeries
- "ANSI C - Made Easy", Herbert Schildt, Osborne McGraw-Hill
- "Learning to Program in C", N. Kantaris, Babani
- "C - The Complete Reference", Herbert Schildt, Osborne McGraw-Hill
- "Programming in C", Reema Thareja, Oxford University Press
- "A First Course in Programming With C", T. Jeyapoovan, Vikas Publishing House
- "Let Us C", Yashavant P. Kanetkar, BPB Publications

UCMSMAJ11001L: Programming in C Lab [Credit: 1, Lab Hours: 30]

Students are advised to do laboratory/practical practice not limited to, but including the following types of problems:

1. WAP to perform input/output of all basic data types.
2. WAP to enter two numbers and find their sum.
3. WAP to reverse a number.
4. WAP to Swap Two Numbers (using and without using a third variable).
5. WAP to check whether a number is even or odd
6. WAP to compute the factors of a given number.
7. WAP to enter marks of five subjects and calculate total, average and percentage.
8. WAP to print the sum and product of digits of an integer.
9. WAP to check whether a character is vowel or consonant
10. WAP to find the largest among three numbers
11. WAP to compute the sum of the first 'n' terms of the following series
    S =1-2+3-4+5…….n
12. WAP to compute the sum of the first 'n' terms of the following series
    S = 1+1/2+1/3+1/4+……n
13. WAP to print a triangle of stars as follows (take number of lines from user):

```
*          *      *****    *****      *        * * * * *
**        **      ****     ****      ***        * * * *
***      ***      ***      ***      *****        * * *
****    ****      **       **      *******        * *
*****  *****      *        *      *********        *
```

```
1          5      1          5      1              1
12         45     22         44     2 3          121
123        345    333        333    4 5 6      12321
1234       2345   4444       2222   7 8 9 10   1234321
12345      12345  55555      11111  11 12 13 14 123454321
```

```
A              E      PQRST      PP PP P
AB            DE      QRST       QQQQ
ABC          CDE       RST        RRR
ABCD        BCDE        ST         SS
ABCDE      ABCDE         T          T
```

14. WAP to find the factors of a number.
15. WAP to display the Fibonacci series.
16. WAP to find the factorial of a number.
17. WAP to check if a number is prime or not.
18. WAP to check if a number is Armstrong or not.
19. WAP to check if a number is Perfect or not.
20. WAP to print all the prime numbers within a given range.

21. WAP to print all the Armstrong numbers within a given range.
22. WAP to create and display an array.
23. WAP to perform following actions on an array entered by the user:
    a) Print the even-valued elements
    b) Print the odd-valued elements
    c) Calculate and print the sum and average of the elements ofarray
    d) Print the maximum and minimum element of array
    e) Remove the duplicates from the array
    f) Print the array in reverse order
24. WAP for addition of two matrices.
25. WAP to find the sum of the diagonals of a matrix.
26. WAP to check if a matrix is symmetric or not.
27. WAP for matrix multiplication.
28. WAP which takes the radius of a circle as input from the user, passes it to another function that computes the area and the circumference of the circle and displays the value of area and circumference from the main() function.
29. WAP to find the length of a string.
30. WAP to concatenate two strings entered by the user.
31. WAP to find if a character is present in a string or not.
32. WAP to reverse a string.
33. WAP to check if a string is palindrome or not.
34. WAP to convert all lowercase characters to uppercase
35. WAP to convert all uppercase characters to lowercase
36. WAP to calculate number of vowels in a string.
37. Create a structure Student containing fields for Roll No., Name, Class, Year and Total Marks. Create 10 students and store them in a file.
38. Write a program to retrieve the student information from file created in previous question and print it infollowing format:

    Roll No. Name Marks

39. WAP to copy the contents of one text file to another file, after removing all whitespaces.
40. WAP to Write a Sentence to a File.
41. WAP to Read a Line From a File and Display it.

TEMPLATE FOR COURSE SYLLABUS FOR NEP IMPLEMENTATION

Discipline: Science ☑ Arts, Humanities & Social Science ☐

Commerce ☐ BBA ☐ BCA ☐

Subject Name: Computer Science

Subject Code: (Will be provided by the University)

Semester: Semester I ☑ Semester II ☑ Semester III ☐ Semester IV ☐

Semester V ☐ Semester VI ☐ Semester VII ☐ Semester VIII ☐

Course Name: Fundamentals of Computers and Problem Solving

Course Code: UCMSMIN10001 (Will be provided by the University)

Course Credit: Theoretical 3 Practical/Tutorial 1

Marks Allotted: Theoretical 60 Practical/Tutorial 0

Continuing Evaluation 10 Attendance 5

Course Type (tick the correct alternatives):

Major Core	☐	AEC	☐
Interdisciplinary/ DSE	☐	SEC	☐
Minor / Generic Elective	☑	VAC	☐
Research Project/Dissertation	☐	Vocational	☐

Is the course focused on employability / entrepreneurship? YES ☑ NO ☐

Is the course focused on imparting life skill? YES ☐ NO ☑

Is the course based on Activity ? YES ☑ NO ☐

Remarks by Chairman, UG BOS, if any

The syllabus may be modified from time to time on the basis of the requirements in future.

UG BOS Meeting Reference Number: 180/UG-23 Date: 5/7/23

Course Code: UCMSMIN10001

Course Name: Fundamentals of Computers & Problem-Solving

Brief Course Description:

This course deals with the basic concepts of computers, its generations, and its evolution.

Prerequisite(s) and/or Note(s):

(1) High school mathematics.
(2) Note(s): Syllabus changes yearly and may be modified during the term itself, depending on the circumstances. However, students will be evaluated only based on topics covered in the course.

Course Objectives:

Knowledge acquired:

(1) Fundamental idea about computers and computing devices.

(2) Familiarity with hardware and software.

(3) Primary knowledge about internet and networking

Skills gained:

(1) Flexibility with use of computers

(2) Application of computers in solving real life problems

(3) Development of working skills with simple office tools

Competency Developed:

(1) Ability to convers in basic computer terminology
(2) Learning how to interact with computers and use it efficiently.

Course Syllabus Overview:

UCMSMIN10001: Fundamentals of Computers & Problem Solving [Credits: 3, Lectures: 45]

Unit-1: Knowing Computer Basics: [10 Lectures]

Evolution of Computing: Abacus to Mark-I, Generations of Computers, Classification of Computers: Digital and Analog, Characteristics of a computer, Elements of a Computer, Hardware concepts, Input Devices: (Magnetic media, Optical media, direct data entry devices), Output devices: (impact printers, non-impact printers, plotters, LCD, VDU), Control Unit, ALU, Memory devices: (ROM, RAM), Secondary storage devices: (Magnetic tapes, disks, Optical disks, Flash memory), Connectivity ports, Buses, Types of Buses, Address Space, Word length.

Unit- 2. Software and Date Fundamentals: :[10 Lectures]

Concept of software, Firmware, Types of Software: (System software, Application software, Utility software), Concept of Operating System, Loaders, Linkers, Debuggers, Translators: (Compilers, Assemblers, Interpreters), Data and Information, Types of data, Units of data measurement, Qualities of Information, Concept of database, Languages, Generation of Languages.

Unit-3. DOS (Disk Operating System): :[05 Lectures]

Introduction to DOS, Files, Directories, Drives, using extensions and wildcards, Basic DOS commands: (CLS, DIR, COPY, CMD, CD, MKDIR, DEL, TIME, REN), Booting, warm boot, cold boot, concept of BIOS.

UNIT-4. Applications of computers: :[10 Lectures]

Computer Application in various fields: (In offices, book publishing, Desktop publishing system, Data analysis, Accounting, Investment, Inventory control, Graphics, CAM, Database management, Project management, Communications, Education, Medical field, industrial control and instrumentation, airline and ticket reservation, robots, Artificial Intelligence, Military applications, banks, Design and research work, real time and online applications, point of sale terminals, financial transaction terminals, computer vision).

Unit- 5. Problem solving and programming: :[10 Lectures]

Algorithm, Algorithm for simple problems, Flowchart: Components of a flowchart, Drawing flowcharts for simple problems, Structure of a program, types of languages: unstructured, structured, procedure oriented, object oriented.

Suggested Readings

- "Computer Fundamentals: Architecture and Organization", B. Ram, New Age International Publisher
- "Computer Fundamentals", P. K. Sinha, Bpb Publications
- "Fundamentals of Computers", V. Rajaraman & Neeharika Adabala, Prentice Hall India Learning Private Limited

UCMSMIN10001: Fundamental of Computer & Problem-Solving Tutorial. **[Credits: 1, Lecture Hours: 15]**

Fundamentals of Computers & Problem-Solving tutorials as assigned and advised by teacher (s).

TEMPLATE FOR COURSE SYLLABUS FOR NEP IMPLEMENTATION

Discipline: Science ☑ Arts, Humanities & Social Science ☐

Commerce ☐ BBA ☐ BCA ☐

Subject Name: Computer Science

Subject Code: (Will be provided by the University)

Semester: Semester I ☑ Semester II ☐ Semester III ☐ Semester IV ☐

Semester V ☐ Semester VI ☐ Semester VII ☐ Semester VIII ☐

Course Name: System Tools & Peripheral and Office Automation

Course Code: UCMSSEC11001 (Will be provided by the University)

Course Credit: Theoretical 2 Practical/Tutorial 1

Marks Allotted: Theoretical 40 Practical/Tutorial 20

Continuing Evaluation 10 Attendance 5

Course Type (tick the correct alternatives):

Major Core	☐	AEC	☐
Interdisciplinary/ DSE	☐	SEC	☑
Minor / Generic Elective	☐	VAC	☐
Research Project/Dissertation	☐	Vocational	☐

Is the course focused on employability / entrepreneurship? YES ☑ NO ☐

Is the course focused on imparting life skill? YES ☑ NO ☐

Is the course based on Activity ? YES ☐ NO ☑

Remarks by Chairman, UG BOS, if any

The syllabus may be modified from time to time on the basis of the requirements in future.

UG BOS Meeting Reference Number: 180/UG-23 Date: 05/07.2023

TEMPLATE FOR COURSE SYLLABUS FOR NEP IMPLEMENTATION

Course Code: UCMSSEC11001

Course Name: System Tools & Peripheral and Office Automation

Brief Course Description:

The course on "System Tools & Peripheral and Office Automation" is designed to provide students with a comprehensive understanding of essential system tools, peripheral devices, and office automation technologies. This course aims to equip students with the knowledge and skills required to efficiently utilize system tools, manage peripheral devices, and streamline office operations using automation.

Prerequisite(s) and/or Note(s):

(1) Basic knowledge of Computer
(2) Note(s): Syllabus changes yearly and may be modified during the term itself, depending on the circumstances. However, students will be evaluated only on the basis of topics covered in the course.

Course Objectives:

- Introduce students to the fundamental concepts of system tools, their functionalities, and their role in computer systems.
- Familiarize students with various peripheral devices commonly used in computer systems and their functionalities.
- Develop students' proficiency in utilizing system tools to optimize computer performance, troubleshoot issues, and maintain system integrity.
- Enable students to effectively manage peripheral devices, including printers, scanners, external storage devices, and input/output devices.
- Explore the concept of office automation and its significance in modern workplaces.
- Introduce students to popular office automation tools and software, such as document management systems, collaboration platforms, and workflow automation tools.
- Enhance students' skills in utilizing office automation tools to streamline routine office tasks, improve productivity, and enhance communication and collaboration within organizations.

Skills gained:

- The course assessment will be conducted through a combination of assignments, quizzes, practical exercises, tests and a final examination. The assignments and quizzes will assess students' understanding of the theoretical concepts, while practical exercises will evaluate their proficiency in utilizing system tools, managing peripheral devices, and implementing office automation solutions.

Competency Developed:

- The course on "System Tools & Peripheral and Office Automation" aims to equip students with the knowledge and skills required to effectively utilize system tools, manage peripheral devices, and implement office automation solutions. By completing this course, students will be well-prepared to contribute to the efficient operation of computer systems and optimize office processes using automation technologies.

UCMSSEC11001: System Tools & Peripheral and Office Automation [Credits: 2, Lectures:30]

UNIT 1: Introduction to Computers

Introduction, Definition, Characteristics of computer, Generations of Computer, Classification of Computers, Block diagram of a computer, types of Software-System and Application, Operating System, CUI vs GUI. Computer language-evolution, language classification-low level and high level language, assembly language, interpreters, compilers, assemblers.

UNIT 2: Peripheral devices

Input and Output Devices – Punched Card, Keyboard, Mouse, Joystick, Trackball, Light Pen, Touch Screen, Magnetic Ink Character Recognition (MICR), Optical Character Recognition (OCR), Optical Mark Recognition (OMR), Display units, Printers- Impact and Non-Impact. Primary storage – RAM-SRAM, DRAM, ROM-PROM, EPROM, EEPROM, Secondary storage – Hard drive, Magnetic drive, Compact Disk, Cache memory, components of motherboard.

UNIT 3 Working with MS OFFICE

Introduction to Word, Word layout, Creating, Editing, Saving and printing text documents, Text formatting, Working with tables, Using lists and styles, Working with Images, Clip Art, Chart, Shapes, Word Art and Symbols, Using Spelling and Grammar check, Mail merge

UNIT 4 Working with MS Excel

Introduction to Excel, Formatting excel work book, Perform Calculations with Functions, Sort and Filter Data with Excel, Create Effective Charts to Present Data Visually

UNIT 5 Working with MS Power Point

Introduction to Power point, Creating slides and applying themes, Working with bullets and numbering, Working with Animation and Slide Transition, Working with different views, Working with slide Master, Slide show option

Suggested Reading:

1. Nabin Kumar Samanta(2007) , An overview of Information Technology and its application in Bussiness, New Central Book Agency (P) Ltd.Kolkata

2. V.Rajaraman(PHI,1996), Fundamental of Computers (2nd Edition)

3. S.Jaiswal (Galgotia), Fundamentals of Information Technology for BCA.

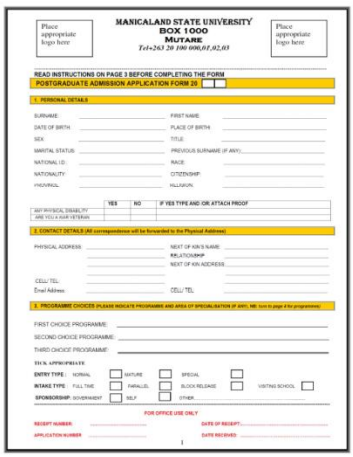
4. Peter Norton's (2000), Introduction to Computers,Tata McGraw Hill.

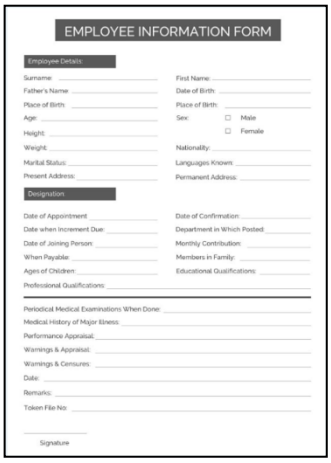
5 Ashok Arora (2022), Introductions to Computer Application, Vikas Publishing

UCMSSEC11001L: System Tools & Peripheral and Office Automation Lab [Credit:1, Lab Hours:30]

Ms Word practical

- Create a document and perform formatting/font operations.
- Write steps to perform cut, copy and paste commands.
- Demonstrate the bullets and numbering
- Write steps and perform following task:¬Find and replace¬Go to¬Spelling& grammer check¬Hyperlink¬Bookmark¬Header & footer¬Watermark¬Page color¬Page border¬Endnote & footnote
- Write steps to create a table of 10-15 students using columns: sl.no, stu_name, roll no, contact number
- Write steps to insert images/pictures
- Demonstrate Mail Merge in Ms Word
- Demonstrate Macro in Ms Word
- Draw the flowchart using drawing tools in your word processing.
- Create the following form in Ms Word





- Design advertisement using Ms Word

Ms Excel practical

- Create a workbook and enter the raw data applying as many presentation Features (Font, Font Size, Font Colour, Number Formats and Colour, Cell Shading, Text Rotation, etc)
- Apply appropriate number formats to your numbers.
- Select the best page orientation for your spreadsheet.
- Adjust the column width and row height to suit the layout you have selected.
- Create formula's to calculate the percentage of the total number of people
- Setup an appropriate title, header, footer and page number in your spreadsheet.
- Create the following Table in Excel with given details :-

  RollNo, Name, Math, English, Science, Total Result, Division
- Create a Column chart, bar chart, pie chart
- Demonstrate following : -

  Formulas Sum, Average, If, Count, Counta, Countif & Sumif

Roll No	Student Name	Hindi	English	Math	Physics	Chemistry	Total	Average	Grade
1	RAM	20	10	14	18	15	77	15.4	A
2	ASHOK	21	12	14	12	18	?	?	?
3	MANOJ	33	15	7	14	17	?	?	?
4	RAJESH	15	14	8	16	20	?	?	?
5	RANJANA	14	17	10	13	18	?	?	?
6	POOJA	16	8	20	17	15	?	?	?
7	MAHESH	18	19	3	10	14	?	?	?
8	ASHUTOSH	19	20	7	14	18	?	?	?
9	ANIL	22	13	8	12	19	?	?	?
10	PREM	26	12	10	11	27	?	?	?

Q.1 Find the Total Number & Average in all Subjects in Each Student .
Q.2 Find Grade Using If Function - If Average Greater >15 then "A" Grade otherwise "B" Grade
Q.3 How Many Student "A" and "B" Grade Use of Countif
Q.4 Student Ashok and Manoj Total Number and Average Use of Sumif
Q.5 Count how many Students Use of Counta
Q.6 How Many Student Hindi & English Subject Number Grater Then > 20 and <15 Use of Countif

- Demonstrate different formulas available in Ms Excel.

Ms Power Point practical

- Creating a Title Slide
- Creating Slides Using Layouts
- Create a presentation that consists of 5 slides and save your Presentation in desktop.
- Demonstrate slide transitions and animation
- Insert slide number, slide date, slide header and footer
- Demonstrate rehearse time.
- Demonstrate master slide.

Suggested Readings:

1. Dinesh Maidasani , Learning Computer fundamentals MS office and Internet & Web Technology, Laxmi Publications; Third edition (1 January 2016).

2. Saravanan, Computer Fundamentals with Ms Office Applications, Scitech Pub. (1 January 2008)

3. Jain Anupama and Navneet Mehra, Computer Fundamental MS Office, Vitasta Publishing Pvt.Ltd

4. Harish Gujjar, Fundamentals of Computers And Ms-Office, S S Bhavikatti Prakashana (1 January 2015)

TEMPLATE FOR COURSE SYLLABUS FOR NEP IMPLEMENTATION

Discipline: Science ☑ Arts, Humanities & Social Science ☐

Commerce ☐ BBA ☐ BCA ☐

Subject Name: **Computer Science**

Subject Code: (Will be provided by the University)

Semester: Semester I ☑ Semester II ☐ Semester III ☐ Semester IV ☐

Semester V ☐ Semester VI ☐ Semester VII ☐ Semester VIII ☐

Course Name: **Fundamentals of Data Science**

Course Code: UCMSMDC11001 (Will be provided by the University)

Course Credit: Theoretical **3** Practical/Tutorial **0**

Marks Allotted: Theoretical **60** Practical/Tutorial **0**

Continuing Evaluation **10** Attendance **05**

Course Type (tick the correct alternatives):

Major Core	☐	AEC	☐
Interdisciplinary/ DSE	☑	SEC	☐
Minor / Generic Elective	☐	VAC	☐
Research Project/Dissertation	☐	Vocational	☐

Is the course focused on employability / entrepreneurship? YES ☑ NO ☐

Is the course focused on imparting life skill? YES ☑ NO ☐

Is the course based on Activity ? YES ☑ NO ☐

Remarks by Chairman, UG BOS, if any

The syllabus may be modified from time to time on the basis of the requirements in future.

UG BOS Meeting Reference Number: 180/UG-23 Date: 05/07/23

TEMPLATE FOR COURSE SYLLABUS FOR NEP IMPLEMENTATION

Course Code: UCMSMDC11001

Course Name: Fundamentals of Data Science

Brief Course Description: Data science combines math and statistics, specialized programming, sophisticated analytics, artificial intelligence (AI), machine learning, and specialist subject matter expertise with domain expertise to reveal useful insights hidden in the data of an organization. Decision-making and strategic planning can be influenced by these findings. In order to analyze massive volumes of data, this multidisciplinary approach incorporates ideas and methods from the domains of mathematics, statistics, artificial intelligence, and computer engineering.

Prerequisite(s) and/or Note(s):

(1) High school mathematics.
(2) Idea about basic computer programming.

Course Objectives:

Knowledge acquired:

(1) Students will develop relevant programming abilities.
(2) Students will demonstrate proficiency with statistical analysis of data.
(3) Students will develop the ability to build and assess data-based models.

Skills gained:

(1) Design of AI based systems for data analysis

(2) Students will demonstrate skill in data management.

(3) Students will use data science principles and techniques to address issues in practical settings and effectively explain their findings.

Competency Developed:

(1) Applying the concept of a data science to real life problems such as Data Interpretation
(2) Facility in handling problems involving business decision making
(3) Facility in solving real life problems using statistical analyses

Course Syllabus Overview:

UCMSMDC11001: Fundamentals of Data Science [Credits: 3, Lectures: 45]

Unit 1: Data Governance (10 Lectures)

Introduction to data and information, what is data governance? Ethical guidelines on data handling, Privacy of data, introduction to the tools that will be used in building data analysis software like Python and/or R. Obtaining data from the web, from APIs, from databases and from colleagues in various formats

Unit 2: Exploratory data analysis (10 Lectures)

Introduction to data analysis, Univariate and bivariate analysis of data, common multivariate statistic techniques used to visualize high-dimensional data, basics of data cleaning and making data tidy

Unit 3: Classification Algorithms (10 Lectures)

Supervised learning, Fundamentals of trees, Decision tree, working of a decision tree, generation of a decision tree using algorithm, K-fold cross validation scheme, implementation in Python/R

Unit 4: Regression (10 Lectures)

Introduction of linear regression, Fitting of a straight line, least square method of curve fitting, algorithm, implementation in Python/R

Unit 5: Clustering (5 Lectures)

Unsupervised learning, K-Means clustering algorithm, working, implementation in Python/R

Suggested Readings:

D. Cielen, Arno D. B. Meysman, M. Ali, Introducing Data Science, Dreamtech Press

Rachel Schutt, Cathy O'Neil, "Doing Data Science: Straight Talk from the Frontiline" by Schroff/O'Reilly, 2013.

Foster Provost, Tom Fawcett, "Data Science for Business" What You Need to Know About Data Mining and Data-Analytic Thinking" by O'Reilly, 2013.

John W. Foreman, "Data Smart: Using data Science to Transform Information into Insight" by John Wiley & Sons, 2013.

Minu Kohli, "A textbook of Data Science for class XII", Goyal Brothers Prakashan

Avrim Blum, John Hopcroft and Ravindran Kanan, "Foundations of Data Science", Cambridge University Press

TEMPLATE FOR COURSE SYLLABUS FOR NEP IMPLEMENTATION

Discipline: Science ☑ Arts, Humanities & Social Science ☐

Commerce ☐ BBA ☐ BCA ☐

Subject Name: Computer Science

Subject Code: (Will be provided by the University)

Semester: Semester I ☐ Semester II ☑ Semester III ☐ Semester IV ☐

Semester V ☐ Semester VI ☐ Semester VII ☐ Semester VIII ☐

Course Name: Discrete Structures

Course Code: UCMSMAJ12002 (Will be provided by the University)

Course Credit: Theoretical 3 Practical/Tutorial 1

Marks Allotted: Theoretical 60 Practical/Tutorial -

Continuing Evaluation 10 Attendance 5

Course Type (tick the correct alternatives):

Major Core	☑	AEC	☐
Interdisciplinary/ DSE	☐	SEC	☐
Minor / Generic Elective	☐	VAC	☐
Research Project/Dissertation	☐	Vocational	☐

Is the course focused on employability / entrepreneurship? YES ☑ NO ☐

Is the course focused on imparting life skill? YES ☐ NO ☑

Is the course based on Activity ? YES ☐ NO ☑

Remarks by Chairman, UG BOS, if any

The syllabus may be modified from time to time on the basis of the requirements in future.

UG BOS Meeting Reference Number: 180/UG-23 Date: 05/07/23

Prepared by CIRM

Course Code: UCMSMAJ12002

Course Name: Discrete Structures

Brief Course Description:

This course deals with the basic idea about discrete mathematics and discrete structures, about mathematical notations and their use.

Prerequisite(s) and/or Note(s):

(1) High school mathematics.
(2) Note(s): Syllabus changes yearly and may be modified during the term itself, depending on the circumstances. However, students will be evaluated only on the basis of topics covered in the course.

Course Objectives:

Knowledge acquired:

(1) Basic knowledge of discrete mathematics and discrete structures,
(2) To develop understanding of Logic sets and functions
(3) Knowledge of mathematically correct terminology and notations.
(4) Knowledge about construction of direct and indirect proofs..

Skills gained:

(1) Development of problem-solving skills necessary for understanding counting problems.
(2) Ability to generalize from a single instance of a problem an entire class of problems and identification of patterns of data.

Competency Developed:

(1) Ability to analyze problems and solve problems.
(2) Ability to implement mathematical knowledge in data analysis.

Course Syllabus Overview:

UCMSMAJ12002: Discrete Structures [Credits: 3, Lectures: 45]

Unit 1: Introduction: (10 Lectures)
Sets - finite and Infinite sets, uncountably Infinite Sets; functions, relations, Properties of Binary Relations, Closure, Partial Ordering Relations; counting - Pigeonhole Principle, Permutation and Combination; Mathematical Induction, Principle of Inclusion and Exclusion.

Unit 2: Growth of Functions: (5 Lectures)
Asymptotic Notations, Summation formulas and properties, Bounding Summations, approximation by Integrals

Unit 3: Recurrences: (10 Lectures)
Recurrence Relations, generating functions, Linear Recurrence Relations with constant coefficients and their solution,Substitution Method, Recurrence Trees, Master Theorem

Unit 4: Graph Theory (10 Lectures)
Basic Terminology, Models and Types, multigraphs and weighted graphs, Graph Representation, Graph Isomorphism, Connectivity, Euler and Hamiltonian Paths and Circuits, Planar Graphs, Graph Coloring, Trees, Basic Terminologyand properties of Trees, Introduction to Spanning Trees

Unit 5: Prepositional Logic (10 Lectures)
Logical Connectives, Well-formed Formulas, Tautologies, Equivalences, Inference Theory

Suggested Readings

- C.L. Liu , D.P. Mahopatra, Elements of Discrete mathematics, 2nd Edition , Tata McGraw Hill, 1985,
- Kenneth Rosen, Discrete Mathematics and Its Applications, Sixth Edition ,McGraw Hill 2006
- T.H. Coremen, C.E. Leiserson, R. L. Rivest, Introduction to algorithms, 3rd edition Prentice Hall on India,2009
- M. O. Albertson and J. P. Hutchinson, Discrete Mathematics with Algorithms , John wiley Publication, 1988
- J. L. Hein, Discrete Structures, Logic, and Computability, 3rd Edition, Jones and Bartlett Publishers, 2009
- D.J. Hunter, Essentials of Discrete Mathematics, Jones and Bartlett Publishers, 2008
- Discrete Mathematical Structures with Applications to Combinatorics, V Ramaswamy, University Press
- Discrete Mathematics: A Concept-based Approach, Basavaraj S Anami, Venkanna S Madalli, UniversityPress

UCMSMAJ12002T: Discrete Structures Tutorial [Credits: 1, Lecture Hours: 15]

Discrete structures tutorials as assigned and advised by teacher (s).

TEMPLATE FOR COURSE SYLLABUS FOR NEP IMPLEMENTATION

Discipline: Science ☑ Arts, Humanities & Social Science ☐

Commerce ☐ BBA ☐ BCA ☐

Subject Name: Computer Science

Subject Code: (Will be provided by the University)

Semester: Semester I ☐ Semester II ☑ Semester III ☐ Semester IV ☐

Semester V ☐ Semester VI ☐ Semester VII ☐ Semester VIII ☐

Course Name: Digital Electronics

Course Code: UCMSSEC12002 (Will be provided by the University)

Course Credit: Theoretical 2 Practical/Tutorial 1

Marks Allotted: Theoretical 40 Practical/Tutorial 20

Continuing Evaluation 10 Attendance 5

Course Type (tick the correct alternatives):

Major Core	☐	AEC	☐
Interdisciplinary/ DSE	☐	SEC	☑
Minor / Generic Elective	☐	VAC	☐
Research Project/Dissertation	☐	Vocational	☐

Is the course focused on employability / entrepreneurship? YES ☑ NO ☐

Is the course focused on imparting life skill? YES ☐ NO ☑

Is the course based on Activity ? YES ☑ NO ☐

Remarks by Chairman, UG BOS, if any

The syllabus may be modified from time to time on the basis of the requirements in future.

UG BOS Meeting Reference Number: 180/UG-23 Date: 05/07/23

Prepared by CIRM

Course Code: UCMSSEC12002

Course Name: Digital Electronics

Brief Course Description:

This course deals with the basic concepts of Digital computers and digital logic, it gives us an overview of the internal structure and working of a digital computer and its building blocks. The logic behind the working of each component is explained in this subject.

Prerequisite(s) and/or Note(s):

(1) High school mathematics.
(2) Note(s): Syllabus changes yearly and may be modified during the term itself, depending on the circumstances. However, students will be evaluated only on the basis of topics covered in the course.

Course Objectives:

Knowledge acquired:

(1) Basic knowledge of digital logic and digital circuits,
(2) Overall idea about how computers function and the internal building blocks of a computer.
(3) Knowledge about how operations are performed in a computer
(4) A thorough understanding of the fundamental concepts and techniques used in digital electronics.

Skills gained:

(1) Application of the knowledge of digital logic to understand digital electronics circuits.
(2) The ability to understand, analyze and design various combinational and sequential circuits.
(3) To understand and examine the structure of various number systems and its application in digital design.

Competency Developed:

(1) Ability to identify basic requirements for a design application and propose a cost effective solution.
(2) The ability to identify and prevent various hazards and timing problems in a digital design.
(3) Ability and skill to develop/build, and troubleshoot digital circuits.

Course Syllabus Overview:

UCMSSEC12002: Digital Electronics [Credits: 2, Lectures: 30]

Unit 1: Number system and codes (5 Lectures)

Binary, octal, hexadecimal and decimal number systems and their inter conversion, BCD numbers (8421-2421), Gray code, excess–3 code, code conversion, ASCII, EBCDIC codes, their advantages and disadvantage, Binary addition and subtraction, Negative number representation: Sign magnitude, 1's, 2's Complement. signed and unsigned binary numbers, Fixed and floating-point representation.

Unit 2: Basic logic circuits (5 Lectures)

Logic gates (AND, OR, NOT, NAND, NOR, Ex-OR, Ex-NOR and their truth tables,), Universal Gates, Laws of Boolean algebra, De-Morgan's theorem, Min term, Max term, POS, SOP, K-Map for 2, 3, 4 variables, Simplification by Boolean theorems, don't care condition, Venn diagram. SSI, MSI, LSI and VLSI circuits.

Unit 3: Logic Families (5 Lectures)

Introduction to digital logic family such as RTL, DTL, TTL, ECL, CMOS, IIR, HTL etc., their comparative study, Basic circuit, performance characteristics.

Unit 4: Combinational Logic (5 Lectures)

Half adder, Full adder, parallel adder, half subtractor, full subtractor, 4-bit binary adder cum subtractor, Multiplexer, Demultiplexer, Decoder, BCD to seven segment Decoder, Encoders.

Unit 5: Sequential Circuit: (10 Lectures)

Set-reset latches, D-flip-flop, R-S flip-flop, J-K flip-flop, Master slave flip-flop, edge triggered flip-flop, T flip-flop, Synchronous/Asynchronous counter, Up/down synchronous counter, Ripple Counter, Applications of counter, Serial in/Serial out shift register, Parallel in/Serial out shift register, Serial in/parallel out shift register, parallel in/ parallel out shift register, Bi-directional register, Applications of register.

Suggested Readings

- "Digital Logic and Computer Design", M. Morris Mano, Pearson Publication
- "An Introduction to Digital Computer Design", Rajaraman V. & Radhakrishnan, PHI.
- "Digital Principles & Applications", Malvino & Leach, TMH
- "Digital Circuits and Design", S. Salivahanan, S. Arivazhagan,Oxford University Press

UCMSSEC12002L: Digital Electronics Lab [Credit: 1, Lab Hours: 30]

Students are advised to do laboratory/practical practice not limited to, but including the following types of problems:

1. General study of Basic & Universal gates

   a) AND b) OR c) NOT d) NOR
   e) NAND f) XOR g) XNOR

2. Simple Boolean Expression using Basic gates and Universal gates:

   $A \cdot (B+A) + B.A$
   $XZ + X' Y Z$
   $A + B [AC + (B + C') D]$

3. Design Half-Adder, Full-Adder, Half-Subtractor, Full-Subtractor Circuit.
4. Parallel Adder (2-bit, 3-bit) Circuit.
5. Implement logic functions in SOP form using Multiplexer.
6. Implement De-multiplexer.
7. Implement 7- Segment Display with Decoder.
8. Implement Parity Generator (Odd & Even)
9. Implement Magnitude Comparator (1-bit, 2-bit, 3-bit)
10. Circuit design and implementation of Decoder (2x4)
11. Circuit design and implementation of Encoder (4x2)
12. Circuit design and implementation of an expression using decoders.

TEMPLATE FOR COURSE SYLLABUS FOR NEP IMPLEMENTATION

Discipline: Science ☑ Arts, Humanities & Social Science ☐

Commerce ☐ BBA ☐ BCA ☐

Subject Name: **Computer Science**

Subject Code: (Will be provided by the University)

Semester: Semester I ☐ Semester II ☑ Semester III ☐ Semester IV ☐

Semester V ☐ Semester VI ☐ Semester VII ☐ Semester VIII ☐

Course Name: **Web Technology**

Course Code: UCMSMDC12002 (Will be provided by the University)

Course Credit: Theoretical **3** Practical/Tutorial **0**

Marks Allotted: Theoretical **60** Practical/Tutorial **0**

Continuing Evaluation **10** Attendance **05**

Course Type (tick the correct alternatives):

Major Core	☐	AEC	☐
Interdisciplinary/ DSE	☑	SEC	☐
Minor / Generic Elective	☐	VAC	☐
Research Project/Dissertation	☐	Vocational	☐

Is the course focused on employability / entrepreneurship? YES ☑ NO ☐

Is the course focused on imparting life skill? YES ☑ NO ☐

Is the course based on Activity ? YES ☐ NO ☑

Remarks by Chairman, UG BOS, if any

The syllabus may be modified from time to time on the basis of the requirements in future.

UG BOS Meeting Reference Number: 180/UG-23 Date: 05/07/23

TEMPLATE FOR COURSE SYLLABUS FOR NEP IMPLEMENTATION

Course Code: UCMSMDC12002

Course Name: Web Technology

Brief Course Description: This subject Web technology provides students with the basic idea about what are web pages and how they can be created using simple codes. It provides an insight about the process of creation of web sites and hosting of the web site on the internet. Along with that students will also learn about the basic protocols involved in Internet Technology.

Prerequisite(s) and/or Note(s):

(1) Basic Computer Knowledge.
(2) Interest in Computers.

Course Objectives:

Knowledge acquired:

(1) Knowledge about HTML and Web page creation
(2) Basic knowledge of server-side scripting
(3) Knowledge about web application development procedures
(4) Familiarity with various concepts of application development using HTML, and JavaScript

Competency Developed:

(1) Proficiency in Webpage Development and website management
(2) Ability to create dynamic Web Interface
(3) Ability to write server and client sides scripts and manage websites
(4) Ability to design a web page using Image, Audio and Video editing tools
(5) Ability to understand the basic concepts of Open-Source Standards and Open Source software.

Course Syllabus Overview:

UCMSMDC12002: Web Technology [Credits: 3, Lectures: 45]

Unit 1: Introduction to WWW (5 Lectures)
Introduction to internet, client server model, Protocols and programs, secure connections, IP addresses, Domain name, Internet service, Electronic mail, application, and development tools. Web Design: Web site design principles, planning the site and navigation,

Unit 2: Introduction to HTML (5 Lectures)
Brief history, HTML tags, HTML documents, header section, body section, headings, formatting characters, font tag, listing, anchor tag.

Unit 3: Links, Images and Tables (5 Lectures)
Relative Links, Absolute Links, Link Attributes, Using the ID Attribute to Link Within a Document, Putting an Image on a Page, Using Images as Links, Putting an Image in the Background, creating a Table, Table Headers, Captions, Spanning Multiple Columns, Styling Table.

Unit 4: HTML Frames and Form (10 Lectures)
Frameset definition, Frame Definition, nested frameset, HTML Forms, Basic Input and Attributes, Other Kinds of Inputs, Styling forms with CSS, Where to Go from Here Capturing FormData, GET and POST form methods, Dealing with multi value fields, Redirecting a form after submission

Unit 5: Style Sheets (10 Lectures)
Need for CSS, introduction to CSS, basic syntax, and structure, using CSS, background images, colors and properties, manipulating texts, using fonts, borders and boxes, margins, padding lists, positioning using CSS, CSS2

Unit 6: JavaScript (10 Lectures)
Client-side scripting, Introduction to JavaScript, datatypes, variables, operators, functions, conditional statements: loops and repetition, Advance script, JavaScript and objects, the DOM and web browser environments, forms and validations, DHTML: Combining HTML, CSS and JavaScript, events and buttons, controlling your browser,

Suggested Readings

1. Web Technology and design, C. Xavier, new Age International Publishers
2. Virginia DeBolt , Integrated HTML and CSS A Smarter, Faster Way to Learn , Wiley / Sybex , 2006
3. Cassidy Williams, Camryn Williams Introduction to HTML and CSS, O'Reilly, 2015
4. XML in action web technology by William J. Pardi
5. Step by Step XML by Michael J. Young
6. Steven Holzner, "PHP: The Complete Reference Paperback", McGraw Hill Education (India), 2007.

Discipline: Science ☑ Arts, Humanities & Social Science ☐

Commerce ☐ BBA ☐ BCA ☐

Subject Name: **Computer Science**

Subject Code: (Will be provided by the University)

Semester: Semester I ☐ Semester II ☑ Semester III ☐ Semester IV ☐

Semester V ☐ Semester VI ☐ Semester VII ☐ Semester VIII ☐

Course Name: **Software Development**

Course Code: UCMSMDC12003 (Will be provided by the University)

Course Credit: Theoretical **3** Practical/Tutorial **0**

Marks Allotted: Theoretical **60** Practical/Tutorial **0**

Continuing Evaluation **10** ndance **05**

Course Type (tick the correct alternatives):

Major Core	☐	AEC	☐
Interdisciplinary/ DSE	☑	SEC	☐
Minor / Generic Elective	☐	VAC	☐
Research Project/Dissertation	☐	Vocational	☐

Is the course focused on employability / entrepreneurship? YES ☑ NO ☐

Is the course focused on imparting life skill? YES ☑ NO ☐

Is the course based on Activity ? YES ☐ NO ☑

Remarks by Chairman, UG BOS, if any

The syllabus may be modified from time to time on the basis of the requirements in future.

UG BOS Meeting Reference Number: 180/UG-23 Date: 05/07/23

Course Code: UCMSMDC12003

Course Name: Software Development

Brief Course Description: The course on software development, designed to equip students with the knowledge and skills necessary to excel in the dynamic world of technology. This formal program offers a rigorous exploration of software development principles, methodologies, and tools, providing a solid foundation for success in this fast-paced industry. Throughout this course, students will learn about the fundamentals of programming languages and algorithms, empowering them to write efficient and robust code. Gain invaluable insights into software design patterns and architectures, enabling them to create scalable and maintainable solutions. They will also explore various testing methodologies to ensure the reliability and quality of the software projects.

By the end of this course, students will possess the confidence to take on software development challenges and contribute meaningfully to both small-scale projects and large enterprise systems. Whether they are a beginner or an experienced developer seeking to enhance their expertise, this course will be the gateway to a rewarding career in software development.

Prerequisite(s) and/or Note(s):

(1) Idea about basic computer, working principles, flowchart and algorithms.
(2) Note(s): Syllabus changes yearly and may be modified during the term itself, depending on the circumstances. However, students will be evaluated only on the basis of topics covered in the course.

Course Objectives:

Knowledge acquired:

(1) Students will develop relevant software development abilities.
(2) Students will demonstrate proficiency with coding, designing and testing.
(3) Students will develop the ability to develop the software.

Skills gained:

(1) Software development instills a strong foundation in programming languages, enabling individuals to write, read, and understand code efficiently.
(2) Students learn to break down complex problems into manageable parts, analyze issues, and devise effective solutions.
(3) Students learn to architect software systems, considering factors like scalability, maintainability, and user experience.
(4) Software development emphasizes the importance of testing code to ensure its correctness and identify and resolve bugs effectively, resulting in more reliable software.
(5) Developers are encouraged to think creatively, finding innovative solutions to problems and exploring new ways to enhance software capabilities.

Competency Developed:

(1) Empowers developers to create functional and innovative software solutions.
(2) Learning software development fosters the ability to work cohesively in a team environment, contributing effectively to shared objectives.
(3) Writing code requires meticulous attention to detail to avoid errors and bugs. This competency extends to other aspects of software development, such as designing user interfaces and documenting project requirements accurately.
(4) Software development not only makes individuals proficient in coding but also equips them with transferable skills applicable to various other domains and professions.
(5) Learning software development nurtures a mindset of continuous learning, as developers need to keep up with emerging technologies and best practices to stay relevant in the industry.

Course Syllabus Overview:

UCMSMDC12003: Software Development [Credits: 3, Lectures: 45]

Unit 1: Introduction (8 Lectures)
Software Processes & Characteristics – Types of Software – Phases of Software development life cycle – Waterfall, Prototype, Spiral Models and Evolutionary - Role of System Analyst.

Unit 2: Software Requirements Analysis & Specifications (12 Lectures)
Software Requirement Analysis, needs for Software Requirements Specifications (SRS), Characteristics and Components of SRS, Fact finding Techniques- Examining documentation, Interviewing ,Observing the enterprise, Research, Questionnaires, Data dictionaries, Data Flow Diagram (DFD), Entity Relationship Diagrams (ERD).

Unit 3: Software Project Management (8 Lectures)
The People the Problem, the Process, the Project. Software Project Planning: Size Estimation like lines of Code & Function Count, Cost Estimation Models- COCOMO, Project scheduling, Capability Maturity Model Integration (CMMI)

Unit 4: Software Design (6 Lectures)
Design concepts, software architecture, Cohesion & Coupling, Software Metrics, Good coding style, Verification vs. Validation.

Unit 5: Testing strategies (6 Lectures)
Software testing fundamentals, Testing Process, Design of Test Cases, Techniques of testing – Black box and white box testing, Types of Testing- Unit Testing, Integration Testing and System Testing,

Unit 6: Quality Management (5 Lectures)
Quality concepts, Software Quality Assurance (SQA), Software Review and Maintenance, ISO9000-Certification.

Suggested Readings:

1. Analysis and Design of Information Systems, V.Rajaraman, PHI Learning Pvt. Ltd, 2018.
2. R.S.Pressman, Software Engineering: A Practitioner's Approach (7th Edition), McGraw-Hill, 2009
3. P. Jalote, An Integrated Approach to Software Engineering (2nd Edition), Narosa Publishing House,2003
4. R.Mall, Fundamentals of Software Engineering (2nd Edition), Prentice-Hall of India,2004
5. Dr.S.Mathew, Software Engineering (13th Edition),S.Chand & Company Pvt.Ltd,2013
6. I T HAWRYSZKIEWYCZ (Author), Introduction To Systems Analysis And Design(2nd Edition),1995
7. V.K. Jain, System Analysis and Design, Dreamtech Press, 2000