DEBRAJ ROY COLLEGE
(AUTONOMOUS)

Syllabus for FYUGP in Computer Science

(For Semesters I - VIII)

Recommended in the meeting of the BoS held on

04.07.2024

With effect from the Session 2024-25

COURSE PREAMBLE

The Bachelor of Computer Science program is designed to provide students with a comprehensive understanding of computer science and its various subfields. The program aims to equip students with the necessary skills to design, develop and maintain computer systems and software applications, and to prepare them for careers in the rapidly evolving field of computer science. The program focuses on developing problem-solving skills using computer programs, database management systems, computer networks, algorithms and data structures, cloud computing, artificial intelligence, and related areas. The program also emphasizes the development of communication, analytical, and critical thinking skills.

INTRODUCTION:

The Bachelor of Computer Science program is a four-year undergraduate program designed to provide students with a strong foundation in computer science. The program is structured to ensure that students develop a comprehensive understanding of the principles and practices of computer science and its various subfields. The program comprises of eight semesters, and students are allowed different exit points with the following certification/diploma/degree:

i. Students on exit after one year of the course shall be awarded Undergraduate Certificate (in Computer Science) after securing the requisite 40 Credits in Semesters I and II.

ii. Students on exit after second years of the course shall be awarded Undergraduate Diploma (in the Computer Science) after securing the requisite 80 Credits on completion of Semester IV.

iii. Students on exit after three years of the course shall be awarded Bachelor of (Computer Science) Honours (3years) after securing the requisite 120 Credits on completion of Semester VI.

iv. Students on exit after four years of the course shall be awarded Bachelor of (Computer Science) (Honours with Research) (4 years) after securing the requisite 160 Credits on completion of Semester VIII**.**

AIM

The aim of the Bachelor of Computer Science program is to provide students with a comprehensive understanding of computer science and its various subfields. The program aims to equip students with the necessary skills to design, develop and maintain computer systems and software applications, and to prepare them for careers in the rapidly evolving field of computer science. The program also aims to develop communication, analytical, and critical thinking skills.

GRADUATE ATTRIBUTES

Upon completion of the program, graduates will possess the following attributes:

- An in-depth understanding of computer science and its various subfields.
- The ability to design, develop, and maintain computer systems and software applications.
- Strong problem-solving and analytical skills.
- Effective communication and teamwork skills.
- The ability to think critically and creatively.
- An understanding of ethical and professional issues related to computer science

PROGRAMME LEARNING OUTCOMES

Upon completion of the program, graduates will be able to:

- Design, develop, and maintain computer systems and software applications using various programming languages and tools.
- Develop and manage database management systems.
- Develop and implement computer networks.
- Analyze algorithms and data structures.
- Develop and implement cloud computing solutions.
- Develop and implement artificial intelligence solutions.
- Apply mathematical and computational thinking and analysis to solve computer scienceproblems.
- Understand and analyze ethical and professional issues related to computer science.
- Communicate effectively with team members and stakeholders.
- Continuously update their knowledge and skills in the rapidly evolving field of computer science.

TEACHING-LEARNING PROCESS

The Bachelor of Computer Science program will be taught through a combination of lectures, tutorials, practical sessions, and projects. The program will use a blended learning approach, which combines online and offline learning, to provide students with flexibility and convenience. The program will also include guest lectures by industry experts to provide students with insights into real-world scenarios.

ASSESSMENT PROCESS

The assessment process for the Bachelor of Computer Science program will include a combination of continuous assessments and end-of-semester examinations. Continuous assessments will include assignments, quizzes, practical sessions, and projects, and will contribute towards the final grade for the course. End-of-semester examinations will be conducted at the end of each semester and willtest students' understanding of the course material covered during the semester. The final grade for each course will be based on the continuous assessments and end-of-semester examination.

PROGRAMME STRUCTURE FYUGP IN COMPUTER SCIENCE

Year	Semester	Course	Title of the Course	Total Credit
Year 01	1st Semester	CSCMAJ-101	Programming with C	4
		CSCMIN-101	Computer Technology and Fundamentals	4
		CSCGEC-101	Office automation tools	3
		AEC		4
		VAC		2
		CSCSEC-101	Fundamental and PC software	3
	Total Credit			**20**
	2nd Semester	CSCMAJ-201	Data Structures and programming in C++	4
		CSCMIN-201	Internet and Web programming	4
		CSCGEC-201	Data Communication and Computer Networks	3
		AEC		4
		VAC		2
		CSCSEC-201	Mathematics for Computer Science essential skills	3
Total credit				**20**
Year 02	3rd Semester	CSCMAJ-301	Object Oriented Programming Using JAVA	4
		CSCMAJ-302	Computer Architecture and Organization	4
		CSCMIN-301	Introduction to DBMS	4
		CSCGEC-301	Web Technology and E- Commerce	3
		VAC 3		2
		CSCSEC-301	Scientific Computing Using MATLAB	3
	Total credit			**20**

Title of the Course	**:**	**PROGRAMMING WITH C**
Course Code	**:**	**CSCMAJ-101**
Nature of the Course	**:**	**Major**
Total Credits	**:**	**04**
Distribution of Marks	**:**	**End-Sem:45 TH + 15 PR, In-Sem: 30 TH + 10 PR**

COURSE OBJECTIVES:

- To develop programming logic using C
- To solve Mathematical and logical problems using C
- To explore the use of arrays in different scenarios.
- To learn the Use of conditional statements and loops
- To implement pointers and dynamic memory allocation.

UNITS	CONTENTS	L	T	P	Total Hours
1 (Marks) 10 TH	**Introduction to 'C' Language** Character set, Variables and Identifiers, Built-in Data Types, Variable Definition. Arithmetic operators and Expressions, Constants and Literals , Simple assignment statement, Basic input/output statement, Simple 'C' programs.	09	01	00	10
2 (Marks) 10 TH + 6 PR	**Conditional Statements and Loops** Decision making within a program, conditions, Relational Operators, Logical Connectives, if statement, if-else statement, Loops: while loop, do while, for loop, Nested loops, Infinite loops, Switch statement, structures Programming.	09	01	10	20
3 (Marks) 12 TH + 6 PR	**Arrays & Functions** One-dimensional arrays: Array manipulation; Two-dimensional arrays, Top-down approach of problem-solving, Modular programming and functions, Return Type, Function call, Block structure, Passing arguments to a Function: call by reference; call by value, Recursive Functions, arrays as function arguments.	10	02	10	22
4 (Marks) 6 TH + 3 PR	**Structures** Structure variables, initialization, structure assignment, nested structure, structures and functions, structures and arrays: arrays of structures, structures containing arrays.	07	01	08	16
	Pointers & File Processing Address operators, pointer type declaration, pointer	06	01	00	07

5 (Marks)7 TH	assignment, pointer initialization, pointer arithmetic, functions and pointers, Arrays and Pointers, pointer arrays. Concept of Files, File opening in various modes and closing of a file, Reading from a file, Writing onto a file.				
Total (in Hrs)		**41**	**06**	**28**	**75**

Where, ***L: Lectures*** ***T: Tutorials*** ***P: Practical***

MODES OF IN-SEMESTER ASSESSMENT: (40 Marks)

- One Internal (TH) Examination - **10 Marks**
- One Internal (PR) Examination - **10 Marks**
- Others - **20 Marks**
  - Quiz
  - Seminar presentation
  - Assignment

COURSE OUTCOMES:

After the completion of this course, the learner will be able to:

CO1: Write programs using C as a language.
CO2: Explain the basic terminologies used in computer programmingCO3: Debug programs in C language.
CO4: Use different data types in a computer program.
CO5: Design programs involving decision structures, loops and functions.

SUGGESTED READINGS/REFERENCES:

1. Byron Gottfried "Programming with C" 4th edition,Tata McGraw-Hill, 2018.
2. E. Balaguruswami, "Programming with ANSI-C" 7th Edition,Tata McGraw Hill,2018.
3. Brian W. Kernighan, Dennis M. Ritchie, "The C Programming Language (Ansi C Version) " 2nd edition,Pearson Education India, 2015.
4. R.G. Dromey, "How to solve it by Computer",Pearson India, 2007.

Title of the Course : PROGRAMMING WITH C
Course Code : CSCMAJ-101

Cognitive Map of Course Outcomes with Bloom's Taxonomy

Knowledge Dimension	**Remember**	**Understand**	**Apply**	**Analyze**	**Evaluate**	**Create**
Factual Knowledge	CO1					
Conceptual Knowledge	CO2	CO1, CO2				CO4,CO5
Procedural Knowledge			CO1	CO3	CO1	CO5
Metacognitive Knowledge						CO1,CO5

Mapping of Course Outcomes to Program Outcomes

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	S	S	S	S	S	S	M	S	L	L	S
CO2	S	M	M	M	M	S	M	S	S	M	M
CO3	S	S	S	S	S	S	M	S	M	M	M
CO4	S	S	S	S	M	S	M	S	M	L	M
CO5	S	S	S	S	S	S	M	S	L	L	S

Title of the Course	**:**	**Computer Technology and Fundamentals**
Course Code	**:**	**CSCMIN-101**
Nature of the Course	**:**	**Minor**
Total Credits	**:**	**04**
Distribution of Marks	**:**	**End-Sem :45 TH + 15 PR, In-Sem: 30 TH + 10 PR**

COURSE OBJECTIVES:

- Understand the basic concepts of computers and computing.
- Familiarity with computer hardware and software components.
- Knowledge of computer types and generations.
- Understanding of computer input/output devices and interfaces
- Familiarity with computer memory and storage devices and Understanding of computer processing and processing units.

UNITS	CONTENTS	L	T	P	Total Hours
1 **(Marks)** **10TH**	**Introduction to Computer and number systems** : Definition of computer, basic components of computer ,bus, evolution of computers, Generations of computers, classification of computers, data representation in a computer, ASCII, Unicode, Number system, decimal, binary, octal and hexadecimal number system, conversion among Number system.	06	01	-	07
2 **(Marks)** **10TH**	**Memory and storage devices:** Memory, memory hierarchy, registers, general purpose and special purpose registers, primary and Secondary memory,volatile and nonvolatile memory, semiconductor memory, SRAM and DRAM, Read Only Memory, magnetic storage devices, optical storage devices,solid state devices,flash memory,Storage evaluation criteria.	07	01	-	08
3 **(Marks)** **10TH+06PR**	**Input devices:** Input device, keyboard, keyboard layouts, pointing devices, mechanical and optical mouse, scanner, hand- held and flat-bed scanners, OMR, OCR, MICR, digital camera, touchpad, trackball, joystick, digitizer, digital microphone	09	01	10	20
4 **(Marks)** **08TH+06PR**	**Output devices:** Monitor,LCD,LED,plasmamonitor,printers,impact printers, non-impact printers, dot matrix printers, inkjet printers, laser printers, thermal printers, plotters, voice output systems, projector.	09	01	10	20
5 **(Marks)** **07TH +03PR**	**Computer Software:** Need of software, types of software, system software and application software, programming languages, machine, assembly, high level, 4GL, their merits and demerits. Application Software-word processing, spread sheet, presentation graphics, database management software.	09	01	10	20
	Total (in Hrs)	40	05	30	75

Where, ***L:Lectures*** ***T: Tutorials*** ***P: Practicals***

MODES OF IN-SEMESTER ASSESSMENT: (40 Marks)

- One Internal (TH) Examination - **10 Marks**
- One Internal (PR) Examination - **10 Marks**
- Others - **20 Marks**
  - Quiz
  - Seminar presentation
  - Assignment

COURSE OUTCOMES:

After the completion of this course, the learner will be able to:

CO1: Understand the basic components of a computer system, including hardware and software.
CO2: Explain the concept of binary numbers and data representation.
CO3: Describe the functioning of central processing unit (CPU), memory, and storage devices.
CO4: Understand the role of input/output devices and peripherals.
CO5: Understand the ethical and social implications of computer technology.
CO6: Demonstrate proficiency in using productivity software, such as word processing, spreadsheets, and presentations.

SUGGESTEDREADINGS/ REFERENCES:

1. Ram.B., "*Computer Fundamentals:Architecture and Organization*",2013,5th Edition, New Age
2. Goel.A.,,"*Computer Fundamentals*",2011 Reprint, Pearson Education
3. David J. Malan, Eric Grimson, and John A. Guttag "Introduction to Computer Science" by Harvard University(free online book)

Title of the Course : **Computer Technology and Fundamentals**
Course Code : **CSCMIN-101**

Cognitive Map of Course Outcomes with Bloom's Taxonomy

Knowledge Dimension	**Remember**	**Understand**	**Apply**	**Analyze**	**Evaluate**	**Create**
Factual Knowledge						
Conceptual Knowledge		**CO1,CO2**	**CO2**	**CO2**	**CO4**	
Procedural Knowledge			**CO3**	**CO5**		
Meta cognitive Knowledge					**CO5**	

Mapping of Course Outcomes to Program Outcomes

CO/PO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**
CO1	**L**	**M**	**M**	**M**	**S**	**L**	**M**	**S**	**S**	**S**	**S**
CO2	**M**	**M**	**S**	**M**	**S**	**M**	**S**	**M**	**S**	**S**	**S**
CO3	**L**	**M**	**M**	**M**	**M**	**M**	**S**	**S**	**S**	**S**	**S**
CO4	**S**	**S**	**S**	**S**	**S**	**M**	**S**	**S**	**S**	**S**	**S**
CO5	**S**	**S**	**M**	**S**	**M**	**M**	**L**	**L**	**L**	**L**	**S**

Title of the Course	**:**	**OFFICE AUTOMATION TOOLS**
Course Code	**:**	**GEC – 1**
Nature of the Course	**:**	**GENERIC ELECTIVE**
Total Credits	**:**	**03**
Distribution of Marks	**:**	**End- Sem : 45 TH + 15 PR, In-Sem: 30 TH + 10PR**

COURSE OBJECTIVES:

- Install and configure office suite software such as Microsoft Office and Libre Office for various tasks.
- Format documents, create tables, and use drawing tools to develop advanced word processing skills.
- Utilize basic formulas and functions, create macros, and construct pivot tables in spreadsheets fordata analysis.
- Design and deliver effective presentations by adding and formatting text, pictures, graphic objects, charts, and using transitions and animations.
- Explain the benefits and use of cloud office automation tools, specifically Office 365, inenhancing work efficiency.

UNITS	CONTENTS	L	T	P	Total Hours
1 (Marks) 5TH + 3 PR	**Introduction to office suite:** Installation and basics of MS office/Libre office	05	01	04	10
2 (Marks) 12TH + 3PR	**Word Processing:** Working with Documents- Formatting Documents - Setting Page style- Creating Tables - Drawing- Tools - Printing Documents - Operating with MS Word documents.	06	01	10	17
3 (Marks) 12TH + 3PR	**Spreadsheets:** Worksheets, Formatting data, creating charts and graphs, using basic formulas and functions, macros, Pivot Table	05	01	06	12
4 (Marks) 11TH + 3PR	**Presentation Tools:** Adding and formatting text, pictures, graphic objects, including charts, objects, formatting slides, notes, hand-outs, slide shows, using transitions, animations	05	01	06	12
5 (Marks) 5TH + 3 PR	**Cloud:** Introduction to cloud office automation using office-365.	04	01	04	09
	Total (in Hrs)	**25**	**05**	**30**	**60**

Where, ***L: Lectures*** ***T: Tutorials*** ***P: Practicals***

MODES OF IN-SEMESTER ASSESSMENT: **(40 Marks)**

- One Internal(TH) Examination - **10 Marks**
- One Internal(PR) Examination - **10 Marks**
- Others - **20 Marks**
  - Quiz
  - Seminar presentation
  - Assignment

COURSE OUTCOMES:

After the completion of this course, the learner will be able to:

CO1: Install and configure Microsoft Office and Libre Office software for various tasks.
CO2: Use formatting options, create tables, and employ drawing tools in wordprocessing documents.
CO3: Develop spreadsheets utilizing basic formulas and functions, create macros,and construct pivot tables to analyze data.
CO4: Design and produce effective presentations by adding and formatting text, pictures, graphic objects, including charts and objects, and formatting slides,notes, and hand-outs, and using transitions and animations.
CO5: Implement and utilize cloud-based office automation tools to enhance work efficiency and collaboration.

SUGGESTED READINGS:

1. Sushila M , Introduction to Essential tools,JBA,2009.
2. Wang, W. (2018). Office 2019 For Dummies. United States: Wiley.
3. Kumar, B. (2017). Mastering MS Office. India: V&S Publishers.
4. Kumar A, (2019) Computer Basics with Office Automation, Dreamtech Press, ISBN: 9789389447194, 9789389447194.

Title of the Course : OFFICE AUTOMATION TOOLS
Course Code : GEC – 1

Cognitive Map of Course Outcomes with Bloom's Taxonomy

Knowledge Dimension	Remember	Understand	Apply	Analyze	Evaluate	Create
Factual Knowledge		**CO1**				
Conceptual Knowledge		**CO1**	**CO2**			
Procedural Knowledge			**CO2, CO5**	**CO3**		**CO3, CO4**
Meta cognitive Knowledge			**CO5**	**CO3**		**CO3, CO4**

Mapping of Course Outcomes to Program Outcomes

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	**S**	**L**	**M**	**L**	**L**	**L**	**L**	**M**	**M**	**M**	**L**
CO2	**S**	**L**	**S**	**L**	**L**	**L**	**M**	**M**	**S**	**M**	**L**
CO3	**S**	**L**	**S**	**L**	**L**	**L**	**M**	**M**	**S**	**M**	**L**
CO4	**S**	**L**	**S**	**L**	**L**	**L**	**M**	**M**	**S**	**M**	**L**
CO5	**S**	**L**	**M**	**L**	**L**	**L**	**M**	**M**	**S**	**M**	**L**

Title of the Course	**:**	**Fundamental and PC software**
Course Code	**:**	**SEC - 1**
Nature of the Course	**:**	**Skill Enhancement Course**
Total Credits	**:**	**03**
Distribution of Marks	**:**	**End-Sem : 45 TH + 15 PR, In-Sem: 30 TH + 10 PR**

COURSE OBJECTIVES:

- To introduce to the basics of office suite software, such as Microsoft Office
- To develop skills in word processing, including formatting
- To teach how to use basic formulas and functions, macros, and pivot tables in spreadsheets.
- To instruct on creating and delivering effective presentations using presentation tools.

UNITS	CONTENTS	L	T	P	Total Hours
1 (Marks) 8TH	**Introduction to Computer :**Definition of computer, basic components of computer,bus,evolution of computers,Generations of computers, classification of computers, Memory, Input device, Need of software, types of software, system software and application software.	05	01	-	10
2 (Marks) 10TH + 4PR	**Introduction to office suite** : Introduction to Operating System,Installation and basics of MS office/Libre office	04	01	08	09
3 (Marks) 10TH + 4PR	**Word Processing:** Working with Documents-Formatting Documents-Setting Page style-Creating Tables- Drawing-Tools Printing Documents-Operating with MS-Word documents.	06	01	10	17
4 (Marks) 7TH + 4PR	**Spreadsheets:** Worksheets, Formatting data, creating charts and graphs, using basic formulas and functions, macros, PivotTable	05	01	06	12
5 (Marks) 10TH + 3PR	**Presentation Tools:** Adding and formatting text, pictures, graphic objects, including charts, objects, formatting slides, notes, hand-outs, slide-shows, using transitions, animations	05	01	06	12
	Total (in Hrs)	25	**05**	**30**	**60**

Where, ***L: Lectures*** ***T: Tutorials*** ***P: Practicals***

MODES OF IN-SEMESTER ASSESSMENT: **(40 Marks)**

- One Internal(TH) Examination - **10 Marks**
- One Internal(PR) Examination - **10 Marks**
- Others - **20 Marks**
    - Quiz
    - Seminar presentation
    - Assignment

COURSE OUTCOMES:

After the completion of this course, the learner will be able to:

CO1: Install and configure Microsoft Office and Libre Office software for various tasks.
CO2: Use formatting options, create tables, and employ drawing tools in wordprocessing documents.
CO3: Develop spreadsheets utilizing basic formulas and functions, create macros,and construct pivot tables to analyze data.
CO4: Design and produce effective presentations by adding and formatting text, pictures, graphic objects, including charts and objects, and formatting slides, notes, and hand-outs, and using transitions and animations.
CO5: Implement and utilize cloud-based office automation tools to enhance workefficiency and collaboration.

SUGGESTED READINGS/ REFERENCES:

1. SushilaM , Introduction to Essential tools,JBA,2009.
2. Wang, W. (2018). Office 2019 For Dummies. United States: Wiley.
3. Kumar, B. (2017). Mastering MS Office. India: V&S Publishers.
4. Kumar A, (2019) Computer Basics with Office Automation, Dreamtech Press, ISBN: 9789389447194, 9789389447194.

Title of the Course : Fundamental and PC software

Course Code : SEC - 1

Cognitive Map of Course Outcomes with Bloom's Taxonomy

Knowledge Dimension	**Remember**	**Understand**	**Apply**	**Analyze**	**Evaluate**	**Create**
Factual Knowledge	CO1	CO1				
Conceptual Knowledge		CO2	CO2, CO3, CO4, CO5			CO2, CO3, CO4, CO5
Procedural Knowledge		CO2	CO2, CO3, CO4, CO5			CO2, CO3, CO4, CO5
Metacognitive Knowledge						

Mapping of Course Outcomes to Program Outcomes

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	L	L	M	L	L	L	S	L	L	L	S
CO2	S	S	M	L	S	M	S	S	S	S	S
CO3	S	S	M	M	S	M	S	S	S	S	S
CO4	S	S	M	M	S	M	S	S	S	S	S
CO5	S	S	M	M	S	M	S	S	S	S	S