

Sant Gadge Baba Amravati University, Amravati

FACULTY: Science and Technology

Teaching and Learning Scheme: for the Degree of Bachelor of Computer Application (BCA) with the Major: Artificial Intelligence

(Three Years- Six Semesters Bachelor's Degree Programme)

(Four Years- Eight Semesters Bachelor's Degree Programme (Honors))

(Four Years- Eight Semesters Bachelor's Degree Programme (Honors with Research))

Preamble

The new curriculum of the four-year undergraduate program under NEP, for Computer Application aims to develop the core competence in computing and problem solving amongst its graduates. Informally, "Learning to learn" has been the motto of the department since its inception. The curriculum thus focuses on building theoretical foundations in Computer Science to enable its pupils to think critically when challenged with totally different and new problems. It imbibes the following **Student-Centric** features of NEP2020:

Flexibility to Exit:

In order to support early exits, the curriculum aims to develop employability skills early. This has been done so that the outcomes of the 4 yr degree is not compromised as we believe that all but a few students will go for the full 4-year degree. As programming is at the heart of computing it is proposed to have two programming courses early so that the students can develop good programming skills in the first year. At the same time students are familiarized with the hardware of computers early on.

Employability:

Industry demand in the IT sector has changed considerably in the past few years. With the humongous amount of data coming from all the domains like medical data, social networking data, astronomical data, education, etc., automating information extraction and analysis of data is the only way forward to leverage the available data for the future. The curriculum aims to equip the students with tools and techniques of Artificial Intelligence, Machine Learning and a pathway on Data Science if the student so desires. Having said this, there is no replacement for the foundational courses like programming, data structures and algorithms. With two courses on programming and three courses on data structures and algorithms together, a strong foundation will be laid down for problem solving.

Research:

With the option to obtain specialization in an area of their choice, the curriculum prepares the students to take up research projects in their final year.

Program Outcomes:

Knowledge outcomes: After completing BCA students will be able to:

PO1: To develop problem solving abilities using a computer.;

PO2: To prepare necessary knowledge base for research and development in Computer Science.

Skill outcomes: After completing BCA Computer Science Program students will be able to:

PO3: To build the necessary skill set and analytical abilities for developing computer-based solutions.

PO4: To train students in professional skills related to Software Industry.

Generic outcomes: Students will

PO5: Augment the recent developments in the field of IT and relevant fields of Research and Development.

PO6: Enhance the scientific temper among the students so that to develop a research culture and Implementation the policies to tackle the burning issues at global and local level.

Program Specific Outcomes

PSO1: Students get knowledge and training of technical subjects so that they will be technical professional by learning C programming, Relational Database Management, Data Structure, Software Engineering, Graphics, Java, PHP, Networking, Theoretical Computer Science, System Programming, Object Oriented Software Engineering.

PSO2: Students understand the concepts of software application and projects.

PSO3: Students understand the computer subjects with demonstration of all programming and theoretical concepts with the use of ICT.

PSO4: Development of in-house applications in terms of projects

PSO5: Students will build up programming, analytical and logical thinking abilities.

PSO6: Aware them to publish their work in reputed journals

PSO7: To make them employable according to current demand of IT Industry and responsible citizen.

Level I	Semester	Course Code	Course Name	Credits	Teaching Hours	Exam Duration	Max Marks
4.5	I	101200/ 102200	Fundamentals of Computer	2	30	2 Hrs	30

Course Objectives:	<ol style="list-style-type: none"> To provide the knowledge of basic of Computer Science To understand importance of memory devices of computer To understand importance of memory devices input output devices of computer To understand the Operating System concepts 			
Course Outcomes:	Students will be able to - <ol style="list-style-type: none"> Define Computer, History of Computer, Uses of Computer and Generations of Computers. Define memories of computers, its types and examples of primary and secondary memories. Introduce about all input-output devices of computer systems. Define operating system, its function and types of operating systems. 			
Unit System	Contents	Workload Allotted	Weightage of Marks Allotted	Incorporation of Pedagogies
Unit I	Introduction to Computer, Uses of Computers, History of Computers, Characteristics, Generations of Computers, Block diagram of Computer.	8 Hrs	8 Marks	BoS shall recommend suitable pedagogical strategies, both classical and contemporary innovations, for integration into the Teaching, Learning, and Evaluation (T, L, & E) Processes. These strategies should be tailored to enhance the delivery and comprehension of the course content within each Unit, ensuring that they align with the educational objectives and learning outcomes.
Unit II	Memories: Primary Memories: RAM, ROM, and its types, Cache Memory, Secondary Storage Devices: Hard Disk, SSD, Pen drives.	7 Hrs	7 Marks	
Unit III	I/O Devices: Input Devices- Keyboard, Mouse, Scanner, Output Devices- Touch Screen, Monitors: VDU, LCD & LED. Printers: Types of Printers, Impact and non-impact printers, Modem.	8 Hrs	8 Marks	
Unit IV	Operating System: Definition, Functions of Operating System, Types: Batch Mode, Multiprogramming, Timesharing, Online Real Time, Distributed O.S. Booting Process.	7 Hrs	7 Marks	
References :	Course Material/Learning Resources Text books: <ol style="list-style-type: none"> "Computer Fundamentals & Networking" by P.K.Sinha "Fundamentals of Computer" by B. Ram "Computer Fundamentals" by Goel "Fundamentals of Computers" by Rajaraman V and Adabala N Reference Books: <ol style="list-style-type: none"> Fundamentals of Computer - V.Rajaraman "Fundamentals of Computers" by Reema Thareja 			

	<p>3) "Fundamentals of Computers" by E Balagurusamy</p> <p>Weblink to Equivalent MOOC on SWAYAM if relevant:</p> <ul style="list-style-type: none"> • https://onlinecourses.swayam2.ac.in/cec19_cs06/preview • https://onlinecourses.swayam2.ac.in/nou20_cs03/preview • https://www.classcentral.com/course/swayam-computer-fundamentals-13950
<p>Model Questions:</p>	<p>Short Type (At least 8)</p> <ol style="list-style-type: none"> 1. What is Computer? Explain its characteristics. 2. Explain the history of computer. 3. What is the function of memory? What are its types? 4. Enlist Input-Output devices of computers. 5. What are the types of computers? 6. What is the function of Printer? 7. What is the Function of Operating System? 8. What is Booting Process? <p>Long Type (At least 4)</p> <ol style="list-style-type: none"> 1. Draw and explain the block diagram of computer. 2. Explain the generations of computers. 3. What is Memory? Explain its types. 4. Explain the types of printers. 5. Explain any three Input/ Output devices of Computers. 6. Explain the types of operating system. 7. Explain the characteristics of computers. 8. Explain the uses of computers. <p>MCQs for Internal Assessment (At least 8)</p> <ol style="list-style-type: none"> 1. Who is the father of Computers? <ol style="list-style-type: none"> a) James Gosling b) Charles Babbage c) Dennis Ritchie d) Bjarne Stroustrup <p>Answer: b) Charles Babbage</p> 2. What is the full form of CPU? <ol style="list-style-type: none"> a) Computer Processing Unit b) Computer Principle Unit c) Central Processing Unit d) Control Processing Unit <p>Answer: c) Central Processing Unit</p> 3. Which of the following is the brain of the computer? <ol style="list-style-type: none"> a) Central Processing Unit b) Memory c) Arithmetic and Logic unit d) Control unit <p>Answer: d) Control unit</p> 4. Which of the following is the smallest unit of data in a computer? <ol style="list-style-type: none"> a) Bit b) KB c) Nibble

d) Byte
Answer: a) Bit

5. Which of the following is designed to control the operations of a computer?

- a) User
- b) Application Software
- c) System Software
- d) Utility Software

Answer: c) System Software

Level	Semester	Course Code	Course Name	Credits	Teaching Hours	Exam Duration	Max Marks
4.5	I	101201/ 102201	Laboratory on Office Automation Tools	2	60	4 Hrs	50

Course Objectives:	<ol style="list-style-type: none"> 1. Understand the concept of Office Automation Tools. 2. Know the importance of Office Automation. 3. Explain the functions of Office Suits. 4. Define the scope and benefits and limitations of MS-Office.
Course Outcomes:	<p>On competition of the following syllabus the students will be able to -</p> <ol style="list-style-type: none"> 1. To design documentation using MS-Word. 2. To design Spread Sheets using MS-Excel. 3. To create the presentation using MS-PowerPoint.

Contents	Workload Allotted	Weightage of Marks Allotted	Incorporation of Pedagogies
<p>List of Practical:</p> <ol style="list-style-type: none"> 1. Create a MS-Word document for your own Biodata. 2. Create MS-Word Document Using Cut, Copy, Paste, Find and Replace using Edit Option. 3. Create MS-Word Document for inserting Tables, Pictures, Cliparts, Shapes, Symbols and Word Arts using Insert Option. 4. Create MS-Word Document for Any Newspaper News using Column Option. 5. Create MS-Word Document for Bullets and Numbering Option. 6. Create MS-Word Document using all formatting options. 7. Create MS-Word Document using Change Case Option. 8. Create MS-Word Document for changing Fonts,Color,Size using Formatting Option. 9. Create MS-Word Document to Write and Send Letter using Mail-Merge Option. 10. Create MS-Word Document to prepare Marksheet using table Menu. 11. Create the Excel Spreadsheet for Preparing the Marksheet. 12. Create the Excel Spreadsheet for Preparing the Payment Sheet. 13. Create the Excel Spreadsheet for Preparing the Electric Bill. 14. Create the Excel Spreadsheet for Preparing the Bar Chart On 			<ol style="list-style-type: none"> 1. Demonstration of document using MS-Word. 2. Demonstration of Spreadsheet using MS-Excel. 3. Demonstration of Presentation using MS-PowerPoint.

	<p>Marksheet.</p> <p>15. Create the Excel Spreadsheet for Preparing the Column Chart on Payment Sheet.</p> <p>16. Create the PowerPoint Presentation on your Seminar topic.</p> <p>17. Create the PowerPoint Presentation using various designs.</p> <p>18. Create the PowerPoint Presentation using various Layouts.</p> <p>19. Create the PowerPoint Presentation using various Transition effects.</p> <p>20. Create the PowerPoint Presentation using various Animation Effects.</p> <p>21. Create the PowerPoint Presentation using various Audio and Video effects.</p>			
<p>References:</p>	<p>Weblink to Equivalent MOOC on SWAYAM if relevant:</p> <ul style="list-style-type: none"> • https://www.classcentral.com/course/youtube-microsoft-office-tutorial-learn-excel-powerpoint-and-word-9-hour-ms-office-course-117828 • https://www.shiksha.com/online-courses/ms-office-courses-certification-training-st639-tg503 • https://www.classcentral.com/subject/microsoft-office <p>Any pertinent media (recorded lectures, YouTube, etc.) if relevant:</p> <ul style="list-style-type: none"> • https://www.youtube.com/watch?v=SH4oyV5AJ6A • https://www.youtube.com/watch?v=PVvoqAib7Zs • https://www.youtube.com/watch?v=U6pbEdrJv-w&list=PLzj7TwUeMQ3hH_MxteY6LR3OSMHPDkt_j 			

Level	Semester	Course Code	Course Name	Credits	Teaching Hours	Exam Duration	Max Marks
4.5	II	101400/ 102400	Programming with C	2	30	2 Hrs	30

Course Objectives :	<p>1.To provide students with understanding of code organization and functional hierarchical decomposition with using data types.</p> <p>2. Programming is about writing the instructions which a computer follows to enable it to store knowledge, process knowledge, and communicate knowledge with the outside world.</p>			
Course Outcomes:	<p>On completion of the following syllabus the students will be able to -</p> <ol style="list-style-type: none"> 1. Understand the Programming concepts. 2. Understand development of C language. 3. Write Algorithms for the task/problem. 4. Able to design flowcharts of the problem. 5. Able to write Simple C Programs. 			
Unit System	Contents	Workload Allotted	Weightage of Marks Allotted	Incorporation of Pedagogies
Unit I	Algorithm, flowcharting, Types of programming languages. History of C language, Advantages, Structure of C program, Character set, Identifiers, Keywords, Constants and Variables, Symbolic constants, Qualifiers, Type conversion. Operators and Expressions	8 Hrs	8 Marks	The students have a problem understanding the concept of arrays, dealing with the syntax of the language, designing the organization of the program and understanding the concept of flow control such as looping and branching or function calls.
Unit II	<p>Formatted I/O:scanf(), printf(),</p> <p>Unformatted I/O : getch(), getchar(), gets(), putch(), putchar(), puts().</p> <p>Control structures: Branching: if, if-else, Conditional operator(? :), nested if, switch. Looping: while, do-while, for statements, comma operator, goto, break, continue, nested loops</p>	7 Hrs	7 Marks	<p>1. To help solve this problem we have divided the various concepts and used</p>

Unit III	Arrays - Declaration and initialization of one and two dimensional array. Structure - Definition, declaration, initialization, array of structure, nested structure, union. Pointers - Declaration, initialization, pointers arithmetic	8 Hrs	8 Marks	different examples in day to day life. 2. The Necessity Of Teaching Reform: The final goal of programming teaching is making the students mastering the ability of coding and debugging.
Unit IV	Functions in C: Definition of function, function prototype, categories of function, actual argument, formal argument, function calling: call by value, call by reference, function parameters, local and global variable, functions with array, function recursion. String functions - String functions :strlen(), strcpy(), strcmp() & strcat()	7 Hrs	7 Marks	3. Chalk and Board method. 4. Power point presentation with animation. 5. Use of online software to explain the coding and debugging.
References:	<p>Text books:</p> <ol style="list-style-type: none"> 1) Programming in C: E Balagurusamy : TMH Publication. 2) Programming in C - V.Rajaraman <p>Reference Books:</p> <ol style="list-style-type: none"> 1) ANSI C- Dennis Ritchie 2) Programming with C: Venugopal K.R. TMH, Publication. 3) Programming with C: Byson Gottfried , Schaum Series Publication. <p>Weblink to Equivalent MOOC on SWAYAM if relevant:</p> <ul style="list-style-type: none"> • https://onlinecourses.nptel.ac.in/noc19_cs42/preview • https://onlinecourses.swayam2.ac.in/aic20_sp06/preview • https://onlinecourses.swayam2.ac.in/cec20_cs02/preview • https://onlinecourses.nptel.ac.in/noc19_cs42/preview • https://onlinecourses.swayam2.ac.in/aic20_sp06/preview • https://onlinecourses.swayam2.ac.in/cec20_cs02/preview • https://www.classcentral.com/course/swayam-introduction-to-programming-in-c-2486 • https://swayamprabha.gov.in/asset/new_team/images/course_files/R12-Introduction%20to%20Programming%20in%20C%20.pdf <p>Weblink to Equivalent Virtual Lab if relevant:</p> <ul style="list-style-type: none"> • https://www.programiz.com/c-programming/online-compiler/ • https://www.onlinegdb.com/online_c_compiler • https://www.tutorialspoint.com/compile_c_online.php <p>Any pertinent media (recorded lectures, YouTube, etc.) if relevant:</p> <ul style="list-style-type: none"> • https://www.youtube.com/watch?v=87SH2Cn0s9A • https://www.youtube.com/watch?v=rQoqCP7LX60&list=PLxgZQoSe9cg1drBnejUaDD9GEJBGQ5hMt • https://www.youtube.com/watch?v=EjavYOFoJJ0&list=PLdo5W4Nhv31a8UcMN9-35ghv8qyFWD9_S 			
Model Questions:	<p>Short Type (At least 8):</p> <ol style="list-style-type: none"> 1. What do mean by Algorithm? 			

2. Define a flowchart.
3. What is means by program?
4. Define keyword.
5. Define Identifier.
6. Define an Array.
7. Define Structure.
8. Define Union.
9. What is a function?
10. What is String?

Long Type (At least 4)

1. Describe the structure of C program.
2. Explain the looping structures in C with suitable example.
3. Describe Union and its use in C with example.
4. Illustrate Prototype of function with example.
5. Illustrate pointers with example

MCQs:

1. Which of the following language is the predecessor to C Programming Language?

- a) A
- b) B
- c) BCPL
- d) C++

Ans: c

2. C programming language was developed by

- a) Dennis Ritchie
- b) Ken Thompson
- c) Bill Gates
- d) Peter Norton

Ans: a

3. C was developed in the year ____

- a) 1970
- b) 1972
- c) 1976
- d) 1980

Ans: b

4. C is a ____ language

- a) High Level
- b) Low Level
- c) Middle Level
- d) Machine Level

Ans: c

5. C language is available for which of the following Operating Systems?

- a) DOS
- b) Windows
- c) Unix
- d) All of these

Ans: d

Level	Semester	Course Code	Course Name	Credits	Teaching Hours	Exam Duration	Max Marks
4.5	II	101401/ 102401	Laboratory on Programming with C	2	60	4Hrs	50

Course Objectives:	<ol style="list-style-type: none"> 1. Understand the concept of C programming 2. Know the importance of Looping Statement. 3. To implement decision making structure 4. To develop proficiency in Functions
Course Outcomes:	<p>On completion of the following syllabus the students will be able to -</p> <ol style="list-style-type: none"> 1. To design simple C Program. 2. To design program for implementing looping structure. 3. Ability to use function. 4. Skill in structuring code with function.

Contents	Workload Allotted	Weightage of Marks Allotted	Incorporation of Pedagogies
<ol style="list-style-type: none"> 1. Write a program in 'C' to demonstrate Arithmetic Operations. 2. Write a program in 'C' to demonstrate If -Else Statement. 3. Write a program in 'C' to demonstrate Nested If Statement. 4. Write a program in C to demonstrate Switch-case Statement. 5. Write a program in 'C' to demonstrate For Loop Statement. 6. Write a program in 'C' to demonstrate While Loop Statement. 7. Write a program in 'C' demonstrate Do-While Loop Statement. 8. Write a program in 'C' demonstrate Nested Loop. 9. Write a program in 'C' demonstrate One-Dimensional Array. 10. Write a program in 'C' demonstrate Two-Dimensional Array. 11. Write a program in 'C' demonstrate String Functions. 12. Write a program in 'C' demonstrate Structure. 13. Write a program in 'C' demonstrate Pointers. 14. Write a program in 'C' demonstrate Function. 15. Write a program in 'C' demonstrate Function Recursion. 			

Weblink to Equivalent Virtual Lab if relevant:

- <https://www.programiz.com/c-programming/online-compiler/>
- https://www.onlinegdb.com/online_c_compiler
- https://www.tutorialspoint.com/compile_c_online.php

Any pertinent media (recorded lectures, YouTube, etc.) if relevant:

- <https://www.youtube.com/watch?v=87SH2Cn0s9A>
- <https://www.youtube.com/watch?v=rQoqCP7LX60&list=PLxgZQoSe9cg1drBnejUaDD9GEJBGQ5hMt>
- https://www.youtube.com/watch?v=EjavYOFoJJ0&list=PLdo5W4Nhv31a8UcMN9-35ghv8qyFWD9_S

Level	Semester	Course Code	Course Name	Credits	Teaching Hours	Exam Duration	Max Marks
4.5	I	101600/ 102600	Laboratory on Information Communication Technology Tools	2	60	4 Hrs	50

Course Objectives :	<ol style="list-style-type: none"> 1. Effectively use ICT tools, software applications and digital resources. 2. Acquire, organize and create his/her own digital resources. 3. Participate in the evaluation and selection of ICT resources. 4. Practice safe, ethical and legal ways of using ICT.
Course Outcomes :	<p>On completion of the following syllabus the students will be able to -</p> <ol style="list-style-type: none"> 1. Understand importance and need of incorporating modern ICT tools in education. 2. Use applications of Google for academics, carry out Scholarly writing using ICT tools. 3. Integrate ICT into teaching-learning and its evaluation. 4. Use ICT for making classroom processes more inclusive and to address multiple learning abilities.

Contents	Workload Allotted	Weightage of Marks Allotted	Incorporation of Pedagogies
<p>List of Practical:</p> <ol style="list-style-type: none"> 1. Create a Google form using short and long answers. 2. Create a Google form using Multiple Choice and Checkboxes answer. 3. Create a Google form using Drop-down menu answer. 4. Create a quiz using Google form with different kinds of questions. 5. Create a Survey using Google form to collect data about students learning experiences. 6. Create Google Forms to create permission slips for field trips and email them directly to parents. 7. Create Google Forms to create polls to gather data about student opinions on a variety of topics. 8. Create Google Forms to gather feedback from students on specific lessons and topics, teaching styles, curriculum, and more. 9. Create and edit documents using Google Docs. 10. Create a bulleted list, Customize a 			<ol style="list-style-type: none"> 1. Google Forms 2. Google Docs 3. Google Sheet 4. Google Translate 5. Google Slides 6. Google Classroom 7. Google Site 8. YouTube 9. Google Drive 10. Twitter 11. Instagram 12. LinkedIn

	<p>bulleted list using Google Docs.</p> <ol style="list-style-type: none"> 11. Create a numbered list, Change the line and paragraph spacing, Change the text alignment and change the indentation using Google Docs. 12. Create a document using Google docs to insert an image, insert a table, insert a chart, insert page numbers, insert headers and footers, insert a comment and customize your page layout. 13. Create home inventory sheet using Google Sheet. 14. Create health exercise chart using Google Sheet. 15. Create monthly budget using Google Sheet. 16. Create a salary sheet of employees of colleges using Google Sheet. 17. Create a document in Marathi language using Google Translate. 18. Convert the English document into Marathi, Hindi, and Tamil language using Google Translate. 19. Create presentation using Google Slides. 20. Create presentation on Google Forms using Google Slides. 21. Create Class on Google Classroom. 22. Upload the material, links and videos of subject in different topics. 23. Create own website using Google Site. 24. Create college website using Google Site. 25. Create account on YouTube. 26. Create your own channel on YouTube and upload your videos. 27. Create an account on Google Drive and upload your files on it. 28. Upload folder on Google Drive and share the links to your friends. 29. Create your account on Twitter 30. Tweets short post, videos, photos and links to followers. 31. Create account on Instagram. 32. Check out friends and families on Instagram 33. Upload photos, videos and share them with their followers. 34. Create account on LinkedIn. 35. Upload your profile on LinkedIn for business or service. 			
Reference s:	Weblink to Equivalent MOOC on SWAYAM if relevant: https://www.google.com			

<https://mail.google.com>
<https://docs.google.com>
<https://sites.google.com>
<https://forms.google.com>
<https://drive.google.com>
<https://twitter.com/>
<https://www.youtube.com>
<https://www.instagram.com/>
<https://in.linkedin.com/>
[https://en.wikipedia.org/wiki/Google Docs](https://en.wikipedia.org/wiki/Google_Docs)
<https://www.youtube.com/user/youtube>
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