Sant Gadge Baba Amravati University, Amravati

FACULTY: Science and Technology

Teaching and Learning Scheme: for the Degree of Bachelor of Science with the Major: Computer Science/ Information Technology/ Computer Application (Regular)/ Computer Application (Vocational)/ Data Analytics

(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 Science 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 B.Sc. Computer Science Program 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 B.Sc. 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.

PS06: Aware them to publish their work in reputed journals

PS07: To make them employable according to current demand of IT Industry and responsible citizen.

Level	Semester	Course Code	Course Name	Credits	Teaching Hours	Exam Duration	Max Marks
4.5	I	109200/ 110200/ 112200/ 123200/ 134200	**Fundamentals of Computer**	2	30	2 Hrs	30

Course Objectives:	1. To provide the knowledge of basic of Computer Science 2. To understand importance of memory devices of computer 3. To understand importance of memory devices input output devices of computer 4. To understand the Operating System concepts			
Course Outcomes:	Students will be able to - 1. Define Computer, History of Computer, Uses of Computer and Generations of Computers. 2. Define memories of computers, its types and examples of primary and secondary memories. 3. Introduce about all input-output devices of computer systems. 4. 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:** 1) Computer Fundamentals & Networking - P.K.Sinha 2) Fundamentals of Computer - B.Ram 3) Internet Book - Clstenes 4) Information Technology - Alexies & Mathews - Vijay Nikole **Reference Books:** 1) Fundamentals of Computer - V.Rajaraman 2) Computer Network-Andrew Tennanbaum			

	Weblink to Equivalent MOOC on SWAYAM if relevant: • 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 • https://onlinecourses.nptel.ac.in/noc19_cs42/preview • https://onlinecourses.swayam2.ac.in/aic20_sp06/preview • https://onlinecourses.swayam2.ac.in/cec20_cs02/preview
Model Questions:	**Short Type (At least 8)** 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? **Long Type (At least 4)** 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. **MCQs for Internal Assessment (At least 8**) 1. Who is the father of Computers? a) James Gosling b) Charles Babbage c) Dennis Ritchie d) Bjarne Stroustrup Answer: b) Charles Babbage 2. What is the full form of CPU? a) Computer Processing Unit b) Computer Principle Unit c) Central Processing Unit d) Control Processing Unit Answer: c) Central Processing Unit 3. Which of the following is the brain of the computer? a) Central Processing Unit b) Memory c) Arithmetic and Logic unit d) Control unit Answer: d) Control unit 4. Which of the following is the smallest unit of data in a computer? 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	109601/ 110601/ 112601/ 123601/ 134601	**Laboratory on Office Automation Tools**	2	60	4 Hrs	50

Course Objectives:	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:	On competition of the following syllabus the students will be able to - 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**
	List of Practical: 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			1. Demonstration of document using MS-Word. 2. Demonstration of Spreadsheet using MS-Excel. 3. Demonstration of Presentation using MS-PowerPoint.

	Marksheet. 15. Create the Excel Spreadsheet for Preparing the Column Chart on Payment Sheet. 16. Create the PowerPoint Presentation on your Seminar topic. 17. Create the PowerPoint Presentation using various designs. 18. Create the PowerPoint Presentation using various Layouts. 19. Create the PowerPoint Presentation using various Transition effects. 20. Create the PowerPoint Presentation using various Animation Effects. 21. Create the PowerPoint Presentation using various Audio and Video effects.			
References:	**Weblink to Equivalent MOOC on SWAYAM if relevant:**			

Level	Semester	Course Code	Course Name	Credits	Teaching Hours	Exam Duration	Max Marks
4.5	I	109501/ 110501/ 112501/ 123501/ 134501	**Information Communication Technology**	2	30	2 Hrs	30

Course Outcomes :	Students will be able to - 1. Understand the literature of social networks and their properties. 2. Which network is suitable for whom. 3. Develop skills to use various social networking. 4. Learn some GOI digital initiatives in higher education. 5. Apply skills to use online forums, documents, spreadsheets, presentation for communication, collaboration and research. 6. Get acquainted with internet threats and security mechanisms.			
Unit System	**Contents**	**Workload Allotted**	**Weightage of Marks Allotted**	**Incorporation of Pedagogies**
Unit I	**Introduction to Networking:** Introduction, Need of computer communication network, Communication protocol, Types of networks: LAN, MAN, WAN Topology: Ring, Bus, Star, Hybrid, Hierarchical& Mesh.	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. 1. To help solve this problem we have divided the various concepts and used 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. 3. Chalk and Board
Unit II	**Internet:** History, Applications of Internet, Types of Internet Connection: wired and wireless. Internet Protocols: TCP/IP, FTP, HTTP, URL, e-mail address, WWW, Web browsers, Search Engines, Introduction to Social Networking: Twitter, LinkedIn, Facebook, Flickr, Skype, YouTube, WhatsApp.	7 Hrs	7 Marks	
Unit III	**E-mail:** Definition of E-mail, Advantages and disadvantages, User Ids, Login, Passwords, Email Addresses, Domain Names, Mailers, Message Components, message Composition, Mail Managements. G-Suits: Google Drive, Google Documents, Google Spread Sheets, Google Slides and Google Forms.	8 Hrs	8 Marks	

Unit IV	**Internet Securities:** -mail threats and secure E-mails, Viruses and Antivirus Software, Firewalls, Cryptography, Digital Signatures, Copyright issues.	7 Hrs	7 Marks	method. 4. Power point presentation with animation. 5. Use of online software to explain the coding and debugging.
References:	**Course Material/Learning Resources** **Text books:** 1) Computer Networks (Fourth Edition) - Andrew S. Tanenbaum (PHI) 2) Information Technology - Alexies & Mathews - Vijay Nikole **Reference Books:** 1) Fundamentals of the Internet and World Wide Web, 2/e – Raymond Greenlaw and Ellen Hepp, TMH publication. 2) Internet Technology and Web Designs, ISRD group, TMH Publication. 3) Information Technology- The breaking wave, Dennis P.Curtin, Kim Foley,Kunai Sen and Cathleen Mortin, TMH Publication. 4) Computer Network & Internet - Douglas E. Comer (Pearson)			
Model Questions:	**Short Type (At least 8)** 9. What is Computer Networks. 10. Differentiate between Lan, Man and WAN 11. What is Internet? What are its applications? 12. How to secure your E-mail?. 13. What are the components of E-mail?? 14. What is the Internet Protocols? 15. What is network topologies?? 16. What are the copyright issues? **Long Type (At least 4)** 9. Explain the types of computer Networks. 10. Explain Bus topology with advantages and disadvantages. 11. Explain how to create E-mail address. 12. Explain the types of viruses. 13. Explain i) Cryptography ii) Digital Signature 14. Explain how to create google form? **MCQs for Internal Assessment (At least 8)** 6. What is internet? a) A network of interconnected local area networks b) A collection of unrelated computers **c) Interconnection of wide area networks** d) A single network What is the full form of CPU? 7. What is a computer network? a) A device used to display information on a computer screen **b) A collection of interconnected computers and devices that can communicate and share resources** c) A type of software used to create documents and presentations d) The physical casing that protects a computer's internal components 8. Which topology requires a multipoint connection? a) Ring **b) Bus** c) Star			

d) Mesh Which of the following is designed to control the operations of a computer?

9. What is the term for the data communication system within a building or campus?
   a) MAN
   b) LAN
   c) PAN
   d) WAN
10. E-mail stands for?

A. Electrical mail
B. Electronic messaging service
C. Electronic mail
D. All of these

6**.** What is the URL of a website?

A. It is the location of website on internet
B. It is used to create internet
C. It is location of peripheral on internet
D. None of these

7."@" in an email address is used to ___.

A. Separate username from ISP
B. Create password for email
C. Add strength to email
D. None of these

8.Which of these are web browsers?

A. Google Chrome
B. Internet Explorer
C. Brave
D. **All of these**

Level	Semester	Course Code	Course Name	Credits	Teaching Hours	Exam Duration	Max Marks
4.5	I	109502/ 110502/ 112502/123502/ 134502	**Business Data Processing**	2	30	2 Hrs	30

Course Objectives:	1. Student should understand the Data in Business. 2. Student should process the data in Business. 3. Student should present the data in Business in various forms. 4.			
Course Outcomes:	On competition of the following syllabus the students will be able to - 1. Understand the concepts of Data Processing. 2. Student should process the data in Business. 3. Understand type of files required for Data Processing. 4. Interpret data in Business. 5. Able to present data in graphical forms.			
Unit System	**Contents**	**Workload Allotted**	**Weightage of Marks Allotted**	**Incorporation of Pedagogies**
Unit I	Online Processing, Batch Processing, Real-time Processing, Time-Sharing, Multiprogramming Systems, Multiprocessing Systems, Distributed Data Processing	8 Hrs	8 Marks	1. To help in understanding the various concepts and used different examples in day to day life. 2. Chalk and Board method. 3. Power point presentation with animation. 4. Use of online software to explain the coding and debugging. 5. Use of spreadsheet.
Unit II	Master File, Transaction File, Intermediate files, Back up files, etc	7 Hrs	7 Marks	
Unit III	Word processing: application of word processing, menus and tool bars, word processor: creating, entering, saving and printing the document, editing and formatting text, mail merge and macros	8 Hrs	8 Marks	
Unit IV	Spreadsheet: application, menus and tool bar, preparing tables, charts, sorting, etc., running statistical applications in Excel and Libra Office Calc, creating formulae in spreadsheets.	7 Hrs	7 Marks	
References:	**Text books:** 1. V. K. Kapoor, Introduction to Computer Data Processing & System Analysis, Sultan Chand & Sons. 2. Joyce Cox & Joan Lambert, Microsoft Access 2010 Step by Step, Microsoft Press. **Reference Books:** 1. Foster Provost & Tom Fawcett, Data Science for Business; O'Reilly Media Publishing House 2. Bhadka Harsad and Sharma Priyanka, Business Data Processing, LAP Lambert Academic Publishers. 3. S.S. Shrivastava, MS Office, Laxmi Publications. **Weblink to Equivalent MOOC on SWAYAM if relevant:** **Weblink to Equivalent Virtual Lab if relevant:-Nil** Any pertinent media (recorded lectures, YouTube, etc.) if relevant:			

	• https://www.youtube.com/watch?v=uvVsyCR4-7c • https://www.youtube.com/watch?v=b3GjKrArLkw
Model Questions:	**Short Type (At least 8):** 1. What do mean by data? 2. What is Master file? 3. What is transaction file? **Long Type (At least 4)** 1. Describe the data processing . 2. Describe various types of data processing. **MCQs:** 1. In computer terminology, information means (A) Alphanumeric data (B) Program (C) Data in more useful or intelligible form (D) Raw data Answer : C

Level	Semester	Course Code	Course Name	Credits	Teaching Hours	Exam Duration	Max Marks
4.5	I	109602/ 110602/ 112602/ 123602/ 134602	**Laboratory on Information Communication Technology Tools**	2	60	4 Hrs	50

Course Objectives:	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:	On competition of the following syllabus the students will be able to - 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**
List of Practical: 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 bulleted list using Google Docs. 11. Create a numbered list, Change the line and paragraph spacing, Change the text alignment and change the			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

	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.			
References:	**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://www.youtube.com/user/youtube https://www.google.com/sheets/about/ https://support.google.com/docs/answer/6000292?hl=en&co=GENIE.Platform%3DAndroid https://support.google.com/a/users/answer/9303071?hl=en#create_form https://support.google.com/a/users/answer/9310491?hl=en#sites_create_name https://support.google.com/drive/answer/2424384?hl=en&co=GENIE.Platform%3DAndroid