

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

FIRST YEAR: SEMESTER – I

Mode of Teaching	Vertical No.	The Vertical	Type of Course	Course Code	Course Name	Credits	Workload (Hrs/Week)	Vertical Workload (Hrs/Week)
Classroom Teaching/ Lab Work (Practical)/ Outdoor / Field	a.	Major/Minor: Computer Science	Theory1	112200	Fundamentals of Computer	2	2	6
			Lab/Practical-1	112201	Laboratory on Office Automation Tools	2	4	
	b.	Major/Minor:	-	-	-	4	6	6
	c.	Generic/ Open Elective	Theory1	112500	Information Communication Technology	2	2	4
			Theory2	112501	Business Data Processing	2	2	
	d.	VSC	-	-	-	-	-	4
		SEC	Lab/Practical-3	112600	Laboratory on Information Communication Technology Tools	2	4	
	e.	AEC - English	Theory			1	1	6
		AEC –MIL	Theory			1	1	
		IKS-Generic	Theory			2	2	
		VEC	Theory			2	2	
	f.	CC	Outdoor			2	4	4
		TOTAL				22	30	30

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FIRST YEAR: SEMESTER – II

Mode of Teaching	Ver. No	The Vertical	Type of Course	Course Code	Course Name	Credits	Workload (Hrs/Week)	Vertical Workload (Hrs/Week)
Classroom Teaching/ Lab Work (Practical)/ Outdoor / Field	a.	Major: Computer Science	Theory2	112202	Programming with C	2	2	6
			Lab/Practical-4	112203	Laboratory on Programming with C	2	4	
	b.	Minor: Computer Science	-	-	-	4	6	6
	c.	Generic/ Open Elective	Theory3	112502	E Business	2	2	4
			Theory4	112503	Website Design Principles	2	2	
	d.	VSC	Lab/Practical-6	112601	Laboratory on E-Commerce	2	4	8
		SEC	Lab/Practical-7	112602	Laboratory on Web Publishing	2	4	
	e.	AEC - English	Theory			1	1	4
		AEC –MIL	Theory			1	1	
		VEC	Theory			2	2	
	f.	CC	Outdoor			2	4	4
		TOTAL				22	32	32

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SECONOD YEAR: SEMESTER – III

Mode of Teaching	Ver. No	The Vertical	Type of Course	Course Code	Course Name	Credits	Workload (Hrs/Week)	Vertical Workload (Hrs/Week)
Classroom Teaching/ Lab Work (Practical)/ Outdoor / Field	a.	Major: Computer Science	Theory3	112204	Data Structure	2	2	10
			Theory4	112205	Relational Database Management System	2	2	
			Lab/Practical-8	112206	DS and RDBMS Laboratory	2	4	
			IKS - SS	Theory	112700	IKS in Computational Sciences	2	2
	b.	Minor: Computer Science	Theory3	112400	E-Commerce	2	2	6
			Lab/Practical-9	112401	Laboratory on E-Commerce	2	4	
	c.	Generic/ Open Elective	Theory5	112504	E Content Development	2	2	2
	d.	VSC	Lab/Practical-10	112603	Laboratory on MySQL	2	4	4
	e.	AEC - English	Theory			1	1	2
		AEC –MIL	Theory			1	1	
	f.	FP/CES	Project	112710	Project	2	4	8
		CC	Outdoor			2	4	
		TOTAL				22	32	32

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SECOND YEAR: SEMESTER – IV

Mode of Teaching	Vertical No	The Vertical	Type of Course	Course Code	Course Name	Credits	Workload (Hrs/Week)	Vertical Workload (Hrs/Week)
Classroom Teaching/ Lab Work (Practical)/ Outdoor / Field	a.	Major: Computer Science	Theory5	112207	OOP with C++	2	2	8
			Theory6	112208	Computer Networks	2	2	
			Lab/Practical-11	112209	Laboratory on OOP with C++	2	4	
	b.	Minor: Computer Science	Theory4	112402	Open-Source Software	2	2	4
			Lab/Practical-12	112403	Open-Source Software Laboratory	2	2	
	c.	Generic/ Open Elective	Theory6	112505	Web Technologies	2	2	2
	d.	VSC	Lab/Practical-13	112604	Windows Programming Laboratory	2	4	8
		SEC	Lab/Practical-14	112605	Laboratory on VB.Net	2	4	
	e.	AEC - English	Theory			1	1	2
		AEC –MIL	Theory			1	1	
	f.	FP/CES	Project	112711	Project	2	4	8
		CC	Outdoor			2	4	
		TOTAL				22	32	32

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THIRD YEAR: SEMESTER – V

Mode of Teaching	Vertical. No	The Vertical	Type of Course	Course Code	Course Name	Credits	Workload (Hrs/Week)	Vertical Workload (Hrs/Week)
Classroom Teaching/ Lab Work (Practical)/ Outdoor / Field	a.	Major: Computer Science	Theory7	112210	Core Java Programming	2	2	20
			Theory8	112211	Software Engineering	2	2	
			Theory9	112212	Python Programming	2	2	
			Lab/Practical-15	112213	Laboratory on Core Java Programming	2	4	
			Lab/Practical-16	112214	Laboratory on Python Programming	2	4	
		Major: Computer Science (Elective)	Theory1	112300	Data Mining	2	2	
			Theory1	112301	Data Science			
			Lab/Practical-17	112302	Laboratory on Data Mining Tools	2	4	
	b.	Minor: Computer Science	Theory5	112404	Multimedia Content Development	2	2	6
			Lab/Practical-18	112405	Laboratory on Multimedia Content Development	2	4	
	c.	Generic/ Open Elective	-		-	-	-	-
	d.	VSC	Lab/Practical-19	112606	Laboratory on PHP Programming	2	4	4
		SEC	-	-	-	-	-	
	e.	VEC	-	-	-	-	-	0
	f.	FP/CES	Project	112712	-	2	4	4
		CC	-	-	-	-	-	-
		TOTAL				22	34	34

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THIRD YEAR: SEMESTER – VI

Mode of Teaching	Vertical. No	The Vertical	Type of Course	Course Code	Course Name	Credits	Workload (Hrs/Week)	Vertical Workload (Hrs/Week)	
Classroom Teaching/ Lab Work (Practical)/ Outdoor / Field	a.	Major: Computer Science	Theory10	112215	Advance Java Programming	2	2	18	
			Theory11	112216	Computer Animation	2	2		
			Lab/Practical-20	112217	Laboratory on Advance Java Programming	2	4		
			Lab/Practical-21	112218	Laboratory on Computer Animation	2	4		
		Major: Computer Science (Elective)	Theory2	112304	Artificial Intelligence	2	2		
			Theory2	112305	Machine Learning	2	4		
			Lab/Practical-22	112306	Laboratory on Artificial Intelligence				
			Lab/Practical-22	112307	Laboratory on Machine Learning				
	b.	Minor: Computer Science	Theory6	112406	.Net Programming using C#	2	2	6	
			Lab/Practical-23	112407	Laboratory on .Net Programming using C#	2	4		
	c.	Generic/ Open Elective	-		-	-	-	0	
	d.	VSE	Lab/Practical-24	112607	Laboratory on R Programming	2	4	4	
	e.	VEC							
	f.	Internship / Apprenticeship	OJT	112713		4	8	8	
			FP/CES	Project	112714	Project	-		-
			-		-	-	-		-
		TOTAL				22	36	36	

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FACULTY: SCIENCE AND TECHNOLOGY
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(Four Years- Eight Semesters Bachelor's Degree Programme (Honors)

FOURTH YEAR: SEMESTER –VII

Mode of Teaching	Vertical Number	The Vertical	Type of Course	Course Code	Course Name	Credits	Workload (Hrs/Week)	Vertical Workload (Hrs/Week)
Classroom Teaching/ Lab Work (Practical)/ Outdoor / Field	a.	Major: Computer Science	Theory12	112219	Android Application Development	2	2	22
			Theory13	112220	Cloud Computing Essentials	2	2	
			Theory14	112221	Cyber Security	2	2	
			Theory15	112222	Software Testing	2	2	
			Theory16	112223	Full Stack Development	2	2	
			Lab/Practical-25	112224	Laboratory on Android Application Development	2	4	
			Lab/Practical-26	112225	Laboratory on Full Stack Development	2	4	
		Elective	Theory5	112308	Computer System Organization	2	2	
			Theory5	112309	Compiler Construction			
			Theory6	112310	Design and Analysis of Algorithms	2	2	
			Theory6	112311	Advance Database Management System			
		Research Methodology(RM)	Theory1	112715	Research Methodology	2	2	6
			Lab/Practical-27	112716	Laboratory on Research Methodology	2	4	
		TOTAL				22	28	28

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FOURTH YEAR: SEMESTER –VIII

Mode of Teaching	Vertical Number	The Vertical	Type of Course	Course Code	Course Name	Credits	Workload (Hrs/Week)	Vertical Workload (Hrs/Week)
Classroom Teaching/ Lab Work (Practical)/ Outdoor / Field	a.	Major: Computer Science	Theory17	112226	Operating System Algorithms	2	2	22
			Theory18	112227	Network Security	2	2	
			Theory19	112228	Mobile Computing	2	2	
			Theory20	112229	Big Data Analysis	2	2	
			Theory21	112230	Natural Language Processing	2	2	
			Lab/Practical-28	112231	Laboratory on Operating System Algorithms	2	4	
			Lab/Practical-29	112232	Laboratory on Mobile Computing	2	4	
		Elective	Theory7	112312	Theory of Computation	2	2	
			Theory7	112313	Computer Graphics			
			Theory8	112314	Distributed Systems	2	2	
			Theory8	112315	Blockchain Technology			
		OJT	Lab/Practical-30	112717	-	6	12	12
		TOTAL				22	34	34

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

FOURTH YEAR: SEMESTER –VII

Mode of Teaching	Vertical Number	The Vertical	Type of Course	Course Code	Course Name	Credits	Workload (Hrs/Week)	Vertical Workload (Hrs/Week)
Classroom Teaching/ Lab Work (Practical)/ Outdoor / Field	a.	Major: Computer Science	Theory12	112219	Android Application Development	2	2	22
			Theory13	112220	Cloud Computing Essentials	2	2	
			Theory14	112221	Cyber Security	2	2	
			Theory15	112222	Software Testing	2	2	
			Theory16	112223	Full Stack Development	2	2	
			Lab/Practical-25	112224	Laboratory on Android Application Development	2	4	
			Lab/Practical-26	112225	Laboratory on Full Stack Development	2	4	
		Elective	Theory5	112308	Computer System Organization	2	2	8
			Theory5	112309	Compiler Construction			
			Theory6	112310	Design and Analysis of Algorithms	2	2	
			Theory6	112311	Advance Database Management System			
		Research Project(RP)	Project	112718	Project	4	8	
		TOTAL				22	30	30

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FOURTH YEAR: SEMESTER –VIII

Mode of Teaching	Vertical Number	The Vertical	Type of Course	Course Code	Course Name	Credits	Workload (Hrs/Week)	Vertical Workload (Hrs/Week)
Classroom Teaching/ Lab Work (Practical)/ Outdoor / Field	a.	Major: Computer Science	Theory17	112226	Operating System Algorithms	2	2	22
			Theory18	112227	Network Security	2	2	
			Theory19	112228	Mobile Computing	2	2	
			Theory20	112229	Big Data Analysis	2	2	
			Theory21	112230	Natural Language Processing	2	2	
			Lab/Practical-28	112231	Laboratory on Operating System Algorithms	2	4	
			Lab/Practical-29	112232	Laboratory on Mobile Computing	2	4	
		Elective	Theory7	112312	Theory of Computation	2	2	
			Theory7	112313	Computer Graphics			
			Theory8	112314	Distributed Systems	2	2	
			Theory8	112315	Blockchain Technology			
		Research Project(RP)	Project	112719	Project	6	12	12
		TOTAL				22	34	34

Notes:

- # Here mention the title of Degree. For example - Degree of Bachelor of Science with the Major: Computer Science Discipline / Subject Computer Science as Degree of Bachelor of Science (Computer Science)
- The strength of the batch of the Practical for UG Classes shall be 16 with an addition of 10% with the permission of Hon'ble Vice Chancellor. However, for Music Discipline the batch size shall be of 7 students. The number of the students required to constitute a batch or calculate the workload shall be in accordance with the relevant Government Resolution in force at the time, applicable to specific time, region, course type, mode of instruction, and other pertinent factors.
- 1 Credit shall mean 1 Hour Teaching per Week per Semester (Total 15 Hrs/ Semester), the duration of 1 Teaching Period will be 60 Minutes. For Practical 1 Credit shall mean 2 Hour Teaching per Week per Semester (Total 30 Hrs/ Semester).
- For Examination and Evaluation of Theory Courses, 40 % Marks shall be assigned to Internal Examination and 60% Marks shall be assigned to end-semester external university examination.
- Co-curricular Courses:** Health and wellness, Yoga Education, Sports and Fitness, Cultural Activities, NSS/NCC, Fine/Applied/Visual/Performing Arts During Semester I, II, III, IV,

V and VI. These courses may be taught by Physical Education Director or may be assigned to Language Teacher by the Principal of HEI based on the expertise of the concerned.

- f. Value Education Courses to be selected from the Basket of Courses provided by the University. These courses may be assigned to the Language Teacher by the Principal of HEI based on the expertise of the concerned.
- g. **Generic / Open Elective Courses (GE/OE):** Courses to be selected from the Basket of Courses provided by the University
- h. **Abbreviations:** Department Specific Core: DSC, Department Specific Elective: DSE, FSC: Faculty Specific Core, FSE: Faculty Specific Elective, Indian Knowledge System: IKS, Inter Faculty Specific Core: IFSC, Inter Faculty Specific Elective: IFSE, Theory : Th, Practical/Practicum: Pr, Environment Studies: ES, Pre-requisite Course mandatory if applicable: Prq, Laboratory: Lab (Practical), Generic/ Open Electives: OE; Vocational Skill and Skill Enhancement Courses: VSEC; Vocational Skill Courses: VSC; Skill Enhancement Courses: SEC; Ability Enhancement Courses: AEC; Value Education Courses: VEC; OJT: On Job Training; Internship/ Apprenticeship; Field projects: FP; Community Engagement and Service: CES; Co-curricular Courses: CC; RM: Research Methodology; Research Project: RP; MIL: Modern Indian Language

Curriculum Design:

Each theory paper of Major: Computer Science shall be of 2 Credits comprising of 4 Units with Teaching Hours as mentioned in the table. The pattern of theory papers shall be as per following template –

Level	Semester	Course Code	Course Name	Credits	Teaching Hours	Exam Duration	Max Marks
4.5	I	101200	Diversity of Lower Plant	2	30	2 Hrs	30

The Curriculum of any Course shall be designed as per following template:

Course Objectives:				
Course Outcomes:	As per Blooms Taxonomy (4 to 6)			
Unit System	Contents	Workload Allotted	Weightage of Marks Allotted	Incorporation of Pedagogies
Unit I	Detailed pointwise contents with at least four points	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	Detailed pointwise contents with at least four points	7 Hrs	7 Marks	
Unit III	Detailed pointwise contents with at least four points	8 Hrs	8 Marks	
Unit IV	Detailed pointwise contents with at least four points	7 Hrs	7 Marks	
References:	Study Materials in the form of - Reference Books, Text Books, Research Articles, Digital Resources like Weblinks, E- Contents, Educational Software, Databases, etc.			
Model	Short Type (At least 8), Long Type (At least 4) and MCQs for Internal Assessment (At least 8) wherever applicable as the need of curriculum.			

Questions:	
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