

SANT GADGE BABA AMRAVATI UNIVERSITY, AMRAVATI



THREE YEAR UNDERGRADUATE PROGRAMME

B.Sc. Computer Science (112)/Information Technology (123)/Computer Application (Regular) (109)/ Computer Application (Vocational) (110)/Data Analytics (134)/Data Science and Analytics (135)/ Web Designing and Development (138)

Semester - I and II

FACULTY: SCIENCE AND TECHNOLOGY

(Courses effective from Academic Year 2026-27) Under NEP 2020

SYLLABUS

INDEX

Sr. No.	Item	Page Number
01	Member's List - Board of Studies in Computer Science (including Computer Application, Information Technology etc.)	3
02	Scheme- Examination, Evaluation and Assessment (University Draft)	4
03	Semester-I, Credits, Workload, Examination, Evaluation and Assessment Scheme	8
04	Semester-II, Credits, Workload, Examination, Evaluation and Assessment Scheme	15
05	Syllabus, B.Sc.- I, Semester – I	
06	Major/Minor Course: Fundamentals of Computer (109201/110201/112201/123201/134201/135201/138201)	23
07	Major/Minor Course: Laboratory on Office Automation Tools (109202/110202/112202/123202/134202/135202/138202)	26
08	GOEC Theory1: Information Communication Technology (109271/110271/112271/123271/134271/135271/138271)	28
09	GOEC Theory2: Business Data Processing (109272/110272/112272/123272/134272/135272/138272)	30
10	SEC: Laboratory on Information Communication Technology Tools (109281/ 110281/ 112281/123281/134281 / 135281/138281)	32
11	Syllabus, B.Sc.- I, Semester – II	
12	Major/Minor Course: Programming with C (109203/110203/112203/123203/134203/135203/138203)	37
13	Major/Minor Course: Laboratory on Programming with C (109204/110204/112203/123204/134204/135204/138204)	40
14	GOEC Theory3: E-Business (109273/110273/112273/123273/134273/135273/138273)	42
15	GOEC Theory4: Website Design Principles (109274/110274/112274/123274/134274/135274/138274)	44
16	VSC: Laboratory on E-Commerce (109282/110282/112282/123282/134282/135282/138282)	46
17	SEC: Laboratory on Web Publishing (109283/110283/112283/123283/134283/135283/138283)	48

Sant Gadge Baba Amravati University, Amravati
Faculty of Science and Technology (Science Group)
Board of Studies in Computer Science
(including Computer Application, Information Technology etc.)

Sr. No.	Name	Designation	Address
01	Dr. Swati Sherekar	Chairman	PGTD in Computer Science and Engineering, SGBAU, Amravati
02	Dr. Dineshkumar N. Satange	Member (Faculty Member)	Smt. Narsamma Arts, Commerce and Science College, Kiran Nagar, Amravati. 444606
03	Dr. Mohd. Atique Mohd. Junaid	Member	HoD, PGTD in Computer Science and Engineering, SGBAU, Amravati
04	Dr. Avinash Baburao Kadam	Member	Shri Shivaji Science and Arts College, Chikhali Dist. Buldana
05	Dr. Ajay Purushottam Chendke	Member	Degree College of Physical Education (HVPM), Amravati
06	Dr. Chandrashekhar H. Sawarkar	Member	Smt. Narsamma Arts, Commerce and Science College, Kiran Nagar, Amravati. 444606
07	Dr. Arvind A. Tayade	Member	G.S. Science Arts and Commerce College, Khamgaon Dist. Buldana
08	Prof. Sudeshkumar Chaudhari	Member	RDIK, Mahavidyalaya, Badnera Rly. Amravati.
09	Dr. Narendra M. Jathe	Member	Smt. Narsamma Arts, Commerce and Science College, Kiran Nagar, Amravati. 444606
10	Dr. Homraj Patelpaik	Member	Lokmanya Tilak Mahavidyalaya Wani, Dist. Yavatmal
11	Prof. Sureshkumar Mapari	Member	R. A. College, Washim.

Examination, Evaluation and Assessment

Notes:

- a. 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. 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.
- b. 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).
- c. 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.
- d. **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.
- e. **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.
- f. **Generic / Open Elective Courses (GE/OE):** Courses to be selected from the Basket of Courses provided by the University
- g. **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
- h.

Examination and Assessment Process:

- i. The basic principle of the Credit framework is that Credits are a function of the successful completion of a program of study/ vocational education/ training and assessment. No Credit can be earned by the student unless the student is assessed for the achievement of the desired competencies and outcome of a program.
- ii. Exit options are provided with Certificate, Diploma and Basic Bachelor's degrees to the students at the end of the second, fourth and sixth semesters of a Four Years Multidisciplinary Degree Programme. Students will receive a Bachelor's degree with Honors/ Research on successfully completing of all eight semesters of the UG Program either at a stretch or with opted exits and re-entries.
- iii. For the smooth success of four-year degree programme with multiple entry and exit systems, the examination mode should be based on the combination of innovative trends in formative (informal and formal tests administered during the learning process) and summative (evaluation of students learning at the end of an instructional unit) examination modes in line with the UGC Report on 'Evaluation Reforms in Higher Educational Institutions (2019).

Examination, Evaluation and Assessment Scheme

The total marks for each Course shall be based on Continuous Assessment and Semester End Examination.

Each theory course of Major, Minor, GE/OE, AEC, IKS, VEC as mentioned in **Teaching Learning Scheme** prepared by the Board of Studies shall be evaluated as per the scheme as mentioned in the following table -

Examination, Evaluation and Assessment Scheme

Vertical No.	The Vertical	Mode of Examination, Evaluation & Assessment	Theory				Theory (Total)		Practical				Practical (Total)	
			External		Internal				External		Internal		Max. Marks	Min. Marks
			Max. Marks	Min. Marks	Max. Marks	Min. Marks	Max. Marks	Min. Marks	Max. Marks	Min. Marks				
a	Major	External & Internal	30	9	20	6	50	20	25	10	25	10	50	20
b	Minor		30	9	20	6	50	20	25	10	25	10	50	20
c	Generic/ Open Elective		30	9	20	6	50	20	--	--	--	--	--	--
d	VSC	Internal	--	--	--	--	--	--	--	--	50	20	50	20
	SEC	Internal	--	--	--	--	--	--	--	--	50	20	50	20
e	AEC (Eng. & One MIL Composite)	External & Internal	30	9	20	6	50	20	--	--	--	--	--	--
	IKS (Generic)	External & Internal	30	9	20	6	50	20	--	--	--	--	--	--
	VEC	External & Internal	30	9	20	6	50	20	--	--	--	--	--	--
f	FP/CEP	Internal	--	--	--	--	--	--	--	--	50	20	50	20
	Internship/ Apprenticeship		Assessment of these verticals shall be based on various activities/practices. It shall be evaluated by giving maximum marks of 50 per 2 Credit Course with separate activity weightages/levels. A detailed SOP for this assessment process is prescribed for Phase I and Phase II											
	CC													

Continuous Assessment Tests (CAT)

For internal assessment, the Continuous Assessment Tests (CAT) shall be conducted as under-

- i. Three CAT each of 8 / 10 Marks (Theory) as applicable and 10 Marks (Practical).
 - First on completion of 25% Syllabus of the course or on completion of 25 teaching days,
 - Second on completion of 50% Syllabus of the course or on completion of 50 teaching days,
 - Third on completion of 75% Syllabus of the course or on completion of 75 teaching days.
- ii. Each concurrent assessment (CAT-I, II & III) will be mapped to relevant Course Learning Outcome.
- iii. Total Performance in CAT (i.e. 40 %) shall be based on the best two out of three in CAT examinations
- iv. Internal assessment shall be carried out by the respective course teacher by choosing variety of assessment tools/methods such as class test, record book, seminar, case study, field work, mini project work, quiz or any innovative method, which may be deemed to be appropriate for assessing the relevant course outcome.

Conduction of the Examination:

As per the scheme of teaching, learning, examination and evaluation, theory/practical examinations of Semester-I, II, III, IV, V, VI, VII and VIII shall be conducted by the University (except for Internal Examinations as applicable) at the end of each semester.

The theory/practical examinations of all the Semesters shall be held as per the following Schedule –

Sr. No.	Name of the Examination	End Sem Examination	Supplementary Examination*
1	Semester-I, III, V and VII	Winter	Summer
2	Semester-II, IV, VI and VIII	Summer	Winter

* The University may evolve mechanism for conducting repeat end semester examination. Such repeat examinations shall have to be conducted within one month of the regular even semester examination and on demand examination.

1. The practical examination of all semesters shall be conducted by the University at the end of each semester. The HEI shall conduct the Practical examination of odd semesters as per the schedule announced by the University. However, the appointment of the External and Internal Examiners shall be done by the Head or Principal of respective HEI to conduct external examination of the odd semester and the same should be communicated to the University before commencement of the practical examination. The University shall conduct the external practical examination of all even semester by appointing external and internal examiners.
2. The examinations specified above shall be held twice in a year at such places and on such dates as may be prescribed by the University.
3. An applicant to an examination specified above, shall pursue a regular course of study in courses prescribed for the examination concerned for not less than one semester in a particular semester in a College/Institute/University department.
4. Provided that the student shall be eligible to appear for examination if -
 - a. He/she complies with the provisions of the Ordinance pertaining to the Examination in general from time to time.
 - b. He/she has prosecuted a regular course of study in a university department/college affiliated to the University.
 - c. He/she has in the opinion of the Principal shown satisfactory progress in his/her studies.
5. The provisions of Ordinance No. 6 and Ordinance No. 9 shall be mutatis-mutandis applicable to every collegiate/non-collegiate student.
6. The fees for each theory examination and practical examination conducted by the university shall be as prescribed by the University, from time to time.

SEMESTER – I

Computer Application (General) (109) Credits, Workload, Examination, Evaluation and Assessment Scheme

The Vertical	Course Code	Course Title	Credits	Workload	Theory/Practical				Theory/Pract	
					External		Internal		(Total)	
					Max. Marks	Min. Marks	Max. Marks	Min. Marks	Max. Marks	Min. Marks
Major-T1	109201	Fundamentals of Computer	2	2	30	9	20	6	50	20
Major-P1	109202	Laboratory on Office Automation Tools	2	4	25	10	25	10	50	20
Minor-T	--	--	2	2	30	9	20	6	50	20
Minor-P	--	--	2	4	25	10	25	10	50	20
GOEC-T1	109271	Information Communication Technology	2	2	30	9	20	6	50	20
GOEC-T2	109272	Business Data Processing	2	2	30	9	20	6	50	20
SEC-P3	109281	Laboratory on Information Communication Technology Tools	2	4	-	-	50	20	50	20
AEC-English	--	--	1	1	15	-	-	-	-	-
AEC-MIL	--	--	1	1	15	-	-	-	-	-
IKS-Generic	--	--	2	2	30	9	20	6	50	20
VEC	--	--	2	2	30	9	20	6	50	20
CC	--	Separate SOP will be released	2	4	-	-	50	20	50	20
Total:			22	30						

Computer Application (Vocational) (110) Credits, Workload, Examination, Evaluation and Assessment Scheme

The Vertical	Course Code	Course Title	Credits	Workload	Theory/Practical				Theory/Practical (Total)	
					External		Internal		Max. Marks	Min. Marks
					Max. Marks	Min. Marks	Max. Marks	Min. Marks		
Major-T1	110201	Fundamentals of Computer	2	2	30	9	20	6	50	20
Major-P1	110202	Laboratory on Office Automation Tools	2	4	25	10	25	10	50	20
Minor-T	--	--	2	2	30	9	20	6	50	20
Minor-P	--	--	2	4	25	10	25	10	50	20
GOEC-T1	110271	Information Communication Technology	2	2	30	9	20	6	50	20
GOEC-T2	110272	Business Data Processing	2	2	30	9	20	6	50	20
SEC-P3	110281	Laboratory on Information Communication Technology Tools	2	4	-	-	50	20	50	20
AEC-English	--	--	1	1	15	-	-	-	-	-
AEC-MIL	--	--	1	1	15	-	-	-	-	-
IKS-Generic	--	--	2	2	30	9	20	6	50	20
VEC	--	--	2	2	30	9	20	6	50	20
CC	--	Separate SOP will be released	2	4	-	-	50	20	50	20
Total:			22	30						

Computer Science (112) Credits, Workload, Examination, Evaluation and Assessment Scheme

The Vertical	Course Code	Course Title	Credits	Workload	Theory/Practical				Theory/Practical (Total)	
					External		Internal		Max. Marks	Min. Marks
					Max. Marks	Min. Marks	Max. Marks	Min. Marks		
Major-T1	112201	Fundamentals of Computer	2	2	30	9	20	6	50	20
Major-P1	112202	Laboratory on Office Automation Tools	2	4	25	10	25	10	50	20
Minor-T	--	--	2	2	30	9	20	6	50	20
Minor-P	--	--	2	4	25	10	25	10	50	20
GOEC-T1	112271	Information Communication Technology	2	2	30	9	20	6	50	20
GOEC-T2	112272	Business Data Processing	2	2	30	9	20	6	50	20
SEC-P3	110281	Laboratory on Information Communication Technology Tools	2	4	-	-	50	20	50	20
AEC-English	--	--	1	1	15	-	-	-	-	-
AEC-MIL	--	--	1	1	15	-	-	-	-	-
IKS-Generic	--	--	2	2	30	9	20	6	50	20
VEC	--	--	2	2	30	9	20	6	50	20
CC	--	Separate SOP will be released	2	4	-	-	50	20	50	20
Total:			22	30						

Information Technology (123) Credits, Workload, Examination, Evaluation and Assessment Scheme

The Vertical	Course Code	Course Title	Credits	Workload	Theory/Practical				Theory/Practical (Total)	
					External		Internal		Max. Marks	Min. Marks
					Max. Marks	Min. Marks	Max. Marks	Min. Marks		
Major-T1	123201	Fundamentals of Computer	2	2	30	9	20	6	50	20
Major-P1	123202	Laboratory on Office Automation Tools	2	4	25	10	25	10	50	20
Minor-T	--	--	2	2	30	9	20	6	50	20
Minor-P	--	--	2	4	25	10	25	10	50	20
GOEC-T1	123271	Information Communication Technology	2	2	30	9	20	6	50	20
GOEC-T2	123272	Business Data Processing	2	2	30	9	20	6	50	20
SEC-P3	123281	Laboratory on Information Communication Technology Tools	2	4	-	-	50	20	50	20
AEC-English	--	--	1	1	15	-	-	-	-	-
AEC-MIL	--	--	1	1	15	-	-	-	-	-
IKS-Generic	--	--	2	2	30	9	20	6	50	20
VEC	--	--	2	2	30	9	20	6	50	20
CC	--	Separate SOP will be released	2	4	-	-	50	20	50	20
Total:			22	30						

Data Analytics (134) Credits, Workload, Examination, Evaluation and Assessment Scheme

The Vertical	Course Code	Course Title	Credits	Workload	Theory/Practical				Theory/Practical (Total)	
					External		Internal		Max. Marks	Min. Marks
					Max. Marks	Min. Marks	Max. Marks	Min. Marks		
Major-T1	134201	Fundamentals of Computer	2	2	30	9	20	6	50	20
Major-P1	134202	Laboratory on Office Automation Tools	2	4	25	10	25	10	50	20
Minor-T	--	--	2	2	30	9	20	6	50	20
Minor-P	--	--	2	4	25	10	25	10	50	20
GOEC-T1	134271	Information Communication Technology	2	2	30	9	20	6	50	20
GOEC-T2	134272	Business Data Processing	2	2	30	9	20	6	50	20
SEC-P3	134281	Laboratory on Information Communication Technology Tools	2	4	-	-	50	20	50	20
AEC-English	--	--	1	1	15	-	-	-	-	-
AEC-MIL	--	--	1	1	15	-	-	-	-	-
IKS-Generic	--	--	2	2	30	9	20	6	50	20
VEC	--	--	2	2	30	9	20	6	50	20
CC	--	Separate SOP will be released	2	4	-	-	50	20	50	20
Total:			22	30						

Data Science and Analytics (135) Credits, Workload, Examination, Evaluation and Assessment Scheme

The Vertical	Course Code	Course Title	Credits	Workload	Theory/Practical				Theory/Practical (Total)	
					External		Internal		Max. Marks	Min. Marks
					Max. Marks	Min. Marks	Max. Marks	Min. Marks		
Major-T1	135201	Fundamentals of Computer	2	2	30	9	20	6	50	20
Major-P1	135202	Laboratory on Office Automation Tools	2	4	25	10	25	10	50	20
Minor-T	--	--	2	2	30	9	20	6	50	20
Minor-P	--	--	2	4	25	10	25	10	50	20
GOEC-T1	135271	Information Communication Technology	2	2	30	9	20	6	50	20
GOEC-T2	135272	Business Data Processing	2	2	30	9	20	6	50	20
SEC-P3	135281	Laboratory on Information Communication Technology Tools	2	4	-	-	50	20	50	20
AEC-English	--	--	1	1	15	-	-	-	-	-
AEC-MIL	--	--	1	1	15	-	-	-	-	-
IKS-Generic	--	--	2	2	30	9	20	6	50	20
VEC	--	--	2	2	30	9	20	6	50	20
CC	--	Separate SOP will be released	2	4	-	-	50	20	50	20
Total:			22	30						

Web Designing and Development (138) Credits, Workload, Examination, Evaluation and Assessment Scheme

The Vertical	Course Code	Course Title	Credits	Workload	Theory/Practical				Theory/Practical (Total)	
					External		Internal		Max. Marks	Min. Marks
					Max. Marks	Min. Marks	Max. Marks	Min. Marks		
Major-T1	138201	Fundamentals of Computer	2	2	30	9	20	6	50	20
Major-P1	138202	Laboratory on Office Automation Tools	2	4	25	10	25	10	50	20
Minor-T	--	--	2	2	30	9	20	6	50	20
Minor-P	--	--	2	4	25	10	25	10	50	20
GOEC-T1	138271	Information Communication Technology	2	2	30	9	20	6	50	20
GOEC-T2	138272	Business Data Processing	2	2	30	9	20	6	50	20
SEC-P3	138281	Laboratory on Information Communication Technology Tools	2	4	-	-	50	20	50	20
AEC-English	--	--	1	1	15	-	-	-	-	-
AEC-MIL	--	--	1	1	15	-	-	-	-	-
IKS-Generic	--	--	2	2	30	9	20	6	50	20
VEC	--	--	2	2	30	9	20	6	50	20
CC	--	Separate SOP will be released	2	4	-	-	50	20	50	20
Total:			22	30						

SEMESTER – II

Computer Application (General) (109) Credits, Workload, Examination, Evaluation and Assessment Scheme

The Vertical	Course Code	Course Title	Credits	Workload	Theory/Practical				Theory/Practical (Total)	
					External		Internal			
					Max. Marks	Min. Marks	Max. Marks	Min. Marks	Max. Marks	Min. Marks
Major-T2	109203	Programming with C	2	2	30	9	20	6	50	20
Major-P4	109204	Laboratory on Programming with C	2	4	25	10	25	10	50	20
Minor-T	--	--	2	2	30	9	20	6	50	20
Minor-P	--	--	2	4	25	10	25	10	50	20
GOEC-T3	109273	E Business	2	2	30	9	20	6	50	20
GOEC-T4	109274	Website Design Principles	2	2	30	9	20	6	50	20
VSC-P6	109282	Laboratory on E-Commerce	2	4	-	-	50	20	50	20
SEC-P7	109283	Laboratory on Web Publishing	2	4	-	-	50	20	50	20
AEC-English	--	--	1	1	15	-	-	-	-	-
AEC-MIL	--	--	1	1	15	-	-	-	-	-
VEC	--	--	2	2	30	9	20	6	50	20
CC	--	Separate SOP will be released	2	4	-	-	50	20	50	20
Total:			22	32						

Computer Application (Vocational) (110) Credits, Workload, Examination, Evaluation and Assessment Scheme

The Vertical	Course Code	Course Title	Credits	Workload	Theory/Practical				Theory/Practical (Total)	
					External		Internal		Max. Marks	Min. Marks
					Max. Marks	Min. Marks	Max. Marks	Min. Marks		
Major-T2	110203	Programming with C	2	2	30	9	20	6	50	20
Major-P4	110204	Laboratory on Programming with C	2	4	25	10	25	10	50	20
Minor-T	--	--	2	2	30	9	20	6	50	20
Minor-P	--	--	2	4	25	10	25	10	50	20
GOEC-T3	110273	E Business	2	2	30	9	20	6	50	20
GOEC-T4	110274	Website Design Principles	2	2	30	9	20	6	50	20
VSC-P6	110282	Laboratory on E-Commerce	2	4	-	-	50	20	50	20
SEC-P7	110283	Laboratory on Web Publishing	2	4	-	-	50	20	50	20
AEC-English	--	--	1	1	15	-	-	-	-	-
AEC-MIL	--	--	1	1	15	-	-	-	-	-
VEC	--	--	2	2	30	9	20	6	50	20
CC	--	Separate SOP will be released	2	4	-	-	50	20	50	20
Total:			22	32						

Computer Science (112) Credits, Workload, Examination, Evaluation and Assessment Scheme

The Vertical	Course Code	Course Title	Credits	Workload	Theory/Practical				Theory/Practical (Total)	
					External		Internal		Max. Marks	Min. Marks
					Max. Marks	Min. Marks	Max. Marks	Min. Marks		
Major-T2	112203	Programming with C	2	2	30	9	20	6	50	20
Major-P4	112204	Laboratory on Programming with C	2	4	25	10	25	10	50	20
Minor-T	--	--	2	2	30	9	20	6	50	20
Minor-P	--	--	2	4	25	10	25	10	50	20
GOEC-T3	112273	E Business	2	2	30	9	20	6	50	20
GOEC-T4	112274	Website Design Principles	2	2	30	9	20	6	50	20
VSC-P6	112282	Laboratory on E-Commerce	2	4	-	-	50	20	50	20
SEC-P7	112283	Laboratory on Web Publishing	2	4	-	-	50	20	50	20
AEC-English	--	--	1	1	15	-	-	-	-	-
AEC-MIL	--	--	1	1	15	-	-	-	-	-
VEC	--	--	2	2	30	9	20	6	50	20
CC	--	Separate SOP will be released	2	4	-	-	50	20	50	20
Total:			22	32						

Information Technology (123) Credits, Workload, Examination, Evaluation and Assessment Scheme

The Vertical	Course Code	Course Title	Credits	Workload	Theory/Practical				Theory/Practical (Total)	
					External		Internal		Max. Marks	Min. Marks
					Max. Marks	Min. Marks	Max. Marks	Min. Marks		
Major-T2	123203	Programming with C	2	2	30	9	20	6	50	20
Major-P4	123204	Laboratory on Programming with C	2	4	25	10	25	10	50	20
Minor-T	--	--	2	2	30	9	20	6	50	20
Minor-P	--	--	2	4	25	10	25	10	50	20
GOEC-T3	123273	E Business	2	2	30	9	20	6	50	20
GOEC-T4	123274	Website Design Principles	2	2	30	9	20	6	50	20
VSC-P6	123282	Laboratory on E-Commerce	2	4	-	-	50	20	50	20
SEC-P7	123283	Laboratory on Web Publishing	2	4	-	-	50	20	50	20
AEC-English	--	--	1	1	15	-	-	-	-	-
AEC-MIL	--	--	1	1	15	-	-	-	-	-
VEC	--	--	2	2	30	9	20	6	50	20
CC	--	Separate SOP will be released	2	4	-	-	50	20	50	20
Total:			22	32						

Data Analytics (134) Credits, Workload, Examination, Evaluation and Assessment Scheme

The Vertical	Course Code	Course Title	Credits	Workload	Theory/Practical				Theory/Practical (Total)	
					External		Internal		Max. Marks	Min. Marks
					Max. Marks	Min. Marks	Max. Marks	Min. Marks		
Major-T2	134203	Programming with C	2	2	30	9	20	6	50	20
Major-P4	134204	Laboratory on Programming with C	2	4	25	10	25	10	50	20
Minor-T	--	--	2	2	30	9	20	6	50	20
Minor-P	--	--	2	4	25	10	25	10	50	20
GOEC-T3	134273	E Business	2	2	30	9	20	6	50	20
GOEC-T4	134274	Website Design Principles	2	2	30	9	20	6	50	20
VSC-P6	134282	Laboratory on E-Commerce	2	4	-	-	50	20	50	20
SEC-P7	134283	Laboratory on Web Publishing	2	4	-	-	50	20	50	20
AEC-English	--	--	1	1	15	-	-	-	-	-
AEC-MIL	--	--	1	1	15	-	-	-	-	-
VEC	--	--	2	2	30	9	20	6	50	20
CC	--	Separate SOP will be released	2	4	-	-	50	20	50	20
Total:			22	32						

Data Science and Analytics (135) Credits, Workload, Examination, Evaluation and Assessment Scheme

The Vertical	Course Code	Course Title	Credits	Workload	Theory/Practical				Theory/Practical (Total)	
					External		Internal		Max. Marks	Min. Marks
					Max. Marks	Min. Marks	Max. Marks	Min. Marks		
Major-T2	135203	Programming with C	2	2	30	9	20	6	50	20
Major-P4	135204	Laboratory on Programming with C	2	4	25	10	25	10	50	20
Minor-T	--	--	2	2	30	9	20	6	50	20
Minor-P	--	--	2	4	25	10	25	10	50	20
GOEC-T3	135273	E Business	2	2	30	9	20	6	50	20
GOEC-T4	135274	Website Design Principles	2	2	30	9	20	6	50	20
VSC-P6	135282	Laboratory on E-Commerce	2	4	-	-	50	20	50	20
SEC-P7	135283	Laboratory on Web Publishing	2	4	-	-	50	20	50	20
AEC-English	--	--	1	1	15	-	-	-	-	-
AEC-MIL	--	--	1	1	15	-	-	-	-	-
VEC	--	--	2	2	30	9	20	6	50	20
CC	--	Separate SOP will be released	2	4	-	-	50	20	50	20
Total:			22	32						

Web Designing and Development (138) Credits, Workload, Examination, Evaluation and Assessment Scheme

The Vertical	Course Code	Course Title	Credits	Workload	Theory/Practical				Theory/Practical (Total)	
					External		Internal		Max. Marks	Min. Marks
					Max. Marks	Min. Marks	Max. Marks	Min. Marks		
Major-T2	138203	Programming with C	2	2	30	9	20	6	50	20
Major-P4	138204	Laboratory on Programming with C	2	4	25	10	25	10	50	20
Minor-T	--	--	2	2	30	9	20	6	50	20
Minor-P	--	--	2	4	25	10	25	10	50	20
GOEC-T3	138273	E Business	2	2	30	9	20	6	50	20
GOEC-T4	138274	Website Design Principles	2	2	30	9	20	6	50	20
VSC-P6	138282	Laboratory on E-Commerce	2	4	-	-	50	20	50	20
SEC-P7	138283	Laboratory on Web Publishing	2	4	-	-	50	20	50	20
AEC-English	--	--	1	1	15	-	-	-	-	-
AEC-MIL	--	--	1	1	15	-	-	-	-	-
VEC	--	--	2	2	30	9	20	6	50	20
CC	--	Separate SOP will be released	2	4	-	-	50	20	50	20
Total:			22	32						

SYLLABUS

B.Sc.- I, SEMESTER – I

Computer Science (112)

Information Technology (123)

Computer Application (Regular) (109)

Computer Application (Vocational) (110)

Data Analytics (134)

Data Science and Analytics (135)

Web Designing and Development (138)

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 (112)/Information Technology (123)/Computer Application (Regular) (109)/ Computer Application (Vocational) (110)/Data Analytics (134)/Data Science and Analytics (135)/ Web Designing and Development (138)

(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))

Major/Minor Course: Fundamentals of Computer

Level	Semester	Course Code	Course Name	Credits	Teaching Hours	Exam Duration	Max Marks
4.5	I	109201/ 110201/ 112201/123201/ 134201/135201/ 138201	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	Use any pedagogical technique suitable for the topic
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			

Assessment Rubric: Major/Minor- Internal for Theory Course

SANT GADGE BABA AMRAVATI UNIVERSITY, AMRAVATI THEORY EXAMINATION B.Sc. I, SEMESTER – I (NEP)			
Theory	Course Code: 109201/ 110201/ 112201/123201/ 134201/135201/ 138201	Course Title: Fundamentals of Computer	Max Marks: 20
Sr. No.	Assessment Criteria		Marks
1	Any Two of the Activity (weekly or monthly assignment/ Unit Test/Class Test) (CAT-1)		10
2	Any One of the Activity includes Open Book Test, MCQ Tests, / Theory related Class activity/Task etc.) etc. (CAT-2)		5
3	Participation in any one Activity includes Quiz, Seminar, Group Discussion, Industry visit, CaseStudy, Mini project, innovative work, etc. based on Theory Course. Involvement in subject related activities such as Conference, Workshop, Coding Competitions etc. (CAT-3)		5

Major/Minor Course: Laboratory on Office Automation Tools

Level	Semester	Course Code	Course Name	Credits	Teaching Hours	Exam Duration	Max Marks
4.5	I	109202/ 110202/ 112202/ 123202/ 134202/135202/ 138202	Laboratory on Office Automation Tools	2	60	4Hrs	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 completion 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.			Use any pedagogical technique suitable for the topic

	14. Create the Excel Spreadsheet for Preparing the Bar Chart on 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.			
--	--	--	--	--

Assessment Rubric: External Practical Course

SANT GADGE BABA AMRAVATI UNIVERSITY, AMRAVATI PRACTICAL EXAMINATION B.Sc. I, SEMESTER – I (NEP)				
Practical	Course Code: 109202/ 110202/ 112202/123202/ 134202/135202/ 138202	Laboratory on Office Automation Tools	Max Marks: 25	Time: 4 Hrs.
Sr. No.	Exercise			Marks
1.	Single Program Writing, Algorithm, Flowchart, Execution, with Sample inputs and Outputs, and Printout			10
2.	Submitted Record book (Preferably handwritten)			05
3.	External Viva Voce			10

Assessment Rubric: Internal Practical Course

SANT GADGE BABA AMRAVATI UNIVERSITY, AMRAVATI PRACTICAL EXAMINATION B.Sc. I, SEMESTER – I (NEP)			
Practical	Course Code: 109202/ 110202/ 112202/123202/ 134202/135202/ 138202	Laboratory on Office Automation Tools	Max Marks: 25
Sr. No.	Assessment Criteria		Marks
1.	Attendance/Regularity in practical's / Students' overall performance		05
2.	Record book Preparation (Preferably handwritten)		10
3.	Internal Viva Voce		10

GOEC Theory1: Information Communication Technology

Level	Semester	Course Code	Course Name	Credits	Teaching Hours	Exam Duration	Max Marks
4.5	I	109271/ 110271/ 112271/123271/ 134271/135271/ 138271	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	Use any pedagogical technique suitable for the topic	
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		

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)			

Assessment Rubric: Internal for GOEC-1- Information Communication Technology

SANT GADGE BABA AMRAVATI UNIVERSITY, AMRAVATI THEORY EXAMINATION B.Sc. I, SEMESTER – I (NEP)			
Theory	Course Code: 109271/ 110271/ 112271/123271/ 134271/135271/ 138271	Information Communication Technology	Max Marks: 20
Sr. No.	Assessment Criteria	Marks	
1	Any Two of the Activity (weekly or monthly assignment/ Unit Test/Class Test) (CAT-1)	10	
2	Any One of the Activity includes Open Book Test, MCQ Tests, / Theory related Class activity/Task etc.) etc. (CAT-2)	5	
3	Participation in any one Activity includes Quiz, Seminar, Group Discussion, Industry visit, CaseStudy, Mini project, innovative work, etc. based on Theory Course. Involvement in subject related activities such as Conference, Workshop, Coding Competitions etc. (CAT-3)	5	

GOEC Theory2: Business Data Processing

Level	Semester	Course Code	Course Name	Credits	Teaching Hours	Exam Duration	Max Marks
4.5	I	109272/ 110272/ 112272/123272/ 134272/135272/ 138272	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 completion 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	Use any pedagogical technique suitable for the topic
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 Libre 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
--	---

Assessment Rubric: Internal for GOEC-2- Information Communication Technology

SANT GADGE BABA AMRAVATI UNIVERSITY, AMRAVATI THEORY EXAMINATION B.Sc. I, SEMESTER – I (NEP)			
Theory	Course Code: 109272/ 110272/ 112272/123272/ 134272/135272/ 138272	Business Data Processing	Max Marks: 20
Sr. No.	Assessment Criteria	Marks	
1	Any Two of the Activity (weekly or monthly assignment/ Unit Test/Class Test) (CAT-1)	10	
2	Any One of the Activity includes Open Book Test, MCQ Tests, / Theory related Class activity/Task etc.) etc. (CAT-2)	5	
3	Participation in any one Activity includes Quiz, Seminar, Group Discussion, Industry visit, CaseStudy, Mini project, innovative work, etc. based on Theory Course. Involvement in subject related activities such as Conference, Workshop, Coding Competitions etc. (CAT-3)	5	

SEC: Laboratory on Information Communication Technology Tools

Level	Semester	Course Code	Course Name	Credits	Teaching Hours	Exam Duration	Max Marks
4.5	I	109281/ 110281/ 112281/123281/ 134281/135281/ 138281	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 completion 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.						Use any pedagogical technique suitable for the topic

	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 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
-------------	--

Assessment Rubric: Internal Examination Practical Course (SEC)

SANT GADGE BABA AMRAVATI UNIVERSITY, AMRAVATI PRACTICAL EXAMINATION B.Sc. I, SEMESTER – I (NEP)			
Practical	Course Code: 109281/ 110281/ 112281/123281/ 134281/135281/ 138281	Laboratory on Information Communication Technology Tools	Max Marks: 50
Sr. No.	Assessment Criteria		Marks
1.	Single Program Writing, Algorithm, Flowchart, Execution, with Sample inputs and Outputs, and Printout		20
2.	Record book preparation (Preferably handwritten) / Assignments preparation during semester		10
3.	Attendance in practical session / Students' overall performance		10
4.	Internal Viva Voce		10

SYLLABUS

B.Sc.- I, SEMESTER – II

Computer Science (112)

Information Technology (123)

Computer Application (Regular) (109)

Computer Application (Vocational) (110)

Data Analytics (134)

Data Science and Analytics (135)

Web Designing and Development (138)

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 (112)/Information Technology (123)/Computer Application (Regular) (109)/ Computer Application (Vocational) (110)/Data Analytics (134)/Data Science and Analytics (135)/ Web Designing and Development (138)

**(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)**

Major/Minor Course: Programming with C

Level	Semester	Course Code	Course Name	Credits	Teaching Hours	Exam Duration	Max Marks
4.5	II	109203/ 110203/ 112203/123203/ 134203/135203/ 138203	Programming with C	2	30	2 Hrs.	30

Course Objectives:	1.To provide students with understanding of code organization and functional hierarchical decomposition with using data types. 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.						
Course Outcomes:	On completion of the following syllabus the students will be able to - 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	Use any pedagogical technique suitable for the topic
Unit II	Formatted I/O: scanf(), printf(), Unformatted I/O : getch(), getchar(), gets(), putch(), putchar(), puts(). Control structures: Branching: if, if-else, Conditional operator(? :), nested if, switch. Looping: while, do-while, for statements, comma operator, goto, break, continue, nested loops	7 Hrs.	7 Marks	
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	
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	
References:	Text books: 1. Programming in C: E Balagurusamy: TMH Publication. Reference Books: 1) ANSI C- Dennis Ritchie 2) Programming in C - V. Rajaraman 3) Programming with C: Venugopal K.R. TMH, Publication. 4) Programming with C: Byson Gottfried , Schaum Series Publication. Weblink to Equivalent MOOC on SWAYAM if relevant: 1. https://onlinecourses.swayam2.ac.in/cec19_cs06/preview 2. https://onlinecourses.swayam2.ac.in/nou20_cs03/preview 3. https://www.classcentral.com/course/swayam-computer-fundamentals-13950 4. https://onlinecourses.nptel.ac.in/noc19_cs42/preview 5. https://onlinecourses.swayam2.ac.in/aic20_sp06/preview 6. https://onlinecourses.swayam2.ac.in/cec20_cs02/preview 7. https://www.classcentral.com/course/swayam-introduction-to-programming-in-c-2486 8. https://swayamprabha.gov.in/asset/new_team/images/course_files/R12-Introduction%20to%20Programming%20in%20C%20.pdf Weblink to Equivalent Virtual Lab if relevant: 1. https://www.programiz.com/c-programming/online-compiler/			

	2. https://www.onlinegdb.com/online_c_compiler 3. https://www.tutorialspoint.com/compile_c_online.php Any pertinent media (recorded lectures, YouTube, etc.) if relevant: 1. https://www.youtube.com/watch?v=eEo_aacpwCw 2. https://www.youtube.com/watch?v=OGM2BJ29Syg 3. https://www.youtube.com/playlist?list=PLWPirh4EWFpF_2T13UeEgZWZHc8nHBuXp
--	--

Assessment Rubric: Major/Minor- Internal for Theory Course

SANT GADGE BABA AMRAVATI UNIVERSITY, AMRAVATI THEORY EXAMINATION B.Sc. I, SEMESTER – II (NEP)			
Theory	Course Code: 109203/ 110203/ 112203/123203/ 134203/135203/ 138203	Course Title: Programming with C	Max Marks: 20
Sr. No.	Assessment Criteria	Marks	
1	Any Two of the Activity(weekly or monthly assignment/ Unit Test/Class Test) (CAT-1)	10	
2	Any One of the Activity includes Open Book Test, MCQ Tests, / Theory related Class activity/Task etc.) etc. (CAT-2)	5	
3	Participation in any one Activity includes Quiz, Seminar, Group Discussion, Industry visit, CaseStudy, Mini project, innovative work, etc. based on Theory Course. Involvement in subject related activities such as Conference, Workshop, Coding Competitions etc. (CAT-3)	5	

Major/Minor Course: Laboratory on Programming with C

Level	Semester	Course Code	Course Name	Credits	Teaching Hours	Exam Duration	Max Marks
4.5	II	109204/ 110204/ 112203/123204/ 134204/135204/ 138204	Laboratory on Programming with C	2	60	4Hrs.	50

Course Objectives:	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:	On completion of the following syllabus the students will be able to - 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
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.			Use any pedagogical technique suitable for the topic

Assessment Rubric: External Practical Course

SANT GADGE BABA AMRAVATI UNIVERSITY, AMRAVATI PRACTICAL EXAMINATION B.Sc. I, SEMESTER – II (NEP)				
Practical	Course Code: 109204/ 110204/ 112203/123204/ 134204/135204/ 138204	Laboratory on Programming with C	Max Marks: 25	Time: 4 Hrs.
Sr. No.	Exercise			MaxMarks
1.	Single Program Writing, Algorithm, Flowchart, Execution, with Sample inputs and Outputs, and Printout			10
2.	Submitted Record book (Preferably handwritten)			05
3.	External Viva Voce			10

Assessment Rubric: Internal Practical Course

SANT GADGE BABA AMRAVATI UNIVERSITY, AMRAVATI PRACTICAL EXAMINATION B.Sc. I, SEMESTER – II (NEP)			
Practical	Course Code: 109204/ 110204/ 112203/123204/ 134204/135204/ 138204	Laboratory on Programming with C	Max Marks: 25
Sr. No.	Assessment Criteria		Marks
1.	Attendance/Regularity in practical's / Students' overall performance		05
2.	Record book Preparation (Preferably handwritten)		10
3.	Internal Viva Voce		10

GOEC Theory3: E-Business

Level	Semester	Course Code	Course Name	Credits	Teaching Hours	Exam Duration	Max Marks
4.5	II	109273/ 110273/ 112273/123273/ 134273/135273/ 138273	E-Business	2	30	2 Hrs.	30

Course Objectives:	1. To understand how C++ improves C with object-oriented features 2. Describe the procedural and object-oriented paradigm with concepts of streams, classes, functions, data and objects. 3. To learn the syntax and semantics of the C++ programming language. 4. To learn how to design C++ classes for code reuse. 5. Perform programming on functions, inline functions, constructor and destructor. 6. Perform programming on the concept of function overloading, operator overloading, virtual functions and polymorphism.					
Course Outcomes:	On competition of the following syllabus the students will be able to- 1. Define and identify the fundamental knowledge about object-oriented programming. 2. Declare and describe the concepts of abstraction, encapsulation, inheritance and polymorphism. 3. Implement Object Oriented Programming Concepts in C++. 4. To be able to develop applications in C++. 5. Demonstrate employability skills through the development of programming projects.					
Unit System	Contents	Workload Allotted	Weightage of Marks Allotted	In corporation of Pedagogies		
Unit I	Introduction to E-Commerce: Introduction, E-Commerce – Definition, History of Ecommerce, Online Extension of a BAM Model, Transition to E-Commerce in India, E-Commerce v/s Traditional Commerce, E - Commerce v/s E - Business. Electronic Commerce – Cutting Edge Technologies, Strengths, Weakness, Opportunities and Challenges of E-Commerce, Components of E-Business	8 Hrs.	8 Marks	Use any pedagogical technique suitable for the topic		
Unit II	E-Commerce Business models – B2C, B2B, C2B, C2C, B2G, C2G., Brokerage, Advertising, Infomediary, Merchant, Manufacturer (Direct), Affiliate, Community, Subscription, Utility. Ecommerce Business Revenue Models & Types, Impact of E-Commerce on business, Successful Business Models in India.	7 Hrs.	7 Marks			
Unit III	EDI: Electronic Data Interchange (EDI): Meaning & Definition, History & Evolution, Uses, EDI Standards, EDI Working Concept, Implementation difficulties of EDI, Financial EDI, EDI and	8 Hrs.	8 Marks			

	Internet, EDI services			
Unit IV	Hardware and Software for E Business: Web Servers – Browsers – Server Software– Web Authoring Tools Database System - World Wide Web – Domain Name – Hardware requirements, Brief on Shopping Cart, Point of Sale, Wireless Payment Device,	7 Hrs.	7 Marks	

References:	▪ Kalakota Ravi and A. B. Whinston : Frontiers of Electronic Commerce, Addison Wesley ▪ Raydu – E Commerce, HPH ▪ Agarwala K. N. and DeekshaArarwala : Business on the Net – Bridge to the online store front, Macmillan, New Delhi. ▪ Agarwala K.N and Deeksha Ararwala: Business on the Net – Whats and Hows of E-Commerce.
--------------------	--

Assessment Rubric: GOEC Theory-3 - Internal for Theory Course

SANT GADGE BABA AMRAVATI UNIVERSITY, AMRAVATI THEORY EXAMINATION B.Sc. I, SEMESTER – II (NEP)			
Theory	Course Code: 109273/ 110273/ 112273/123273/ 134273/135273/ 138273	Course Title: E-Business	Max Marks: 20
Sr. No.	Assessment Criteria	Marks	
1	Any Two of the Activity (weekly or monthly assignment/ Unit Test/Class Test) (CAT-1)	10	
2	Any One of the Activity includes Open Book Test, MCQ Tests, / Theory related Class activity/Task etc.) etc. (CAT-2)	5	
3	Participation in any one Activity includes Quiz, Seminar, Group Discussion, Industry visit, CaseStudy, Mini project, innovative work, etc. based on Theory Course. Involvement in subject related activities such as Conference, Workshop, Coding Competitions etc. (CAT-3)	5	

GOEC Theory4: Website Design Principles

Level	Semester	Course Code	Course Name	Credits	Teaching Hours	Exam Duration	Max Marks
4.5	II	109274/ 110274/ 112274/123274/ 134274/135274/ 138274	Website Design Principles	2	30	2 Hrs.	30

Course Objectives:	• To have an understanding of the introductory Internet and World Wide Web concepts. • To be able to configure text, color, and page layout with Cascading Style Sheets. • To have an understanding of configuring images & multimedia on web pages. • To have an understanding of some advanced technologies of web. • To develop the skill & knowledge of Web page design using HTML5.				
Course Outcomes:					
Unit System	Contents	Workload Allotted	Weightage of Marks Allotted	In corporation of Pedagogies	
Unit I	Internet: History, Application, World Wide Web, Web Standards, Basics in Web Design: Multitier Application Architecture, Client-Side Scripting versus Server-Side Scripting, World Wide Web Consortium (W3C). History of HTML, Introduction to HTML Tags and Attributes	8 Hrs.	8 Marks	Use any pedagogical technique suitable for the topic	
Unit II	HTML5: Features, Editing, First HTML5 Example, Headings, Linking, Images, Lists, Tables, HTML-Iframe. HTML-Form: <input><textarea><button><select><label>	7 Hrs.	7 Marks		
Unit III	CSS: Benefits of CSS, CSS Versions History, CSS Syntax, CSS Properties. Selectors: universal, type, id, class. Inline Styles Embedded Style Sheets, External Style Sheets.	8 Hrs.	8 Marks		
Unit IV	Introduction to scripting: Java Script basics, operators, data types, popup boxes. Control structures: if, If-else, Switch. Looping structures: for, do-while, while.	7 Hrs.	7 Marks		
References:	1. Paul Deitel, Harvey Deitel and Abbey Deitel, “Internet & World Wide Web: How to program”, Fifth Edition Pearson ISBN 978-0-13-215100-9 2. Thomas A. Powell, “HTML & CSS: The Complete Reference”, Fifth Edition, McGraw-Hill, ISBN: 978-0-07-174170-5				

	3. Kogent Learning Solutions Inc, HTML5 Black Book: Covers CSS3, Javascript, XML, Dreamtech Press, New Delhi, 2011 4. Jeffery C. Jackson, “Web Technologies”, A Computer Science Perspective, Pearson Education
--	--

Assessment Rubric: GOEC Theory-4 - Internal for Theory Course

SANT GADGE BABA AMRAVATI UNIVERSITY, AMRAVATI THEORY EXAMINATION B.Sc. I, SEMESTER – II (NEP)			
Theory	Course Code: 109274/ 110274/ 112274/123274/ 134274/135274/ 138274	Course Title: Website Design Principles	Max Marks: 20
Sr. No.	Assessment Criteria		Marks
1	Any Two of the Activity (weekly or monthly assignment/ Unit Test/Class Test) (CAT-1)		10
2	Any One of the Activity includes Open Book Test, MCQ Tests, / Theory related Class activity/Task etc.) etc. (CAT-2)		5
3	Participation in any one Activity includes Quiz, Seminar, Group Discussion, Industry visit, CaseStudy, Mini project, innovative work, etc. based on Theory Course. Involvement in subject related activities such as Conference, Workshop, Coding Competitions etc. (CAT-3)		5

VSC: Laboratory on E-Commerce

Level	Semester	Course Code	Course Name	Credits	Teaching Hours	Exam Duration	Max Marks
4.5	II	109282/ 110282/ 112282/123282/ 134282/135282/ 138282	Laboratory on E-Commerce	2	60	4Hrs.	50

Course Objectives:	1. To provide students with understanding of E-Commerce. 2. Importance of E-Commerce in the current business. 3. How to process E-Commerce and communicate knowledge with the outside world.			
Course Outcomes:	On completion of the following syllabus the students will be able to - 1. Understand the complexity of e-Commerce and its many facts. 2. Explore how e-business and e-commerce fit together. 3. Apply the Knowledge to perform E-Commerce transactions. 4. Identify the impact of e-commerce. 5. Recognize the benefits and limitations of e-commerce			
Unit System	Contents	Workload Allotted	Weightage of Marks Allotted	Incorporation of Pedagogies
	List of Practical: 1. Visit E-Commerce Website 2. B2B e commerce. Give an example for this. 3. Define B2C e commerce. Give an example for this. 4. Define C2B e commerce. Give an example for this. 5. Define C2C e commerce. Give an example for this. 6. Give any 2 applications of e commerce. 7. Perform digital marketing, Edit Basket of purchase. 8. Visit the e-Commerce site register yourself as client. 9. Visit the e-Commerce site register yourself as client and change the address of client. 10. Illustrate the B2B, B2C with example.			Use any pedagogical technique suitable for the topic

References:	Weblink to Equivalent MOOC on SWAYAM if relevant: • https://www.bigcommerce.com/articles/ecommerce/best-ecommerce-website-design/ • https://www.coursera.org/learn/ecommerce-academy • https://www.coursera.org/learn/foundations-of-digital-marketing-and-e-commerce.
--------------------	---

Assessment Rubric: Internal Examination Practical Course |(VSC)

SANT GADGE BABA AMRAVATI UNIVERSITY, AMRAVATI PRACTICAL EXAMINATION B.Sc. I, SEMESTER – II (NEP)			
Practical	Course Code: 109282/ 110282/ 112282/123282/ 134282/135282/ 138282	Laboratory on E-Commerce	Max Marks: 50
Sr. No.	Assessment Criteria		Marks
1.	Single Program Writing, Algorithm, Flowchart, Execution, with Sample inputs and Outputs, and Printout		20
2.	Record book preparation (Preferably handwritten) / Assignments preparation during semester		10
3.	Attendance in practical session / Students' overall performance		10
4.	Internal Viva Voce		10

SEC: Laboratory on Web Publishing

Level	Semester	Course Code	Course Name	Credits	Teaching Hours	Exam Duration	Max Marks
4.5	II	109283/ 110283/ 112283/123283/ 134283/135283/ 138283	Laboratory on Web Publishing	2	60	4Hrs.	50

Course Objectives:	1. Understand the concept of Webpage/site 2. Know the importance of web publishing. 3. Explain the functions of web publishing. 4. Define the scope and benefits and limitations of web publishing.			
Course Outcomes:	On completion of the following syllabus the students will be able to - 1. To design simple web page. 2. To design web page with login id. 3. To create web page/site. 4. To publish the website.			
Contents		Workload Allotted	Weightage of Marks Allotted	Incorporation of Pedagogies
	List of Practical: 1. Create a web page of your name using various heading tags. 2. Design a web page according to the format given below using heading tag with your name displayed on the top. Creating a web-page using <p> tag 3. Design a web page describing yourself using single and multiline comments. Also use tag. 4. Create a html file for displaying a webpage with below mentioned tags. a. Bold b. Italics c. Underline d. Alignment e. Paragraph 5. Create a html file for displaying a webpage with below mentioned tags: a. Text color			Use any pedagogical technique suitable for the topic

	b. Headings c. HR d. Background color e. Line break 6. Design a web page of your CV with headings as objective, educational qualification, achievements, strengths, hobbies and personal details. a. Insert a horizontal line after every above-mentioned heading b. Set any light color as page background. c. Bold and underline every heading 4. Use heading tag to specify the heading d. Use pre tag for Educational Qualification. 7. Create a html page which shows the following list apply the following parts: a. Put horizontal line after newspaper and magazine. b. Apply heading tag for newspaper and magazine. c. Apply a background color 8. Create a webpage to show the use of lists with type. 9. Design a web page to display the names of Beverages, Dishes and Desserts using unordered lists: 10. Design a web page to display the different courses available in your institute. Show the use of different types of ordered lists.			
References:	Weblink to Equivalent MOOC on SWAYAM if relevant: • https://www.youtube.com/watch?v=8RT4n8KGjfE • http://tinyurl.com/mtjx8pnw • https://www.youtube.com/watch?v=qiR-7fL-I2A • http://tinyurl.com/y84uddwa			

Assessment Rubric: Internal Examination Practical Course |(SEC)

SANT GADGE BABA AMRAVATI UNIVERSITY, AMRAVATI PRACTICAL EXAMINATION B.Sc. I, SEMESTER – II (NEP)			
Practical	Course Code: 109283/ 110283/ 112283/123283/ 134283/135283/ 138283	Laboratory on Web Publishing	Max Marks: 50

Sr. No.	Assessment Criteria	Marks
1.	Single Program Writing, Algorithm, Flowchart, Execution, with Sample inputs and Outputs, and Printout	20
2.	Record book preparation (Preferably handwritten) / Assignments preparation during semester	10
3.	Attendance in practical session / Students' overall performance	10
4.	Internal Viva Voce	10

SANT GADGE BABA AMRAVATI UNIVERSITY, AMRAVATI



THREE YEAR UNDERGRADUATE PROGRAMME

**B.Sc. Computer Science (112)/Information Technology (123)/Computer Application (Regular) (109)/
Computer Application (Vocational) (110)/Data Analytics (134)/Data Science and Analytics (135)/Web
Designing and Development (138)**

Semester - III and IV

FACULTY: SCIENCE AND TECHNOLOGY

(Courses effective from Academic Year 2026-27) Under NEP 2020

SYLLABUS

INDEX

Sr. No.	Item	Page Number
01	Member's List - Board of Studies in Computer Science (including Computer Application, Information Technology etc.)	3
02	Scheme- Examination, Evaluation and Assessment (University Draft)	4
03	Semester-III, Credits, Workload, Examination, Evaluation and Assessment Scheme	8
04	Semester-IV, Credits, Workload, Examination, Evaluation and Assessment Scheme	15
05	Syllabus, B.Sc.- II, Semester – III	
06	Major Course: Data Structure (109205/ 110205/ 112205/123205/ 134205/135205/138205)	23
07	Major Course: Relational Database Management System (RDBMS) (109207/110207/112207/123207/134207/135207/ 138207)	26
08	Major Practical: Laboratory on DS and RDBMS (109271/ 110271/ 112271/123271/ 134271/135271/ 138271)	29
09	IKS –Major Specific: IKS in Computational Sciences (109208/ 110208/ 112208/123208/ 134208/135208/138208)	32
10	Minor Theory: Data Structure and RDBMS (109261/ 110261/ 112261/123261/ 134261/135261/138261)	35
11	Minor Practical: Laboratory on Data Structure and RDBMS (109262/ 110262/ 112262/123262/ 134262/135262/138262)	38
12	GOEC Theory 5: E Content Development (109275/ 110275/ 112275/123275/ 134275/135275/138275)	40
13	VSC: Laboratory on MySQL	43
14	Field Project / Community Engagement Services: Phase-I (109291/ 110291/ 112291/123291/ 134291/135291/138291)	45
	Syllabus, B.Sc.- II, Semester – IV	
15	Major Course: OOP with C++ (109209/110209/ 112209/123209/ 134209/135209/ 138209)	51
16	Major Course: Computer Networks (109210/110210/ 112210/123210/ 134210/135210/138210)	54
17	Major Course: Python Programming (109211/110211/ 112211/123211/ 134211/135211/138211)	56
18	Major Practical: Laboratory on OOP with C++ (109212/110212/ 112212/ 123212/ 134212/135212/138212)	59
19	Minor Course: C++ and Python Programming (109263/110263/ 112263/123263/ 134263/135263/138263)	63
20	Minor Practical: Laboratory on C++ and Python Programming (109264/110264/ 112264/123264/ 134264/135264/138264)	67
21	GOEC Theory 6: Web Technologies (109276/110276/ 112276/123276/ 134276/135276/138276)	70
22	VSC: Database using Access Laboratory (109285/110285/ 112285/123285/ 134285/135285/138285)	72
23	Field Project / Community Engagement Services: Phase-II (109292/ 110292/ 112292/123292/ 134292/135292/138292)	76

Sant Gadge Baba Amravati University, Amravati
Faculty of Science and Technology (Science Group)
Board of Studies in Computer Science
(including Computer Application, Information Technology etc.)

Sr. No.	Name	Designation	Address
01	Dr. Swati Sherekar	Chairman	PGTD in Computer Science and Engineering, SGBAU, Amravati
02	Dr. Dineshkumar N. Satange	Member (Faculty Member)	Smt. Narsamma Arts, Commerce and Science College, Kiran Nagar, Amravati. 444606
03	Dr. Mohd. Atique Mohd. Junaid	Member	HoD, PGTD in Computer Science and Engineering, SGBAU, Amravati
04	Dr. Avinash Baburao Kadam	Member	Shri Shivaji Science and Arts College, Chikhali Dist. Buldana
05	Dr. Ajay Purushottam Chendke	Member	Degree College of Physical Education (HVPM), Amravati
06	Dr. Chandrashekhar H. Sawarkar	Member	Smt. Narsamma Arts, Commerce and Science College, Kiran Nagar, Amravati. 444606
07	Dr. Arvind A. Tayade	Member	G.S. Science Arts and Commerce College, Khamgaon Dist. Buldana
08	Prof. Sudeshkumar Chaudhari	Member	RDIK, Mahavidyalaya, Badnera Rly. Amravati.
09	Dr. Narendra M. Jathe	Member	Smt. Narsamma Arts, Commerce and Science College, Kiran Nagar, Amravati. 444606
10	Dr. Homraj Patelpaik	Member	Lokmanya Tilak Mahavidyalaya Wani, Dist. Yavatmal
11	Prof. Sureshkumar Mapari	Member	R. A. College, Washim.

Notes:

- a. 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. 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.
- b. 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).
- c. 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.
- d. **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.
- e. **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.
- f. **Generic / Open Elective Courses (GE/OE):** Courses to be selected from the Basket of Courses provided by the University
- g. **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

Examination, Evaluation and Assessment

Examination and Assessment Process:

- i. The basic principle of the Credit framework is that Credits are a function of the successful completion of a program of study/ vocational education/ training and assessment. No Credit can be earned by the student unless the student is assessed for the achievement of the desired competencies and outcome of a program.
- ii. Exit options are provided with Certificate, Diploma and Basic Bachelor's degrees to the students at the end of the second, fourth and sixth semesters of a Four Years Multidisciplinary Degree Programme. Students will receive a Bachelor's degree with Honors/ Research on successfully completing of all eight semesters of the UG Program either at a stretch or with opted exits and re-entries.
- iii. For the smooth success of four-year degree programme with multiple entry and exit systems, the examination mode should be based on the combination of innovative trends in formative (informal and formal tests administered during the learning process) and summative (evaluation of students learning at the end of an instructional unit) examination modes in line with the UGC Report on 'Evaluation Reforms in Higher Educational Institutions (2019).

Examination, Evaluation and Assessment Scheme

The total marks for each Course shall be based on Continuous Assessment and Semester End Examination.

Each theory course of Major, Minor, GE/OE, AEC, IKS, VEC as mentioned in **Teaching Learning Scheme** prepared by the Board of Studies shall be evaluated as per the scheme as mentioned in the following table -

Examination, Evaluation and Assessment Scheme

Vertical No.	The Vertical	Mode of Examination, Evaluation & Assessment	Theory				Theory (Total)		Practical				Practical (Total)	
			External		Internal				External		Internal		Max. Marks	Min. Marks
			Max. Marks	Min. Marks	Max. Marks	Min. Marks	Max. Marks	Min. Marks	Max. Marks	Min. Marks				
a	Major	External & Internal	30	9	20	6	50	20	25	10	25	10	50	20
b	Minor		30	9	20	6	50	20	25	10	25	10	50	20
c	Generic/ Open Elective		30	9	20	6	50	20	--	--	--	--	--	--
d	VSC	Internal	--	--	--	--	--	--	--	--	50	20	50	20
	SEC	Internal	--	--	--	--	--	--	--	--	50	20	50	20
e	AEC (Eng. & One MIL Composite)	External & Internal	30	9	20	6	50	20	--	--	--	--	--	--
	IKS (Generic)	External & Internal	30	9	20	6	50	20	--	--	--	--	--	--
	VEC	External & Internal	30	9	20	6	50	20	--	--	--	--	--	--
f	FP/CEP	Internal	--	--	--	--	--	--	--	--	50	20	50	20
	Internship/ Apprenticeship		Assessment of these verticals shall be based on various activities/practices. It shall be evaluated by giving maximum marks of 50 per 2 Credit Course with separate activity weightages/levels. A detailed SOP for this assessment process is prescribed for Phase I and Phase II											
	CC													

Continuous Assessment Tests (CAT)

For internal assessment, the Continuous Assessment Tests (CAT) shall be conducted as under-

- i. Three CAT each of 8 / 10 Marks (Theory) as applicable and 10 Marks (Practical).
 - First on completion of 25% Syllabus of the course or on completion of 25 teaching days,
 - Second on completion of 50% Syllabus of the course or on completion of 50 teaching days,
 - Third on completion of 75% Syllabus of the course or on completion of 75 teaching days.
- ii. Each concurrent assessment (CAT-I, II & III) will be mapped to relevant Course Learning Outcome.
- iii. Total Performance in CAT (i.e. 40 %) shall be based on the best two out of three in CAT examinations
- iv. Internal assessment shall be carried out by the respective course teacher by choosing variety of assessment tools/methods such as class test, record book, seminar, case study, field work, mini project work, quiz or any innovative method, which may be deemed to be appropriate for assessing the relevant course outcome.

conduction of the Examination:

As per the scheme of teaching, learning, examination and evaluation, theory/practical examinations of Semester-I, II, III, IV, V, VI, VII and VIII shall be conducted by the University (except for Internal Examinations as applicable) at the end of each semester.

The theory/practical examinations of all the Semesters shall be held as per the following Schedule –

Sr. No.	Name of the Examination	End Sem Examination	Supplementary Examination*
1	Semester-I, III, V and VII	Winter	Summer
2	Semester-II, IV, VI and VIII	Summer	Winter

* The University may evolve mechanism for conducting repeat end semester examination. Such repeat examinations shall have to be conducted within one month of the regular even semester examination and on demand examination.

1. The practical examination of all semesters shall be conducted by the University at the end of each semester. The HEI shall conduct the Practical examination of odd semesters as per the schedule announced by the University. However, the appointment of the External and Internal Examiners shall be done by the Head or Principal of respective HEI to conduct external examination of the odd semester and the same should be communicated to the University before commencement of the practical examination. The University shall conduct the external practical examination of all even semester by appointing external and internal examiners.
2. The examinations specified above shall be held twice in a year at such places and on such dates as may be prescribed by the University.
3. An applicant to an examination specified above, shall pursue a regular course of study in courses prescribed for the examination concerned for not less than one semester in a particular semester in a College/Institute/University department.
4. Provided that the student shall be eligible to appear for examination if -
 - a. He/she complies with the provisions of the Ordinance pertaining to the Examination in general from time to time.
 - b. He/she has prosecuted a regular course of study in a university department/college affiliated to the University.
 - c. He/she has in the opinion of the Principal shown satisfactory progress in his/her studies.
5. The provisions of Ordinance No. 6 and Ordinance No. 9 shall be mutatis-mutandis applicable to every collegiate/non-collegiate student.
6. The fees for each theory examination and practical examination conducted by the university shall be as prescribed by the University, from time to time.

SEMESTER – III

Computer Application (General) (109) Credits, Workload, Examination, Evaluation and Assessment Scheme

The Vertical	Course Code	Course Title	Credits	Workload	Theory/Practical				Theory/Practical (Total)	
					External		Internal		Max. Marks	Min. Marks
					Max. Marks	Min. Marks	Max. Marks	Min. Marks		
Major-T1	109205	Data Structure (DS)	2	2	30	9	20	6	50	20
Major-T2	109206	Relational Database Management System (RDBMS)	2	2	30	9	20	6	50	20
Major-P	109207	Laboratory on DS and RDBMS	2	4	25	10	25	10	50	20
IKS-T	109208	IKS in Computational Sciences	2	2	30	9	20	6	50	20
Minor-T	109261	Data Structure and RDBMS	2	2	30	9	20	6	50	20
Minor-P	109262	Laboratory on Data Structure and RDBMS	2	4	25	10	25	10	50	20
GOEC-T	109275	E Content Development	2	2	30	9	20	6	50	20
VSC-P	109284	Laboratory on MySQL	2	4	-	-	50	20	50	20
AEC-English	-	-	1	1	15	-	-	-	-	-
AEC-MIL	-	-	1	1	15	-	-	-	-	-
FP/CES	109291	Field Project / Community Engagement Services in Computer Application (General): Phase-I	2	4	-	-	50	20	50	20
CC		Separate SOP will be released	2	4	-	-	50	20	50	20

Computer Application (Vocational) (110) Credits, Workload, Examination, Evaluation and Assessment Scheme

The Vertical	Course Code	Course Title	Credits	Workload	Theory/Practical				Theory/Practica	
					External		Internal		(Total)	
					Max. Marks	Min. Marks	Max. Marks	Min. Marks	Max. Marks	Min. Marks
Major-T1	110205	Data Structure (DS)	2	2	30	9	20	6	50	20
Major-T2	110206	Relational Database Management System (RDBMS)	2	2	30	9	20	6	50	20
Major-P	110207	Laboratory on DS and RDBMS	2	4	25	10	25	10	50	20
IKS-T	110208	IKS in Computational Sciences	2	2	30	9	20	6	50	20
Minor-T	110261	Data Structure and RDBMS	2	2	30	9	20	6	50	20
Minor-P	110262	Laboratory on Data Structure and RDBMS	2	4	25	10	25	10	50	20
GOEC-T	110275	E Content Development	2	2	30	9	20	6	50	20
VSC-P	110284	Laboratory on MySQL	2	4	-	-	50	20	50	20
AEC-English	-	-	1	1	15	-	-	-	-	-
AEC-MIL	-	-	1	1	15	-	-	-	-	-
FP/CES	110291	Field Project / Community Engagement Services in Computer Application (General): Phase-I	2	4	-	-	50	20	50	20
CC		Separate SOP will be released	2	4	-	-	50	20	50	20

Computer Science (112) Credits, Workload, Examination, Evaluation and Assessment Scheme

The Vertical	Course Code	Course Title	Credits	Workload	Theory/Practical				Theory/Practical (Total)	
					External		Internal		Max. Marks	Min. Marks
					Max. Marks	Min. Marks	Max. Marks	Min. Marks		
Major-T1	112205	Data Structure (DS)	2	2	30	9	20	6	50	20
Major-T2	112206	Relational Database Management System (RDBMS)	2	2	30	9	20	6	50	20
Major-P	112207	Laboratory on DS and RDBMS	2	4	25	10	25	10	50	20
IKS-T	112208	IKS in Computational Sciences	2	2	30	9	20	6	50	20
Minor-T	112261	Data Structure and RDBMS	2	2	30	9	20	6	50	20
Minor-P	112262	Laboratory on Data Structure and RDBMS	2	4	25	10	25	10	50	20
GOEC-T	112275	E Content Development	2	2	30	9	20	6	50	20
VSC-P	112284	Laboratory on MySQL	2	4	-	-	50	20	50	20
AEC-English	-	-	1	1	15	-	-	-	-	-
AEC-MIL	-	-	1	1	15	-	-	-	-	-
FP/CES	112291	Field Project / Community Engagement Services in Computer Application (General): Phase-I	2	4	-	-	50	20	50	20
CC		Separate SOP will be released	2	4	-	-	50	20	50	20

Information Technology (123) Credits, Workload, Examination, Evaluation and Assessment Scheme

The Vertical	Course Code	Course Title	Credits	Workload	Theory/Practical				Theory/Practica (Total)	
					External		Internal			
					Max. Marks	Min. Marks	Max. Marks	Min. Marks	Max. Marks	Min. Marks
Major-T1	123205	Data Structure (DS)	2	2	30	9	20	6	50	20
Major-T2	123206	Relational Database Management System (RDBMS)	2	2	30	9	20	6	50	20
Major-P	123207	Laboratory on DS and RDBMS	2	4	25	10	25	10	50	20
IKS-T	123208	IKS in Computational Sciences	2	2	30	9	20	6	50	20
Minor-T	123261	Data Structure and RDBMS	2	2	30	9	20	6	50	20
Minor-P	123262	Laboratory on Data Structure and RDBMS	2	4	25	10	25	10	50	20
GOEC-T	123275	E Content Development	2	2	30	9	20	6	50	20
VSC-P	123284	Laboratory on MySQL	2	4	-	-	50	20	50	20
AEC-English	-	-	1	1	15	-	-	-	-	-
AEC-MIL	-	-	1	1	15	-	-	-	-	-
FP/CES	123291	Field Project / Community Engagement Services in Computer Application (General): Phase-I	2	4	-	-	50	20	50	20
CC		Separate SOP will be released	2	4	-	-	50	20	50	20

Data Analytics (134) Credits, Workload, Examination, Evaluation and Assessment Scheme

The Vertical	Course Code	Course Title	Credits	Workload	Theory/Practical				Theory/Practical (Total)	
					External		Internal		Max. Marks	Min. Marks
					Max. Marks	Min. Marks	Max. Marks	Min. Marks		
Major-T1	134205	Data Structure (DS)	2	2	30	9	20	6	50	20
Major-T2	134206	Relational Database Management System (RDBMS)	2	2	30	9	20	6	50	20
Major-P	134207	Laboratory on DS and RDBMS	2	4	25	10	25	10	50	20
IKS-T	134208	IKS in Computational Sciences	2	2	30	9	20	6	50	20
Minor-T	134261	Data Structure and RDBMS	2	2	30	9	20	6	50	20
Minor-P	134262	Laboratory on Data Structure and RDBMS	2	4	25	10	25	10	50	20
GOEC-T	134275	E Content Development	2	2	30	9	20	6	50	20
VSC-P	134284	Laboratory on MySQL	2	4	-	-	50	20	50	20
AEC-English	-	-	1	1	15	-	-	-	-	-
AEC-MIL	-	-	1	1	15	-	-	-	-	-
FP/CES	134291	Field Project / Community Engagement Services in Computer Application (General): Phase-I	2	4	-	-	50	20	50	20
CC		Separate SOP will be released	2	4	-	-	50	20	50	20

Data Science and Analytics (135) Credits, Workload, Examination, Evaluation and Assessment Scheme

The Vertical	Course Code	Course Title	Credits	Workload	Theory/Practical				Theory/Practical (Total)	
					External		Internal		Max. Marks	Min. Marks
					Max. Marks	Min. Marks	Max. Marks	Min. Marks		
Major-T1	135205	Data Structure (DS)	2	2	30	9	20	6	50	20
Major-T2	135206	Relational Database Management System (RDBMS)	2	2	30	9	20	6	50	20
Major-P	135207	Laboratory on DS and RDBMS	2	4	25	10	25	10	50	20
IKS-T	135208	IKS in Computational Sciences	2	2	30	9	20	6	50	20
Minor-T	135261	Data Structure and RDBMS	2	2	30	9	20	6	50	20
Minor-P	135262	Laboratory on Data Structure and RDBMS	2	4	25	10	25	10	50	20
GOEC-T	135275	E Content Development	2	2	30	9	20	6	50	20
VSC-P	135284	Laboratory on MySQL	2	4	-	-	50	20	50	20
AEC-English	-	-	1	1	15	-	-	-	-	-
AEC-MIL	-	-	1	1	15	-	-	-	-	-
FP/CES	135291	Field Project / Community Engagement Services in Computer Application (General): Phase-I	2	4	-	-	50	20	50	20
CC		Separate SOP will be released	2	4	-	-	50	20	50	20

Web Designing and Development (138) Credits, Workload, Examination, Evaluation and Assessment Scheme

The Vertical	Course Code	Course Title	Credits	Workload	Theory/Practical				Theory/Practical (Total)	
					External		Internal		Max. Marks	Min. Marks
					Max. Marks	Min. Marks	Max. Marks	Min. Marks		
Major-T1	138205	Data Structure (DS)	2	2	30	9	20	6	50	20
Major-T2	138206	Relational Database Management System (RDBMS)	2	2	30	9	20	6	50	20
Major-P	138207	Laboratory on DS and RDBMS	2	4	25	10	25	10	50	20
IKS-T	138208	IKS in Computational Sciences	2	2	30	9	20	6	50	20
Minor-T	138261	Data Structure and RDBMS	2	2	30	9	20	6	50	20
Minor-P	138262	Laboratory on Data Structure and RDBMS	2	4	25	10	25	10	50	20
GOEC-T	138275	E Content Development	2	2	30	9	20	6	50	20
VSC-P	138284	Laboratory on MySQL	2	4	-	-	50	20	50	20
AEC-English	-	-	1	1	15	-	-	-	-	-
AEC-MIL	-	-	1	1	15	-	-	-	-	-
FP/CES	138291	Field Project / Community Engagement Services in Computer Application (General): Phase-I	2	4	-	-	50	20	50	20
CC		Separate SOP will be released	2	4	-	-	50	20	50	20

SEMESTER – IV

Computer Application (General) (109) Credits, Workload, Examination, Evaluation and Assessment Scheme

The Vertical	Course Code	Course Title	Credits	Workload	Theory/Practical				Theory/Practical (Total)	
					External		Internal			
					Max. Marks	Min. Marks	Max. Marks	Min. Marks	Max. Marks	Min. Marks
Major-T1	109209	OOP with C++	2	2	30	9	20	6	50	20
Major-T2	109210	Computer Networks	2	2	30	9	20	6	50	20
Major-T3	109211	Python Programming								
Major-P	109212	Laboratory on C++ and Python Programming	2	4	25	10	25	10	50	20
Minor-T	109263	C++ and Python Programming	2	2	30	9	20	6	50	20
Minor-P	109264	Laboratory on C++ and Python Programming	2	4	25	10	25	10	50	20
GOEC-T	109276	Web Technologies	2	2	30	9	20	6	50	20
VSC-P	109285	Database using Access Laboratory	2	4	-	-	50	20	50	20
AEC English	-	-	1	1	15	-	-	-	-	-
AEC MIL	-	-	1	1	15	-	-	-	-	-
FP/CES	109292	Field Project / Community Engagement Services in Computer Application (General): Phase-II	2	4	-	-	50	20	50	20
CC		Separate SOP will be released	2	4	-	-	50	20	50	20

Computer Application (Vocational) (110) Credits, Workload, Examination, Evaluation and Assessment Scheme

The Vertical	Course Code	Course Title	Credits	Workload	Theory/Practical				Theory/Practical (Total)	
					External		Internal		Max. Marks	Min. Marks
					Max. Marks	Min. Marks	Max. Marks	Min. Marks		
Major-T1	110209	OOP with C++	2	2	30	9	20	6	50	20
Major-T2	110210	Computer Networks	2	2	30	9	20	6	50	20
Major-T3	110211	Python Programming								
Major-P	110212	Laboratory on C++ and Python Programming	2	4	25	10	25	10	50	20
Minor-T	110263	C++ and Python Programming	2	2	30	9	20	6	50	20
Minor-P	110264	Laboratory on C++ and Python Programming	2	4	25	10	25	10	50	20
GOEC-T	110276	Web Technologies	2	2	30	9	20	6	50	20
VSC-P	110285	Database using Access Laboratory	2	4	-	-	50	20	50	20
AEC English	-	-	1	1	15	-	-	-	-	-
AEC MIL	-	-	1	1	15	-	-	-	-	-
FP/CES	110292	Field Project / Community Engagement Services in Computer Application (General): Phase-II	2	4	-	-	50	20	50	20
CC		Separate SOP will be released	2	4	-	-	50	20	50	20

Computer Science (112) Credits, Workload, Examination, Evaluation and Assessment Scheme

The Vertical	Course Code	Course Title	Credits	Workload	Theory/Practical				Theory/Practical (Total)	
					External		Internal		Max. Marks	Min. Marks
					Max. Marks	Min. Marks	Max. Marks	Min. Marks		
Major-T1	112209	OOP with C++	2	2	30	9	20	6	50	20
Major-T2	112210	Computer Networks	2	2	30	9	20	6	50	20
Major-T3	112211	Python Programming								
Major-P	112212	Laboratory on C++ and Python Programming	2	4	25	10	25	10	50	20
Minor-T	112263	C++ and Python Programming	2	2	30	9	20	6	50	20
Minor-P	112264	Laboratory on C++ and Python Programming	2	4	25	10	25	10	50	20
GOEC-T	112276	Web Technologies	2	2	30	9	20	6	50	20
VSC-P	112285	Database using Access Laboratory	2	4	-	-	50	20	50	20
AEC English	-	-	1	1	15	-	-	-	-	-
AEC MIL	-	-	1	1	15	-	-	-	-	-
FP/CES	112292	Field Project / Community Engagement Services in Computer Application (General): Phase-II	2	4	-	-	50	20	50	20
CC		Separate SOP will be released	2	4	-	-	50	20	50	20

Information Technology (123) Credits, Workload, Examination, Evaluation and Assessment Scheme

The Vertical	Course Code	Course Title	Credits	Workload	Theory/Practical				Theory/Practical (Total)	
					External		Internal		Max. Marks	Min. Marks
					Max. Marks	Min. Marks	Max. Marks	Min. Marks		
Major-T1	123209	OOP with C++	2	2	30	9	20	6	50	20
Major-T2	123210	Computer Networks	2	2	30	9	20	6	50	20
Major-T3	123211	Python Programming								
Major-P	123212	Laboratory on C++ and Python Programming	2	4	25	10	25	10	50	20
Minor-T	123263	C++ and Python Programming	2	2	30	9	20	6	50	20
Minor-P	123264	Laboratory on C++ and Python Programming	2	4	25	10	25	10	50	20
GOEC-T	123276	Web Technologies	2	2	30	9	20	6	50	20
VSC-P	123285	Database using Access Laboratory	2	4	-	-	50	20	50	20
AEC English	-	-	1	1	15	-	-	-	-	-
AEC MIL	-	-	1	1	15	-	-	-	-	-
FP/CES	123292	Field Project / Community Engagement Services in Computer Application (General): Phase-II	2	4	-	-	50	20	50	20
CC		Separate SOP will be released	2	4	-	-	50	20	50	20

Data Analytics (134) Credits, Workload, Examination, Evaluation and Assessment Scheme

The Vertical	Course Code	Course Title	Credits	Workload	Theory/Practical				Theory/Practical (Total)	
					External		Internal		Max. Marks	Min. Marks
					Max. Marks	Min. Marks	Max. Marks	Min. Marks		
Major-T1	134209	OOP with C++	2	2	30	9	20	6	50	20
Major-T2	134210	Computer Networks	2	2	30	9	20	6	50	20
Major-T3	134211	Python Programming								
Major-P	134212	Laboratory on C++ and Python Programming	2	4	25	10	25	10	50	20
Minor-T	134263	C++ and Python Programming	2	2	30	9	20	6	50	20
Minor-P	134264	Laboratory on C++ and Python Programming	2	4	25	10	25	10	50	20
GOEC-T	134276	Web Technologies	2	2	30	9	20	6	50	20
VSC-P	134285	Database using Access Laboratory	2	4	-	-	50	20	50	20
AEC English	-	-	1	1	15	-	-	-	-	-
AEC MIL	-	-	1	1	15	-	-	-	-	-
FP/CES	134292	Field Project / Community Engagement Services in Computer Application (General): Phase-II	2	4	-	-	50	20	50	20
CC		Separate SOP will be released	2	4	-	-	50	20	50	20

Data Science and Analytics (135) Credits, Workload, Examination, Evaluation and Assessment Scheme

The Vertical	Course Code	Course Title	Credits	Workload	Theory/Practical				Theory/Practical (Total)	
					External		Internal		Max. Marks	Min. Marks
					Max. Marks	Min. Marks	Max. Marks	Min. Marks		
Major-T1	135209	OOP with C++	2	2	30	9	20	6	50	20
Major-T2	135210	Computer Networks	2	2	30	9	20	6	50	20
Major-T3	135211	Python Programming								
Major-P	135212	Laboratory on C++ and Python Programming	2	4	25	10	25	10	50	20
Minor-T	135263	C++ and Python Programming	2	2	30	9	20	6	50	20
Minor-P	135264	Laboratory on C++ and Python Programming	2	4	25	10	25	10	50	20
GOEC-T	135276	Web Technologies	2	2	30	9	20	6	50	20
VSC-P	135285	Database using Access Laboratory	2	4	-	-	50	20	50	20
AEC English	-	-	1	1	15	-	-	-	-	-
AEC MIL	-	-	1	1	15	-	-	-	-	-
FP/CES	135292	Field Project / Community Engagement Services in Computer Application (General): Phase-II	2	4	-	-	50	20	50	20
CC		Separate SOP will be released	2	4	-	-	50	20	50	20

Web Designing and Development (138) Credits, Workload, Examination, Evaluation and Assessment Scheme

The Vertical	Course Code	Course Title	Credits	Workload	Theory/Practical				Theory/Practica (Total)	
					External		Internal			
					Max. Marks	Min. Marks	Max. Marks	Min. Marks	Max. Marks	Min. Marks
Major-T1	138209	OOP with C++	2	2	30	9	20	6	50	20
Major-T2	138210	Computer Networks	2	2	30	9	20	6	50	20
Major-T3	138211	Python Programming								
Major-P	138212	Laboratory on C++ and Python Programming	2	4	25	10	25	10	50	20
Minor-T	138263	C++ and Python Programming	2	2	30	9	20	6	50	20
Minor-P	138264	Laboratory on C++ and Python Programming	2	4	25	10	25	10	50	20
GOEC-T	138276	Web Technologies	2	2	30	9	20	6	50	20
VSC-P	138285	Database using Access Laboratory	2	4	-	-	50	20	50	20
AEC English	-	-	1	1	15	-	-	-	-	-
AEC MIL	-	-	1	1	15	-	-	-	-	-
FP/CES	138292	Field Project / Community Engagement Services in Computer Application (General): Phase-II	2	4	-	-	50	20	50	20
CC		Separate SOP will be released	2	4	-	-	50	20	50	20

SYLLABUS

B.Sc.- II, SEMESTER – III

B.Sc. Computer Science (112)

Information Technology (123)

Computer Application (Regular) (109)

Computer Application (Vocational) (110)

Data Analytics (134)

Data Science and Analytics (135)

Web Designing and Development (138)

Teaching and Learning Scheme: for the Degree of Bachelor of Science with the Major: Computer Science (112)/Information Technology (123)/Computer Application (Regular) (109)/ Computer Application (Vocational) (110)/Data Analytics (134)/Data Science and Analytics (135)/ Web Designing and Development (138)

(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))

Major Course: Data Structure

Level	Semester	Course Code	Course Name	Credits	Teaching Hours	Exam Duration	Max Marks
5.0	III	109205/ 110205/ 112205/123205/ 134205/135205/138205	Data Structure (DS)	2	30	2.00Hrs.	30 (External) 20 (Internal)

Course Objectives:	1. To provide the knowledge of basic of Data Structure 2. To understand importance of Algorithms 3. To understand importance of different steps of algorithm in Computer Science 4. To understand the Data Structure concepts						
Course Outcomes:	Students will be able to - 1. Learn the basic types for data structure, implementation and application. 2. Know the strength and weakness of different data structures. 3. Use the appropriate data structure in context of solution of given problem. 4. Develop programming skills which require to solve given problem.						
Unit System	Contents				Workload Allotted	Weightage of Marks	Incorporation of Pedagogies

			Allotted	
Unit I	Data structure: Introduction to data structure, Types of data structure: Primitive and Non-primitive, Linear and Non-linear data structure, Data structure operations. Array: Definition and concepts, Memory Representations, Operations: Traversing, Insertion, Deletion.	8 Hrs.	8 Marks	Use any pedagogical technique suitable for the topic
Unit II	Stacks: Definition and concepts, Memory Representations, Operations: Traversing, Insertion, Deletion. Queue: Definition and concepts, Memory Representations, Operations: Traversing, Insertion, Deletion. Types of Queue.	7 Hrs.	7 Marks	
Unit III	Linked List: Definition and concepts, Memory Representations, Types of Linked List, and Operations: Traversing, Insertion, Deletion. Tree: Definition and Terminologies, Memory Representations of Trees, Types of Trees : Binary Trees, Complete Binary Trees, Binary Search Trees, Traversing: Preorder, Inorder, Postorder, Insertion, Deletion.	8 Hrs.	8 Marks	
Unit IV	Searching and Sorting: Definition and concept. Searching Techniques: Linear Search, Binary Search and Indexed Sequential Search. Sorting Techniques: Bubble Sort, Selection Sort, Insertion Sort	7 Hrs.	7 Marks	
References:	Course Material/Learning Resources Text books: 1. Data Structures, Seymour Lipschutz, Schaum's Outlines Series, Tata McGraw-Hill. 2. Text Book of Computer Science (Data Structure and C++): S. D. Pachpande, R.B. Ghayalkar and Athar Iqbal, Dnyanpath Publication. Reference Books: 1. Fundamentals of Data Structures in C, Ellis Horowitz, Sartaj Sahni and Susan Anderson-Freed. W. H. Freeman and Company. 2. Data Structure and Algorithms: Aho, Hopcroft, Ulman 3. Introduction to Data Structure: Bhagat Singh, Thomas L Naps Weblink to Equivalent MOOC on SWAYAM if relevant: 1. https://onlinecourses.swayam2.ac.in/cec22_cs19/ 2. https://onlinecourses.nptel.ac.in/noc22_cs92/ 3. https://onlinecourses.nptel.ac.in/noc22_cs70/			

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

1. <https://www.youtube.com/watch?v=RBSGKlAvoiM>
2. <https://www.youtube.com/watch?v=zg9ih6SVACc>

Assessment Rubric: Internal for Theory Course (Major)

SANT GADGE BABA AMRAVATI UNIVERSITY, AMRAVATI THEORY EXAMINATION B.Sc. II, SEMESTER – III (NEP)			
Theory	Course Code: 109205/ 110205/ 112205/123205/ 134205/135205/138205	Course Title: Data Structure (DS)	Max Marks: 20
Sr. No.	Assessment Criteria	Marks	
1	Any Two of the Activity (weekly or monthly assignment/ Unit Test/Class Test) (CAT-1)	10	
2	Any One of the Activity includes Open Book Test, MCQ Tests, / Theory related Class activity/Task etc.) etc. (CAT-2)	5	
3	Participation in any one Activity includes Quiz, Seminar, Group Discussion, Industry visit, CaseStudy, Mini project, innovative work, etc. based on Theory Course. Involvement in subject related activities such as Conference, Workshop, Coding Competitions etc. (CAT-3)	5	

Major Course: Relational Database Management System (RDBMS)

Level	Semester	Course Code	Course Name	Credits	Teaching Hours	Exam Duration	Max Marks
5.0	III	109206/ 110206/ 112206/123206/ 134206/135206/138206	Relational Database Management System (RDBMS)	2	30	2 Hrs.	30

Course Objectives:	1. Discuss Database management systems, databases and its applications 2. Familiarize the students with a good formal foundation on the relational model. 3. Outline the various systematic database design approaches 4. Familiarize with SQL, a basic language of database and enhance the skill to perform the queries by using functions. 5. Explore the Cursor, procedure, function and trigger.					
Course Outcomes:	Students will be able to - 1. Understand the fundamental concepts of Database. 2. Knowledge and ability to implement Normalization. 3. Understand the role and responsibility of Database Administrator, 4. Familiar with SQL, a basic language of database and enhance the skill to perform the queries by using functions. 5. Creation and use of store procedure and functions with the help of PL/SQL. 6. Ability to understand, design and implementation of Cursor, procedure, function and trigger.					
Unit System	Contents	Workload Allotted	Weightage of Marks Allotted	Incorporation of Pedagogies		
Unit I	Introduction to Database: Data, Information, Characteristics of Database, Need of database, and Relational Model. Architecture of DBMS, DBA and its Role, Structured Query Language (SQL): Introduction, features, characteristics, advantages, data types, operators, Components of SQL: DDL, DML, DCL and TCL commands, Select statement with Clauses (Order By, Group By, Having, Where)	8 Hrs.	8 Marks	Use any pedagogical technique suitable for the topic		
Unit II	Constraint: Data constraints and its type. Operations on Table with constraints. Views: Need, advantage & types. Index: Need, types and advantages, Joins and	7 Hrs.	7 Marks			

	Union of Tables and its types. In-built Functions: Character Functions, Number Functions, Date Functions, Group Functions, and Conversion Functions, Use of alias, Null, NVL, sub queries.			
Unit III	PL/SQL: Introduction, data types, Block structure of PL/SQL, Exception handling Cursor: Types of Cursor, attributes of Cursor, Life cycle of Cursor	8 Hrs.	8 Marks	
Unit IV	Procedure, Functions, Triggers: Introduction, importance, types advantages & disadvantages. Creation of Procedure, Functions. Backup and Recovery: Introduction, Archive (Transaction) Logs, and Importance of Backups, Database Recovery, and Transaction Control.	7 Hrs.	7 Marks	
References:	Course Material/Learning Resources Text books: 1. SQL, PL/SQL Programming – Ivan Bayross (BPB) 2. SQL A Complete Reference, Alexis Leon, Mathews Leon (Tata McGraw Hill) Reference Books: 1. Database Management System 3rd Ed. by Raghu Ramakrishnan and <i>Johannes Gehrke</i> 2. Oracle PL/SQL Language Pocket Reference, 5E: A Guide to Oracle's PL/SQL Language Fundamentals. by Steven Feuerstein, Bill Pribyl and Chip Dawes (O'REILLY) Weblink to Equivalent MOOC on SWAYAM if relevant: 1. https://onlinecourses.swayam2.ac.in/cec19_cs05/preview 2. https://onlinecourses.nptel.ac.in/noc19_cs46/preview 3. https://onlinecourses.nptel.ac.in/noc20_cs60/preview Weblink to Equivalent Virtual Lab if relevant: 1. http://vlabs.iitb.ac.in/vlabs-dev/labs/dblab/index.php Any pertinent media (recorded lectures, YouTube, etc.) if relevant: 1. https://www.youtube.com/watch?v=3EJlovevfcA 2. https://www.youtube.com/watch?v=U2T_LCdO14Y 3. https://www.youtube.com/watch?v=7wj7UEdLI6U			

Assessment Rubric: Internal for Theory Course (Major)

SANT GADGE BABA AMRAVATI UNIVERSITY, AMRAVATI THEORY EXAMINATION B.Sc. II, SEMESTER – III (NEP)			
Theory	Course Code:109206/ 110206/ 112206/123206/ 134206/135206	Course Title: Relational Database Management System (RDBMS)	Max Marks: 20
Sr. No.	Assessment Criteria		Marks
1	Any Two of the Activity (weekly or monthly assignment/ Unit Test/Class Test) (CAT-1)		10
2	Any One of the Activity includes Open Book Test, MCQ Tests, / Theory related Class activity/Task etc.) etc. (CAT-2)		5
3	Participation in any one Activity includes Quiz, Seminar, Group Discussion, Industry visit, CaseStudy, Mini project, innovative work, etc. based on Theory Course. Involvement in subject related activities such as Conference, Workshop, Coding Competitions etc. (CAT-3)		5

Major Practical: Laboratory on DS and RDBMS

Level	Semester	Course Code	Course Name	Credits	Teaching Hours	Exam Duration	Max Marks
5.0	III	109207/ 110207/ 112207/123207/ 134207/135207/138207	Laboratory on DS and RDBMS	2	60	4Hrs.	50

Course Objectives:	1. To develop coding and understanding of database management system 2. To understand how a real world problem can be solved using the concept of DBMS and DS 3. To solve different DS and RDBMS real world problems & to learn its applications.
Course Outcomes:	On completion of the following syllabus the students will be able to - 1. Be able to design and analyze the time and space efficiency of the data structure. 2. Be capable to identify the appropriate data structure for given problem. 3. Have practical knowledge on the applications of data structures 4. Ability to implement linear and non-linear data structure operations using C programs 5. Ability to solve problems implementing appropriate data structures 6. Ability to implement sorting and searching algorithms using relevant data structures

Contents	Workload Allotted	Weightage of Marks Allotted	Incorporation of Pedagogies
1. Design Program to find sum of N number 2. Design Program to find factorial of N 3. Design Program to find greatest amongst three given number 4. Implementation of traversing technique in array 5. Implementation of insertion technique in array 6. Implementation of deletion technique in array 7. Implementation of PUSH and POP operations on stack. 8. Implementation of insertion and deletion technique in queue 9. Implementation of List data structure using i) array ii) singly linked list. 10. Implementation of recursive technique for finding factorial of an integer. 11. Implement stack using i) array ii) singly linked list 12. Implement Queue using i) array ii) singly linked list 13. Implementation of data insertion in Binary Search trees			Use any pedagogical technique suitable for the topic

14. Implementation of data deletion in Binary Search trees 15. Implementation of search in Binary Search trees 16. Implementation of Linear search 17. Implementation of Binary Search using arrays. 18. Implementation of Bubble sort 19. Implementation of Selection sort 20. Implementation of Insertion sort 21. Illustrate use of DDL commands 22. Illustrate SELECT command by using of possible clauses 23. Illustrate use EXIST, LIKE, IS NULL, IN operators. 24. Illustrate Joins and its types 25. Illustrate queries by using possible inbuilt Character, Number, Date Functions 26. Illustrate queries by using possible Group Functions 27. Write PL/SQL code to create Cursor 28. Write PL/SQL to create Simple Function 29. Write PL/SQL code illustrating loop 30. Write PL/SQL code illustrating conditional controls. 31. Write PL/SQL code to create Triggers 32. Illustrate use of Row Level and Statement level Trigger			
--	--	--	--

Assessment Rubric: External Practical Course

SANT GADGE BABA AMRAVATI UNIVERSITY, AMRAVATI PRACTICAL EXAMINATION B.Sc. II, SEMESTER – III (NEP)				
Practical	Course Code: 109207/ 110207/ 112207/123207/ 134207/135207/138207	Laboratory on DS and RDBMS	Max Marks: 25	Time: 4 Hrs.
Sr. No.	Exercise			Marks
1.	Single Program Writing, Algorithm, Flowchart, Execution, with Sample inputs and Outputs, and Printout			10
2.	Submitted Record book (Preferably handwritten)			05
3.	External Viva Voce			10

Assessment Rubric: Internal Practical Course

SANT GADGE BABA AMRAVATI UNIVERSITY, AMRAVATI PRACTICAL EXAMINATION B.Sc. II, SEMESTER – III (NEP)			
Practical	Course Code: 109207/ 110207/ 112207/123207/ 134207/135207/138207	Laboratory on DS and RDBMS	Max Marks: 25
Sr. No.	Assessment Criteria		Marks
1.	Attendance/Regularity in practical's / Students' overall performance		05
2.	Record book Preparation (Preferably handwritten)		10
3.	Internal Viva Voce		10

IKS –Major Specific: IKS in Computational Sciences

Level	Semester	Course Code	Course Name	Credits	Teaching Hours	Exam Duration	Max Marks
5.0	III	109208/ 110208/ 112208/123208/ 134208/135208/138208	IKS in Computational Sciences	2	30	2 Hrs.	30

Course Objectives:	1. To sensitize the students about context in which they are embedded i.e. Indian Culture and civilization including its Knowledge System and Tradition. 2. Familiarize with the key components of the IKS 3. Know the phonetical foundations in Sanskrit Language. 4. Understand how to measures for time, length and weight were in use in Ancient India. 5. Identify the root of Modern-day binary system.					
Course Outcomes:	Students will be able to - 1. Understanding of the key concepts and principles of the Indian knowledge system. 2. Appreciate the potential Sanskrit offers in Natural Language Processing. 3. Understand how measures, time, length and weight were in use in Ancient India. 4. Understand specific contribution in Arithmetic and Geometry. 5. Demonstrate the aspect of Indian Mathematics.					
Unit System	Contents	Workload Allotted	Weightage of Marks Allotted	Incorporation of Pedagogies		
Unit I	Importance of Ancient knowledge, Defining Indian Knowledge System, The IKS Corpus-A Classification Framework, Caturdasa –vidyasthana. History of IKS, Unique Aspects of IKS. Components of a Language, Sanskrit Grammar and Phonetics in Sanskrit.	8 Hrs.	8 Marks	Use any pedagogical technique suitable for the topic		
Unit II	Computational Concept in Astaddhyayi, Role of Sanskrit in Natural Language Processing. IKS in science, engineering and technology - Introduction to ancient Indian mathematics, importance of mathematics in ancient time, great Indian mathematician and their contribution, number system and its significance, concept of algebra, arithmetic and geometry.	7 Hrs.	7 Marks			

Unit III	Number System in India – Historical Evidence, Salient Features of the Indian Numeral. Concept of Zero and its importance, Large Numbers and their Representation, Place value of Numerals, Decimal Number System, Approaches to represent Numbers,	8 Hrs.	8 Marks	
Unit IV	Measurements for Time, Distance and Weight Unique Aspect of Indian Mathematics, Great Mathematicians and their Contributions, Arithmetic- Square of Number, Square Root, Series and Progressions. Value of Pi (π). Algebra, Binary Mathematics. Magic Squares in India.	7 Hrs.	7 Marks	
References :	Course Material/Learning Resources Text books: 1. Introduction to IKS Concept and Application by Prof B Mahadevan, V R Bhat and Nagendra Pavana R N, PHI Publication. References: 1. Nair, Shantha N. Echoes of Ancient Indian Wisdom. New Delhi: Hindology Books, 2008. 2. Banerjea, P. (1916), Public administration in ancient India, Macmillan, London. 3. Kautilya Arthasastra by Dr. R P Kangle, second edition, 1969, reprint in 2000 by Motilal Banarsi Dass Publishers Private Limited, Delhi. 4. L. N.Rangarajan- Kautilya Arthashastra (English), Penguin Books India (P) Ltd, 1992. Web link: 1. https://iksindia.org/ 2. https://iksindia.org/lectures-and-videos.php 3. https://mmc.ugc.ac.in/Home/Indian_Knowledge_System			

Assessment Rubric: Internal for IKS (Major Specific) Course

SANT GADGE BABA AMRAVATI UNIVERSITY, AMRAVATI THEORY EXAMINATION B.Sc. II, SEMESTER – III (NEP)			
Theory	Course Code: 109208/ 110208/ 112208/123208/ 134208/135208/138208	Course Title: IKS in Computational Sciences	Max Marks: 20
Sr. No.	Assessment Criteria	Marks	
1	Any Two of the Activity (weekly or monthly assignment/ Unit Test/Class Test) (CAT-1)	10	
2	Any One of the Activity includes Open Book Test, MCQ Tests, / Theory related Class activity/Task etc.) etc. (CAT-2)	5	
3	Participation in any one Activity includes Quiz, Seminar, Group Discussion, Industry visit, CaseStudy, Mini project, innovative work, etc. based on Theory Course. Involvement in subject related activities such as Conference, Workshop, Coding Competitions etc. (CAT-3)	5	

Minor Theory: Data Structure and RDBMS

Level	Semester	Course Code	Course Name	Credits	Teaching Hours	Exam Duration	Max Marks
5.0	III	109261/ 110261/ 112261/123261/ 134261/135261/138261	Data Structure and RDBMS	2	30	2 Hrs.	30

Course Objectives:	1. To provide the knowledge of basic of Data Structure 2. To understand importance of Algorithms 3. To understand importance of different steps of algorithm in Computer Science 4. To understand the Data Structure concepts 5. Discuss Database management systems, databases and its applications 6. Familiarize the students with a good formal foundation on the relational model. 7. Outline the various systematic database design approaches 8. Familiarize with SQL, a basic language of database and enhance the skill to perform the queries by using functions.			
Course Outcomes:	Students will be able to - 1. Learn the basic types for data structure, implementation and application. 2. Know the strength and weakness of different data structures. 3. Use the appropriate data structure in context of solution of given problem. 4. Understand the fundamental concepts of Database. 5. Knowledge and ability to implement Normalization. 6. Understand the role and responsibility of Database Administrator, 7. Familiar with SQL, a basic language of database and enhance the skill to perform the queries by using functions.			
Unit System	Contents	Workload Allotted	Weightage of Marks Allotted	Incorporation of Pedagogies
Unit I	Data structure: Introduction to data structure, Types of data structure: Primitive and Non-primitive, Linear and Non-linear data structure, Data structure operations. Array: Definition and concepts, Memory Representations, Operations: Traversing, Insertion,	8 Hrs.	8 Marks	Use any pedagogical

	Deletion.			technique suitable for the topic
Unit II	Stacks: Definition and concepts, Memory Representations, Operations: Traversing, Insertion, Deletion. Queue: Definition and concepts, Memory Representations, Operations: Traversing, Insertion, Deletion. Types of Queue.	7 Hrs.	7 Marks	
Unit III	Introduction to Database: Data, Information, Characteristics of Database, Need of database, and Relational Model. Architecture of DBMS, DBA and its Role, Structured Query Language (SQL): Introduction, features, characteristics, advantages, data types, operators, Components of SQL: DDL, DML, DCL and TCL commands, select statement with clauses (Order By, Group By, Having, Where)	8 Hrs.	8 Marks	
Unit IV	Constraint: Data constraints and its type. Operations on Table with constraints. Snapshot, Views: Need, advantage & types. Index: Need, types and advantages, Joins and Union of Tables and its types. In-built Functions: Character Functions, Number Functions, Date Functions, Group Functions, and Conversion Functions, Use of alias, Null, NVL, sub queries.	7 Hrs.	7 Marks	
References :	Course Material/Learning Resources Text books: 1. Data Structures, Seymour Lipschutz, Schaum's Outlines Series, Tata McGraw-Hill. 2. Text Book of Computer Science (Data Structure and C++): S. D. Pachpande, R. B. Ghayalkar and Athar Iqbal, Dnyanpath Publication. 3. SQL, PL/SQL Programming – Ivan Bayross (BPB) 4. SQL A Complete Reference, Alexis Leon, Mathews Leon (Tata McGraw Hill) Reference Books: 1. Fundamentals of Data Structures in C, Ellis Horowitz, Sartaj Sahni and Susan Anderson-Freed. W.H. Freeman and Company. 2. Data Structure and Algorithms: Aho, Hopcroft, Ulman 3. Introduction to Data Structure: Bhagat Singh, Thomas L Naps 4. Database Management System 3rd Ed. by Raghu Ramakrishnan and <i>Johannes Gehrke</i> 5. Oracle PL/SQL Language Pocket Reference, 5E: A Guide to Oracle's Pl/SQL Language Fundamentals. by Steven Feurstein, Bill Pribyl and Chip Dawes (O'REILLY) Weblink to Equivalent MOOC on SWAYAM if relevant: 1. https://onlinecourses.swayam2.ac.in/cec22_cs19/ 2. https://onlinecourses.nptel.ac.in/noc22_cs92/ 3. https://onlinecourses.nptel.ac.in/noc22_cs70/			

	4. https://onlinecourses.swayam2.ac.in/cec19_cs05/preview 5. https://onlinecourses.nptel.ac.in/noc19_cs46/preview 6. https://onlinecourses.nptel.ac.in/noc20_cs60/preview Any pertinent media (recorded lectures, YouTube, etc.) if relevant: 1. https://www.youtube.com/watch?v=RBSGKIAv0iM 2. https://www.youtube.com/watch?v=zg9ih6SVACc 3. https://www.youtube.com/watch?v=3EJlovevfcA 4. https://www.youtube.com/watch?v=U2T_LCdO14Y 5. https://www.youtube.com/watch?v=7wj7UEdLI6U
Model Questions:	

Assessment Rubric: Internal for Data Structure and RDBMS (Minor Specific) Course

SANT GADGE BABA AMRAVATI UNIVERSITY, AMRAVATI THEORY EXAMINATION B.Sc. II, SEMESTER – III (NEP)			
Theory	Course Code: 109261/ 110261/ 112261/123261/ 134261/135261/138261	Course Title: Data Structure and RDBMS	Max Marks: 20
Sr. No.	Assessment Criteria	Marks	
1	Any Two of the Activity (weekly or monthly assignment/ Unit Test/Class Test) (CAT-1)	10	
2	Any One of the Activity includes Open Book Test, MCQ Tests, / Theory related Class activity/Task etc.) etc. (CAT-2)	5	
3	Participation in any one Activity includes Quiz, Seminar, Group Discussion, Industry visit, CaseStudy, Mini project, innovative work, etc. based on Theory Course. Involvement in subject related activities such as Conference, Workshop, Coding Competitions etc. (CAT-3)	5	

Minor Practical: Laboratory on Data Structure and RDBMS

Level	Semester	Course Code	Course Name	Credits	Teaching Hours	Exam Duration	Max Marks
5.0	III	109262/ 110262/ 112262/123262/ 134262/135262/138262	Laboratory on Data Structure and RDBMS	2	60	4Hrs.	50

Course Objectives:	1. To develop coding and understanding of database management system 2. To understand how a real world problem can be solved using the concept of DBMS and DS 3. To solve different DS and RDBMS real world problems & to learn its applications.			
Course Outcomes:	On completion of the following syllabus the students will be able to - 1. Be able to design and analyze the time and space efficiency of the data structure. 2. Be capable to identify the appropriate data structure for given problem. 3. Have practical knowledge on the applications of data structures 4. Ability to implement linear and non-linear data structure operations using C programs 5. Ability to solve problems implementing appropriate data structures 6. Ability to implement sorting and searching algorithms using relevant data structures			
Contents		Workload Allotted	Weightage of Marks Allotted	Incorporation of Pedagogies
	List of Practical: 1. Design Program to find sum of N number 2. Design Program to find factorial of N 3. Design Program to find greatest amongst three given number 4. Implementation of traversing technique in array 5. Implementation of insertion technique in array 6. Implementation of deletion technique in array 7. Implementation of PUSH operations on stack. 8. Implementation of POP operations on stack. 9. Implementation of insertion technique in queue 10. Implementation of deletion technique in queue 11. Illustrate use of DDL commands 12. Illustrate SELECT command by using of possible clauses 13. Illustrate use EXIST, LIKE, IS NULL, IN operators.			Use any pedagogical technique suitable for the topic

	14. Illustrate Joins and its types 15. Illustrate queries by using possible inbuilt Character, Number, Date Functions 16. Illustrate queries by using possible Group Functions			
--	--	--	--	--

Assessment Rubric: External Practical Course

SANT GADGE BABA AMRAVATI UNIVERSITY, AMRAVATI PRACTICAL EXAMINATION B.Sc. II, SEMESTER – III (NEP)				
Practical	Course Code: 109262/ 110262/ 112262/123262/ 134262/135262/138262	Laboratory on DS and RDBMS	Max Marks: 25	Time: 4 Hrs.
Sr. No.	Exercise			Marks
1.	Single Program Writing, Algorithm, Flowchart, Execution, with Sample inputs and Outputs, and Printout			10
2.	Submitted Record book (Preferably handwritten)			05
3.	External Viva Voce			10

Assessment Rubric: Internal Practical Course

SANT GADGE BABA AMRAVATI UNIVERSITY, AMRAVATI PRACTICAL EXAMINATION B.Sc. II, SEMESTER – III (NEP)			
Practical	Course Code: 109262/ 110262/ 112262/123262/ 134262/135262/138262	Laboratory on DS and RDBMS	Max Marks: 25
Sr. No.	Assessment Criteria		Marks
1.	Attendance/Regularity in practical's / Students' overall performance		05
2.	Record book Preparation (Preferably handwritten)		10
3.	Internal Viva Voce		10

GOEC Theory 5: E Content Development

Level	Semester	Course Code	Course Name	Credits	Teaching Hours	Exam Duration	Max Marks
5.0	III	109275/ 110275/ 112275/123275/ 134275/135275/138275	E Content Development	2	30	2 Hrs.	30

Course Objectives:	1. Understand the fundamentals of e-content development. 2. Learn about instructional design principles. 3. Explore various multimedia tools for e-content creation. 4. Develop interactive and engaging digital learning materials. 5. Assess the quality and effectiveness of e-content.			
Course Outcomes:	Students will be able to - 1. Developing e-content for specific learning management systems (LMS): Integrating e-content with the features of a particular LMS platform. 2. Understanding the role of technology in e-learning: Exploring emerging trends like gamification, artificial intelligence, and adaptive learning in e-content development. 3. Project management skills: Planning, organizing, and executing e-content development projects within timelines and budget constraints.			
Unit System	Contents	Workload Allotted	Weightage of Marks Allotted	Incorporation of Pedagogies
Unit I	Introduction to E-Content Development: Definition, Importance, and Scope of E-Content, Types of E-Content: Text, Audio, Video, Animation, Interactive Modules, Benefits and Challenges in E-Content Development, Role of E-Content in Higher Education and Training. Instructional Design for E-Content: Learning Theories and Pedagogical Models, ADDIE (Analysis, Design, Development, Implementation, Evaluation) Model, Bloom's Taxonomy for Digital Learning, Principles of Effective Instructional Design.	8 Hrs.	8 Marks	Use any pedagogical technique suitable for the topic

Unit II	Tools and Technologies for E-Content Development: Authoring Tools: Articulate Storyline, Adobe Captivate, iSpring, H5P, Video Editing Tools: Camtasia, Adobe Premiere Pro, OpenShot, Audio Editing Tools: Audacity, Adobe Audition, Animation and Infographics: Canva, Powtoon, Vyond, Learning Management Systems (LMS): Moodle, Google Classroom. Multimedia Integration in E-Content: Principles of Multimedia Learning, Creating Engaging Visual Content, Audio Narration and Voiceovers, Interactive Elements: Quizzes, Simulations, and Gamification, Accessibility Considerations in E-Content.	7 Hrs.	7 Marks	
Unit III	E-Content Development Process: Content Planning and Storyboarding, Scripting and Designing Interactive Modules, Content Development and Testing, Publishing and Hosting E-Content (SCORM, HTML5, MP4 Formats).	8 Hrs.	8 Marks	
Unit IV	Evaluation and Quality Assurance in E-Content: Usability Testing and User Feedback, Assessment Strategies for Digital Learning, Standards and Best Practices (SCORM, xAPI, WCAG), Improving Engagement and Retention through Analytics. Emerging Trends in E-Content Development: AI and Machine Learning in E-Learning, Augmented Reality (AR) and Virtual Reality (VR) in Digital Education, Microlearning and Mobile Learning, Cloud-Based Learning Platforms.	7 Hs.	7 Marks	
References :	Course Material/Learning Resources Reference Books: 1. E-Learning and the Science of Instruction – Ruth Colvin Clark & Richard E. Mayer 2. Designing Effective Instruction – Gary R. Morrison, Steven M. Ross, Jerrold E. Kemp, and Howard Kalman 3. E-Content: Technologies and Perspectives for the European Market – P. Belfiore & F. Tiscar 4. Multimedia Learning – Richard E. Mayer 5. The Principles of Beautiful Web Design" – Jason Beaird & James George 6. Digital Media Tools – Nigel Chapman & Jenny Chapman 7. Teaching in a Digital Age – A.W. (Tony) Bates (Available online for free) 8. Learning Management System Technologies and Software Solutions for Online Teaching– Terry Anderson 9. Moodle 4 Administration – Alex Büchner Weblink to Equivalent MOOC on SWAYAM if relevant: 1. https://onlinecourses.swayam2.ac.in/cec20_ge31/preview 2. https://onlinecourses.swayam2.ac.in/ntr22_ed05/preview 3. https://onlinecourses.nptel.ac.in/noc19_ge27/preview			

	4. https://onlinecourses.swayam2.ac.in/ntr21_ed50/preview Weblink to Equivalent Virtual Lab if relevant: 1. https://www.vlab.co.in/ 2. https://concord.org/ Any pertinent media (recorded lectures, YouTube, etc.) if relevant: 1. https://www.youtube.com/playlist?list=PLcsj1x9n9h4gk2xxMdNWluAoGj9EPoFAv 2. https://www.youtube.com/playlist?list=PLt_wlo40Ef554qp2xM-vS1e19DQUcStdP
--	--

Assessment Rubric: Internal for E Content Development (GOEC) Course

SANT GADGE BABA AMRAVATI UNIVERSITY, AMRAVATI THEORY EXAMINATION B.Sc. II, SEMESTER – III (NEP)			
Theory	Course Code:109275/ 110275/ 112275/123275/ 134275/135275/138275	Course Title: E Content Development	Max Marks: 20
Sr. No.	Assessment Criteria	Marks	
1	Any Two of the Activity (weekly or monthly assignment/ Unit Test/Class Test) (CAT-1)	10	
2	Any One of the Activity includes Open Book Test, MCQ Tests, / Theory related Class activity/Task etc.) etc. (CAT-2)	5	
3	Participation in any one Activity includes Quiz, Seminar, Group Discussion, Industry visit, CaseStudy, Mini project, innovative work, etc. based on Theory Course. Involvement in subject related activities such as Conference, Workshop, Coding Competitions etc. (CAT-3)	5	

VSC: Laboratory on MySQL

Level	Semester	Course Code	Course Name	Credits	Teaching Hours	Exam Duration	Max Marks
5.0	III	109284/ 110284/ 112284/ 123284/ 134284/135284/138284	Laboratory on MySQL	2	60	4Hrs.	50

Course Objectives:	1. Get Familiar with Relational Database and MySQL. 2. Able to Create various Relational Database and Operations over it. 3. Prepare queries by using inbuilt functions.			
Course Outcomes:	On competition of the following syllabus the students will be able to - 1. To design and implement on Relational Database Management System. 2. To design and operate various commands of MySQL. 3. To prepared and execute PL/SQL programs on MySQL			
Contents		Workload Allotted	Weightage of Marks Allotted	Incorporation of Pedagogies
	List of Practical: 1. Demonstrate the DDL Commands. (Create, Alter, Drop, Rename) 2. Demonstrate the DML Commands. (Select, Insert, Delete, Update) 3. Demonstrate SELECT commands by using the clauses. (Having, Group By, Where, Order By). 4. Demonstrate the use of Operators. (EXIST, LIKE, IS NULL, IN) 5. Demonstrate the following Joins – (Self, Equi. Outer) 6. Demonstrate the following Character Function. (LOWER, UPPER, INITCAP, CONCAT, LENGTH, SUBSTR, TRIM, REPLACE, LPAD, RPAD) 7. Demonstrate the Numeric Function. (SQUARE ROOT, SINE, MODULUS, CEIL, FLOOR, POWER, ROUND, TRUNCATE, GREATEST, LEAST) 8. Demonstrate the DATE function, (Add month function, Last_day function, Months_between function, Next_function). 9. Demonstrate the Group Function. (COUNT, DISTINCT, MAX, MIN, AVG, SUM) 10. Write PL/SQL code to create Cursor. (IMPLICIT CURSOR, EXPLICIT CURSOR) 11. Write PL/SQL Code to create Simple Function. 12. Write PL/SQL code to demonstrate Loop- a. If Condition Then Statement b. If Condition Then Else Statement			Use any pedagogical technique suitable for the topic

	c. If Condition Elseif Condition Else Statement 13. Write PL/SQL code to demonstrate Conditional Controls 14. Write PL/SQL code to create Trigger. 15. Write PL/SQL code to demonstrate commands on Triggers. (Insert, Update)			
--	---	--	--	--

Assessment Rubric: Internal Examination Practical Course |(VSC)

SANT GADGE BABA AMRAVATI UNIVERSITY, AMRAVATI PRACTICAL EXAMINATION B.Sc. II, SEMESTER – III (NEP)			
Practical	Course Code: 109284/ 110284/ 112284/123284/ 134284/135284/138284	Laboratory on MySQL	Max Marks: 50
Sr. No.	Assessment Criteria	Marks	
1.	Single Program Writing, Algorithm, Flowchart, Execution, with Sample inputs and Outputs, and Printout	20	
2.	Record book preparation (Preferably handwritten) / Assignments preparation during semester	10	
3.	Attendance in practical session / Students' overall performance	10	
4.	Internal Viva Voce	10	

**Field Project / Community Engagement Services in Computer Science (112)/Information Technology (123)/
Computer Application (Regular) (109)/ Computer Application (Vocational) (110)/Data Analytics (134)/Data
Science and Analytics (135)/ Web Designing and Development (138): Phase-I**

Level	Semester	Course Code	Course Name	Credits	Teaching Hours	Exam Duration	Max Marks
5.0	III	109291/ 110291/ 112291/123291/ 134291/135291/138291	Field Project / Community Engagement Services in Computer Science (112)/Information Technology (123)/ Computer Application (Regular) (109)/ Computer Application (Vocational) (110)/Data Analytics (134)/Data Science and Analytics (135)/ Web Designing and Development (138): Phase-I	2	60	--	50

Course Objectives:

- To develop a sense of social responsibility among students.
- To foster civic values and the spirit of community service.
- To provide practical experience in addressing societal issues.
- To encourage students to work collaboratively with community members and organizations.
- To enhance critical thinking, problem-solving, and leadership skills through real-world application.
- To help students to initiate developmental activities in the community in coordination with public and government authorities.
- To enable students to apply theoretical/practical Computer Science/Application/Engineering concepts in real-life challenges, enhancing the quality of experiential learning.
- To give exposure to the students about the development of relation between rural communities and Computer Technology
- To study the Computer Technology driven solutions for local problems

Course Outcomes:

Upon successful completion of this course, students will be able to:

- Develop problem-solving and critical thinking abilities by social activities and services to real-world situation.
- Critically evaluate information and conclusions based on the analysis and interpretation of data collected during the project.

- Contribute the knowledge to the social cause by understanding the societal problems and deriving the solution for the same
- Gain valuable experience and skills in a relevant field.
- Gain efficiency in written and oral communication through activity reports, presentations and discussions.
- Work effectively as part of a team to achieve social responsibility.
- Understand the importance of Computer Technology in various rural area problems.
- Build connections with local communities and learn from traditional knowledge.
- Identify Computer Technology related challenges (Lack of Technological Knowledge, non-availability of infrastructure, ICT problem, etc.) and provide the solution/ corrective measure to the concerning authority.

Guidelines/ SoP for FP/CEP

For understanding key principles of CE, forms of CE, operational guidelines and implementation strategy please refer https://www.ugc.gov.in/pdfnews/4187860_Revised-Final-Guidelines.pdf

As per NEP 2020, students of B Sc. II of Semester III need to perform a Field Project (FP) for TWO (2) credits i.e. 50 Marks.

The guidelines regarding the field project are as follows:

1. Students must complete 60 hours of field engagement.
2. Work may be done individually or in groups of up to 4 students, each under a departmental faculty guide.
3. A survey or sample collection methodology must be chosen, with appropriate documentation tools: questionnaires, datasheets, plant specimen formats, etc.
4. Projects can be survey-based, experimental, observational, or intervention-based.
5. **Final report to include:** Title, Introduction, Materials & Methods, Results, Discussion, Conclusion, References.
6. Minimum 6 pages excluding cover page, certificate, acknowledgement, etc.
7. Poster/PPT presentation is mandatory and will be evaluated by an appointed examiner.
8. For a SURVEY based project related questionnaire (15 or more questions) shall be prepared.
9. The departmental coordinator/guide shall check the questions and finalize the questionnaire. The question that may create unnecessary complications should be avoided. The questions should be qualitative as well as quantitative.
10. If the project is related to work that does not involve survey work, then the questionnaire part can be replaced accordingly (e.g. Sample collection/Data collection/ Experimental base etc.).
11. The total project work including preparation of questionnaire to presentation should be evaluated for 2 credits (50 Marks).

**SUGGESTED FORMS OF COMMUNITY-ENGAGED PRACTICE IN COMPUTER SCIENCE (112)/INFORMATION TECHNOLOGY (123)/
COMPUTER APPLICATION (REGULAR) (109)/ COMPUTER APPLICATION (VOCATIONAL) (110)/DATA ANALYTICS (134)/DATA
SCIENCE AND ANALYTICS (135)/ WEB DESIGNING AND DEVELOPMENT (138)**

Community Engagement Services (CES) in Computer Science involve using technology and digital tools to connect, involve, and empower communities. This can encompass various activities, from developing online platforms for community interaction to using data analysis to understand community needs and informed decision-making. CES in Computer Science aims to bridge the digital divide, promote digital literacy, and foster collaboration between communities and organizations.

Here's a more detailed look at CES in Computer Science:

Students have to choose any one of the following as the Community Engagement Services. Programmes may be interdisciplinary, integrating knowledge from various fields such as social sciences, health, education, environmental studies, etc.

1) Teaching

- Basics of Computers, MS Office and internet
- Cyber security and cyber crime
- Applications of statistics in real life
- Introduction to Statistical Software (Excel)
- Online digital services

2) Services

- Digital Banking and Online Payments
- Basic software installation
- E-Governance and Digital Services
- Health Awareness Using Digital Tools
- Online digital services and literacy

3) Data Collection and Survey

- Utilization of government community empowerment schemes.
- IT infrastructure in India
- Cyber and forensic investigation in India, Etc.

Note: Students must have to perform activities from above heads to complete 60 hours of community engagement and services

Key Benefits of CES in Computer Science:

- **Increased Community Participation:**
CES can make it easier for community members to participate in decision-making processes and contribute to their community's development.
- **Improved Communication:**
Online platforms and digital tools can facilitate better communication and information sharing within communities.
- **Enhanced Collaboration:**
CES can foster collaboration between community members, organizations, and local governments.
- **Empowered Communities:**
By providing access to information, resources, and technology, CES can empower communities to address their own needs and shape their future.
- **Greater Social Impact:**
CES can contribute to positive social change by addressing critical community needs and promoting civic engagement.

Assessment Rubric for FP/CEP: Phase -I

**SANT GADGE BABA AMRAVATI UNIVERSITY, AMRAVATI
B.Sc. II, SEMESTER – III (NEP)**

FP/CEP	109291/ 110291/ 112291/123291/ 134291/135291/138291	Field Project / Community Engagement Services in Computer Science (112)/Information Technology (123)/ Computer Application (Regular) (109)/ Computer Application (Vocational) (110)/Data Analytics (134)/Data Science and Analytics (135)/ Web Designing and Development (138): Phase-I	Max Marks: 50
Q. No.	Exercise		Marks
1	Field Engagement & Participation (Attendance, hands-on involvement, and community interaction)		15
2	Project Report Quality (Clarity, structure, scientific accuracy, originality, and referencing)		15
3	Data Collection & Analysis (Depth, relevance, and quality of survey/sample collection and its analysis)		10
4	Presentation (Poster or PPT) (Communication of findings, visual clarity, and confidence)		05
5	Social Relevance & Innovation (Creative solutions, awareness campaigns, or community impact beyond data.)		05

SYLLABUS

B.Sc.- II, SEMESTER – IV

B.Sc. Computer Science (112)

Information Technology (123)

Computer Application (Regular) (109)

Computer Application (Vocational) (110)

Data Analytics (134)

Data Science and Analytics (135)

Web Designing and Development (138)

Teaching and Learning Scheme: for the Degree of Bachelor of Science with the Major: Computer Science (112)/Information Technology (123)/Computer Application (Regular) (109)/ Computer Application (Vocational) (110)/Data Analytics (134)/Data Science and Analytics (135)/ Web Designing and Development (138)

(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))

Major Course: OOP with C++

Level	Semester	Course Code	Course Name	Credits	Teaching Hours	Exam Duration	Max Marks
5.0	IV	109209/110209/ 112209/123209/ 134209/135209/ 138209	OOP with C++	2	30	2 Hrs	30

Course Objectives:	1. To understand the concepts of object-oriented paradigm 2. To understand the C++ language features for OOP 3. Apply object-oriented concepts in programming 4. Use object-oriented thinking in problem-solving 5. Able to differentiate structure oriented programming and object oriented programming. 6. Able to understand and apply various object oriented features. 7. Able to know concepts in operator overloading, function overloading & polymorphism.						
Course Outcomes:	1. Understanding of fundamental principles of OOP, including concepts like classes, objects, inheritance, polymorphism, encapsulation 2. Understanding of how to apply OOP concepts effectively within the C++ programming language 3. Design and develop structured, reusable, and modular code by creating well-defined classes and objects to solve complex problems.						
Unit System	Contents	Workload Allotted			Weightage of Marks Allotted	Incorporation of Pedagogies	
Unit I	OOP Paradigm: Basic Concepts, Features, Advantages, Applications of OOP, Structured Vs OOP, Trending OOP Languages.	8 Hrs			8 Marks	Use any pedagogical	

	OOP Concepts- Data Abstraction and Encapsulation: Classes and Objects Introduction, Defining a Class,			technique suitable for the topic
Unit II	Functions: Function Prototype, Inline Function, Default Argument, Function Overloading, Constructors: Types of Constructors: Default, Parameterized and Copy Constructor	7 Hrs	7 Marks	
Unit III	Functions and Objects: Access Specifiers, Memory Allocation for Objects, Objects as Function Arguments, Returning Objects from Functions. Inheritance: Definition, Types of Inheritance: Single, Multiple, Hierarchical, Multilevel, Hybrid, Visibility Modes	8 Hrs	8 Marks	
Unit IV	Polymorphism: Compile Time, Run Time, Virtual Base Classes, Virtual Functions, Pure Virtual Functions, Early Binding and Late Binding. Function Overriding, Operator Overloading, Overloading Unary and Binary Operator, Rules for Overloading.	7 Hrs	7 Marks	
References :	Course Material/Learning Resources Text books: 1. Object oriented programming with C++: E. Balagurusamy Reference Books: 1. The Object-Oriented Thought Process, 5th Edition by Matt Weisfeld 2. An Introduction to Object-Oriented Programming: Timothy Budd 3. The C++ programming language: Bjarne Stroustrup 4. Programming principles and Practice using C++: Bjarne Stroustrup Weblink to Equivalent MOOC on SWAYAM if relevant: 1. https://onlinecourses.nptel.ac.in/noc21_cs02/preview 2. https://www.classcentral.com/course/swayam-programming-in-c-6704 3. https://www.coursera.org/learn/cplusplus-crypto-i 4. https://www.mygreatlearning.com/academy/learn-for-free/courses/oops-concepts-in-c 5. https://www.coursera.org/courses?query=object%20oriented%20programming 6. https://www.classcentral.com/course/freecodecamp-object-oriented-programming-oop-in-c-course-104967 7. https://unacademy.com/goal/computer-science/VTQXS/free-platform/object-oriented-programming-in-c/TKNQJ 8. https://www.udemy.com/course/c-programming-oops-concepts/?srsltid=AfmBOopd-ae-k0vN2Q5HR8HWNZKLKxN1jBPrld4RqxQ8vbpg91bFp6L5&couponCode=ST3MT200225A 9. https://www.edx.org/learn/object-oriented-programming/ibm-object-oriented-implementation-using-c			

	Weblink to Equivalent Virtual Lab if relevant: 1. https://www.programiz.com/cpp-programming/online-compiler/ 2. https://www.onlinegdb.com/online_cplusplus_compiler 3. https://onecompiler.com/cpp 4. https://www.codechef.com/cpp-online-compiler
--	--

Assessment Rubric: Internal for Theory Course (Major)

SANT GADGE BABA AMRAVATI UNIVERSITY, AMRAVATI THEORY EXAMINATION B.Sc. II, SEMESTER-IV (NEP)			
Theory	Course Code: 109209/110209/ 112209/123209/ 134209/135209/138209	Course Title: OOP with C++	Max Marks: 20
Sr. No.	Assessment Criteria		Marks
1	Any Two of the Activity (weekly or monthly assignment/ Unit Test/Class Test) (CAT-1)		10
2	Any One of the Activity includes Open Book Test, MCQ Tests, / Theory related Class activity/Task etc.) etc. (CAT-2)		5
3	Participation in any one Activity includes Quiz, Seminar, Group Discussion, Industry visit, CaseStudy, Mini project, innovative work, etc. based on Theory Course. Involvement in subject related activities such as Conference, Workshop, Coding Competitions etc. (CAT-3)		5

Major Course: Computer Networks

Level	Semester	Course Code	Course Name	Credits	Teaching Hours	Exam Duration	Max Marks
5.0	IV	109210/110210/ 112210/123210/ 134210/135210/138210	Computer Networks	2	30	2 Hrs	30

Course Objectives:	1. To provide the knowledge of basic of Computer Network. 2. To understand importance of OSI model in Computer Networking. 3. To understand importance of Network Devices and Network Topology. 4. To understand the concepts of Internet and Email Services.						
Course Outcomes:	Students will be able to - 1. Define Computer Networks, its types and Network Topologies. 2. Define Network Devices and OSI Model. 3. Introduce about data Transmission Media, Switching and Multiplexing. 4. Define Internet and E-mail System						
Unit System	Contents	Workload Allotted	Weightage of Marks Allotted	Incorporation of Pedagogies			
Unit I	Introduction to Networking: Introduction, Need of Computer Network, Communication Protocol, Types of Networks: LAN, MAN, WAN Network Topology: Ring, Bus, Star & Mesh.	8 Hrs	8 Marks	Use any pedagogical technique suitable for the topic			
Unit II	Network Devices: Repeater, Hub, Switch, Bridge, Router OSI Reference Model: Introduction, OSI Model, Functions of seven layers of OSI.	7 Hrs	7 Marks				
Unit III	Data Transmission Media: Guided Media (Twisted pair, Coaxial, Fiber Optics) and Wireless media (Radio Waves, Micro Waves, Infrared). Switching: Circuit, Message, Packet. Multiplexing: Frequency Division, Time Division	8 Hrs	8 Marks				
Unit IV	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.	7 Hrs	7 Marks				

References:	Course Material/Learning Resources Text books: 1. Computer Networks (Fourth Edition) - Andrew S. Tanenbaum (PHI) 2. Data Communications and Networking, 4th Edition, Behrouz A Forouzan. McGraw-Hill 3. Computer Networking; A Top Down Approach Featuring The Internet, 2nd Edition, Kurose James F., Ross W. Keith PEARSON EDUCATION ASIA Reference Books: 1. Business Data Communication & Networking (fifth edition) – Fitzerland & Dennis. 2. Data and Computer Communication – William Stallings (Pearson) 3. Data Communication and Networking – Behrouz A. Forouzan (McGraw Hill) 4. Computer Network & Internet - Douglas E. Comer (Pearson) Weblink to Equivalent MOOC on SWAYAM if relevant: 1. https://onlinecourses.swayam2.ac.in/ntr25_ed44/ 2. https://onlinecourses.nptel.ac.in/noc25_cs02/ 3. https://onlinecourses.nptel.ac.in/noc25_cs15/
--------------------	--

Assessment Rubric: Internal for Theory Course (Major)

SANT GADGE BABA AMRAVATI UNIVERSITY, AMRAVATI THEORY EXAMINATION B.Sc. II, SEMESTER-IV (NEP)			
Theory	Course Code: 109210/110210/ 112210/123210/ 134210/135210/138210	Course Title: Computer Networks	Max Marks: 20
Sr. No.	Assessment Criteria	Marks	
1	Any Two of the Activity (weekly or monthly assignment/ Unit Test/Class Test) (CAT-1)	10	
2	Any One of the Activity includes Open Book Test, MCQ Tests, / Theory related Class activity/Task etc.) etc. (CAT-2)	5	
3	Participation in any one Activity includes Quiz, Seminar, Group Discussion, Industry visit, CaseStudy, Mini project, innovative work, etc. based on Theory Course. Involvement in subject related activities such as Conference, Workshop, Coding Competitions etc. (CAT-3)	5	

Major Course: Python Programming

Level	Semester	Course Code	Course Name	Credits	Teaching Hours	Exam Duration	Max Marks
5.0	IV	109211/110211/ 112211/123211/ 134211/135211/138211	Python Programming	2	30	2 Hrs	30

Course Objectives:	1. To understand the fundamentals of the Python programming language 2. To develop problem-solving skills using Python. 3. To learn modular programming through functions, parameter passing techniques, exception handling, and the use of built-in modules in Python. 4. To perform string manipulation and implement Python programs						
Course Outcomes:	Students will be able to - 1. Describe the core syntax and semantics of Python programming language. 2. Discover the need for working with the strings and functions. 3. Illustrate the process of structuring the data using lists, dictionaries, tuples and sets. 4. Indicate the use of regular expressions and built-in functions						
Unit System	Contents	Workload Allotted	Weightage of Marks Allotted	Incorporation of Pedagogies			
Unit I	Introduction: History of Python Programming Language, Thrust area of Python, Installing Anaconda Python Distribution, Installing PyCharm IDE to setup a Python Development Environment, Creating and running your first Python Project. Parts of Python Programming Language: Identifiers, Keywords, Statements and Expressions, Variables, Operators, Precedence and Associativity.	8 Hrs	8 Marks	Use any pedagogical technique suitable for the topic			
Unit II	Data Types, Indentation, Comments, Reading Input, Printing Output, Type Conversions, The type() Function and Is Operator, Dynamic and Strongly Typed Language. Control Flow Statements: The if, if-else, if-elif-else Decision Control Statement, Nested if Statement, The while Loop, The for Loop, The continue and break Statements.	7 Hrs	7 Marks				
Unit III	Functions: Built-In Functions, Commonly Used Modules, Function Definition and Calling the Function, The return Statement and void Function, Scope and Lifetime of Variables, Default Parameters, Keyword Arguments, *args and **kwargs, Command Line Arguments	8 Hrs	8 Marks				
Unit IV	Strings: Creating and Storing Strings, Basic String Operations, Accessing Characters in	7 Hrs	7 Marks				

	String by Index Number, String Slicing and Joining,			
References :	Course Material/Learning Resources Text books: 1. “Introduction to Python Programming”, 1st Edition, by Gowrishankar S, Veena A Reference Books: 1. “Python Data Science Handbook: Essential Tools for Working with Data”, by Jake VanderPlas, 2. “Hands-On Machine Learning with Scikit-Learn and TensorFlow: Concepts, Tools, and Techniques to Build Intelligent Systems”, by Aurelien Geron 3. “Core Python Applications Programming”, 3rd Edition, by Wesley J Chun education. Weblink to Equivalent MOOC on SWAYAM if relevant: 1. https://onlinecourses.swayam2.ac.in/aic20_sp33/preview 2. https://onlinecourses.nptel.ac.in/noc19_cs40/preview 3. https://www.classcentral.com/course/swayam-python-for-data-science-14266 Weblink to Equivalent Virtual Lab if relevant: 1. https://python-iitk.vlabs.ac.in/ 2. http://vlabs.iitb.ac.in/vlabs-dev/labs/python-basics/index.html 3. https://www.vlab.co.in/broad-area-computer-science-and-engineering Any pertinent media (recorded lectures, YouTube, etc.) if relevant: 1. https://www.youtube.com/watch?v=daefaLgNkw0 2. https://www.youtube.com/watch?v=W8KRzmHUcc 3. https://www.youtube.com/watch?v=gfDE2a7MKjA			

Assessment Rubric: Internal for Theory Course (Major)

SANT GADGE BABA AMRAVATI UNIVERSITY, AMRAVATI THEORY EXAMINATION B.Sc. II, SEMESTER-IV (NEP)			
Theory	Course Code:109211/110211/ 112211/123211/ 134211/135211/138211	Course Title: Python Programming	Max Marks: 20
Sr. No.	Assessment Criteria		Marks
1	Any Two of the Activity (weekly or monthly assignment/ Unit Test/Class Test) (CAT-1)		10
2	Any One of the Activity includes Open Book Test, MCQ Tests, / Theory related Class activity/Task etc.) etc. (CAT-2)		5
3	Participation in any one Activity includes Quiz, Seminar, Group Discussion, Industry visit, CaseStudy, Mini project, innovative work, etc. based on Theory Course. Involvement in subject related activities such as Conference, Workshop, Coding Competitions etc. (CAT-3)		5

Major Practical: Laboratory on OOP with C++

Level	Semester	Course Code	Course Name	Credits	Teaching Hours	Exam Duration	Max Marks
5.0	IV	109212/110212/ 112212/ 123212/ 134212/135212/138212	Laboratory on C++ and Python Programming	2	60	4Hrs	50

Course Objectives:	1. To learn the syntax and semantics of the C++ programming language. 2. To understand the concept of data abstraction and encapsulation. 3. Perform programs on OOPs using C++ 4. Perform programs on functions, constructor and destructor. 5. To learn how to overload functions and operators in C++ 6. Understand and implement concept of Inheritance. 7. To learn how to design C++ classes for code reuse. 8. To implement Python programs with conditionals and loops. 9. Use functions for structuring Python programs. 10. Represent compound data using Python lists, tuples, and dictionaries.						
Course Outcomes:	On completion of the following syllabus the students will be able to - 1. Able to write, compile and debug programs in C++ language. 2. Design programs involving constructors, destructors. 3. Able to use C++ classes and class libraries, arrays and pointers 4. Able to use Python programs with conditionals and loops. 5. Able to use functions for structuring Python programs. 6. Able to compound data using Python lists, tuples, and dictionaries.						
Contents					Workload Allotted	Weightage of Marks Allotted	Incorporation of Pedagogies

	List of Practical: 1. Write a program in C++ to demonstrate Class and Object. 2. Write a program in C++ to demonstrate constructor and destructor. 3. Write a program in C++ to demonstrate Inline function. 4. Write a program in C++ to demonstrate the use of friend function. 5. Write a program in C++ for default argument. 6. Write a program in C++ for unary operator overloading. 7. Write a program in C++ for Binary operator overloading. 8. Write a program in C++ for function overloading. 9. Write a program in C++ for virtual base class. 10. Write a program in C++ to implement single Inheritance. 11. Write a program in C++ to implement multiple Inheritance. 12. Write a program in C++ to implement multilevel Inheritance. 13. Write a program in C++ to implement hybrid Inheritance. 14. Write a program in C++ to implement hierarchical Inheritance. 15. Write a program in C++ for constructor overloading. 16. Write a program in C++ to implement parameterized constructor 17. Write a program in C++ to implement copy constructor 18. Write a program to demonstrate different number data types in python. 19. Write a Python program to perform different arithmetic operations on numbers. 20. Write a Python Program for checking whether the given number is an even number or not. Using a for loop. 21. Write a Python program using a while loop that asks the user for a number, and prints a countdown from that number to zero. 22. Write a Python program to demonstrate if-elif-else statement 23. Write a Python program to demonstrate nested if- else statement 24. Write a program to create, concatenate and print a string and accessing substring from a given string. 25. Write a Python program to check if a substring is present in a given string.			Use any pedagogical technique suitable for the topic
--	---	--	--	---

References:	Weblink to Equivalent MOOC on SWAYAM if relevant: 1. https://www.programiz.com/cpp-programming/online-compiler/ 2. https://www.onlinegdb.com/online_cplusplus_compiler 3. https://onecompiler.com/cpp 4. https://www.codechef.com/cpp-online-compiler 5. https://www.w3schools.com/cpp/cpp_compiler.asp 6. https://www.tutorialspoint.com/compile_cpp_online.php 7. https://nextleap.app/online-compiler/cpp-programming 8. https://www.jdoodle.com/online-compiler-cplusplus			
--------------------	---	--	--	--

Assessment Rubric: External Practical Course

SANT GADGE BABA AMRAVATI UNIVERSITY, AMRAVATI PRACTICAL EXAMINATION B.Sc. II, SEMESTER – III (NEP)				
Practical	Course Code: 109212/ 110212/ 112212/123212/ 134212/135212/138212	Laboratory on C++ and Python Programming	Max Marks: 25	Time: 4 Hrs.
Sr. No.	Exercise			Marks
1.	Single Program Writing, Algorithm, Flowchart, Execution, with Sample inputs and Outputs, and Printout			10
2.	Submitted Record book (Preferably handwritten)			05
3.	External Viva Voce			10

Assessment Rubric: Internal Practical Course

SANT GADGE BABA AMRAVATI UNIVERSITY, AMRAVATI PRACTICAL EXAMINATION B.Sc. II, SEMESTER – III (NEP)			
Practical	Course Code: 109212/ 110212/ 112212/123212/ 134212/135212/138212	Laboratory on C++ and Python Programming	Max Marks: 25
Sr. No.	Assessment Criteria		Marks
1.	Attendance/Regularity in practical's / Students' overall performance		05
2.	Record book Preparation (Preferably handwritten)		10
3.	Internal Viva Voce		10

Minor Course: C++ and Python Programming

Level	Semester	Course Code	Course Name	Credits	Teaching Hours	Exam Duration	Max Marks
5.0	IV	109263/110263/ 112263/123263/ 134263/135263/138263	C++ and Python Programming	2	30	2 Hrs	30

Course Objectives:	After completion of this course student will be able to: 1. To understand the concepts of object-oriented paradigm 2. To understand the C++ language features for OOP 3. Apply object-oriented concepts in programming 4. Use object-oriented thinking in problem-solving 5. Able to differentiate structure oriented programming and object oriented programming. 6. Able to understand and apply various object oriented features. 7. To understand the core syntax and semantics of Python programming language. 8. To understand the working with functions. 9. To understand the concepts of lists, dictionaries			
Course Outcomes:	1. Understanding of fundamental principles of OOP, including concepts like classes, objects, inheritance, polymorphism, encapsulation 2. Understanding of how to apply OOP concepts effectively within the C++ programming language 3. Design and develop structured, reusable, and modular code by creating well-defined classes and objects to solve complex problems. 4. Describe the core syntax and semantics of Python programming language. 5. Discover the need for working with functions. 6. Illustrate the process of structuring the data using lists, dictionaries			
Unit System	Contents	Workload Allotted	Weightage of Marks Allotted	Incorporation of Pedagogies
Unit I	OOP Paradigm: Basic Concepts, Features, Advantages, Applications of OOP, Structured Vs OOP, Trending OOP Languages. OOP Concepts- Data Abstraction and Encapsulation: Classes and Objects, Defining a Class.	8 Hrs	8 Marks	Use any pedagogical technique suitable for the topic
Unit II	Functions: Function Prototype, Inline Function, Default Argument, Function Overloading,	7 Hrs	7 Marks	

	Constructors: Types of Constructors: Default, Parameterized and Copy Constructor Inheritance: Definition, Types of Inheritance: Single, Multiple, Hierarchical, Multilevel, Hybrid, Visibility Modes			
Unit III	Introduction: History of Python Programming Language, Thrust area of Python Parts of Python Programming Language: Identifiers, Keywords, Statements and Expressions, Variables, Operators, Precedence and Associativity. Data Types, Indentation, Comments, Reading Input, Printing Output, Type Conversions, The type() Function and Is Operator, Dynamic and Strongly Typed Language.	8 Hrs	8 Marks	
Unit IV	Control Flow Statements: The if, if-else, if-elif-else Decision Control Statement, Nested if Statement, The while Loop, The for Loop, The continue and break Statements. Functions: Built-In Functions, Commonly Used Modules, Function Definition and Calling the Function, The return Statement and void Function, Scope and Lifetime of Variables, Default Parameters,	7 Hrs	7 Marks	
References :	Course Material/Learning Resources Text books: 1. Object oriented programming with C++: E. Balagurusamy 2. "Introduction to Python Programming", 1st Edition, by Gowrishankar S, Veena A Reference Books: 1. The Object-Oriented Thought Process, 5th Edition by Matt Weisfeld 2. An Introduction to Object-Oriented Programming: Timothy Budd 3. The C++ programming language: Bjarne Stroustrup 4. Programming principles and Practice using C++: Bjarne Stroustrup 5. "Python Data Science Handbook: Essential Tools for Working with Data", by Jake VanderPlas, 6. "Hands-On Machine Learning with Scikit-Learn and TensorFlow: Concepts, Tools, and Techniques to Build Intelligent Systems", by Aurelien Geron 7. "Core Python Applications Programming", 3rd Edition, by Wesley J Chun 8. "Flask Web Development: Developing Web Applications with Python", 2nd Edition, by Miguel Grinberg, Weblink to Equivalent MOOC on SWAYAM if relevant: 1. https://onlinecourses.nptel.ac.in/noc21_cs02/preview 2. https://www.classcentral.com/course/swayam-programming-in-c-6704 3. https://www.coursera.org/learn/cplusplus-crypto-i 4. https://www.mygreatlearning.com/academy/learn-for-free/courses/oops-concepts-in-c 5. https://www.coursera.org/courses?query=object%20oriented%20programming 6. https://www.classcentral.com/course/freecodecamp-object-oriented-programming-oop-in-c-course-104967			

7. <https://unacademy.com/goal/computer-science/VTQXS/free-platform/object-oriented-programming-in-c/TKNQJ>
8. <https://www.udemy.com/course/c-programming-oops-concepts/?srsltid=AfmBOopd-ae-k0vN2Q5HR8HWNZKLKxN1jBPr1d4RqxQ8vbpg91bFp6L5&couponCode=ST3MT200225A>
9. <https://www.edx.org/learn/object-oriented-programming/ibm-object-oriented-implementation-using-c>
10. https://onlinecourses.swayam2.ac.in/aic20_sp33/preview
11. https://onlinecourses.nptel.ac.in/noc19_cs40/preview
12. <https://www.classcentral.com/course/swayam-python-for-data-science-14266>

Weblink to Equivalent Virtual Lab if relevant:

1. <https://www.programiz.com/cpp-programming/online-compiler/>
2. https://www.onlinegdb.com/online_c++_compiler
3. <https://onecompiler.com/cpp>
4. <https://www.codechef.com/cpp-online-compiler>
5. <https://python-iitk.vlabs.ac.in/>
6. <http://vlabs.iitb.ac.in/vlabs-dev/labs/python-basics/index.html>
7. <https://www.vlab.co.in/broad-area-computer-science-and-engineering>

Assessment Rubric: Internal for Theory Course (Minor)

SANT GADGE BABA AMRAVATI UNIVERSITY, AMRAVATI THEORY EXAMINATION B.Sc. II, SEMESTER-IV (NEP)			
Theory	Course Code:109263/110263/ 112263/123263/ 134263/135263/138263	Course Title: C++ and Python Programming	Max Marks: 20
Sr. No.	Assessment Criteria		Marks
1	Any Two of the Activity (weekly or monthly assignment/ Unit Test/Class Test) (CAT-1)		10
2	Any One of the Activity includes Open Book Test, MCQ Tests, / Theory related Class activity/Task etc.) etc. (CAT-2)		5
3	Participation in any one Activity includes Quiz, Seminar, Group Discussion, Industry visit, CaseStudy, Mini project, innovative work, etc. based on Theory Course. Involvement in subject related activities such as Conference, Workshop, Coding Competitions etc. (CAT-3)		5

Minor Practical: Laboratory on C++ and Python Programming

Level	Semester	Course Code	Course Name	Credits	Teaching Hours	Exam Duration	Max Marks
5.0	IV	109264/110264/ 112264/123264/ 134264/135264/138264	Laboratory on C++ and Python Programming	2	60	4Hrs	50

Course Objectives:	1. To learn the syntax and semantics of the C++ programming language. 2. To understand the concept of data abstraction and encapsulation. 3. Perform programs on OOPs using C++ 4. Perform programs on functions, constructor and destructor. 5. To learn how to overload functions and operators in C++ 6. Understand and implement concept of Inheritance. 7. To learn how to design C++ classes for code reuse. 8. To implement Python programs with conditionals and loops. 9. Use functions for structuring Python programs. 10. Represent compound data using Python lists and dictionaries.						
Course Outcomes:	On completion of the following syllabus the students will be able to - 1. Able to write, compile and debug programs in C++ language. 2. Design programs involving constructors, destructors. 3. Able to use C++ classes and class libraries, arrays and pointers 4. Able to use Python programs with conditionals and loops. 5. Able to use functions for structuring Python programs. 6. Able to compound data using Python lists, tuples, and dictionaries.						
Contents				Workload Allotted	Weightage of Marks Allotted	Incorporation of Pedagogies	

	List of Practical: 1. Write a program in C++ to demonstrate Class and Object. 2. Write a program in C++ to demonstrate the Constructor 3. Write a program in C++ to demonstrate Inline function. 4. Write a program in C++ for default argument. 5. Write a program in C++ for function overloading. 6. Write a program in C++ to implement single Inheritance. 7. Write a program in C++ to implement multiple Inheritance. 8. Write a program in C++ to implement multilevel Inheritance. 9. Write a program in C++ to implement hybrid Inheritance. 10. Write a program in C++ to implement hierarchical Inheritance. 11. Write a program to demonstrate different number data types in python. 12. Write a Python program to perform different arithmetic operations on numbers. 13. Write a Python program for checking whether the given number is an even number or not, using a for loop. 14. Write a Python program using a while loop that asks the user for a number, and prints a countdown from that number to zero. 15. Write a Python program to perform different arithmetic operations on numbers. 16. Write a Python Program for checking whether the given number is an even number or not. Using a for loop. 17. Write a Python program using a while loop that asks the user for a number, and prints a countdown from that number to zero. 18. Write a Python program to demonstrate if-elif-else statement 19. Write a Python program to demonstrate nested if- else statement			Use any pedagogical technique suitable for the topic
References:	Weblink to Equivalent MOOC on SWAYAM if relevant: 1. https://www.programiz.com/cpp-programming/online-compiler/ 2. https://www.onlinegdb.com/online_cplusplus_compiler 3. https://onecompiler.com/cpp 4. https://www.codechef.com/cpp-online-compiler 5. https://www.w3schools.com/cpp/cpp_compiler.asp 6. https://www.tutorialspoint.com/compile_cpp_online.php 7. https://nextleap.app/online-compiler/cpp-programming 8. https://www.jdoodle.com/online-compiler-cplusplus			

Assessment Rubric: External Practical Course

SANT GADGE BABA AMRAVATI UNIVERSITY, AMRAVATI PRACTICAL EXAMINATION B.Sc. II, SEMESTER – IV (NEP)				
Practical	Course Code: 109264/110264/ 112264/123264/ 134264/135264/138264	Laboratory on C++ and Python Programming	Max Marks: 25	Time: 4 Hrs.
Sr. No.	Exercise			Marks
1.	Single Program Writing, Algorithm, Flowchart, Execution, with Sample inputs and Outputs, and Printout			10
2.	Submitted Record book (Preferably handwritten)			05
3.	External Viva Voce			10

Assessment Rubric: Internal Practical Course

SANT GADGE BABA AMRAVATI UNIVERSITY, AMRAVATI PRACTICAL EXAMINATION B.Sc. II, SEMESTER – IV (NEP)			
Practical	Course Code: 109264/110264/ 112264/123264/ 134264/135264/138264	Laboratory on C++ and Python Programming	Max Marks: 25
Sr. No.	Assessment Criteria		Marks
1.	Attendance/Regularity in practical's / Students' overall performance		05
2.	Record book Preparation (Preferably handwritten)		10
3.	Internal Viva Voce		10

GOEC Theory 6: Web Technologies

Level	Semester	Course Code	Course Name	Credits	Teaching Hours	Exam Duration	Max Marks
5.0	IV	109276/110276/ 112276/123276/ 134276/135276/138276	Web Technologies	2	30	2 Hrs	30

Course Objectives:	1. To explain different components and technologies of World Wide Web as a platform. 2. To develop the static website using client-side programming like HTML and CSS. 3. To enable students to understand web page site planning, management and maintenance. 4. To explain the concepts of developing advanced HTML pages with the help of frames, scripting language.						
Course Outcomes:	Students will be able to - 1. Understand the fundamentals of Internet and how the web function. 2. Design a static webpage by applying HTML elements. 3. Apply CSS concepts for designing HTML web pages. 4. To acquire knowledge and skills for creation of web site considering client-side programming. 5. Understand need and purpose of Web Hosting						
Unit System	Contents	Workload Allotted	Weightage of Marks Allotted	Incorporation of Pedagogies			
Unit I	Basic Terminology of Web and Web Design Principles What is Internet, Brief History of Internet, What is World Wide Web, Client Server Architecture, Web Server Vs Web browser, Webpages, Website, How website works? Types of Websites, Domain Name Server and Uniform Resource locator, Basic principles involved in developing a web site, Five Golden rules of web designing, Web Standards and W3C recommendations	8 Hrs	8 Marks	Use any pedagogical technique suitable for the topic			
Unit II	What is HTML, Features of HTML, Basic structure of an HTML document, Basic Building blocks of HTML, Working with Lists, Tables and Frames, Working with Text and Image Hyperlinks, Images and Multimedia, Working with Forms and Controls.	7 Hrs	7 Marks				
Unit III	Concept of CSS, Need of CSS, Creating Style Sheet -Inline, External, Embedded CSS, CSS Selectors, Types of Selectors, CSS Properties -Position, Float, clear, visibility , CSS Flexbox Layout, CSS Grid Layout, CSS Styling Properties (Background, Text Format, Controlling Fonts), Working with Lists and Tables, Box Model (Border properties, Padding Properties, Margin properties, Display properties)	8 Hrs	8 Marks				

Unit IV	What is Web Hosting? Need of Web Hosting, Types of Hosting packages, Registering Domains, Defining Name Servers, Steps to host the website	7 Hrs	7 Marks	
References :	Course Material/Learning Resources Text books: 1. HTML5 and CSS3- WAN BAYROSS -BPB Publications Reference Books: 1. HTML and CSS, 5th Edition –Thomas A Powell 2. Head First HTML and CSS,2nd Edition-Elisabeth Robson and Eric Freeman –O'Reilly 3. An introduction to Web Design + Programming- Paul S Wang, Sanda S Katila Weblink to Equivalent MOOC on SWAYAM if relevant: 1. https://onlinecourses.swayam2.ac.in/cec21_lb01/preview 2. https://onlinecourses.swayam2.ac.in/nou22_cs03/preview			

Assessment Rubric: Internal for Theory Course (GOEC)

SANT GADGE BABA AMRAVATI UNIVERSITY, AMRAVATI THEORY EXAMINATION B.Sc. II, SEMESTER-IV (NEP)			
Theory	Course Code: 109276/110276/ 112276/123276/ 134276/135276/138276	Course Title: Web Technologies	Max Marks: 20
Sr. No.	Assessment Criteria	Marks	
1	Any Two of the Activity (weekly or monthly assignment/ Unit Test/Class Test) (CAT-1)	10	
2	Any One of the Activity includes Open Book Test, MCQ Tests, / Theory related Class activity/Task etc.) etc. (CAT-2)	5	
3	Participation in any one Activity includes Quiz, Seminar, Group Discussion, Industry visit, CaseStudy, Mini project, innovative work, etc. based on Theory Course. Involvement in subject related activities such as Conference, Workshop, Coding Competitions etc. (CAT-3)	5	

VSC: Database using Access Laboratory

Level	Semester	Course Code	Course Name	Credits	Teaching Hours	Exam Duration	Max Marks
5.0	IV	109285/110285/ 112285/123285/ 134285/135285/138285	Database using Access Laboratory	2	60	4 Hrs	50

Course Objectives:	1. To understand the Working on existing database systems 2. To familiarize students with hands-on experience in designing relational databases 3. To familiarize students with hands-on experience in implementing relational databases 4. To familiarize students with hands-on experience in managing relational databases						
Course Outcomes:	On completion of the following syllabus the students will be able to - 1. Understand the fundamentals of relational databases 2. Demonstrate knowledge of designing relational databases 3. Demonstrate knowledge of implementing relational databases 4. Demonstrate knowledge of managing relational databases						
Contents					Workload Allotted	Weightage of Marks Allotted	Incorporation of Pedagogies
	List of Practical: 1. Create a table (person) in access with name, phno, email-id and address. insert 10 records. Create a query to display email id, phno and address when user gives name. 2. Field Name Data type Description Class Number Section 3. Prepare a query to display all records and Name should be in ascending order. 4. Create a database named “library.mdb” and perform the following tasks: Create a table named “Book” having following structure: Field name, Field datatype, Description, Book _id Text Primary key. Book identification number Bname Text Book name Wname Text Writer’s name 5. Prepare a query named “senior” to display records including fields name, class, sec, rollno, status, photo and value of “status” field must be senior.						Use any pedagogical technique suitable for the topic

	Prepare a form of above query “senior”. 6. Prepare a query to display only records including book name, writer name and publication name. Save the query as “q_book”. 7. Prepare a query to display all records on the basis of price which is more than Rs. 500. 8. Prepare a form on the basis of table. 9. Prepare a query named “senior” to display records including fields name, class, sec, rollno, status, photo and value of “status” field must be senior. Prepare a report of all the fields of above table.2. 10. Create a table named “student info” having following table structure. Field Name Data type, Description, ClassNumber, Section, Text, Roll no Number, Name Text 40 11. Create a database named “library.mdb” and perform the following tasks: Create a table named “Book” having following structure: Field name Field datatype Description 12. Create a table named “Book” having following structure: Field name Field datatype Description Prepare a form on the basis of table. 13. Create a database named “Nepal Bank” to store information about its staffs and do the following tasks: Create a table named “staffinfo” having following table structure: Field Name, Data Type, Discription 14. Create a form on the basis of “staffinfo” table and save as “entryform”. 15. Create a Student Table in MS-Access with the following features: a. Roll Number b. Student Name c. Class d. Marks in Subject 1, Subject 2, Subject 3 e. Total f. Average g. Result 16. Create “Employee” database and table “Emp”. With following features: Empno, Ename, Designation, Deptno, DOJ, Basic Salary. Calculate DA as 40% of Basic Salary. 17. Create “Employee1” database and table “Emp1” Empno, Ename, Designation, Deptno, DOJ, Basic Salary. List all the Employees who get less than 20000 Salary. 18. Create “Course” database and “Coursedtl” table having following records:- SRollno, Sname, Course Section, Medium, College, Total Fees. Prepare the Report to display all students who are pursuing B.Sc.(Computer)			
--	---	--	--	--

	19. Create a “Stock” database having “Inventory” table:- Display all the Items which has closing stock < 100. 20. Create Business table by using Design Wizard with year own data (at least 6 fields and 10 records)			
References:	Weblink to Equivalent MOOC on SWAYAM if relevant:			

Assessment Rubric: Internal Examination Practical Course |(VSC)

SANT GADGE BABA AMRAVATI UNIVERSITY, AMRAVATI PRACTICAL EXAMINATION B.Sc. II, SEMESTER – IV (NEP)			
Practical	Course Code: 109285/110285/ 112285/123285/ 134285/135285/138285	Database using Access Laboratory	Max Marks: 50
Sr. No.	Assessment Criteria		Marks
1.	Single Program Writing, Algorithm, Flowchart, Execution, with Sample inputs and Outputs, and Printout		20
2.	Record book preparation (Preferably handwritten) / Assignments preparation during semester		10
3.	Attendance in practical session / Students’ overall performance		10
4.	Internal Viva Voce		10

Field Project / Community Engagement Services in Computer Science (112)/Information Technology (123)/ Computer Application (Regular) (109)/ Computer Application (Vocational) (110)/Data Analytics (134)/Data Science and Analytics (135)/ Web Design and Development (138): Phase-II

Level	Semester	Course Code	Course Name	Credits	Teaching Hours	Exam Duration	Max Marks
5.0	IV	109292/ 110292/ 112292/123292/ 134292/135292/138292	Field Project / Community Engagement Services in Computer Science (112)/Information Technology (123)/ Computer Application (Regular) (109)/ Computer Application (Vocational) (110)/Data Analytics (134)/Data Science and Analytics (135) /Web Design and Development (138): Phase-II	2	60	--	50

Course Objectives:

- To develop a sense of social responsibility among students.
- To foster civic values and the spirit of community service.
- To provide practical experience in addressing societal issues.
- To encourage students to work collaboratively with community members and organizations.
- To enhance critical thinking, problem-solving, and leadership skills through real-world application.
- To help students to initiate developmental activities in the community in coordination with public and government authorities.
- To enable students to apply theoretical/practical Computer Science/Application/Engineering concepts in real-life challenges, enhancing the quality of experiential learning.
- To give exposure to the students about the development of relation between rural communities and Computer Technology
- To study the Computer Technology driven solutions for local problems

Course Outcomes:

Upon successful completion of this course, students will be able to:

- Develop problem-solving and critical thinking abilities by social activities and services to real-world situation.

- Critically evaluate information and conclusions based on the analysis and interpretation of data collected during the project.
- Contribute the knowledge to the social cause by understanding the societal problems and deriving the solution for the same
- Gain valuable experience and skills in a relevant field.
- Gain efficiency in written and oral communication through activity reports, presentations and discussions.
- Work effectively as part of a team to achieve social responsibility.
- Understand the importance of Computer Technology in various rural area problems.
- Build connections with local communities and learn from traditional knowledge.
- Identify Computer Technology related challenges (Lack of Technological Knowledge, non-availability of infrastructure, ICT problem, etc.) and provide the solution/ corrective measure to the concerning authority.

Guidelines/ SoP for FP/CEP

For understanding key principles of CE, forms of CE, operational guidelines and implementation strategy please refer https://www.ugc.gov.in/pdfnews/4187860_Revised-Final-Guidelines.pdf

As per NEP 2020, students of B Sc. II of Semester IV need to perform a Field Project (FP) for TWO (2) credits i.e. 50 Marks.

The guidelines regarding the field project are as follows:

1. Students must complete 60 hours of field engagement.
2. Work may be done individually or in groups of up to 4 students, each under a departmental faculty guide.
3. A survey or sample collection methodology must be chosen, with appropriate documentation tools: questionnaires, datasheets, plant specimen formats, etc.
4. Projects can be survey-based, experimental, observational, or intervention-based.
5. **Final report to include:** Title, Introduction, Materials & Methods, Results, Discussion, Conclusion, References.
6. Minimum 6 pages excluding cover page, certificate, acknowledgement, etc.
7. Poster/PPT presentation is mandatory and will be evaluated by an appointed examiner.
8. For a SURVEY based project related questionnaire (15 or more questions) shall be prepared.
9. The departmental coordinator/guide shall check the questions and finalize the questionnaire. The question that may create unnecessary complications should be avoided. The questions should be qualitative as well as quantitative.
10. If the project is related to work that does not involve survey work, then the questionnaire part can be replaced accordingly (e.g. Sample collection/Data collection/ Experimental base etc.).

11. The total project work including preparation of questionnaire to presentation should be evaluated for 2 credits (50 Marks).

**SUGGESTED FORMS OF COMMUNITY-ENGAGED PRACTICE IN COMPUTER SCIENCE (112)/ INFORMATION TECHNOLOGY (123)/
COMPUTER APPLICATION (REGULAR) (109)/ COMPUTER APPLICATION (VOCATIONAL) (110)/DATA ANALYTICS (134)/DATA
SCIENCE AND ANALYTICS (135)**

Community Engagement Services (CES) in Computer Science involve using technology and digital tools to connect, involve, and empower communities. This can encompass various activities, from developing online platforms for community interaction to using data analysis to understand community needs and informed decision-making. CES in Computer Science aims to bridge the digital divide, promote digital literacy, and foster collaboration between communities and organizations.

Here's a more detailed look at CES in Computer Science:

Students have to choose any one of the following as the Community Engagement Services. Programmes may be interdisciplinary, integrating knowledge from various fields such as social sciences, health, education, environmental studies, etc.

1) Teaching

- Basics of Computers, MS Office and internet
- Cyber security and cyber crime
- Applications of statistics in real life
- Introduction to Statistical Software (Excel)
- Online digital services

2) Services

- Digital Banking and Online Payments
- Basic software installation
- E-Governance and Digital Services
- Health Awareness Using Digital Tools
- Online digital services and literacy

3) Data Collection and Survey

- Utilization of government community empowerment schemes.
- IT infrastructure in India

- Cyber and forensic investigation in India, Etc.

Note: Students must have to perform activities from above heads to complete 60 hours of community engagement and services

Key Benefits of CES in Computer Science:

- **Increased Community Participation:**

CES can make it easier for community members to participate in decision-making processes and contribute to their community's development.

- **Improved Communication:**

Online platforms and digital tools can facilitate better communication and information sharing within communities.

- **Enhanced Collaboration:**

CES can foster collaboration between community members, organizations, and local governments.

- **Empowered Communities:**

By providing access to information, resources, and technology, CES can empower communities to address their own needs and shape their future.

- **Greater Social Impact:**

CES can contribute to positive social change by addressing critical community needs and promoting civic engagement.

Assessment Rubric for FP/CEP: Phase -II

SANT GADGE BABA AMRAVATI UNIVERSITY, AMRAVATI B.Sc. II, SEMESTER – IV (NEP)			
FP/CEP	Course Code: 109292/ 110292/ 112292/123292/ 134292/135292/138292	Field Project / Community Engagement Services in Computer Science (112)/Information Technology (123)/ Computer Application (Regular) (109)/ Computer Application (Vocational) (110)/Data Analytics (134)/Data Science and Analytics (135) /Web Design and Development (138) : Phase-II	Max Marks: 50
Q. No.	Exercise		Marks
1	Field Engagement & Participation (Attendance, hands-on involvement, and community interaction)		15
2	Project Report Quality (Clarity, structure, scientific accuracy, originality, and referencing)		15
3	Data Collection & Analysis (Depth, relevance, and quality of survey/sample collection and its analysis)		10
4	Presentation (Poster or PPT) (Communication of findings, visual clarity, and confidence)		05
5	Social Relevance & Innovation (Creative solutions, awareness campaigns, or community impact beyond data.)		05

SANT GADGE BABA AMRAVATI UNIVERSITY, AMRAVATI



THREE YEAR UNDERGRADUATE PROGRAMME

B.Sc. Web Designing and Development (138)

Semester - V and VI

FACULTY: SCIENCE AND TECHNOLOGY

(Courses effective from Academic Year 2026-27) Under NEP 2020

SYLLABUS

INDEX

Sr. No.	Item	Page Number
01	Member's List - Board of Studies in Computer Science (including Computer Application, IT, etc.)	3
02	Scheme- Examination, Evaluation and Assessment (University Draft)	4
03	Semester-V, Credits, Workload, Examination, Evaluation and Assessment Scheme	8
04	Semester-VI, Credits, Workload, Examination, Evaluation and Assessment Scheme	9
05	Syllabus, B.Sc.- III, Semester – V	
06	Major Course: Web Designing with Java script (138213)	11
07	Major Course: Python Programming for Web Applications (138214)	14
08	Major Course: Responsive Web Designing (138215)	17
09	Major Course: Laboratory for web designing on Java script and Python Programming (138216)	20
10	Major Course (Elective-1): PHP Programming (138217)	23
11	Major Course (Elective-1): UI/UX Design (138218)	26
12	Major Course (Elective-1 Laboratory): Laboratory on PHP Programming (138219)	29
13	Major Course (Elective-1 Laboratory): Laboratory on UI/UX Design (138220)	32
14	Minor Course: Fundamentals of Web Designing and Development (138265)	34
15	Minor Course: Laboratory on Advanced python Programming 138266()	36
16	VSC: Laboratory on Content Management System with WordPress (138286)	39
17	SEC: Laboratory on Web Designing with Bootstrap (138287)	42
18	Project in Web Designing and Development (138293)	45
19	Foundation of Artificial Intelligence	48
	Syllabus, B.Sc.- III, Semester – VI	
20	Major Course: ASP.Net with C# (138221)	54
21	Major Course: Advanced Web Application with Node. JS (138222)	57
22	Major Course: Web Security and Deployment (138223)	60
23	Major Course: Laboratory on ASP.Net with C# and Node.JS (138224)	63
24	Major Course (Elective-2): Mobile Responsive Web Design (138225)	66
25	Major Course (Elective-2): E-Commerce Website Development (138226)	69
26	Major Course (Elective-2 Laboratory): Laboratory on Mobile Responsive Web Design (138227)	72
27	Major Course (Elective-2 Laboratory): Laboratory on E-Commerce Website Development (138228)	75
28	Minor Course: Web Development with PHP and Java Script (138267)	78
29	Minor Course: Laboratory on PHP and Java Script (138268)	80
30	VSC: Laboratory on Apache server (138288)	83
31	Internship/Apprenticeship: (112294)	85

Sant Gadge Baba Amravati University, Amravati
Faculty of Science and Technology (Science Group)
Board of Studies in Computer Science

(including Computer Application, Information Technology etc.)

Sr. No.	Name	Designation	Address
01	Dr. Swati Sherekar	Chairman	PGTD in Computer Science and Engineering, SGBAU, Amravati
02	Dr. Dineshkumar N. Satange	Member (Faculty Member)	Smt. Narsamma Arts, Commerce and Science College, Kiran Nagar, Amravati. 444606
03	Dr. Mohd. Atique Mohd. Junaid	Member	HoD, PGTD in Computer Science and Engineering, SGBAU, Amravati
04	Dr. Avinash Baburao Kadam	Member	Shri Shivaji Science and Arts College, Chikhali Dist. Buldana
05	Dr. Ajay Purushottam Chendke	Member	Degree College of Physical Education (HVPM), Amravati
06	Dr. Chandrashekhar H. Sawarkar	Member	Smt. Narsamma Arts, Commerce and Science College, Kiran Nagar, Amravati. 444606
07	Dr. Arvind A. Tayade	Member	G.S. Science Arts and Commerce College, Khamgaon Dist. Buldana
08	Prof. Sudeshkumar Chaudhari	Member	RDIK, Mahavidyalaya, Badnera Rly. Amravati.
09	Dr. Narendra M. Jathe	Member	Smt. Narsamma Arts, Commerce and Science College, Kiran Nagar, Amravati. 444606
10	Dr. HomrajPatelpaik	Member	Lokmanya Tilak Mahavidyalaya Wani, Dist. Yavatmal
11	Prof. Sureshkumar Mapari	Member	Rajasthan Aryan Arts, Shri Mithulal Kacholia Commerce and Shri SatyanarayanjiRamkrishnaji Rathi Science College, Washim

Subcommittee appointed for drafting syllabus of B. Sc. III Sem. V and VI (NEP) in B.Sc. Web Designing and Development (138)

Sr. No.	Name	Designation	Address
01	Dr. H.B. Patelpaik	Chairman	Lokmanya Tilak Mahavidyalaya Wani, Dist. Yavatmal
02	Dr. Ujjwala Junghare	Member	Shri Shivaji Science College, Amravati
03	Dr. Anita Dube	Member	Shivaji Arts, Commerce & Science College, Akola
04	Dr. Yogesh Rode,	Member	JijamataMahavidyalaya Buldhana
05	Prof. Mayari Gudadhe	Member	Shivaji Arts, Commerce & Science College, Akola
06	Dr. Kshitija Patil	Member	Degree College of Physical Education, HVPM, Amravati

Scheme- Examination, Evaluation and Assessment

Notes:

- a. 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. 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.
- b. 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).
- c. 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.
- d. **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.
- e. **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.
- f. **Generic / Open Elective Courses (GE/OE):** Courses to be selected from the Basket of Courses provided by the University
- g. **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

Examination and Assessment Process:

- The basic principle of the Credit framework is that Credits are a function of the successful completion of a program of study/ vocational education/ training and assessment. No Credit can be earned by the student unless the student is assessed for the achievement of the desired competencies and outcome of a program.
- Exit options are provided with Certificate, Diploma and Basic Bachelor's degrees to the students at the end of the second, fourth and sixth semesters of a Four Years Multidisciplinary Degree Programme. Students will receive a Bachelor's degree with Honors/ Research on successfully completing of all eight semesters of the UG Program either at a stretch or with opted exits and re-entries.
- For the smooth success of four-year degree programme with multiple entry and exit systems, the examination mode should be based on the combination of innovative trends in formative (informal and formal tests administered during the learning process) and summative (evaluation of students learning at the end of an instructional unit) examination modes in line with the UGC Report on 'Evaluation Reforms in Higher Educational Institutions (2019).

Examination, Evaluation and Assessment Scheme

The total marks for each Course shall be based on Continuous Assessment and Semester End Examination.

Each theory course of Major, Minor, GE/OE, AEC, IKS, VEC as mentioned in **Teaching Learning Scheme** prepared by the Board of Studies shall be evaluated as per the scheme as mentioned in the following table -

Examination, Evaluation and Assessment Scheme

Vertical No.	The Vertical	Mode of Examination, Evaluation & Assessment	Theory				Theory (Total)		Practical				Practical (Total)	
			External		Internal				External		Internal			
			Max. Marks	Min. Marks	Max. Marks	Min. Marks	Max. Marks	Min. Marks	Max. Marks	Min. Marks	Max. Marks	Min. Marks		
a	Major	External & Internal	30	9	20	6	50	20	25	10	25	10	50	20
b	Minor		30	9	20	6	50	20	25	10	25	10	50	20
c	Generic/ Open Elective		30	9	20	6	50	20	--	--	--	--	--	--
d	VSC	Internal	--	--	--	--	--	--	--	--	50	20	50	20
	SEC	Internal	--	--	--	--	--	--	--	--	50	20	50	20
e	AEC (Eng. & One MIL Composite)	External & Internal	30	9	20	6	50	20	--	--	--	--	--	--
	IKS (Generic)	External & Internal	30	9	20	6	50	20	--	--	--	--	--	--
	VEC	External & Internal	30	9	20	6	50	20	--	--	--	--	--	--

F	FP/CEP	Internal	--	--	--	--	--	--	--	--	50	20	50	20
	Internship/ Apprenticeship		Assessment of these verticals shall be based on various activities/practices. It shall be evaluated by giving maximum marks of 50 per 2 Credit Course with separate activity weightages/levels. A detailed SOP for this assessment process is prescribed for Phase I and Phase II											
	CC													

Continuous Assessment Tests (CAT)

For internal assessment, the Continuous Assessment Tests (CAT) shall be conducted as under-

- i. Three CAT each of 8 / 10 Marks (Theory) as applicable and 10 Marks (Practical).
 - First on completion of 25% Syllabus of the course or on completion of 25 teaching days,
 - Second on completion of 50% Syllabus of the course or on completion of 50 teaching days,
 - Third on completion of 75% Syllabus of the course or on completion of 75 teaching days.
- ii. Each concurrent assessment (CAT-I, II & III) will be mapped to relevant Course Learning Outcome.
- iii. Total Performance in CAT (i.e. 40 %) shall be based on the best two out of three in CAT examinations
- iv. Internal assessment shall be carried out by the respective course teacher by choosing variety of assessment tools/methods such as class test, record book, seminar, case study, field work, mini project work, quiz or any innovative method, which may be deemed to be appropriate for assessing the relevant course outcome.

Conduction of the Examination:

As per the scheme of teaching, learning, examination and evaluation, theory/practical examinations of Semester-I, II, III, IV, V, VI, VII and VIII shall be conducted by the University (except for Internal Examinations as applicable) at the end of each semester.

The theory/practical examinations of all the Semesters shall be held as per the following Schedule –

Sr. No.	Name of the Examination	End Sem Examination	Supplementary Examination*

1	Semester-I, III, V and VII	Winter	Summer
2	Semester-II, IV, VI and VIII	Summer	Winter

* The University may evolve mechanism for conducting repeat end semester examination. Such repeat examinations shall have to be conducted within one month of the regular even semester examination and on demand examination.

1. The practical examination of all semesters shall be conducted by the University at the end of each semester. The HEI shall conduct the Practical examination of odd semesters as per the schedule announced by the University. However, the appointment of the External and Internal Examiners shall be done by the Head or Principal of respective HEI to conduct external examination of the odd semester and the same should be communicated to the University before commencement of the practical examination. The University shall conduct the external practical examination of all even semester by appointing external and internal examiners.
2. The examinations specified above shall be held twice in a year at such places and on such dates as may be prescribed by the University.
3. An applicant to an examination specified above, shall pursue a regular course of study in courses prescribed for the examination concerned for not less than one semester in a particular semester in a College/Institute/University department.
4. Provided that the student shall be eligible to appear for examination if -
 - a. He/she complies with the provisions of the Ordinance pertaining to the Examination in general from time to time.
 - b. He/she has prosecuted a regular course of study in a university department/college affiliated to the University.
 - c. He/she has in the opinion of the Principal shown satisfactory progress in his/her studies.
5. The provisions of Ordinance No. 6 and Ordinance No. 9 shall be mutatis-mutandis applicable to every collegiate/non-collegiate student.
6. The fees for each theory examination and practical examination conducted by the university shall be as prescribed by the University, from time to time.

SEMESTER – V

Web Designing and Development (138) Credits, Workload, Examination, Evaluation and Assessment Scheme

The Vertical	Course Code	Course Title	Credits	Workload	Theory/Practical				Theory/Practical (Total)	
					External		Internal			
					Max. Marks	Min. Marks	Max. Marks	Min. Marks	Max. Marks	Min. Marks
Major-T7	138213	Web Designing with Java script	2	2	30	9	20	6	50	20
Major-T8	138214	Python Programming for Web Application	2	2	30	9	20	6	50	20
Major-T9	138215	Responsive Web Designing	2	2	30	9	20	6	50	20
Major-Lab/Practical-15	138216	Laboratory for web designing on Java script and Python Programming	2	4	25	10	25	10	50	20
Major-Elective T1	138217	PHP Programming	2	2	30	9	20	6	50	20
Major-Elective T1	138218	UI/UX Design	2	2	30	9	20	6	50	20
Major-Elective Lab/Practical-17	138219	Laboratory on PHP Programming	2	4	25	10	25	10	50	20
Major-Elective Lab/Practical-17	138220	Laboratory on UI/UX Design	2	4	25	10	25	10	50	20
Minor-T5	138265	Fundamentals of Web Designing and Development	2	2	30	9	20	6	50	20
Minor-P18	138266	Laboratory on HTML and CSS	2	4	25	10	25	10	50	20
VSC-P19	138286	Content Management System with WordPress	2	4	-	-	50	20	50	20
SEC-P	138287	Web Designing with Bootstrap	2	4	-	-	50	20	50	20
FP/CES	138293	Project in Web Designing and Development	2	4	-	-	50	20	50	20
*Special Theory	--	Foundation of Artificial Intelligence	2	2						

* Implementation of the Course of “Foundation of Artificial Intelligence” for the U.G. Programmes Under all the faculties. As per Extra-Ordinary Notification No. 241/2025 of SGBAU, dated 24/12/2025. Students will earn grade from written examination marks conducted by the concerning college.

SEMESTER – VI

Web Designing and Development (138) Credits, Workload, Examination, Evaluation and Assessment Scheme

The Vertical	Course Code	Course Title	Credits	Workload	Theory/Practical				Theory/Practical	
					External		Internal		(Total)	
					Max. Marks	Min. Marks	Max. Marks	Min. Marks	Max. Marks	Min. Marks
Major-T10	138221	Full Stack Web Development	2	2	30	9	20	6	50	20
Major-T11	138222	Advanced Web Application with Node. JS	2	2	30	9	20	6	50	20
Major-T	138223	Web Security and Deployment	2	2	30	9	20	6	50	20
Major-Lab/Practical-20	138224	Laboratory on Full Stack and Node.JS	2	4	25	10	25	10	50	20
Major-Elective T12	138225	Mobile Responsive Web Design	2	2	30	9	20	6	50	20
Major-Elective T2	138226	E-Commerce Website Development	2	2	30	9	20	6	50	20
Major-Elective Lab/Practical-22	138227	Laboratory on Mobile Responsive Web Design	2	4	25	10	25	10	50	20
Major-Elective Lab/Practical-22	138228	Laboratory on E-commerce Website Development	2	4	25	10	25	10	50	20
Minor-T6	138267	Web Development with PHP and Java Script	2	2	30	9	20	6	50	20
Minor-P23	138268	Laboratory on PHP and Java Script	2	4	25	10	25	10	50	20
VSC-P24	138288	Laboratory on Apache Server	2	4	-	-	50	20	50	20
Internship / Apprenticeship	138294	Internship / Apprenticeship in Web Designing and Development	4	8	-	-	50	20	50	20

SYLLABUS

B.Sc.- III, SEMESTER – V

**Web Designing and Development
(138)**

Major Course: Web Designing with Java script

Level	Semester	Course Code	Course Name	Credits	Teaching Hours	Exam Duration	Max Marks
5.5	V	138213	Web Designing with Java script	2	30	2 Hrs.	30

Course Objectives:	1. Understand the fundamentals of JavaScript and its role in web designing and development. 2. Apply JavaScript concepts such as variables, operators, decision-making, and looping statements in web applications. 3. Develop interactive web pages using functions, arrays, strings, and built-in JavaScript objects. 4. Implement event handling, DOM manipulation, and form validation techniques for dynamic web pages. 5. Create simple real-world web applications using advanced JavaScript concepts such as ES6 features, JSON, error handling, and local storage.			
Course Outcomes:	After successful completion of this course, students will be able to: 1. Demonstrate the use of JavaScript syntax, data types, operators, and control statements in web programming. 2. Develop programs using functions, arrays, strings, and built-in JavaScript methods effectively. 3. Design interactive and dynamic web pages using DOM manipulation and event handling techniques. 4. Implement client-side validation and browser-based interactions using JavaScript objects and dialog boxes. 5. Build simple web-based applications using modern JavaScript features, JSON, timing functions, and local storage concepts.			
Unit System	Contents	Workload Allotted	Weightage of Marks Allotted	Incorporation of Pedagogies
Unit I	Introduction to JavaScript Basics: Introduction to JavaScript, Features and Applications of JavaScript, Client-side and Server-side Scripting, Embedding JavaScript in HTML, Variables and Data Types, Operators in	8 Hrs.	8 Marks	Use any pedagogical technique

	JavaScript, Input and Output Statements, Decision Making Statements, Looping Statements, Introduction to Console and Browser Output			suitable for the topic
Unit II	Functions, Arrays and String Handling: Functions in JavaScript, Types of Functions, Function Parameters and Return Values, Scope of Variables, Arrays in JavaScript, Array Operations, String Handling Functions, Built-in Functions (parseInt(), parseFloat(), isNaN()), Date and Math Objects,	7 Hrs.	7 Marks	
Unit III	JavaScript Objects and Event Handling: Introduction to Objects, Creating and Using Objects, Browser Objects (window, document), DOM (Document Object Model) Basics, Accessing HTML Elements using JavaScript, Event Handling: Mouse Events and Keyboard Events, Form Validation using JavaScript, Dialog Boxes (alert, confirm, prompt)	8 Hrs.	8 Marks	
Unit IV	Modern JavaScript and Practical Applications: Introduction to Modern JavaScript ES6 Features, Arrow Functions, Template Literals, Introduction to JSON, JavaScript Timing Functions (setTimeout, setInterval),Error Handling using try-catch, Introduction to Local Storage, Simple Applications using JavaScript,	7 Hrs.	7 Marks	
References:	Course Material/Learning Resources Text books: 1. JavaScript: The Complete Reference, McGraw-Hill Education 2. Head First JavaScript Programming, O’Reilly 3. JavaScript Black Book, Dreamtech Press Reference Books: 1. Eloquent JavaScript, Marijn Haverbeke 2. Beginning JavaScript, Wrox Publications 3. JavaScript and JQuery, Jon Duckett, Wiley Publications Weblink to Equivalent MOOC on SWAYAM if relevant: 1. https://openpython.org/courses/javascript-fundamentals 2. https://www.coursera.org/learn/programming-with-javascript 3. https://edube.org/study/jse1 4. https://www.youtube.com/watch?v=Og3HDmbW6I			

Assessment Rubric: Internal for Theory Course (Major)

SANT GADGE BABA AMRAVATI UNIVERSITY, AMRAVATI THEORY EXAMINATION B.Sc. III, SEMESTER – V (NEP)			
Theory	Course Code: 138213	Course Title: Web Designing with Java script	Max Marks: 20
Sr. No.	Assessment Criteria		Marks
1	Any Two of the Activity (weekly or monthly assignment/ Unit Test/Class Test) (CAT-1)		10
2	Any One of the Activity includes Open Book Test, MCQ Tests, / Theory related Class activity/Task etc.) etc. (CAT-2)		5
3	Participation in any one Activity includes Quiz, Seminar, Group Discussion, Industry visit, Case Study, Mini project, innovative work, etc. based on Theory Course. Involvement in subject related activities such as Conference, Workshop, Coding Competitions etc. (CAT-3)		5

Major Course: Python Programming for Web Applications

Level	Semester	Course Code	Course Name	Credits	Teaching Hours	Exam Duration	Max Marks
5.5	V	138214	Python Programming for Web Applications	2	30	2 Hrs.	30

Course Objectives:	1. To understand and apply object-oriented programming concepts using Python for developing modular and reusable applications. 2. To understand the role of Python in server-side web development. 3. To develop dynamic web applications using the Flask framework. 4. To design reusable web pages using Jinja2 templates and HTML forms. 5. To integrate databases using SQLite and ORM tools.			
Course Outcomes:	After successful completion of this course, students will be able to: 1. Students will be able to develop Python programs using classes, objects, inheritance, polymorphism, encapsulation, and exception handling concepts 2. Explain CGI, WSGI, and the architecture of Python-based web applications. 3. Develop Flask applications with routing and support for GET and POST requests. 4. Create dynamic templates using Jinja2 and process web forms with validation. 5. Perform CRUD operations using SQLite and Flask-SQLAlchemy.			
Unit System	Contents	Workload Allotted	Weightage of Marks Allotted	Incorporation of Pedagogies
Unit I	Object Oriented Programming: Concept of OOP, Features and advantages of OOP Classes and Objects: Defining classes and creating objects, Class attributes and instance attributes, Constructor (__init__) and use of self, creating and accessing class members Inheritance and Polymorphism: Concept and types of inheritance, Single and multilevel inheritance, Method overriding, Introduction to polymorphism	8 Hrs.	8 Marks	Use any pedagogical technique suitable for the topic
Unit II	Python for Web Development with Flask: Introduction to Web Frameworks CGI and WSGI concepts, Overview of Python web frameworks, Introduction to	7 Hrs.	7 Marks	

	Flask and its features Flask Basics: Installing Flask, Creating a basic Flask application, Routing and URL mapping, HTTP methods: GET and POST			
Unit III	Database Integration and Authentication Database with Flask: Introduction to SQLite, CRUD operations using SQLite with Flask, Using Flask-SQLAlchemy ORM User Authentication: Sessions & Cookies, Flask-Login for Authentication, User Registration & Login Flow, Password Hashing	8 Hrs.	8 Marks	
Unit IV	Templates, Forms Jinja2 Templates: Template syntax and expressions, Template inheritance, Includes and reusable components, Static files (CSS, JavaScript, images) Form Handling: Processing HTML forms, Request object, Validation techniques, Flash messages, Redirects	7 Hrs.	7 Marks	
References:	Course Material/Learning Resources Text books: 1. Learning Python – Mark Lutz, O’Reilly Publications. 2. Flask Web Development – Miguel Grinberg, O’Reilly Publications. 3. Python Programming: An Introduction to Computer Science – John Zelle, Franklin Beedle & Associates. Reference Books: 1. Programming Python – Mark Lutz, O’Reilly Publications. 2. Flask Framework Cookbook – Packt Publishing. 3. Python for Everybody – Exploring Data Using Python. 4. Jinja2 Documentation – Official reference for Jinja2 templates and Flask integration. Web link to Equivalent MOOC on SWAYAM if relevant: 1. https://openpython.org/courses 2. https://openpython.org/courses/python-flask-web-dev			

Assessment Rubric: Internal for Theory Course (Major)

SANT GADGE BABA AMRAVATI UNIVERSITY, AMRAVATI THEORY EXAMINATION B.Sc. III, SEMESTER – V (NEP)			
Theory	Course Code: 138214	Course Title:Python Programming for Web Applications	Max Marks: 20
Sr. No.	Assessment Criteria		Marks
1	Any Two of the Activity (weekly or monthly assignment/ Unit Test/Class Test) (CAT-1)		10
2	Any One of the Activity includes Open Book Test, MCQ Tests, / Theory related Class activity/Task etc.) etc. (CAT-2)		5
3	Participation in any one Activity includes Quiz, Seminar, Group Discussion, Industry visit, Case Study, Mini project, innovative work, etc. based on Theory Course. Involvement in subject related activities such as Conference, Workshop, Coding Competitions etc. (CAT-3)		5

Major Course: Responsive Web Designing

Level	Semester	Course Code	Course Name	Credits	Teaching Hours	Exam Duration	Max Marks
5.5	V	138215	Responsive Web Designing	2	30	2 Hrs.	30

Course Objectives:	1. Understand fundamentals of Responsive Web Design (RWD). 2. Design responsive and user-friendly web interfaces. 3. Learn modern frameworks, UI/UX, and web technologies. 4. Apply testing, optimization, deployment, and security concepts.						
Course Outcomes:	On competition of the following syllabus the students will be able to- 1. Develop responsive websites for different devices. 2. Apply accessibility, UX, and responsive design principles. 3. Use modern tools and frameworks for web development. 4. Test, deploy, and maintain responsive web applications.						
Unit System	Contents				Workload Allotted	Weightage of Marks Allotted	Incorporation of Pedagogies
Unit I	Fundamentals of Responsive Web Design: Introduction to Responsive Web Design (RWD), Importance of responsive websites in modern applications, Mobile-first and desktop-first approaches, User Experience (UX) in responsive design, Accessibility and usability standards, Understanding screen sizes, resolutions, and devices, Responsive web architecture,				8 Hrs.	8 Marks	Use any pedagogical technique suitable for the topic
Unit II	Responsive Design Frameworks & Tools: Front-end frameworks overview, UI/UX prototyping, Wireframing and mockup design, Responsive component-based design, Responsive typography and visual hierarchy concepts, Media and asset optimization concepts, Cross-platform and cross-device design considerations, Introduction to Bootstrap				7 Hrs.	7 Marks	
Unit III	Responsive Web Development Concepts: Client-server architecture basics, Front-end and back-end integration concepts, Content Management Systems (CMS), Responsive navigation and interface concepts, Performance optimization strategies, Responsive image and multimedia management, Search Engine Optimization (SEO) basics, Progressive Web				8 Hrs.	8 Marks	

	App (PWA) concepts, Cloud hosting and deployment basics, Security considerations in web applications			
Unit IV	Testing, Deployment & Maintenance: Responsive website testing methodologies, Device testing and browser compatibility testing, Website auditing tools and techniques, Performance analysis and optimization, Version control concepts using GitHub, Website deployment process, Maintenance and updating of responsive websites, Documentation and project presentation, Industry best practices in responsive web design,	7 Hrs.	7 Marks	
References:	Course Material/Learning Resources Textbooks: UI and UX Design Fundamentals. Reference Books: 1. UX for Beginners, by Joel Marsh 2. Refactoring UI by Adam Wathan 3. UI and UX Design by Dr. K. Saraswathi 4. UX/UI Design Simplified For Beginners by Randall A.D. Parks 5. UI / UX Design for Beginners by Lalm Philip 6. https://youtu.be/AEE9ecgLgdQ?si=cFT2eJyNDPtnxrGs Weblink to Equivalent MOOC on SWAYAM if relevant: 1. https://onlinecourses.nptel.ac.in/e-learning/preview/noc21_ar05 2. https://www.youtube.com/watch?v=GDcOKMTxAq4 3. https://onlinecourses.nptel.ac.in/e-learning/preview/noc24_ar23 4. https://onlinecourses.nptel.ac.in/e-learning/preview/noc25_de09 Any pertinent media(recorded lectures, YouTube, etc.)if relevant: 1. https://www.youtube.com/watch?v=x5OSOCMrOYY 2. https://www.youtube.com/watch?v=At18GcJwKFc 3. https://www.youtube.com/watch?v=IOYuICOWWsg 4. https://www.youtube.com/watch?v=truRwcI7-kg 5. https://www.youtube.com/watch?v=ODpB9-MCa5s 6. https://www.youtube.com/watch?v=P5H7zs0RsUM			

Assessment Rubric: Internal for Theory Course(Major)

SANT GADGE BABA AMRAVATI UNIVERSITY, AMRAVATI THEORY EXAMINATION B.Sc. III, SEMESTER – V (NEP)			
Theory	Course Code: 138215	Course Title:Responsive Web Designing	Max Marks: 20
Sr. No.	Assessment Criteria		Marks
1	Any Two of the Activity (weekly or monthly assignment/ Unit Test/Class Test) (CAT-1)		10
2	Any One of the Activity includes Open Book Test, MCQ Tests, / Theory related Class activity/Task etc.) etc. (CAT-2)		5
3	Participation in any one Activity includes Quiz, Seminar, Group Discussion, Industry visit, Case Study, Mini project, innovative work, etc. based on Theory Course. Involvement in subject related activities such as Conference, Workshop, Coding Competitions etc. (CAT-3)		5

Major Course: Laboratory for web designing on Java script and Python Programming

Level	Semester	Course Code	Course Name	Credits	Teaching Hours	Exam Duration	Max Marks
5.5	V	138216	Laboratory for web designing on Java script and Python Programming	2	60	4Hrs.	50

Course Objectives:	1. Understand and apply JavaScript concepts for developing interactive web pages and client-side applications. 2. Develop programs using JavaScript functions, arrays, objects, DOM manipulation, and event handling techniques. 3. Understand Object-Oriented Programming concepts in Python including classes, objects, inheritance, and polymorphism. 4. Design and develop web applications using the Flask framework, Jinja2 templates, and HTTP methods. 5. Implement database connectivity, authentication, and CRUD operations in Flask-based web applications.			
Course Outcomes:	After successful completion of this laboratory course, students will be able to: 1. Develop interactive web applications using JavaScript programming concepts and browser-based scripting techniques. 2. Apply DOM manipulation, event handling, ES6 features, and JSON handling in practical web designing tasks. 3. Demonstrate Object-Oriented Programming concepts in Python using classes, inheritance, and polymorphism. 4. Create dynamic web applications using Flask, routing, templates, forms, and static resources. 5. Build database-driven Flask applications with CRUD operations, authentication, sessions, and user management features.			
Contents		Workload Allotted	Weightage of Marks Allotted	Incorporation of Pedagogies
	List of Practical: 1. Write a JavaScript program to demonstrate the use of variables, data types, and operators. 2. Write a JavaScript program using decision-making statements (if, if-else, switch) and looping statements (for, while, do-while). 3. Create a web page that accepts user input and displays output using alert(), prompt(), and console.log(). 4. Write JavaScript functions to perform arithmetic operations using function parameters and return values. 5. Write a JavaScript program to perform array operations such as insertion, deletion, searching, and sorting.			Use any pedagogical technique suitable for the topic

	6. Write a JavaScript program demonstrating string handling functions and built-in functions like parseInt(), parseFloat(), and isNaN(). 7. Design a web page using JavaScript objects and DOM manipulation to change HTML content dynamically. 8. Implement event handling in JavaScript using mouse events, keyboard events. 9. Write a JavaScript program using ES6 features such as arrow functions and template literals. 10. Write a JavaScript program that demonstrates JSON handling, timing functions 11. Write a program to Create Python classes and objects to demonstrate class members, constructors, and use of self. 12. Write a Python program to demonstrate single and multilevel inheritance. 13. Write a Python program to demonstrate method overriding and polymorphism. 14. Install Flask and create a basic Flask web application with routing and URL mapping. 15. Create a Flask application demonstrating GET and POST HTTP methods using HTML forms. 16. Develop a Flask application using Jinja2 templates, template inheritance, and static files. 17. Create and connect a SQLite database with a Flask application. 18. Implement CRUD (Create, Read, Update, Delete) operations using Flask and SQLite/Flask-SQLAlchemy. 19. Develop a user registration and login system using Flask-Login, sessions, cookies, and password hashing. 20. Build a mini Flask web application integrating forms, templates, authentication, and database connectivity.			
References:	Weblink to Equivalent MOOC on SWAYAM if relevant: 1. Virtual Lab: https://python-iitk.vlabs.ac.in/ 2. Virtual Lab: https://html-iitd.vlabs.ac.in/exp/introduction-to-html/references.html 3. https://onecompiler.com/javascript 4. https://www.programiz.com/javascript/online-compiler/			

Assessment Rubric: External Practical Course

SANT GADGE BABA AMRAVATI UNIVERSITY, AMRAVATI PRACTICAL EXAMINATION B.Sc. III, SEMESTER – V (NEP)				
Practical	Course Code: 138216	Laboratory for web designing on Java script and Python Programming	Max Marks: 25	Time: 4 Hrs.
Sr. No.	Exercise			Marks
1.	Single Program Writing, Algorithm, Flowchart, Execution, with Sample inputs and Outputs, and Printout			10
2.	Submitted Record book (Preferably handwritten)			05
3.	External Viva Voce			10

Assessment Rubric: Internal Practical Course

SANT GADGE BABA AMRAVATI UNIVERSITY, AMRAVATI PRACTICAL EXAMINATION B.Sc. III, SEMESTER – V (NEP)			
Practical	Course Code: 138216	Laboratory for web designing on Java script and Python Programming	Max Marks: 25
Sr. No.	Assessment Criteria		Marks
1.	Attendance/Regularity in practical's / Students' overall performance		05
2.	Record book Preparation (Preferably handwritten)		10
3.	Internal Viva Voce		10

Major Course (Elective-1): PHP Programming

Level	Semester	Course Code	Course Name	Credits	Teaching Hours	Exam Duration	Max Marks
5.5	V	138217	PHP Programming	2	30	2 Hrs.	30

Course Objectives:	1. To develop the basic skills of web programming. 2. To provide knowledge to create dynamic web page. 3. To improve the skills for fast development of web application. 4. To provide knowledge about database and communication between database & web application				
Course Outcomes:	Students will be able to - 1. Write PHP scripts to handle HTML forms. 2. Create PHP programs that use various PHP library functions 3. Analyze and solve various database tasks using the PHP language. 4. Analyze concept of GET, POST, SESSION, and COOKIE by writing PHP programs. 5. Analyze and solve common Web application tasks by writing PHP programs				
Unit System	Contents	Workload Allotted	Weightage of Marks Allotted	Incorporation of Pedagogies	
Unit I	Introduction: PHP and open source technology, Overview of PHP capabilities, PHP HTML embedding tags and syntax, simple script examples, PHP variables, operators, data types. Flow control or control structure and loops.	8 Hrs.	8 Marks	Use any pedagogical technique suitable for the topic	
Unit II	Array and Functions: Introduction to functions, declaring functions, function scope, passing arguments to function, using include files and require statements, predefined PHP functions and mailing functions.	7 Hrs.	7 Marks		
Unit III	Object oriented concepts: Introduction, basic class definition, visibility, constructors and destructors, static keywords, class constants, inheritance. Database operations: connecting to MySql or any other database with PHP, selecting a database, building and sending query, retrieving and inserting data, PHP Mysql functions	8 Hrs.	8 Marks		
Unit IV	Processing of HTML and PHP: processing HTML form using GET, POST, SESSION, COOKIE variables, Exception and Error handling, Debugging.	7 Hrs.	7 Marks		

	File upload			
References:	Course Material/Learning Resources Text books: 1. Michael K. Glass, Yann Le Scouarnec, Elizabeth Naramore, Gary Mailer, Jeremy Stolz, Jason Gerner, Beginning PHP, Apache, MySQL Web development, Wrox Publication. 2. Jason Gerner, Elizabeth Naramore, Morgan L. Owens, Matt Warden, Professional LAMP: Linux, Apache, MySQL and PHP5 Web development, Wrox Publication. 3. Tim Converse, Joyce Park, PHP5 and MySQL Bible, Wiley publication Reference Books: 1. Lynn Beighley, Michael Morrison, Head first PHP and MySQL, Second Edition, O'Reilly publication. 2. Luke Weling, Laura Thomas, PHP and MySQL Web Development, Pearson Education. Weblink to Equivalent MOOC on SWAYAM if relevant: 1. https://onlinecourses.swayam2.ac.in/e-learning/preview/aic20_sp32 2. https://onlinecourses.swayam2.ac.in/e-learning/preview/ntr26_ed79 3. https://www.coursera.org/learn/web-applications-php 4. https://www.coursera.org/learn/database-applications-php			

Assessment Rubric: Internal for Theory Course (Major Elective-1)

SANT GADGE BABA AMRAVATI UNIVERSITY, AMRAVATI THEORY EXAMINATION B.Sc. III, SEMESTER – V (NEP)			
Theory	Course Code: 138217	Course Title: PHP Programming	Max Marks: 20
Sr. No.	Assessment Criteria		Marks
1	Any Two of the Activity (weekly or monthly assignment/ Unit Test/Class Test) (CAT-1)		10
2	Any One of the Activity includes Open Book Test, MCQ Tests, / Theory related Class activity/Task etc.) etc. (CAT-2)		5
3	Participation in any one Activity includes Quiz, Seminar, Group Discussion, Industry visit, Case Study, Mini project, innovative work, etc. based on Theory Course. Involvement in subject related activities such as Conference, Workshop, Coding Competitions etc. (CAT-3)		5

Major Course (Elective-1): UI/UX Design

Level	Semester	Course Code	Course Name	Credits	Teaching Hours	Exam Duration	Max Marks
5.5	V	138218	UI/UX Design	2	30	2 Hrs	30

Course Objectives:	1. Understand fundamental UI/UX principles and methodologies. 2. Develop wireframes, prototypes, and high-fidelity designs. 3. Apply design thinking and problem-solving skills to real-world projects				
Course Outcomes:	On completion of the following syllabus the students will be able to- 1. learn basics of user experience research and user interface design. 2. Built Strong visual design skills. 3. learn to translate ideas into a practical design.				
Unit System	Contents	Workload Allotted	Weightage of Marks Allotted	Incorporation of Pedagogies	
Unit I	Introduction to UI/UX Design: UI/UX: Definition, Concepts, and Differences, Role of UX/UI designers, Product design lifecycle, key elements of the UI and UX design, Core components of UX design, UI/UX structure and navigation, Accessibility in UI/UX design,	8 Hrs	8 Marks	Use any pedagogical technique suitable for the topic	
Unit II	Design Fundamentals: Color theory, Typography basics, Layout and composition, Visual hierarchy, Spacing and alignment, Grid systems, UI Basics: Buttons, forms, cards, navigation, Mobile vs desktop interfaces, Responsive design basics.	7 Hrs	7 Marks		
Unit III	User Interface Design: Wireframing for UI, Component-Based Design, Design Consistency, Mobile UI Design, Web UI Design, Design for Different Screen Sizes, User Experience Design: UX Design Process, Wireframing in UX, User research in UX design, Interaction Design, Design Thinking, UX metrics and testing, UX Portfolio Development	8 Hrs	8 Marks		
Unit IV	Advanced UX Design: Interaction Design, Micro-interactions in UX, Usability testing methods in UX, Portfolio creation, UX documentation, Advanced UI Design: An interactive UI prototype, UI Animation design, UI kits, UI component library Tool: Figma /Canva/Framer	7 Hrs	7 Marks		

References:	Course Material/Learning Resources Textbooks: 1. UI and UX Design Fundamentals. Reference Books: 1. UX for Beginners,by Joel Marsh 2. Refactoring UI by Adam Wathan 3. UI and UX Design by Dr.K.Saraswathi 4. UX/UI Design Simplified For Beginners by Randall A.D. Parks 5. UI / UX Design for Beginners by Lalm Philip Weblink to Equivalent MOOC on SWAYAM if relevant: 1. https://onlinecourses.nptel.ac.in/e-learning/preview/noc21_ar05 2. https://www.youtube.com/watch?v=GDcOKMTxAq4 3. https://onlinecourses.nptel.ac.in/e-learning/preview/noc24_ar23 4. https://onlinecourses.nptel.ac.in/e-learning/preview/noc25_de09 Any pertinent media(recorded lectures, YouTube, etc.)if relevant: 1. https://www.youtube.com/watch?v=x5OSOCMrOYY 2. https://www.youtube.com/watch?v=Atl8GcjuKFc 3. https://www.youtube.com/watch?v=IOYulCOWWsg 4. https://www.youtube.com/watch?v=truRwcI7-kg 5. https://www.youtube.com/watch?v=ODpB9-MCa5s 6. https://www.youtube.com/watch?v=P5H7zs0RsUM
-------------	--

Assessment Rubric: Internal for Theory Course (Major Elective-1)

SANT GADGE BABA AMRAVATI UNIVERSITY, AMRAVATI THEORY EXAMINATION B.Sc. III, SEMESTER – V (NEP)			
Theory	Course Code: 138218	Course Title: UI/UX Design	Max Marks: 20
Sr. No.	Assessment Criteria		Marks
1	Any Two of the Activity (weekly or monthly assignment/ Unit Test/Class Test) (CAT-1)		10
2	Any One of the Activity includes Open Book Test, MCQ Tests, / Theory related Class activity/Task etc.) etc. (CAT-2)		5
3	Participation in any one Activity includes Quiz, Seminar, Group Discussion, Industry visit, Case Study, Mini project, innovative work, etc. based on Theory Course. Involvement in subject related activities such as Conference, Workshop, Coding Competitions etc. (CAT-3)		5

Major Course (Elective-1 Laboratory): Laboratory on PHP Programming

Level	Semester	Course Code	Course Name	Credits	Teaching Hours	Exam Duration	Max Marks
5.5	V	138219	Laboratory on PHP Programming	2	60	4Hrs.	50

Course Objectives:	1. To learn the syntax and semantics of the PHP 2. To understand the concept of dynamic web pages 3. To design web application to handle form data 4. To write programs on functions, class and object. 5. To learn how to session and cookies 6. Understand and implement concept of Inheritance						
Course Outcomes:	On completion of the following syllabus the students will be able to - 1. Able to write, and debug and run programs in PHP 2. Design programs involving class, function, arrays 3. Make use of conditional and looping structures 4. Connect database with web applications and retrieve data						
Contents				Workload Allotted	Weightage of Marks Allotted	Incorporation of Pedagogies	
	List of Practical: 1. Write a PHP script to make use of operators 2. Write a PHP script to make use of if-else 3. Write a PHP script to swap two numbers. 4. Write a PHP script to make use of switch case. 5. Write a PHP script to use nested if-else statement. 6. Write a PHP script to use If-else Ladder 7. Write a PHP script to use for loop. 8. Write a PHP script to use do-while loop. 9. Write a PHP script to for Array Functions. 10. Write a PHP for script for user defined function mechanism. 11. Write a PHP script to demonstrate classes and objects. 12. Write a PHP script to Insert student personal information into database					Use any pedagogical technique suitable for the topic	

	using class, object and MYSQL functions. 13. Write a PHP script to Display student personal information which is previously inserted into Database using MYSQL functions (use include statement for database file). 14. Write a PHP script to Update student personal information which is previously inserted into Database using MYSQL functions (uses require statement for database file). 15. Write a PHP script to upload image on the site. 16. Write a PHP script to display upload images on the web page. 17. Write a PHP script to demonstrate COOKIES variable. 18. Write a PHP script to demonstrate SESSION variable. 19. Write a PHP script to demonstrate GET and POST Method. 20. Write a PHP script to upload file.			
References:	Weblink to Equivalent MOOC on SWAYAM if relevant: 1. https://www.programiz.com/php/online-compiler/ 2. https://onecompiler.com/php 3. https://www.w3schools.com/pHP/php_compiler.asp 4. https://www.codechef.com/php-online-compiler			

Assessment Rubric: External Practical Course

SANT GADGE BABA AMRAVATI UNIVERSITY, AMRAVATI PRACTICAL EXAMINATION B.Sc. III, SEMESTER – V (NEP)				
Practical	Course Code:138219	Laboratory on PHP Programming	Max Marks: 25	Time: 4 Hrs.
Q. No.	Exercise			Marks
1.	Single Program Writing, Algorithm, Flowchart, Execution, with Sample inputs and Outputs, and Printout			10
2.	Submitted Record book (Preferably handwritten)			05
3.	External Viva Voce			10

Assessment Rubric: Internal Practical Course

SANT GADGE BABA AMRAVATI UNIVERSITY, AMRAVATI PRACTICAL EXAMINATION B.Sc. III, SEMESTER – V (NEP)			
Practical	Course Code:138219	Laboratory on PHP Programming	Max Marks: 25
Q. No.	Assessment Criteria		Marks
1.	Attendance/Regularity in practical's / Students' overall performance		05
2.	Record book Preparation (Preferably handwritten)		10
3.	Internal Viva Voce		10

Major Course (Elective-1 Laboratory): Laboratory on UI/UX Design

Level	Semester	Course Code	Course Name	Credits	Teaching Hours	Exam Duration	Max Marks
5.5	V	138220	Laboratory on UI/UX Design	2	60	4Hrs	50

Course Objectives:	1. To introduce basic UX/UI concepts and tools. 2. To develop skills in wireframing and prototyping. 3. To design user-friendly and responsive interfaces. . 4. To create practical UI projects using modern design tools.			
Course Outcomes:	On completion of the following syllabus the students will be able to- 1. Design basic user interfaces for web and mobile apps. 2. Create wireframes and interactive prototypes. 3. Apply typography, color, and layout principles. 4. Evaluate usability and improve user experience.			
Contents:		Workload Allotted	Weightage of Marks Allotted	Incorporation of Pedagogies
	List of Practical: 1. Install and explore Figma and create a new design file, understand toolbar and layers. 2. Draw rectangles, circles, lines and arrange elements using alignment tools. 3. Apply different fonts, use heading, subheading, body text styles and create readable text hierarchy. 4. Create a 5-color UI palette and use primary, secondary, and accent colors. 5. Design a Simple Login page add username/password fields and create login button and basic layout. 6. Design signup form with labels and inputs and add icons and placeholders. 7. Create welcome screen for a mobile app, use logo and background image. 8. Create top navigation menu and add icons and menu items. 9. Design a home page for a website and add header, banner, content section, footer. 10. Create Wireframes for a Website and draw low-fidelity wireframes. 11. Create Mobile App Wireframes: Design screens for: i) Home, ii) Profile, and iii) Settings			Use any pedagogical technique suitable for the topic

	12. Create simple icons using vector tools. 13. Design a Product Card and add product image, title, price, and button. 14. Design an E-commerce App Screen and add Product listing page, and Shopping cart icon 15. Design a User Profile Page and add profile image, bio, settings options. 16. Conduct Basic User Journey Mapping and Define: User goal, Steps, and Pain points Suggested Software for Lab (Figma, Adobe XD, Canva or Sketch)			
--	---	--	--	--

Assessment Rubric: External Practical Course

SANT GADGE BABA AMRAVATI UNIVERSITY, AMRAVATI PRACTICAL EXAMINATION B.Sc. III, SEMESTER – V (NEP)				
Practical	Course Code: 138220	Laboratory on UI/UX Design	Max Marks: 25	Time:4 Hrs.
Sr. No.	Exercise			Marks
1.	Single Program Writing, Algorithm, Flowchart, Execution, with Sample inputs and Outputs, and Printout			10
2.	Submitted Record book (Preferably handwritten)			05
3.	External Viva Voce			10

Assessment Rubric: Internal Practical Course

SANT GADGE BABA AMRAVATI UNIVERSITY, AMRAVATI PRACTICAL EXAMINATION B.Sc. III, SEMESTER – V (NEP)				
Practical	Course Code: 138220	Laboratory on UI/UX Design	Max Marks: 25	
Sr. No.	Assessment Criteria			Marks
1.	Attendance/Regularity in practical's / Students' overall performance			05
2.	Record book Preparation (Preferably handwritten)			10
3.	Internal Viva Voce			10

Minor Course: Fundamentals of Web Designing and Development

Level	Semester	Course Code	Course Name	Credits	Teaching Hours	Exam Duration	Max Marks
5.5	V	138265	Fundamentals of Web Designing and Development	2	30	2Hrs.	30

Course Objectives:	1. To introduce students to the fundamentals of web technologies and website development. 2. To develop skills in designing web pages using HTML and CSS. 3. To understand the basics of client-side scripting using JavaScript. 4. To familiarize students with modern web development tools and website deployment techniques.				
Course Outcomes:	After successful completion of this course, students will be able to: 1. Understand the basic concepts of web designing and development. 2. Create and design static web pages using HTML and CSS. 3. Apply JavaScript for interactive web page development and validation. 4. Use web development tools and deploy websites effectively.				
Unit System	Contents	Workload Allotted	Weightage of Marks Allotted	Incorporation of Pedagogies	
Unit I	Introduction to Web Technology: Introduction to Internet and World Wide Web, Web Browsers and Web Servers, Static and Dynamic Websites, Website Structure and Web Pages, Domain Name and Web Hosting, Introduction to Web Designing Tools, Basics of Client-Server Architecture	8 Hrs	8 Marks	Use any pedagogical technique suitable for the topic	
Unit II	Web Page Designing using HTML: Introduction to HTML, Structure of HTML Document, HTML Tags and Attributes, Text Formatting Tags, Lists in HTML, Hyperlinks and Images, Tables in HTML, Forms and Input Controls	7 Hrs	7 Marks		
Unit III	Advanced HTML and HTML5: Introduction to HTML5, Semantic Tags in HTML5, Multimedia Elements: Audio and Video, Frames and Iframes, Canvas and SVG Basics, Meta Tags and SEO Basics, Creating Complete Web Pages using HTML5	8 Hrs	8 Marks		
Unit IV	Cascading Style Sheets (CSS): Introduction to CSS, Types of CSS: Inline, Internal and External, CSS Selectors and Properties, Styling Text, Background, Borders and Tables, CSS Box Model, Layout Design using Flexbox, Basics of Responsive Web Design	7 Hrs	7 Marks		

References:	Course Material/Learning Resources Text books: 1. Jon Duckett – HTML & CSS: Design and Build Websites 2. Thomas A. Powell – Web Design: The Complete Reference 3. Robin Nixon – Learning Web Design 4. Jennifer Robbins – Learning Web Design Weblink to Equivalent MOOC on SWAYAM if relevant: Students may enroll in the following SWAYAM / NPTEL MOOCs related to Web Designing and Development: 1. Web-designing and Multimedia Technology – SWAYAM Covers HTML, CSS, responsive web design, JavaScript, Bootstrap, multimedia tools, and web technologies. 2. Web Technology – SWAYAM Includes concepts of WWW, web servers, HTML, CSS, JavaScript, client-side and server-side technologies. 3. SWAYAM Central Portal Official platform to explore MOOCs offered by SWAYAM and NPTEL.
--------------------	---

Assessment Rubric: Internal for Theory Course (Minor)

SANT GADGE BABA AMRAVATI UNIVERSITY, AMRAVATI THEORY EXAMINATION B.Sc. III, SEMESTER – V (NEP)			
Theory	Course Code: 138265	Course Title: Fundamentals of Web Designing and Development	Max Marks: 20
Sr. No.	Assessment Criteria		Marks
1	Any Two of the Activity (weekly or monthly assignment/ Unit Test/Class Test) (CAT-1)		10
2	Any One of the Activity includes Open Book Test, MCQ Tests, / Theory related Class activity/Task etc.) etc. (CAT-2)		5
3	Participation in any one Activity includes Quiz, Seminar, Group Discussion, Industry visit, Case Study, Mini project, innovative work, etc. based on Theory Course. Involvement in subject related activities such as Conference, Workshop, Coding Competitions etc. (CAT-3)		5

Minor Course: Laboratory on Advanced python Programming

Level	Semester	Course Code	Course Name	Credits	Teaching Hours	Exam Duration	Max Marks
5.5	V	138266	Laboratory on HTML and CSS	2	60	4Hrs.	50

Course Objectives:	The practical course aims to: 1. Develop fundamental skills in creating and managing web pages using HTML and HTML5. 2. Familiarize students with web technologies, website structure, browsers, servers, and hosting concepts. 3. Enable students to design interactive web pages using forms, tables, multimedia, and semantic HTML elements. 4. Introduce CSS techniques for styling, layout design, and responsive web development. 5. Provide hands-on experience in developing complete, user-friendly, and responsive websites.			
Course Outcomes:	Successful completion of this practical course, students will be able to: 1. Create web pages using HTML tags, attributes, lists, links, tables, and forms. 2. Develop modern web pages using HTML5 semantic elements, multimedia components, Canvas, SVG, and SEO-related features. 3. Apply CSS styles, selectors, and properties to enhance the appearance and usability of web pages. 4. Design webpage layouts using CSS Box Model and Flexbox techniques. 5. Develop responsive and professional websites by integrating HTML5 and CSS concepts effectively. 6. Build complete web-based projects demonstrating practical knowledge of web designing and development tools and techniques.			
Contents		Workload Allotted	Weightage of Marks Allotted	Incorporation of Pedagogies
	List of Practical's: 1. Create a basic HTML webpage displaying personal information using HTML document structure. 2. Design a webpage using text formatting tags (headings, paragraphs, bold, italic, underline, etc.). 3. Create ordered, unordered, and nested lists in HTML. 4. Design a webpage containing hyperlinks to internal and external web pages. 5. Insert and format images in a webpage using HTML image tags and attributes. 6. Create and format tables using rows, columns, merged cells, and captions. 7. Design an HTML form using various input controls such as text boxes, radio buttons,			Use any pedagogical technique suitable for the topic

	checkboxes, and submit buttons. 8. Create a registration form using HTML form elements and validation attributes. 9. Develop a webpage using HTML5 semantic tags such as <header>, <nav>, <section>, <article>, and <footer>. 10. Embed audio and video files in a webpage using HTML5 multimedia elements. 11. Create a webpage using iframe to display external web content. 12. Design simple graphics using HTML5 Canvas. 13. Create basic shapes and diagrams using SVG. 14. Add meta tags and SEO-related elements to a webpage. 15. Develop a complete multi-section website using HTML5 elements. 16. Apply Inline CSS to style a webpage. 17. Apply Internal CSS for webpage formatting and presentation. 18. Create and link an External CSS stylesheet to multiple webpages. 19. Use CSS selectors and properties to style text, backgrounds, borders, and tables. 20. Demonstrate the CSS Box Model using margins, borders, padding, and content areas. 21. Design webpage layouts using CSS Flexbox. 22. Create a responsive webpage using basic responsive design techniques and media queries. 23. Develop a complete responsive website integrating HTML5 and CSS concepts.			
References:	1. Weblink to Equivalent Virtual Lab (if relevant) 2. Virtual Labs (Ministry of Education, Government of India) – National Virtual Labs platform providing online laboratory experiments and simulations in Computer Science and Engineering, including web technologies. 3. Computer Science & Engineering Virtual Labs – Collection of virtual laboratory experiments for Computer Science and related subjects. 4. Basics of HTML Virtual Lab (IIT Delhi) – Virtual lab covering HTML fundamentals, webpage structure, tags, links, lists, tables, and web page creation. 5. Introduction to HTML Virtual Experiment – Hands-on virtual experiment for learning HTML tags and creating web pages. 6. Virtual Labs (MoE, Government of India)			

Assessment Rubric: External Practical Course

SANT GADGE BABA AMRAVATI UNIVERSITY, AMRAVATI PRACTICAL EXAMINATION B.Sc. III, SEMESTER – V (NEP)				
Practical	Course Code: 138266	Laboratory on HTML and CSS	Max Marks: 25	Time: 4 Hrs.
Sr. No.	Exercise			Marks
1.	Single Program Writing, Algorithm, Flowchart, Execution, with Sample inputs and Outputs, and Printout			10
2.	Submitted Record book (Preferably handwritten)			05
3.	External Viva Voce			10

Assessment Rubric: Internal Practical Course

SANT GADGE BABA AMRAVATI UNIVERSITY, AMRAVATI PRACTICAL EXAMINATION B.Sc. III, SEMESTER – V (NEP)			
Practical	Course Code: 138266	Laboratory on HTML and CSS	Max Marks: 25
Sr. No.	Assessment Criteria		Marks
1.	Attendance/Regularity in practical's / Students' overall performance		05
2.	Record book Preparation (Preferably handwritten)		10
3.	Internal Viva Voce		10

VSC: Laboratory on Content Management System with WordPress

Level	Semester	Course Code	Course Name	Credits	Teaching Hours	Exam Duration	Max Marks
5.5	V	138286	Laboratory on Content Management System with WordPress	2	60	4Hrs	50

Course Objectives:	1. To understand the fundamentals of Content Management Systems (CMS) and WordPress. 2. To design and develop websites using WordPress themes, pages, and plugins. 3. To customize website appearance and functionality using WordPress tools. 4. To manage website content, users, media, and menus effectively. 5. To develop secure and responsive websites using WordPress CMS.						
Course Outcomes:	After successful completion of this lab, students will be able to: 1. Install and configure WordPress for website development. 2. Create and manage web pages, posts, menus, and media content using WordPress. 3. Customize websites using themes, plugins, and widgets. 4. Develop responsive and user-friendly websites using WordPress CMS. 5. Apply basic website security and maintenance practices in WordPress applications.						
Contents					Workload Allotted	Weightage of Marks Allotted	Incorporation of Pedagogies
	List of Practical 1. Install a local server environment (such as XAMPP) and perform the initial setup for WordPress. 2. Download and install WordPress on the local server and explore the various sections of the admin dashboard. 3. Practice upgrading WordPress to the latest version using both the admin panel and manual methods. 4. Search for, preview, and activate various free themes directly from the WordPress theme repository. 5. Upload and install a custom WordPress theme from a .zip file. 6. Modify a website's appearance (site identity, colors, header) using the WordPress Live						Use any pedagogical technique suitable for the topic

	Customizer and add custom CSS. 7. Configure the General, Writing, Reading, and Media settings to define basic site behavior. 8. Add and arrange various widgets within the sidebar and footer areas of a chosen theme. 9. Create a custom navigation menu and add pages, posts, and categories to it. 10. Practice creating hierarchical submenus (drop-downs) and managing existing menu items. 11. Search for, install, activate, and delete plugins from the WordPress repository to extend site functionality. 12. Manage the maintenance of installed plugins by upgrading them and configuring a basic security plugin or backup system. 13. Configure Discussion settings for comment management and set up SEO-friendly Permalink structures. 14. Create and publish both posts and pages using the Gutenberg block editor. 15. Insert and format images, videos, and hyperlinks within posts and pages. 16. Use categories and tags to organize content and establish a clear site hierarchy by managing page order. 17. Install and configure an SEO plugin (like Yoast or Rank Math) to optimize title tags and meta descriptions. 18. Install and configure caching and image optimization plugins to improve website loading speeds. 19. Install the WooCommerce plugin and perform basic configuration for a digital storefront, including adding products and managing product types. 20. Build a complete, multi-page WordPress website and practice migrating the site from a local to a live server environment			
References:	Web References 1. WordPress Official Website – Official CMS platform, software downloads, themes, plugins, and community resources. 2. Learn WordPress – Official WordPress learning portal with courses, tutorials, workshops, and practical lessons for beginners and developers. 3. WordPress Documentation – Official documentation covering installation, dashboard, themes, plugins, media management, and site administration. 4. WordPress Developer Resources – Developer documentation for themes, plugins, APIs, and WordPress customization.			

	- WordPress Tutorials – Learn WordPress – Practical tutorials on WordPress dashboard, themes, templates, and website management - WordPress Beginner Course – Beginner-level course for creating and managing WordPress websites. - W3Schools WordPress Tutorial – Basic tutorials and examples for learning WordPress. Weblink to Equivalent MOOC on SWAYAM (if relevant) - SWAYAM Portal - SWAYAM Course Explorer Weblink to Equivalent Virtual Lab (if relevant) - Virtual Labs (Ministry of Education, Government of India) - Computer Science & Engineering Virtual Labs			
--	---	--	--	--

Assessment Rubric: Internal Examination Practical Course |(VSC)

SANT GADGE BABA AMRAVATI UNIVERSITY, AMRAVATI PRACTICAL EXAMINATION B.Sc. III, SEMESTER – V (NEP)			
Practical	Course Code: 138286	Laboratory on Content Management System with WordPress	Max Marks: 50
Q. No.	Assessment Criteria	Marks	
1.	Single Program Writing, Algorithm, Flowchart, Execution, with Sample inputs and Outputs, and Printout	20	
2.	Record book preparation (Preferably handwritten) / Assignments preparation during semester	10	
3.	Attendance in practical session / Students' overall performance	10	
4.	Internal Viva Voce	10	

SEC: Laboratory on Web Designing with Bootstrap

Level	Semester	Course Code	Course Name	Credits	Teaching Hours	Exam Duration	Max Marks
5.5	V	138287	Laboratory on Web Designing with Bootstrap	2	60	4Hrs	50

Course Objectives:	1. To understand the fundamentals of responsive web design using Bootstrap. 2. To design modern and mobile-friendly web pages using Bootstrap components and utilities. 3. To develop responsive layouts using Bootstrap grid system. 4. To apply Bootstrap classes for styling forms, buttons, tables, and navigation menus. 5. To create interactive and user-friendly web interfaces using Bootstrap framework.						
Course Outcomes:	After successful completion of this lab, students will be able to: 1. Design responsive web pages using Bootstrap framework. 2. Implement Bootstrap grid system and layout techniques effectively. 3. Use Bootstrap components such as forms, cards, alerts, and navigation bars in web applications. 4. Develop mobile-friendly and interactive user interfaces using Bootstrap utilities. 5. Build attractive and responsive websites by integrating HTML, CSS, and Bootstrap.						
Contents					Workload Allotted	Weightage of Marks Allotted	Incorporation of Pedagogies
	List of Practical 1. Create a simple webpage using Bootstrap CDN integration. 2. Design a responsive webpage using Bootstrap container classes. 3. Create different webpage layouts using Bootstrap grid system. 4. Design a responsive navigation bar using Bootstrap Navbar. 5. Create buttons with different Bootstrap button styles and sizes. 6. Design responsive tables using Bootstrap table classes. 7. Create a registration form using Bootstrap form controls. 8. Design a login form with validation styles using Bootstrap. 9. Create cards for displaying product or profile information. 10. Design an image gallery using Bootstrap grid and cards. 11. Create alerts, badges, and progress bars using Bootstrap components. 12. Design dropdown menus and button groups using Bootstrap.						Use any pedagogical technique suitable for the topic

	13. Create an accordion using Bootstrap Collapse component. 14. Design modal popup windows using Bootstrap Modal component. 15. Create tabs and pills navigation using Bootstrap. 16. Design a carousel/slider using Bootstrap Carousel component. 17. Create responsive pagination and breadcrumb navigation. 18. Design a responsive dashboard layout using Bootstrap utilities. 19. Develop a responsive webpage using Bootstrap flex and spacing utilities. 20. Create a mini responsive website integrating various Bootstrap components.			
References:	Web References 1. Bootstrap Official Website – Official Bootstrap framework with documentation, examples, components, and responsive design utilities. 2. Bootstrap Documentation – Complete guide to Bootstrap layout system, forms, navigation bars, cards, buttons, utilities, and responsive web design. 3. Bootstrap Examples Gallery – Ready-made templates and responsive website examples using Bootstrap. 4. W3Schools Bootstrap Tutorial – Beginner-friendly Bootstrap tutorials with examples and exercises. 5. GeeksforGeeks Bootstrap Tutorials – Concepts, components, layouts, grids, forms, and responsive design tutorials. 6. MDN Web Docs – Responsive Design – Concepts related to responsive web design and mobile-friendly layouts. Weblink to Equivalent MOOC on SWAYAM (if relevant) 1. SWAYAM Portal 2. SWAYAM Course Explorer Weblink to Equivalent Virtual Lab (if relevant) 1. Virtual Labs – Ministry of Education, Government of India 2. Computer Science and Engineering Virtual Labs 3. HTML Virtual Lab (IIT Delhi)			

Assessment Rubric: Internal Examination Practical Course |(SEC)

SANT GADGE BABA AMRAVATI UNIVERSITY, AMRAVATI PRACTICAL EXAMINATION B.Sc. III, SEMESTER – V (NEP)			
Practical	Course Code: 138287	Laboratory on Web Designing with Bootstrap	Max Marks: 50
Sr. No.	Assessment Criteria		Marks
1.	Single Program Writing, Algorithm, Flowchart, Execution, with Sample inputs and Outputs, and Printout		20
2.	Record book preparation (Preferably handwritten) / Assignments preparation during semester		10
3.	Attendance in practical session / Students' overall performance		10
4.	Internal Viva Voce		10

Project in Web Designing and Development (138)

Level	Semester	Course Code	Course Name	Credits	Teaching Hours	Exam Duration	Max Marks
5.5	V	112293	Project in Web Designing and Development (138)	2	--	--	--
Course Objectives: 1. To understand the research project development process. 2. To motivate students to undertake research projects and pursue innovations. 3. To cultivate a research and innovation mindset in students. 4. To create awareness about Design Thinking and innovative research idea generation.							
Course Outcomes: Upon successful completion of the course, students will be able to: 1. Develop new research ideas and innovations. 2. Create innovative solutions for identified problems. 3. Use research tools effectively. 4. Develop feasible solutions aligned with Sustainable Development Goals (SDGs).							
Guidelines: 1. The Project must be research or Application based and focus on innovation and problem-solving. 2. The research work needs to be carried out collaboratively and the topic shall be in area of Web Designing and Development or an interdisciplinary in nature. 3. Single or at the most group of Four student will engage in Research Project. 4. Student or group of students responsible for regularly reporting the progress of their research project to their guide (Project In-charge). 5. The synopsis must be submitted within the timeframe provided by the guide (Project In-charge)/Department. 6. Students must submit the Title and Synopsis (5-8 pages) in the prescribed format provided by guide (Project In-charge)/Department. 7. Plagiarism is strictly prohibited. Projects found to contain plagiarism will be rejected. 8. The single or at the most group of four students will conduct the project. 9. Students must submit One copy of their final project report for examination to the department.							

10. All students must adhere to the given schedule for submissions and presentations.
11. Students should ensure that their research work is aligned with ethical research practices.
12. The project report and synopsis should strictly follow the provided format for consistency.
13. Students are encouraged to seek funding or support from relevant bodies and publish their research where applicable.

Formats of the Proposal/Synopsis and Report

Synopsis Format:

1. Title Page
2. Certificate
3. Acknowledgement
4. Index/Table of Contents
5. Abstract
6. Introduction
7. Motivation
8. Aims and Objectives
9. Literature Review
10. Methodology
11. Proposed System/Model
12. Applications
13. References

Research Project Report Format:

1. Title Page
2. Certificate
3. Acknowledgement
4. Index/Table of Contents
5. Abstract
6. Introduction
7. Literature Review
8. Methodology
9. Proposed System/Model
10. Implementation
11. Results and Discussion
12. Conclusion and Future Scope
13. References

Assessment Rubric/Internal evaluation for the Project:

SANT GADGE BABA AMRAVATI UNIVERSITY, AMRAVATI B.Sc. III, SEMESTER – V (NEP)			
Project	Course Code: 138293	Project in Web Designing and Development	Max Marks: 50
Q. No.	Exercise		Marks
1	Innovativeness of Topic, Synopsis Preparation, Submission and Presentation etc.		10
2	Regular Attendance in Laboratory, Progress / objective achievements in proposed plan of research (Clarity, structure, scientific accuracy, originality, and referencing)		10
3	Project Report Quality Assessment/Submission/Evaluation (Clarity, structure, scientific accuracy, originality, and referencing Depth, relevance, etc.)		20
4	Viva-Voce /Presentation (PPT) (Visual clarity, and confidence, Findings etc.)		10



SANT GADGE BABA AMRAVATI UNIVERSITY GAZETTE

Official Publication of Sant Gadge Baba Amravati University

PART- TWO

(Extra-Ordinary)

Wednesday, the 24th December, 2025

(NOTIFICATION)

No. 241/2025

Date: 24/12/2025

Subject: Implementation of the Course of “Foundation of Artificial Intelligence” for the U.G. Programmes Under all the faculties.

It is notified for general information of all the concerned that the authorities of the University have accepted to implement the syllabus of the course “Foundation of Artificial Intelligence” to be implemented from semester V of III Year of all the Under graduate programmes in all the Faculties of the University as per NEP-2020 guidelines from the Academic Session 2026-2027 onwards which is published herewith vide Annexure- “A”

Sd/-

(Dr. Avinash Asanare) Registrar,
Sant Gadge Baba Amravati University

Name of Course – “Foundation of Artificial Intelligence”

Introduction:

The National Education Policy (NEP) 2020 emphasizes the integration of Artificial Intelligence (AI) across all undergraduate levels and disciplines to foster digital literacy and problem-solving skills. ‘It can enhance the employability of the youth and prepare professionals in cutting-edge areas.’ (pg. 46, R.D Kulkarni Report)

The Foundations of Artificial Intelligence course offers an overview of the key concepts, structures, applications, and ethical aspects of AI. It helps learners understand how intelligent systems work and shape modern life. The course covers AI’s definition, evolution, types, and practical uses, along with its basic architectures like rule-based systems, machine learning, and neural networks. Learners will explore AI’s role in education, healthcare, and commerce while reflecting on ethical and social concerns such as privacy, bias, and automation. In line with NEP 2020, it fosters digital literacy and responsible AI awareness for all disciplines.

A) Objective

- i) Introduce all undergraduate students of all the faculties to the basic concepts, uses, and importance of AI.
- ii) Enable learners to understand AI’s principles, applications, limitations, and effectively use AI tools.
- iii) Encourage students to recognize AI’s role in enhancing life and engage with its social and ethical implications.

B) Outcomes

- i) Understand the fundamental concepts, types, and evolution of Artificial Intelligence.
- ii) Apply basic AI techniques and tools to real-world problems across different domains.
- iii) Evaluate the social, ethical, and professional implications of AI in everyday life.
- iv)

C) Implementation of Syllabus, Scheme of Examination and Teaching.

- 1) Curriculum, Teaching and Examination Scheme Given in Appendix A
- 2) This course given in Appendix A shall be compulsory course in **fifth semester** of all undergraduate programs of all faculties in Sant Gadge Baba Amravati University, Amravati. Medium of instruction, paper setting and writing of Answer paper shall be in English, Marathi and Hindi.
- 3) Question paper shall be set and valued by the College/ Department.
- 4) Duration of external examination shall be of 2 hours and paper shall be of 30 marks.
- 5) Internal 20 marks shall be distributed, 5 to attendance, 15 marks to assignment/class test/viva voce/presentation.
- 6) Distribution of 30 external marks shall be based on 4 units, 15 marks to short and 15 marks to long answer type questions.
- 7) It shall be obligatory on part of the college/department to conduct examination on prescribed date by the university and submit the candidate wise information as follows on university portal on due date after valuation answer books.

Grade A -- mark secured 30 to 50

Grade B -- 25 to 29

Grade C -- 20 to 24
FAIL 19 and below

- 8) The final Grade shall be determined by the combined performance in internal and external assessments. A student must secure a minimum of 30% in the internal assessment, 30% in the external assessment, and at least 40% overall to pass. Failure to meet any of these criteria will result in a grade of "Fail."
- 9) In case of failure, student need to appeared in backlog examination by paying prescribed fees.
- 10) Valuated answer book shall be kept in college custody for one academic year and random verification may be done by the University if required.
- 11) Result of final year of respective degree shall not be declared of an examination unless secured any of the grades out of A to C in Foundation of Artificial intelligence.
- 12) Grade secured by an examinee in examination of said course shall be shown on fifth and last semester marksheet.
- 13) The candidates shall have to pay Rs 150 /- in 5th semester to the college to meet out the expenses by the college on teaching of course, question paper setting and printing, paper valuation, providing answer sheet, and filling grade on University portal. In case of failure student need to pay Rs 20 /- for conduction of examination. There shall not have any facility of revaluation of answer book.
- 14) For teaching of the subject person having PG degree in any faculty with second class shall be considered eligible, provided priority shall be given to Ph.D., NET, SET, regular teacher.

15) Format of question paper

Distribution of 30 external marks shall be based on 4 units, 15 marks to short and 15 marks to long answer type questions with internal choice.

1a) Long or short answer questions based on unit number 1 having 8 marks

Or

1b) Long or short answer questions based on unit number 1 having 8 marks 2a) Long or short answer questions based on unit number 2 having 7 marks

Or

2b) Long or short answer questions based on unit number 2 having 7 marks 3a) Long or short answer questions based on unit number 3 having 8 marks

Or

3b) Long or short answer questions based on unit number 3 having 7 marks 4a) Long or short answer questions based on unit number 4 having 8 marks

Or

4b) Long or short answer questions based on unit number 4 having 8 marks

Program:				Semester:	V	
Course:	Foundation of Artificial Intelligence			Code:		
Teaching Scheme				Evaluation Scheme		
Level	Lecture	Hours	Credit	Internal	External	Total
5.5	2	2	2	20	30	50
Methods of Internal Assessment: 15 Marks to Class Tests, /Assignments/ Viva voce/ Presentation & 5 Marks to Attendance						
Course Objectives: To introduce AI concepts in a simple, real-life way with focus on understanding applications, ethics, and future opportunities.						
Course Outcomes: After completion of the course, the students will be able to:						
CO	Course Outcomes				BT Level	
CO-1	Explain the basic concepts, history, and types of AI with real-life examples.				L1 – Knowledge, L2 – Understanding	
CO-2	Describe AI structures and architectures using simple real-world analogies.				L2 – Understanding, L3 – Application	
CO-3	Identify and analyze applications of AI in the area of arts, commerce, humanities, and daily life.				L3 – Application, L4 – Analysis	
CO-4	Evaluate ethical, social issues and predict future opportunities of AI in their own fields.				L4 – Analysis, L5 – Evaluation	

Unit 1: Introduction to Artificial Intelligence

(8 Hours)

Definition of AI: What is Intelligence? Natural vs. Artificial, Simple definition of AI; History & Evolution of AI: From early computers to modern AI; Types of AI: Narrow AI vs. General AI vs. Super AI; AI in Everyday Life: Google Maps, E-commerce suggestions, Chatbots, Social Media feeds; Key Components: Data, Algorithms, Computing Power

Unit 2: AI Structures, Architectures & Techniques (7 Hours)

Basic Structure of an AI System; AI Architectures (Simplified): Rule Based System, Machine Learning, Neural Networks; Key Concepts: Knowledge Representation (using symbols, facts), Search & Problem Solving (maze example, finding shortest route), Natural Language Understanding (Google Translate, chatbots)

Unit 3: Applications of AI in Society (7 Hours)

AI in Different Fields: Education (Personalized learning apps, plagiarism checkers), Healthcare (Disease prediction, medical chatbots), Commerce (Fraud detection in banking, stock market predictions, customer support), Daily Life (Smart home devices, language translation, travel assistants); AI & Decision Making: Hiring, Loan Approval, Court Decisions; Advantages of AI, Limitations of AI

Unit 4: Ethical, Social & Future Aspects of AI (8 Hours)

Ethical Concerns in AI: Privacy issues (CCTV, online data), Bias & Fairness (AI preferring certain groups), Job Displacement (automation replacing humans); Responsible AI: Transparency, Accountability, Human oversight; Future Trends in AI: Self-driving cars, AI in governance, creative industries; AI and You (Career Perspective): Opportunities in Digital Marketing, Content Creation, Business Analytics, HR Tech, Creative Industries (non-programming roles)

Textbook:

Melanie Mitchell – *Artificial Intelligence: A Guide for Thinking Humans* Reference Books:

1. Boden, Margaret A., Artificial Intelligence: A Very Short Introduction
2. Elaine Rich – Artificial Intelligence (3rd Edition)
3. Godbole, Achyut, Artificial Intelligence Bookganga Publication.
4. Stuart Russell – Human Compatible (2019)

SYLLABUS

B.Sc.- III, SEMESTER – VI

**Web Designing and Development
(138)**

Major Course: ASP.Net with C#

Level	Semester	Course Code	Course Name	Credits	Teaching Hours	Exam Duration	Max Marks
5.5	VI	138221	ASP.Net with C#	2	30	2 Hrs.	30

Course Objectives:	1. To develop foundational programming skills using C#.NET, focusing on data types, control structures, functions, and error handling. 2. To apply Object-Oriented Programming principle such as encapsulation, inheritance, and polymorphism—using C# to build structured applications. 3. To understand the architecture of ASP.NET Web Forms and differentiate web-based development from desktop programming. 4. To connect ASP.NET applications with databases through ADO.NET concepts like Connections, Commands, Data Reader, Data Adapter, and Data Set. 5. To build interactive data-driven web applications capable of performing Insert, Update, Delete, and Select operations.			
Course Outcomes:	Students will be able to - 1. Learn the .NET Framework and the role of CLR, CTS, and class libraries in application development. 2. Use C#.NET programming constructs—data types, control statements, functions, and exception handling—to solve logical problems. 3. Implement Object-Oriented Programming concepts (classes, objects, inheritance, polymorphism, interfaces) in C#.NET applications. 4. Develop dynamic web pages using ASP.NET Web Forms, server controls, and event-driven programming. 5. Use ADO.NET components (Connection, Command, Data Reader, Data Adapter, Data Set) to interact with databases. 6. Perform CRUD (Create, Read, Update, Delete) operations and display records through ASP.NET controls like Grid View.			
Unit System	Contents	Workload Allotted	Weightage of Marks Allotted	Incorporation of Pedagogies

Unit I	Introduction to .NET & C#.NET Basics: Overview of .NET Framework, CLR, CTS, CLS, JIT, MSIL, Architecture of .NET Framework, Introduction to C#.NET: Structure of a C# program, Data types, variables, constants, Operators (Arithmetic, Logical, Relational), Decision making (if, if-else, switch), Looping (for, while, do-while, foreach)	8 Hrs.	8 Marks	Use any pedagogical technique suitable for the topic
Unit II	OOP Using C#.NET: Classes and Objects, Constructors & Destructors, Inheritance with its types, Polymorphism, Method Overloading, Method Overriding, Abstract classes and Interfaces, Exception Handling (try, catch, finally, throw)	7 Hrs.	7 Marks	
Unit III	Introduction to ASP.NET: Features, Framework, Component, Advantages, asp.net Page Life Cycle and events, Single page & Code-behind model, File types in asp.net. ASP.NET Directives: Page, Import, Register, Master, Control. Introduction to ASP.NET Web Forms: Features, WinForms vs Web Forms. HTML controls vs Web Server controls. Standard Web Server Controls: Button, TextBox, Label, CheckBox, RadioButton, Hyperlink, ListBox, DropDownList, Image, Calendar control.	8 Hrs.	8 Marks	
Unit IV	Validation Controls: Required Field Validator, Range Validator, Compare Validator, Regular Expression Validator. Introduction To ADO.Net: Features, Architecture. Connected Model: Core Objects: Connection, Command, Data Reader. Disconnected Model: Data Adapter, DataSet. Basic CRUD Operations: Insert, Update, Delete, Select. Overview Of Data Controls For Web Applications: GridView, DetailsView, FormView.	7 Hrs.	7 Marks	
References:	Course Material/Learning Resources Text books: 1. C# (C Sharp) Programming, V. K. Jain, Dreamtech Press, New Delhi. 2. Programming in C# , Balguruswamy, Tata McGraw Hill. 3. Introduction to DOT NET (.NET), James Conardet. Al., Shroff Publisher 4. Introducing Microsoft Dot Net , David Platt, PHI Publication. 5. C # (C Sharp) Complete Reference ,Schildt, Tata McGraw Hill 6. The Complete Reference-ASP .NET , Matthew Mac Donald, Tata McGraw- Hill. 7. ASP .NET 4.5(Covers C# and VB codes),Black Book, dreamtech Publication			

	Reference Books: 1. Andrew Troelsen , “Pro C# 2010 and the .NET 4 Platform, Fifth edition, A Press, 2010. 2. Ian Griffiths, Matthew Adams, Jesse Liberty, “Programming C# 4.0”, Sixth Edition, O’Reilly, 2010.. Weblink to Equivalent MOOC on SWAYAM(or other) if relevant: 1. https://onlinecourses.swayam2.ac.in/e-learning/preview/nou24_cs18 2. https://online-degree.swayam2.ac.in/mri22_07_d01_s6_cc01/preview 3. https://www.coursera.org/learn/c-sharp-for-dot-net 4. https://www.coursera.org/learn/packt-programming-apis-with-c-sharp-and-net
--	---

Assessment Rubric: Internal for Theory Course (Major)

SANT GADGE BABA AMRAVATI UNIVERSITY, AMRAVATI THEORY EXAMINATION B.Sc. III, SEMESTER – VI (NEP)			
Theory	Course Code: 138221	Course Title:ASP.Net with C#	Max Marks: 20
Sr. No.	Assessment Criteria		Marks
1	Any Two of the Activity (weekly or monthly assignment/ Unit Test/Class Test) (CAT-1)		10
2	Any One of the Activity includes Open Book Test, MCQ Tests, / Theory related Class activity/Task etc.) etc. (CAT-2)		5
3	Participation in any one Activity includes Quiz, Seminar, Group Discussion, Industry visit, Case Study, Mini project, innovative work, etc. based on Theory Course. Involvement in subject related activities such as Conference, Workshop, Coding Competitions etc. (CAT-3)		5

Major Course: Advanced Web Application with Node. JS

Level	Semester	Course Code	Course Name	Credits	Teaching Hours	Exam Duration	Max Marks
5.5	VI	138222	Advanced Web Application with Node. JS	2	30	2 Hrs.	30

Course Objectives:	1. Understand the fundamentals of Node.js. 2. Develop proficiency in Node.js programming concepts. 3. Learn package management and server-side development. 4. Implement database connectivity and build dynamic web applications using Express.js.						
Course Outcomes:	On completion of the following syllabus the students will be able to - 1. Understand Node JS and REPL terminal. 2. Understand Node JS Modules and Node Package Manager. 3. Develop applications to handle events in Node JS. 4. Make use of Web Server to manage database.						
Unit System	Contents				Workload Allotted	Weightage of Marks Allotted	Incorporation of Pedagogies
Unit I	Introduction: Core concept and Architecture, Features and advantages of Node JS, Node.js Process Model, Types of applications that can be developed using Node.js, Install Node.js on Windows, working in REPL, Node JS Console, Creating a Node File with JavaScript, accessing a Node.js File Through the Command Line Interface, Primitive Types, Object Literal, Functions, Buffer, Access Global Scope.				8 Hrs.	8 Marks	Use any pedagogical technique suitable for the topic
Unit II	Node.Js Modules: Core Modules, Local Modules, Third Party Modules, Module Exports. Using Modules in a Node.js File, Using the Built in HTTP, URL, Query String Module, creating a Custom Module, Node Package Manager: NPM, Installing Packages Locally, installing packages globally, Updating packages.				7 Hrs.	7 Marks	
Unit III	Creating Web Server: Handling HTTP requests, Sending requests. File System: Reading, Writing, Opening, and Deleting a file, Operations: Append, Rename, Truncate. File System Module with URL Module, Create, Read, Remove a Directory.				8 Hrs.	8 Marks	

	Events: EventEmitter class, Methods and Events of EventEmitter Class, Extend EventEmitter Class, Passing Arguments to listeners, Error Events.			
Unit IV	Database Connectivity: Connection string, Configuring, working with insert, select command, updating records, deleting records, drop tables, Ordered Result Set, Express and Node Js: Introduction to Express Framework, Express Server Request-Response Routes, Route Parameters, Send Static Files, Accept User Input, File Upload with Express.	7 Hrs.	7 Marks	
References:	Course Material/Learning Resources Text books: 1. Node.js Design Patterns, by Mario Casciaro Reference Books: 1. Beginning Node.js, by Basarat Ali Syed. 2. Node.js Web Development by David Herron. 3. Mastering Backend in Node.js & Express.js by Vivek S Parmar. 4. Node.JS Guidebook by Dhruvi Shah. Weblink to Equivalent MOOC on SWAYAM if relevant: 1. https://www.swayaminfotech.com/services/node-js-development/ 2. https://onlinecourses.swayam2.ac.in/e-learning/preview/nou25_cs23 Any pertinent media (recorded lectures, YouTube, etc.) if relevant: 1. https://www.youtube.com/watch?v=PJd27DFfu3E 2. https://www.youtube.com/watch?v=MIJt9H69QVc 3. https://www.youtube.com/watch?v=YO7672hO_uQ 4. https://www.youtube.com/watch?v=CCRTu3AQQeY			

Assessment Rubric: Internal for Theory Course (Major)

SANT GADGE BABA AMRAVATI UNIVERSITY, AMRAVATI THEORY EXAMINATION B.Sc. III, SEMESTER – VI (NEP)			
Theory	Course Code: 138222	Course Title: Advanced Web Application with Node. JS	Max Marks: 20
Sr. No.	Assessment Criteria		Marks
1	Any Two of the Activity (weekly or monthly assignment/ Unit Test/Class Test) (CAT-1)		10
2	Any One of the Activity includes Open Book Test, MCQ Tests, / Theory related Class activity/Task etc.) etc. (CAT-2)		5
3	Participation in any one Activity includes Quiz, Seminar, Group Discussion, Industry visit, Case Study, Mini project, innovative work, etc. based on Theory Course. Involvement in subject related activities such as Conference, Workshop, Coding Competitions etc. (CAT-3)		5

Major Course: Web Security and Deployment

Level	Semester	Course Code	Course Name	Credits	Teaching Hours	Exam Duration	Max Marks
5.5	VI	138223	Web Security and Deployment	2	30	2 Hrs.	30

Course Objectives:	1. To understand web security concepts and common web application vulnerabilities. 2. To learn secure coding practices and security testing techniques. 3. To understand web server configuration and deployment methods. 4. To gain knowledge of website hosting, cloud deployment, and maintenance.			
Course Outcomes:	After successful completion of this course, students will be able to: 1. Identify common web security threats and vulnerabilities. 2. Apply secure coding and authentication mechanisms in web applications. 3. Perform basic security testing and vulnerability assessment. 4. Deploy and maintain secure web applications on web servers and cloud platforms.			
Unit System	Contents	Workload Allotted	Weightage of Marks Allotted	Incorporation of Pedagogies
Unit I	Introduction to Web Security: Fundamentals of Cyber Security and Web Security, Security Goals: Confidentiality, Integrity, Availability (CIA), Types of Cyber Threats and Attacks, HTTP, HTTPS, SSL/TLS Concepts, Authentication and Authorization, Session Management and Cookies, Introduction to OWASP Top 10 Security Risks	8 Hrs.	8 Marks	Use any pedagogical technique suitable for the topic
Unit II	Web Application Vulnerabilities and Protection: SQL Injection Attacks and Prevention, Cross-Site Scripting (XSS), Cross-Site Request Forgery (CSRF), Broken Authentication and Access Control, Security Misconfiguration, Password Security and Hashing Techniques, Secure Coding Practices and Input Validation, File Upload Security and Data Protection	7 Hrs.	7 Marks	
Unit III	Security Testing and Monitoring: Vulnerability Assessment and Penetration Testing Basics, OWASP Testing Methodology, Security Auditing and Logging, Error Handling and Secure Exception Management, Security Testing Tools: OWASP ZAP, Burp Suite (Introduction),	8 Hrs.	8 Marks	

	Monitoring and Incident Response, Backup and Recovery Strategies			
Unit IV	Web Deployment and Maintenance: Web Hosting Fundamentals, Domain Name and DNS Configuration, Web Server Deployment (Apache and Nginx Overview), Website Deployment Process, Cloud-Based Deployment Basics, SSL Certificate Installation and HTTPS Configuration, Website Maintenance and Updates, Deployment Security Best Practices	7 Hrs.	7 Marks	
References:	Course Material/Learning Resources Reference Books 1. Bryan Sullivan & Vincent Liu – <i>Web Application Security: A Beginner's Guide</i>. 2. Andrew Hoffman – <i>Web Application Security</i>. 3. Dafydd Stuttard & Marcus Pinto – <i>The Web Application Hacker's Handbook</i>. 4. Nina Godbole & Sunit Belapure – <i>Cyber Security</i>. Weblink to Equivalent MOOC on SWAYAM (if relevant) Web Security and Deployment , the following SWAYAM/NPTEL MOOCs are relevant: 1. Introduction to Cyber Security (SWAYAM) Covers fundamentals of cyber security, cyber threats, security practices, and web security concepts. 2. Cyber Security and Privacy (NPTEL–SWAYAM) Covers cybersecurity principles, privacy protection, risk management, and security governance. 3. Ethical Hacking (NPTEL–SWAYAM) Includes network security, vulnerabilities, attacks, penetration testing, and security mechanisms. 4. Practical Cyber Security for Cyber Security Practitioners (NPTEL–SWAYAM) Focuses on practical cyber security operations, security monitoring, and real-world security practices. 5. SWAYAM Central Course Portal Official portal to search for updated MOOCs related to Web Security, Information Security, Cyber Security, Cloud Computing, and Web Technologies. Weblink to Equivalent MOOC on SWAYAM (if relevant): 1. Introduction to Cyber Security – SWAYAM 2. Cyber Security and Privacy – NPTEL/SWAYAM 3. Ethical Hacking – NPTEL/SWAYAM 4. Practical Cyber Security for Cyber Security Practitioners – NPTEL/SWAYAM			

Assessment Rubric: Internal for Theory Course (Major)

SANT GADGE BABA AMRAVATI UNIVERSITY, AMRAVATI THEORY EXAMINATION B.Sc. III, SEMESTER – VI (NEP)			
Theory	Course Code: 138223	Course Title: Web Security and Deployment	Max Marks: 20
Sr. No.	Assessment Criteria		Marks
1	Any Two of the Activity (weekly or monthly assignment/ Unit Test/Class Test) (CAT-1)		10
2	Any One of the Activity includes Open Book Test, MCQ Tests, / Theory related Class activity/Task etc.) etc. (CAT-2)		5
3	Participation in any one Activity includes Quiz, Seminar, Group Discussion, Industry visit, Case Study, Mini project, innovative work, etc. based on Theory Course. Involvement in subject related activities such as Conference, Workshop, Coding Competitions etc. (CAT-3)		5

Major Course: Laboratory on ASP.Net with C# and Node.JS

Level	Semester	Course Code	Course Name	Credits	Teaching Hours	Exam Duration	Max Marks
5.5	VI	138224	Laboratory on ASP.Net with C# and Node.JS	2	60	4Hrs.	50

Course Objectives:	1. Understand Node.js environment, installation, and execution. 2. Core concepts like modules, functions, buffers, and objects. 3. Develop server-side applications using HTTP, File System, and Events. 4. Work with database connectivity and CRUD operations.						
Course Outcomes:	On completion of the following syllabus the students will be able to - 1. Install and run Node.js programs using REPL and CLI. 2. Create modular applications using Node.js modules. 3. Build web applications using HTTP and Express.js. 4. Perform database operations using Node.js.						
Contents					Workload Allotted	Weightage of Marks Allotted	Incorporation of Pedagogies
1. Write a program in C# to make use of operators. 2. Write a program in C# to make use of switch case. 3. Write a program in C# for make use of if-else. 4. Write a program in C# for make use of for loop. 5. Write a program in C# to use while loop. 6. Write a program in C# for Constructor & Destructor. 7. Write a program in C# for Multilevel Inheritance. 8. Write a program in C# to demonstrate class and object concept using bank example. 9. Write a program in C# to demonstrate runtime polymorphism. 10. Write a program in C# to implementing interfaces. 11. Write a program in C# for exception handling using try catch & finally blocks. 12. Install Node.js and execute programs using REPL and CLI							Use any pedagogical technique suitable for the topic

	13. Write a basic Node.js program using variables, functions, and objects 14. Create and use custom modules using module. exports and require() 15. Perform package management using NPM (install, update, uninstall packages) 16. Create a simple web server using the HTTP module 17. Perform file operations using File System module (read/write/append/delete) 18. Perform directory operations using File System module 19. Use URL and Query String modules to parse URLs 20. Implement event handling using EventEmitter class 21. Develop a simple Express.js application with routing and static files 22. Implement form handling in Express.js 23. Implement file upload functionality using Express.js 24. Connect Node.js with database and perform CRUD operations 25. Create a custom event-driven application using EventEmitter 26. Build a mini web application combining modules, Express, and database connectivity			
--	---	--	--	--

Assessment Rubric: External Practical Course

SANT GADGE BABA AMRAVATI UNIVERSITY, AMRAVATI PRACTICAL EXAMINATION B.Sc. III, SEMESTER – VI (NEP)				
Practical	Course Code: 138224	Laboratory on ASP.Net with C# and Node.JS	Max Marks: 25	Time: 4 Hrs.
Sr. No.	Exercise			Marks
1.	Single Program Writing, Algorithm, Flowchart, Execution, with Sample inputs and Outputs, and Printout			10
2.	Submitted Record book (Preferably handwritten)			05
3.	External Viva Voce			10

Assessment Rubric: Internal Practical Course

SANT GADGE BABA AMRAVATI UNIVERSITY, AMRAVATI PRACTICAL EXAMINATION B.Sc. III, SEMESTER – VI (NEP)			
Practical	Course Code: 138224	Laboratory on ASP.Net with C# and Node.JS	Max Marks: 25
Sr. No.	Assessment Criteria		Marks
1.	Attendance/Regularity in practical's / Students' overall performance		05
2.	Record book Preparation (Preferably handwritten)		10
3.	Internal Viva Voce		10

Major Course (Elective-2): Mobile Responsive Web Design

Level	Semester	Course Code	Course Name	Credits	Teaching Hours	Exam Duration	Max Marks
5.5	VI	138225	Mobile Responsive Web Design	2	30	2 Hrs.	30

Course Objectives:	After successful completion of this course, students will be able to: 1. Understand the evolution, concepts, and principles of mobile web technologies and responsive web design. 2. Design user-friendly mobile interfaces by applying mobile UX/UI principles and accessibility guidelines. 3. Develop mobile-first and responsive web layouts using modern web development techniques. 4. Optimize mobile websites for performance using image optimization, caching, compression, and CDN technologies. 5. Understand and implement Progressive Web Applications (PWA) with offline support and installation capabilities. 6. Test, deploy, and maintain mobile-friendly web applications across different devices and platforms.			
Course Outcomes:	After completion of the course, students will be able to: 1. Explain the evolution of mobile web technologies, mobile devices, browsers, and operating systems. 2. Apply mobile UX/UI principles, navigation patterns, and accessibility guidelines while designing websites. 3. Develop responsive and mobile-first web pages using progressive enhancement techniques. 4. Optimize mobile website performance using image optimization, lazy loading, caching, compression, and CDN technologies. 5. Design and implement Progressive Web Applications using service workers and web manifests. 6. Deploy and test mobile websites and PWAs on multiple devices and platforms.			
Unit System	Contents	Workload Allotted	Weightage of Marks Allotted	Incorporation of Pedagogies
Unit I	Mobile Web Design Fundamentals: Evolution of Mobile Web, Mobile Devices and Operating Systems, Mobile Browsers, Mobile UX/UI Design Principles, Touch-based Interface Design, Mobile Navigation Patterns, Mobile Accessibility Guidelines	7 Hrs.	7 Marks	Use any pedagogical technique suitable for the topic
Unit II	Mobile-First Development: Mobile-First Design Strategy, Progressive Enhancement, Mobile Layout Design, Responsive Forms for Mobile, Mobile Typography, Mobile Icons and Graphics, Mobile Gestures and Interactions	8Hrs.	8 Marks	
Unit III	Unit III: Performance Optimization for Mobile Websites: Mobile Performance Metrics Image Optimization, Lazy Loading, Minification and Compression, Browser Caching, Content Delivery Network (CDN), Responsive Images (srcset, picture)	8 Hrs.	8 Marks	

Unit IV	Unit IV: Progressive Web Applications (PWA) and Mobile Deployment: Introduction to Progressive Web Applications, Web App Manifest, Service Workers, Offline Web Applications, Push Notifications, Installing PWAs, Testing and Deployment of Mobile Websites	7 Hrs.	7 Marks	
References:	Course Material/Learning Resources: Text books: 1. Marcotte, Ethan. Responsive Web Design, A Book Apart. 2. Duckett, Jon. HTML and CSS: Design and Build Websites, Wiley. 3. Frain, Ben. Responsive Web Design with HTML5 and CSS, Packt Publishing. 4. Keith, Jeremy. Going Offline: Building Progressive Web Apps, A Book Apart. 5. Nixon, Robin. Learning PHP, MySQL & JavaScript, O'Reilly. 6. Grigsby, Jason. Progressive Web Apps, O'Reilly Media. Reference Books: 1. Krug, Steve. Don't Make Me Think: A Common Sense Approach to Web Usability. 2. Norman, Don. The Design of Everyday Things. 3. Wroblewski, Luke. Mobile First. 4. Zakas, Nicholas C. High Performance Web Sites. 5. Osmani, Addy. Learning JavaScript Design Patterns. Weblink to Equivalent MOOC on SWAYAM if relevant: Responsive Web Design https://onlinecourses.swayam2.ac.in Web Technologies and Applications https://swayam.gov.in Introduction to Web Development https://onlinecourses.nptel.ac.in Programming in HTML5 with JavaScript and CSS3 1. https://swayam.gov.in			

Assessment Rubric: Internal for Theory Course (Major Elective-2)

SANT GADGE BABA AMRAVATI UNIVERSITY, AMRAVATI THEORY EXAMINATION B.Sc. III, SEMESTER – VI (NEP)			
Theory	Course Code: 138225	Course Title: Mobile Responsive Web Design	Max Marks: 20
Sr. No.	Assessment Criteria		Marks
1	Any Two of the Activity (weekly or monthly assignment/ Unit Test/Class Test) (CAT-1)		10
2	Any One of the Activity includes Open Book Test, MCQ Tests, / Theory related Class activity/Task etc.) etc. (CAT-2)		5
3	Participation in any one Activity includes Quiz, Seminar, Group Discussion, Industry visit, Case Study, Mini project, innovative work, etc. based on Theory Course. Involvement in subject related activities such as Conference, Workshop, Coding Competitions etc. (CAT-3)		5

Major Course (Elective-2): E-Commerce Website Development

Level	Semester	Course Code	Course Name	Credits	Teaching Hours	Exam Duration	Max Marks
5.5	VI	138226	E-Commerce Website Development	2	30	2 Hrs	30

Course Objectives:	1. To understand the concepts and architecture of e-commerce systems. 2. To develop knowledge of planning and designing e-commerce websites. 3. To understand online business operations and digital payment systems. 4. To learn website security, deployment, and maintenance in e-commerce.			
Course Outcomes:	After successful completion of this course, students will be able to: 1. Explain the fundamentals and business models of e-commerce. 2. Design the structure and features of an e-commerce website. 3. Understand online payment, order management, and customer services. 4. Apply security, legal, and deployment concepts in e-commerce websites.			
Unit System	Contents	Workload Allotted	Weightage of Marks Allotted	Incorporation of Pedagogies
Unit I	Fundamentals of E-Commerce: Introduction to E-Commerce, Traditional commerce vs Ecommerce, Evolution and Scope of E-Commerce, Types of E-Commerce (B2B, B2C, C2C, C2B, G2C), E-Commerce Business Models, Revenue Models, Components of E-Commerce Systems, E-commerce Ecosystem, E-Commerce Infrastructure, Digital Marketplace, Advantages and Limitations of E-Commerce, Emerging Trends in E-Commerce	8 Hrs	8 Marks	Use any pedagogical technique suitable for the topic
Unit II	E-Commerce Website Planning and Development: Planning an E-Commerce Website, Website Structure and Navigation, CMS for E-Commerce (e.g., WordPress + WooCommerce), Theme Selection and Website Design, Product Categories and Product Catalog, Product Images and Media Management, Product Listing and Product Detail Pages, Customer Registration and User Accounts, Shopping Cart Concept, Checkout Process, Order Management System, Inventory and Stock Management, Wishlist and Customer Reviews,	7 Hrs	7 Marks	
Unit III	Online Business Operations: Electronic Payment Systems, Payment Gateway Concepts,	8 Hrs	8 Marks	

	Digital Wallets and UPI, Online Billing and Invoice Generation, Shipping and Delivery Management, Return, Refund and Cancellation Policies, Customer Relationship Management (CRM), Digital Marketing for E-Commerce, Search Engine Optimization (SEO), Website Analytics and Performance Monitoring,			
Unit IV	E-Commerce Security, Deployment and Maintenance: Website Security Fundamentals, Secure Transactions (SSL/TLS), User Authentication and Authorization, Data Privacy and Protection, Cyber Security Threats in E-Commerce, Legal and Ethical Issues in E-Commerce, Website Testing, Backup and Recovery, Website Hosting, Domain Registration, Website Deployment and Maintenance, Website Performance Optimization,	7 Hrs	7 Marks	
References:	Course Material/Learning Resources Text books: 1. E-Commerce: Strategy, Technologies and Applications – David Whiteley. 2. Electronic Commerce – Gary P. Schneider. 3. E-Commerce: Business, Technology, Society – Kenneth C. Laudon & Carol Guercio Traver. Reference Books: 1. E-Commerce 2023: Business, Technology and Society 2. Electronic Commerce: A Managerial Perspective 3. Beginning E-Commerce Weblink to Equivalent MOOC on SWAYAM if relevant: 1. https://docs.google.com/document/d/1TkUNfpIDBUjKpr-7cRAhcGDsdJ1mKpOC/edit			

Assessment Rubric: Internal for Theory Course (Major Elective-2)

SANT GADGE BABA AMRAVATI UNIVERSITY, AMRAVATI THEORY EXAMINATION B.Sc. III, SEMESTER – VI (NEP)			
Theory	Course Code: 138226	Course Title: E-Commerce Website Development	Max Marks: 20
Sr. No.	Assessment Criteria		Marks
1	Any Two of the Activity (weekly or monthly assignment/ Unit Test/Class Test) (CAT-1)		10
2	Any One of the Activity includes Open Book Test, MCQ Tests, / Theory related Class activity/Task etc.) etc. (CAT-2)		5
3	Participation in any one Activity includes Quiz, Seminar, Group Discussion, Industry visit, Case Study, Mini project, innovative work, etc. based on Theory Course. Involvement in subject related activities such as Conference, Workshop, Coding Competitions etc. (CAT-3)		5

Major Course (Elective-2 Laboratory): Laboratory on Mobile Responsive Web Design

Level	Semester	Course Code	Course Name	Credits	Teaching Hours	Exam Duration	Max Marks
5.5	VI	138227	Laboratory on Mobile Responsive Web Design	2	60	4Hrs	50

Course Objectives:	After successful completion of laboratory work, students will be able to: 1. Design and develop responsive web pages using mobile-first principles. 2. Apply mobile UX/UI design concepts in web applications. 3. Implement responsive layouts, forms, and navigation for various devices. 4. Optimize mobile website performance using modern techniques. 5. Develop, test, and deploy Progressive Web Applications (PWAs).						
Course Outcomes:	After completion of the following the students will be able to 1. Design responsive and mobile-friendly web interfaces using mobile-first design principles. 2. Design responsive and mobile-friendly web interfaces using mobile-first design principles. 3. Develop responsive layouts, forms, and navigation components for multiple screen sizes. 4. Apply performance optimization techniques to improve mobile website efficiency. 5. Implement Progressive Web Application (PWA) features such as service workers and web manifests. 6. Test and deploy mobile-responsive websites across different devices and browsers.						
Contents				Workload Allotted	Weightage of Marks Allotted	Incorporation of Pedagogies	
	List of Practical: 1. Study different mobile devices and screen resolutions. 2. Analyze features of various mobile operating systems and browsers. 3. Design a simple mobile-friendly webpage using responsive design principles. 4. Create a responsive navigation menu for mobile devices. 5. Design a touch-friendly user interface for a mobile application. 6. Implement mobile accessibility guidelines in a webpage. 7. Create a webpage using Mobile-First Design Strategy. 8. Implement Progressive Enhancement in a website. 9. Design responsive layouts using CSS Flexbox. 10. Design responsive layouts using CSS Grid.					Use any pedagogical technique suitable for the topic	

	11. Create responsive forms optimized for mobile devices. 12. Implement responsive typography using relative units. 13. Use icons and scalable graphics for mobile interfaces. 14. Implement touch gestures and interactions using JavaScript. 15. Optimize images for mobile websites. 16. Implement lazy loading for images and multimedia content. 17. Apply minification and compression techniques for web assets. 18. Configure browser caching and integrate CDN resources. 19. Develop a Progressive Web Application using Web Manifest and Service Workers. 20. Test and deploy a responsive mobile website on different devices and browsers.			
References:	Weblink to Equivalent MOOC on SWAYAM if relevant: Responsive Web Design and Development 1. https://swayam.gov.in Web Technologies Laboratory 1. https://onlinecourses.swayam2.ac.in Programming in HTML5 with JavaScript and CSS3 1. https://swayam.gov.in User Interface Design 1. https://onlinecourses.nptel.ac.in Modern Web Application Development 1. https://swayam.gov.in			

Assessment Rubric: External Practical Course

SANT GADGE BABA AMRAVATI UNIVERSITY, AMRAVATI PRACTICAL EXAMINATION B.Sc. III, SEMESTER – VI (NEP)				
Practical	Course Code: 138227	Laboratory on Mobile Responsive Web Design	Max Marks: 25	Time: 4 Hrs.
Sr. No.	Exercise			Marks
1.	Single Program Writing, Algorithm, Flowchart, Execution, with Sample inputs and Outputs, and Printout			10
2.	Submitted Record book (Preferably handwritten)			05
3.	External Viva Voce			10

Assessment Rubric: Internal Practical Course

SANT GADGE BABA AMRAVATI UNIVERSITY, AMRAVATI PRACTICAL EXAMINATION B.Sc. III, SEMESTER – VI (NEP)			
Practical	Course Code: 138227	Laboratory on Mobile Responsive Web Design	Max Marks: 25
Sr. No.	Assessment Criteria		Marks
1.	Attendance/Regularity in practical's / Students' overall performance		05
2.	Record book Preparation (Preferably handwritten)		10
3.	Internal Viva Voce		10

Major Course (Elective-2 Laboratory): Laboratory on E-Commerce Website Development

Level	Semester	Course Code	Course Name	Credits	Teaching Hours	Exam Duration	Max Marks
5.5	VI	138228	Laboratory on E-Commerce Website Development	2	60	4 Hrs	50

Course Objectives:	1. To familiarize students with the planning and development of e-commerce websites. 2. To develop skills in organizing products and managing online business operations. 3. To understand online payment, order management, and website security concepts. 4. To deploy and maintain an e-commerce website using modern website-building platforms.						
Course Outcomes:	After successful completion of this laboratory, students will be able to: 1. Plan and design an e-commerce website structure. 2. Create and manage product catalogs and customer information. 3. Configure payment, shipping, and order management features. 4. Deploy and maintain a secure e-commerce website.						
Contents					Workload Allotted	Weightage of Marks Allotted	Incorporation of Pedagogies
	List of Practical: 1. Study different types of E-Commerce business models (B2B, B2C, C2C, C2B, G2C). 2. Prepare a sitemap and planning document for an e-commerce website. 3. Install and configure a CMS (e.g., WordPress) and design the homepage of an online store. 4. Install and explore WooCommerce/ OpenCart and compare its features with Shopify and Magento. 5. Create product categories and subcategories. 6. Add products with images, descriptions, prices, and stock details. 7. Configure customer registration and user account settings. 8. Configure shopping cart, checkout process, and order placement workflow. 9. Configure inventory management and product availability. 10. Configure customer reviews, ratings, and wishlist functionality. 11. Configure payment methods (Cash on Delivery, UPI, Credit/Debit Card, Net Banking – Demo Mode). 12. Generate sample invoices, order confirmation emails, and order reports.						Use any pedagogical technique suitable for the topic

	13. Configure shipping methods and delivery charges. 14. Configure return, refund, and cancellation policies. 15. Configure SEO-friendly URLs, metadata, and product optimization. 16. Generate sales reports and demonstrate website analytics using sample data. 17. Configure SSL certificate (demonstration) and website security settings. 18. Create user roles and permissions for administrator, manager, and customer. 19. Perform website backup and restore operations. 20. Deploy the e-commerce website on a local server or web hosting platform. 21. Test the e-commerce website for functionality, usability, responsiveness, and security using a testing checklist. 22. Prepare the final mini project: Develop and deploy a basic e-commerce website with product catalog, shopping cart, payment configuration (demo), and security settings.			
References:	Weblink to Equivalent MOOC on SWAYAM if relevant: E-Business – IIT Kharagpur 1. https://onlinecourses.nptel.ac.in/noc26_mg134/preview Consumer Behaviour – IIT Kharagpur 1. https://onlinecourses.nptel.ac.in/noc21_mg20/preview Entrepreneurship – IIT Madras 1. https://onlinecourses.nptel.ac.in/noc26_mg114/preview Innovation, Business Models and Entrepreneurship – IIT Roorkee 1. https://nptel.ac.in/courses/11010709			

Assessment Rubric: External Practical Course

SANT GADGE BABA AMRAVATI UNIVERSITY, AMRAVATI PRACTICAL EXAMINATION B.Sc. III, SEMESTER – VI (NEP)				
Practical	Course Code: 138228	Laboratory on E-Commerce Website Development	Max Marks: 25	Time: 4 Hrs.
Sr. No.	Exercise			Marks
1.	Single Program Writing, Algorithm, Flowchart, Execution, with Sample inputs and Outputs, and Printout			10
2.	Submitted Record book (Preferably handwritten)			05
3.	External Viva Voce			10

Assessment Rubric: Internal Practical Course

SANT GADGE BABA AMRAVATI UNIVERSITY, AMRAVATI PRACTICAL EXAMINATION B.Sc. III, SEMESTER – VI (NEP)			
Practical	Course Code: 138228	Laboratory on E-Commerce Website Development	Max Marks: 25
Sr. No.	Assessment Criteria		Marks
1.	Attendance/Regularity in practical's / Students' overall performance		05
2.	Record book Preparation (Preferably handwritten)		10
3.	Internal Viva Voce		10

Minor Course: Web Development with PHP and Java Script

Level	Semester	Course Code	Course Name	Credits	Teaching Hours	Exam Duration	Max Marks
5.5	VI	138267	Web Development with PHP and Java Script	2	30	2 Hrs.	30

Course Objectives:	1. Introduce students the fundamentals of client-side and server-side web programming using JavaScript & PHP. 2. Develop interactive webpages using JavaScript. 3. Build dynamic web applications using PHP. 4. Integrate PHP with MySQL database for web applications						
Course Outcomes:	Students will be able to - 1. Develop interactive web pages using JavaScript. 2. Build dynamic web applications using PHP. 3. Design and manage MySQL databases for web applications. 4. Build database-driven web applications using PHP and MySQL						
Unit System	Contents				Workload Allotted	Weightage of Marks Allotted	Incorporation of Pedagogies
Unit I	Introduction to JavaScript, Variables and Data Types, Operators and Expressions, Conditional Statements and Loops, Functions, Arrays and Objects, String and Date Functions, DOM Manipulation, Event Handling, Form Validation				8 Hrs.	8 Marks	Use any pedagogical technique suitable for the topic
Unit II	Introduction to PHP, PHP Syntax and Variables, Constants and Data Types, Operators and Expressions, Control Statements, Functions in PHP, Arrays and Strings, Include & Require statement				7 Hrs.	7 Marks	
Unit III	Form Handling using GET and POST, File Handling, Sessions and Cookies, Error Handling, uploading files, PHP Date & Time Functions, Introduction to Object Oriented PHP (Class & Object)				8 Hrs.	8 Marks	
Unit IV	Introduction to DBMS and MySQL, Creating Databases and Tables, SQL Commands: SELECT INSERT, UPDATE, DELETE, PHP-MySQL Connectivity, CRUD Operations, Authentication System, Introduction to Web Security, SQL Injection, Password Security, Input Validation				7 Hrs.	7 Marks	

References:	Course Material/Learning Resources Text books: 1. Learning PHP, MySQL & JavaScript – Robin Nixon 2. PHP and MySQL Web Development – Luke Welling 3. JavaScript: The Good Parts – Douglas Crockford Weblink to Equivalent MOOC on SWAYAM if relevant: 1. https://onlinecourses.swayam2.ac.in/e-learning/preview/aic20_sp32 2. https://swayam-plus.swayam2.ac.in/courses/course-details?id=F_INFOSY_03
--------------------	---

Assessment Rubric: Minor Course

SANT GADGE BABA AMRAVATI UNIVERSITY, AMRAVATI THEORY EXAMINATION B.Sc. III, SEMESTER – VI (NEP)			
Theory	Course Code: 138267	Course Title: Web Development with PHP and Java Script	Max Marks: 20
Sr. No.	Assessment Criteria		Marks
1	Any Two of the Activity (weekly or monthly assignment/ Unit Test/Class Test) (CAT-1)		10
2	Any One of the Activity includes Open Book Test, MCQ Tests, / Theory related Class activity/Task etc.) etc. (CAT-2)		5
3	Participation in any one Activity includes Quiz, Seminar, Group Discussion, Industry visit, Case Study, Mini project, innovative work, etc. based on Theory Course. Involvement in subject related activities such as Conference, Workshop, Coding Competitions etc. (CAT-3)		5

Minor Course: Laboratory on PHP and Java Script

Level	Semester	Course Code	Course Name	Credits	Teaching Hours	Exam Duration	Max Marks
5.5	VI	138268	Laboratory on PHP and Java Script	2	60	4Hrs.	50

Course Objectives:	1. Understand the concepts of client-side scripting using JavaScript and server-side scripting using PHP. 2. Develop interactive applications using JavaScript, including event handling, validation, DOM manipulation, and asynchronous programming. 3. Create dynamic server-side applications using PHP for processing user input, file handling, sessions, cookies, and exception handling. 4. Implement database connectivity using PHP and perform CRUD operations with MySQL. 5. Integrate JavaScript and PHP to develop secure, efficient, and database-driven web applications.						
Course Outcomes:	On completion of the following syllabus the students will be able to - 1. Apply JavaScript to implement client-side scripting, event handling, form validation, DOM manipulation, and asynchronous operations. 2. Develop server-side applications using PHP with functions, arrays, file handling, sessions, cookies, and exception handling. 3. Design and implement database-driven applications using PHP and MySQL to perform CRUD operations. 4. Integrate JavaScript, PHP, and MySQL to build and test dynamic web applications following secure coding and debugging practices.						
Contents					Workload Allotted	Weightage of Marks Allotted	Incorporation of Pedagogies

	List of Practical: 1. Create a web page to perform arithmetic operations using JavaScript. 2. Create a web page to find the largest of three numbers using JavaScript. 3. Create a web page to generate the multiplication table of a number using JavaScript. 4. Create a web page to demonstrate JavaScript functions and arrays. 5. Create a web page to demonstrate string and date functions in JavaScript. 6. Create a web page to modify HTML elements using DOM manipulation. 7. Create a web page to demonstrate event handling using button, mouse, and keyboard events. 8. Design a user registration form with client-side validation using JavaScript. 9. Write a PHP program to demonstrate variables, data types, operators, and control statements. 10. Write a PHP program using functions, arrays, and string functions. 11. Develop a PHP application to process an HTML form using GET and POST methods. 12. Write a PHP program to demonstrate the use of include and require. 13. Write a PHP program to create, read, write, and append data to a text file. 14. Develop a PHP application to demonstrate sessions and cookies. 15. Develop a PHP application for file uploading. 16. Write a PHP program using classes and objects to demonstrate Object-Oriented PHP. 17. Create a MySQL database and tables using SQL commands. 18. Write SQL queries to perform SELECT, INSERT, UPDATE, and DELETE operations. 19. Develop a PHP application to perform CRUD operations using MySQL. 20. Develop a Login and Registration System using PHP and MySQL with password hashing and input validation.			Use any pedagogical technique suitable for the topic
References:	Weblink to Equivalent MOOC on SWAYAM if relevant: 1. https://onlinecourses.swayam2.ac.in/e-learning/preview/aic20_sp32			

Assessment Rubric: External Practical Course

SANT GADGE BABA AMRAVATI UNIVERSITY, AMRAVATI PRACTICAL EXAMINATION B.Sc. III, SEMESTER – VI (NEP)				
Practical	Course Code: 138268	Laboratory on PHP and Java Script	Max Marks: 25	Time: 4 Hrs.
Sr. No.	Exercise			Marks
1.	Single Program Writing, Algorithm, Flowchart, Execution, with Sample inputs and Outputs, and Printout			10
2.	Submitted Record book (Preferably handwritten)			05
3.	External Viva Voce			10

Assessment Rubric: Internal Practical Course

SANT GADGE BABA AMRAVATI UNIVERSITY, AMRAVATI PRACTICAL EXAMINATION B.Sc. III, SEMESTER – VI (NEP)			
Practical	Course Code: 138268	Laboratory on PHP and Java Script	Max Marks: 25
Sr. No.	Assessment Criteria		Marks
1.	Attendance/Regularity in practical's / Students' overall performance		05
2.	Record book Preparation (Preferably handwritten)		10
3.	Internal Viva Voce		10

VSC: Laboratory on Apache server

Level	Semester	Course Code	Course Name	Credits	Teaching Hours	Exam Duration	Max Marks
5.5	VI	138288	Laboratory on Apache server	2	60	4Hrs.	50

Course Objectives:	1. To learn the installation of Apache server 2. To understand the working of Apache server 3. To learn configuration of Apache server with php, MySQL, Python 4. To learn how to deploy static and dynamic websites 5. To run web application using different technologies						
Course Outcomes:	The students will be able to - 1. Do installation of Apache server. 2. Able to write, and debug and run programs in PHP. 3. Configure apache server to deploy websites. 4. Make use of different technologies. 5. Connect database with web applications and retrieve data.						
Contents				Workload Allotted	Weightage of Marks Allotted	Incorporation of Pedagogies	
List of Practical: 1. Installation of Apache web server on windows 2. Installation of Apache web server on windows Using XAMPP. 3. Installation of Apache web server on Linux 4. Installation of LAMP. 5. Configuring Apache server (any platform) 6. Run simple html web page/website on apache server 7. Run simple html web page/website withcss on apache server 8. Run Client-side scripts on apache server 9. Run PHP pageson apache server 10. Run Python web apps on apache server						Use any pedagogical technique suitable for the topic	

	11. Run Java Web Applications on apache server 12. Deploy static website on apache server. 13. Create a new database using phpMyAdmin on apache server 14. Run php-mysql application on apache server 15. Write a PHP script to make use of switch case. 16. Write a PHP script to use nested if-else statement. 17. Write a PHP script to Insert student personal information into database using class, object and MYSQL functions. 18. run a PHP script to upload image on the site. 19. Write a PHP script to demonstrate GET and POST Method. 20. Write a PHP script to upload file.			
References:	Weblink to Equivalent MOOC on SWAYAM if relevant: 1. https://www.coursera.org/learn/build-deploy-php-tutorial-sites-apache-web-server 2. https://www.programiz.com/php/online-compiler/ 3. https://onecompiler.com/php 4. https://www.w3schools.com/pHP/php_compiler.asp 5. https://www.codechef.com/php-online-compiler			

Assessment Rubric: Internal Examination Practical Course |(VSC)

SANT GADGE BABA AMRAVATI UNIVERSITY, AMRAVATI PRACTICAL EXAMINATION B.Sc. III, SEMESTER – VI (NEP)			
Practical	Course Code: 138288	Laboratory on Apache server	Max Marks: 50
Sr. No.	Assessment Criteria		Marks
1.	Single Program Writing, Algorithm, Flowchart, Execution, with Sample inputs and Outputs, and Printout		20
2.	Record book preparation (Preferably handwritten) / Assignments preparation during semester		10
3.	Attendance in practical session / Students' overall performance		10
4.	Internal Viva Voce		10

Internship/Apprenticeship:

Level	Semester	Course Code	Course Name	Credits	Teaching Hours	Exam Duration	Max Marks
5.5	VI	138294	Internship/Apprenticeship in Web Designing and Development	4	120	--	100

Course Objectives:	1. Gain practical exposure to industry, research organizations, startups, or professional work environments related to Computer Science. 2. Apply theoretical knowledge acquired during the academic program to real-world computing problems and industry practices. 3. Enhance professional skills such as communication, teamwork, leadership, project management, and workplace ethics. 4. Strengthen problem-solving, analytical thinking, innovation, and decision-making abilities through experiential learning. 5. Understand organizational structure, work culture, professional responsibilities, and industry standards.
Course Outcomes:	On completion of the following syllabus the students will be able to - 1. Demonstrate the ability to apply Computer Science concepts, tools, and technologies in real workplace or project environments. 2. Analyze industry-specific problems and develop appropriate technical solutions using modern computing techniques. 3. Communicate effectively with team members, supervisors, clients, and stakeholders through reports, presentations, and discussions. 4. Demonstrate teamwork, leadership qualities, project management skills, and collaborative learning abilities. 5. Prepare internship/apprenticeship reports documenting objectives, methodology, activities performed, outcomes achieved, and lessons learned. 6. Evaluate industry practices and identify opportunities for innovation, entrepreneurship, higher studies, research, and career development.
Contents Internship/Apprenticeship in Web Designing and Development Related to Major (During vacations/break period of Semester V and Semester VI) for duration of 120 hours mandatory to all the students, to be completed during vacations of Semester V and/or VI. This will carry 4 Credits for learning of 120 hours. Its credits and grades will be reflected in Semester VI credit grade report. General Guidelines 1. The examinee shall be required to produce hard copy and soft copy of completion of internship/apprenticeship certificate duly signed by competent authority to Faculty Mentors. 2. Student can take internship work in the form of Online/Onsite mode. 3. Research internship under Faculty member (Internal and External), IISC, IIT's, NIT's, research project or innovative project and other Research organizations also be considered.	

Guidelines for Internship/Research Internship for Under Graduate Students:

For understanding key principles of Guidelines for Internship/Research Internship for Under Graduate Students published by UGC on 2023. Please refer

https://www.ugc.gov.in/pdfnews/0063650_Draft-Guidelines-for-Internship-and-Research-Internship-for-Under-Graduate-Students.pdf

Internship Work Evaluation:

1. The parent HEI will examine/evaluate the student's performance following its evaluation method.
2. The interns will be evaluated by research internship supervisor based on their efforts and research output.
3. The interns will be evaluated through seminar presentation or viva-voce at the HEI, (marks will be given by a group of experts from HEI including the supervisor).
4. Students will be allotted to faculty mentors/supervisor
5. Student need to submit at least one/two progress report, attendance, and regular supporting documents to faculty mentors/supervisor

Assessment Rubric/Internal evaluation for the Internship/Apprenticeship in Web Designing and Development:

SANT GADGE BABA AMRAVATI UNIVERSITY, AMRAVATI
B.Sc. III, SEMESTER – VI (NEP)

3	Internship/Apprenticeship	Course Code: 138294	Internship/Apprenticeship in Web Designing and Development	Max Marks: 100
	Sr. No.	Exercise		Marks
	1	Activity logbook and evaluation report of Internship Supervisor		10
	2	Format of presentation and the quality of the intern’s report		10
	3	Acquisition of skill sets by the intern		10
	4	Originality and any innovative contribution		10
	5	Significance of research outcomes		10
	6	Regular Attendance		25
	7	Seminar/Viva-Voce /Presentation (PPT) (Visual clarity, and confidence, Findings etc.)		25
Total:				100