Sant Gadge Baba Amravati University, Amravati
FACULTY: Science and Technology
Teaching, Learning and Examination Scheme
(Three Years- Six Semesters Bachelor in Computer Application (BCA) Stream: Artificial Intelligence and Machine Learning
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FIRST YEAR: SEMESTER – I

The Vertical	Type of Course	Course Code	Course Name	Credits	Workload (Hrs/ Week)	Mode of Examination, Evaluation & Assessment	Examination Theory/Practical				Examination Theory/ Practical/ Tutorial (Total)	
							External		Internal			
							Max. Marks	Min. Marks	Max. Marks	Min. Marks	Max. Marks	Min. Marks
Core Courses (CC)	Theory-1	101CC101	Mathematics Foundations to Computer Science	3	3	External & Internal	60	24	40	16	100	40
	Theory-2	101CC102	Computer Architecture	3	3	External & Internal	60	24	40	16	100	40
	Lab/ Practical-1	101LabCC102	Computer Architecture	2	4	External & Internal	60	24	40	16	100	40
Ability Enhancement Courses (AEC)	Theory-1	101AEC101	General English - I	1	1	External & Internal	30	12	20	8	50	20
	Tutorial-1	101TuAEC101	General English - I	1	1	Internal	--	--	50	20	50	20
	Theory-2	101AEC102	Additional Course - Indian or Foreign Language Other than Mother Tongue and English [optional course]*	0	1	Internal	--	--	50	20	50	20
	Tutorial-2	101TuAEC102	Additional Course - Indian or Foreign Language Other than Mother Tongue and English (1-1- 0)) [optional course]*	0	1	Internal	--	--	50	20	50	20
Multi-Disciplinary Elective Course (MDE)	Theory-1	101MDE101	Indian Knowledge System#	2	2	External & Internal	60	24	40	16	100	40
Value added	Theory-1	101VAC101	Environmental Science and sustainability	2	2	External & Internal	60	24	40	16	100	40

Courses (VAC)												
Skill Enhancement courses (SEC)	Theory-1	101SEC101	Problem Solving using C	3	3	External & Internal	60	24	40	16	100	40
	Lab/ Practical-1	101LabSEC101	Problem Solving using C	2	4	External & Internal	60	24	40	16	100	40
Discipline Specific Elective (DSE)	--	--	--	--	--	--	--	--	--	--	--	--
			Total:	19	25							

Note: #Indian Knowledge System: Indian Culture and Civilization, Indian Vision for Human Society, Indian Science, Indian Town Planning and Architecture, Indian Mathematics and Astronomy, Indian Aesthetics, Indian Health, Wellness and Psychology (including Ayurved)

*IndianLanguages: Sanskrit/Hindi/All Regional languages
Foreign Languages: (not limited to) Spanish/German/French/Korean/Mandarin etc.

Special Note: External Examination (Theory and Practical) shall be conducted by University and Internal Examination (Theory and Tutorial) shall be conducted by college

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FIRST YEAR: SEMESTER – II

The Vertical	Type of Course	Course Code	Course Name	Credits	Workload (Hrs/ Week)	Mode of Examination, Evaluation & Assessment	Examination Theory/Practical				Examination Theory/ Practical/ Tutorial (Total)	
							External		Internal			
							Max. Marks	Min. Marks	Max. Marks	Min. Marks	Max. Marks	Min. Marks
Core Courses (CC)	Theory-3	101CC103	Object Oriented Programming using C++	3	3	External & Internal	60	24	40	16	100	40
	Theory-4	101CC104	Data Structures	3	3	External & Internal	60	24	40	16	100	40
	Lab/ Practical-2	101LabCC104	Data Structures	2	4	External & Internal	60	24	40	16	100	40
	Theory-5	101CC105	Operating Systems	3	3	External & Internal	60	24	40	16	100	40
	Lab/ Practical-3	101LabCC105	Operating Systems	1	2	External & Internal	30	12	20	8	50	20
Ability Enhancement Courses (AEC)	Theory-3	101AEC103	Additional Course - Indian or Foreign Language Other than Mother Tongue and English [optional course]*	0	1	Internal	--	--	50	20	50	20
	Tutorial-3	101AEC103	Additional Course - Indian or Foreign Language Other than Mother Tongue and English (1-1- 0)) [optional course]*	0	1	Internal	--	--	50	20	50	20
Value added Courses (VAC)	Theory-2	101VAC102	Indian Constitution	2	2	External & Internal	60	24	40	16	100	40
Skill	Theory-2	101SEC102	Object Oriented	3	3	External	60	24	40	16	100	40

Enhancement courses(SEC)			Programming using Java			&Internal						
	Lab/ Practical-2	101LabSEC102	Object Oriented Programming using Java	2	4	External & Internal	60	24	40	16	100	40
	Theory-3	101SEC103	Web Technologies	1	1	30	30	12	20	8	50	20
	Lab/ Practical-3	101LabSEC103	Web Technologies	1	2	30	30	12	20	8	50	20
Total:				21	29							

*Indian Languages: Sanskrit/Hindi/All Regional languages

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SECOND YEAR: SEMESTER – III

The Vertical	Type of Course	Course Code	Course Name	Credits	Workload (Hrs/ Week)	Mode of Examination, Evaluation & Assessment	Examination Theory/Practical				Examination Theory/ Practical/ Tutorial (Total)	
							External		Internal			
							Max. Marks	Min. Marks	Max. Marks	Min. Marks	Max. Marks	Min. Marks
Core Courses (CC)	Theory-6	101CC201	Probability and Statistics	3	3	External & Internal	60	24	40	16	100	40
	Theory-7	101CC202	Data Base Management System	3	3	External & Internal	60	24	40	16	100	40
	Lab/ Practical-4	101LabCC202	Data Base Management System	2	4	External & Internal	60	24	40	16	100	40
	Theory-8	101CC203	Software Engineering	3	3	External & Internal	60	24	40	16	100	40
Value added Courses (VAC)	Lab/ Practical-2	101LabVAC201	Yoga/Sports/NCC/NSS/ Disaster Management	2	4	External & Internal	60	24	40	16	100	40
Skill Enhancement courses (SEC)	Theory-4	101SEC201	Python Programming	2	2	External & Internal	60	24	40	16	100	40
	Lab/ Practical-4	101LabSEC201	Python Programming	2	4	External & Internal	60	24	40	16	100	40
Discipline Specific Elective (DSE)	Theory-1	101DSE201	Feature Engineering	1	1	External & Internal	30	12	20	8	50	20
	Lab/ Practical-1	101LabDSE201	Feature Engineering	2	4	External & Internal	60	24	40	16	100	40
			Total:	20	28							

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SECOND YEAR: SEMESTER – IV

The Vertical	Type of Course	Course Code	Course Name	Credits	Workload (Hrs/ Week)	Mode of Examination, Evaluation & Assessment	Examination Theory/Practical				Examination Theory/ Practical/ Tutorial (Total)	
							External		Internal			
							Max. Marks	Min. Marks	Max. Marks	Min. Marks	Max. Marks	Min. Marks
Core Courses (CC)	Theory-9	101CC204	Entrepreneurship and Startup Ecosystem	1	1	External & Internal	30	12	20	8	50	20
	Tutorial-3	101TuCC204	Entrepreneurship and Startup Ecosystem	1	1	Internal	--	--	50	20	50	20
	Theory-10	101CC205	Computer Networks	3	3	External & Internal	60	24	40	16	100	40
	Lab/ Practical-5	101LabCC205	Computer Networks	2	4	External & Internal	60	24	40	16	100	40
	Theory-11	101CC206	Design and Analysis of Algorithm	3	3	External & Internal	60	24	40	16	100	40
	Theory-12	101CC207	Artificial Intelligence	3	3	External & Internal	60	24	40	16	100	40
	Lab/ Practical-6	101LabCC207	Artificial Intelligence	2	4	External & Internal	60	24	40	16	100	40
Skill Enhancement courses (SEC)	Theory-5	101SEC202	Design Thinking and Innovation	1	1	External & Internal	30	12	20	8	50	20
	Tutorial-1	101TuSEC202	Design Thinking and Innovation	1	1	Internal	--	--	50	20	50	20
Discipline Specific Elective (DSE)	Theory-2	101DSE202	Introduction to ML	1	1	External & Internal	30	12	20	8	50	20
	Lab/ Practical-2	101LabDSE202	Introduction to ML	2	4	External & Internal	60	24	40	16	100	40
			Total:	20	26							

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THIRD YEAR: SEMESTER – V

The Vertical	Type of Course	Course Code	Course Name	Credits	Workload (Hrs/ Week)	Mode of Examination, Evaluation & Assessment	Examination Theory/Practical				Examination Theory/ Practical/ Tutorial (Total)	
							External		Internal			
							Max. Marks	Min. Marks	Max. Marks	Min. Marks	Max. Marks	Min. Marks
Skill Enhancement courses (SEC)	Tutorial-3	101SEC301	Quantitative Techniques	2	2	Internal	60	24	40	16	100	40
	Lab/ Practical-5	101LabSEC302	Internship/capstone Project	4	8	External & Internal	60	24	40	16	100	40
	Lab/ Practical-6	101LabSEC303	Major Project [evaluation in sixth semester]	0	4	--	--	--	--	--	--	--
Discipline Specific Elective (DSE)	Theory-3	101DSE301	Neural Network	3	3	External & Internal	60	24	40	16	100	40
	Lab/ Practical-3	101LabDSE301	Neural Network	2	4	External & Internal	60	24	40	16	100	40
	Theory-4	101DSE302	Digital Image Processing	3	3	External & Internal	60	24	40	16	100	40
	Lab/ Practical-4	101LabDSE302	Digital Image Processing	2	4	External & Internal	60	24	40	16	100	40
	Theory-5	101DSE303	Natural Language Processing	3	3	External & Internal	60	24	40	16	100	40
	Lab/ Practical-5	101LabDSE303	Natural Language Processing	2	4	External & Internal	60	24	40	16	100	40
			Total:	21	35							

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THIRD YEAR: SEMESTER –VI

The Vertical	Type of Course	Course Code	Course Name	Credits	Workload (Hrs/ Week)	Mode of Examination, Evaluation & Assessment	Examination Theory/Practical				Examination Theory/ Practical/ Tutorial (Total)	
							External		Internal			
							Max. Marks	Min. Marks	Max. Marks	Min. Marks	Max. Marks	Min. Marks
Core Courses (CC)	Theory-13	101CC301	Generative AI	2	2	External & Internal	60	24	40	16	100	40
	Lab/ Practical-7	101LabCC301	Generative AI	2	4	External & Internal	60	24	40	16	100	40
Ability Enhancement Courses (AEC)	Tutorial-4	101TuAEC301	Soft Skills	1	1	Internal	--	--	50	20	50	20
Skill Enhancement courses (SEC)	Lab/ Practical-7	101LabSEC304	Major Project [Initiated in 5th Semester]	4	4	External & Internal	60	24	40	16	100	40
Discipline Specific Elective (DSE)	Theory-6	101DSE304	Deep Learning for Computer Vision	3	3	External & Internal	60	24	40	16	100	40
	Lab/ Practical-6	101LabDSE304	Deep Learning for Computer Vision	2	4	External & Internal	60	24	40	16	100	40
	Theory-7	101DSE305	Predictive Analysis	3	3	External & Internal	60	24	40	16	100	40
	Lab/ Practical-7	101LabDSE305	Predictive Analysis	2	4	External & Internal	60	24	40	16	100	40
			Total:	19	25							

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FOURTH YEAR: SEMESTER –VII

The Vertical	Type of Course	Course Code	Course Name	Credits	Workload (Hrs/ Week)	Mode of Examination, Evaluation & Assessment	Examination Theory/Practical				Examination Theory/ Practical/ Tutorial (Total)	
							External		Internal			
							Max. Marks	Min. Marks	Max. Marks	Min. Marks	Max. Marks	Min. Marks
Core Courses (CC)	Theory-14	101CC401	Optimization of ML	3	3	External & Internal	60	24	40	16	100	40
	Lab/ Practical-8	101LabCC401	Optimization of ML	2	4	External & Internal	60	24	40	16	100	40
Multi-Disciplinary Elective Course (MDE)	Theory-2	101MDE401	Social Network Analysis	3	2	External & Internal	60	24	40	16	100	40
Skill Enhancement courses (SEC)	Theory-6	101SEC401	Dissertation work [evaluation in Eight semester]	--	8	--	--	--	--	--	--	--
	Lab/ Practical-8	101LabSEC402	Summer Internship	4	8	Internal	--	--	100	40	100	40
Discipline Specific Elective (DSE)	Theory-8	101DSE401	Explainable AI	3	3	External & Internal	60	24	40	16	100	40
	Lab/ Practical-8	101LabDSE401	Explainable AI	2	4	External & Internal	60	24	40	16	100	40
	Theory-9	101DSE402	Evolutionary Algorithm	3	3	External & Internal	60	24	40	16	100	40
			Total:	20	35							

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FOURTH YEAR: SEMESTER – VIII

The Vertical	Type of Course	Course Code	Course Name	Credits	Workload (Hrs/ Week)	Mode of Examination, Evaluation & Assessment	Examination Theory/Practical				Examination Theory/ Practical/ Tutorial (Total)	
							External		Internal			
							Max. Marks	Min. Marks	Max. Marks	Min. Marks	Max. Marks	Min. Marks
Skill Enhancement courses (SEC)	Lab/ Practical-9	101LabSEC403	Dissertation work [Started in Seventh semester]	8	8	External & Internal	120	48	80	32	200	80
Discipline Specific Elective (DSE)	Theory-10	101DSE403	Speech Recognition	3	3	External & Internal	60	24	40	16	100	40
	Lab/ Practical-9	101LabDSE403	Speech Recognition	2	4	External & Internal	60	24	40	16	100	40
	Theory-11	101DSE404	Augmented Reality & Virtual Reality	3	3	External & Internal	60	24	40	16	100	40
	Lab/ Practical-10	101LabDSE404	Augmented Reality & Virtual Reality	2	4	External & Internal	60	24	40	16	100	40
	Theory-12	101DSE405	Security aspects of ML	2	4	External & Internal	60	24	40	16	100	40
			Total:	20	26							

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.

For 3 Credit Theory:

Total Hours: 45 per semester

Theory Paper 60 marks + Internal 40 marks = 100 marks

Course Objectives:				
Course Outcomes:	As per Blooms Taxonomy (4 to 6)			
Unit System	Contents	Workload Allotted	Weightage of Marks Allotted	Incorporation of Pedagogies
Unit I	Detailed pointwise contents with at least four points	12 Hrs	15 Marks	BoS shall recommend suitable pedagogical strategies, both classical and contemporary innovations, for integration into the Teaching, Learning, and Evaluation (T, L, & E) Processes. These strategies should be tailored to enhance the delivery and comprehension of the course content within each Unit, ensuring that they align with the educational objectives and learning outcomes.
Unit II	Detailed pointwise contents with at least four points	11 Hrs	15 Marks	
Unit III	Detailed pointwise contents with at least four points	11 Hrs	15 Marks	
Unit IV	Detailed pointwise contents with at least four points	11 Hrs	15 Marks	
References:	Study Materials in the form of - Reference Books, Text Books, Research Articles, Digital Resources like Weblinks, E- Contents, Educational Software, Databases, etc.			
Model Questions:	Short Type (At least 8), Long Type (At least 4) and MCQs for Internal Assessment (At least 8) wherever applicable as the need of curriculum.			

For 2 Credit Theory:

Total Hours: 30 per semester

Theory Paper 60 marks + Internal 40 marks = 100 marks

Course Objectives:				
Course Outcomes:	As per Blooms Taxonomy (4 to 6)			
Unit System	Contents	Workload Allotted	Weightage of Marks Allotted	Incorporation of Pedagogies
Unit I	Detailed point wise contents with at least four points	7 Hrs	7 Marks	BoS shall recommend suitable pedagogical strategies, both classical and contemporary innovations, for integration into

Unit II	Detailed point wise contents with at least four points	8 Hrs	8 Marks	the Teaching, Learning, and Evaluation (T, L, & E) Processes. These strategies should be tailored to enhance the delivery and comprehension of the course content within each Unit, ensuring that they align with the educational objectives and learning outcomes.
Unit III	Detailed point wise contents with at least four points	7 Hrs	7 Marks	
Unit IV	Detailed point wise contents with at least four points	8 Hrs	8 Marks	
References:	Study Materials in the form of - Reference Books, Text Books, Research Articles, Digital Resources like Weblinks, E- Contents, Educational Software, Databases, etc.			
Model Questions:	Short Type (At least 8), Long Type (At least 4) and MCQs for Internal Assessment (At least 8) wherever applicable as the need of curriculum.			

For 1 Credit Theory: General English – I, Entrepreneurship and Startup Ecosystem, Design Thinking and Innovation

Total Hours: 15 per semester

Theory Paper 30 marks + Internal 20 marks = 50 marks

Course Objectives:				
Course Outcomes:	As per Blooms Taxonomy (4 to 6)			
Unit System	Contents	Workload Allotted	Weightage of Marks Allotted	Incorporation of Pedagogies
Unit I	Detailed point wise contents with at least four points	4 Hrs	7 Marks	BoS shall recommend suitable pedagogical strategies, both classical and contemporary innovations, for integration into the Teaching, Learning, and Evaluation (T, L, & E) Processes. These strategies should be tailored to enhance the delivery and comprehension of the course content within each Unit, ensuring that they align with the educational objectives and learning outcomes.
Unit II	Detailed point wise contents with at least four points	4 Hrs	8 Marks	
Unit III	Detailed point wise contents with at least four points	4 Hrs	8 Marks	
Unit IV	Detailed point wise contents with at least four points	3 Hrs	7 Marks	
References:	Study Materials in the form of - Reference Books, Text Books, Research Articles, Digital Resources like Weblinks, E- Contents, Educational Software, Databases, etc.			

Model Questions:	Short Type (At least 8), Long Type (At least 4) and MCQs for Internal Assessment (At least 8) wherever applicable as the need of curriculum.

For 1 Credit Theory: Web Technologies, Basics of Data Analytics using Spreadsheet, Feature Engineering, Introduction to Machine Learning

Total Hours: 15 per semester

Theory Paper 30 marks + Internal 20 marks = 50 marks

Course Objectives:				
Course Outcomes:	As per Blooms Taxonomy (4 to 6)			
Unit System	Contents	Workload Allotted	Weightage of Marks Allotted	Incorporation of Pedagogies
Unit I	Detailed point wise contents with at least four points	7 Hrs	15 Marks	BoS shall recommend suitable pedagogical strategies, both classical and contemporary innovations, for integration into the Teaching, Learning, and Evaluation (T, L, & E) Processes. These strategies should be tailored to enhance the delivery and comprehension of the course content within each Unit, ensuring that they align with the educational objectives and learning outcomes.
Unit II	Detailed point wise contents with at least four points	8 Hrs	15 Marks	
References:	Study Materials in the form of - Reference Books, Text Books, Research Articles, Digital Resources like Weblinks, E- Contents, Educational Software, Databases, etc.			
Model Questions:	Short Type (At least 8), Long Type (At least 4) and MCQs for Internal Assessment (At least 8) wherever applicable as the need of curriculum.			