

**Rashtrasant Tukadoji Maharaj Nagpur University,
Nagpur-440033**



Bachelor of Science (Artificial Intelligence)

**Credit Structure, Scheme and Syllabus
[NEP-2020, 3-2-1 Pattern]**

Session 2026-27 onwards

Submitted by

Board of Studies (Inter-Disciplinary Programme in Science)

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Level: 4.5 (First Year) Semester: I

Course Type	Course category	Course Code	Course Title	Credits	Teaching Scheme Hr/Week	Evaluation Scheme and Max Marks		
						CIE	SEE	Total
Subject- 1	DSC	BAIIDSC01T	Problem Solving Techniques with C Paper 1 (Theory)	2	2	20	30	50
	DSC	BAIDSC01P	Problem Solving Techniques with C Paper 1 (Practical)	2	4	20	30	50
Subject- 2	DSC		Subject 2 Paper 1 (Theory)	2	2	20	30	50
	DSC		Subject 2 Paper 1 (Practical)	2	4	20	30	50
Subject- 3	DSC		Subject 3 Paper 1 (Theory)	2	2	20	30	50
	DSC		Subject 3 Paper 1 (Practical)	2	4	20	30	50
GE/OE_1	GE/OE	BAIIGOE01T	Introduction to Google Tools (Theory) From other Faculty students [Refer GE/OE basket]	2	2	20	30	50
SEC_1	SEC	BAI1SEC01P	Basics of Data Analytics using Spreadsheet (Practical) [Refer SEC basket]	2	4	20	30	50
IKS_1	IKS	B1IKS01T	IKS-Generic (Theory)	2	2	20	30	50
Language	AEC	BS1AEC01T	Compulsory English (Theory)	2	2	20	30	50
VEC_1	VEC	B1VEC01T	Environmental Science (Theory)	2	2	20	30	50
Total				22	30	220	330	550








Level: 4.5 (First Year)
Semester: II

Course Type	Course Category	Course Code	Course Title	Credits	Teaching Scheme Hr/Week	Evaluation Scheme and Max Marks		
						CIE	SEE	Total
Subject- 1	DSC	BAI2DSC02T	Programming in C++Paper 2 (Theory)	2	2	20	30	50
	DSC	BAI2DSC02P	Programming in C++Paper 2 (Practical)	2	4	20	30	50
Subject- 2	DSC		Subject 2 Paper 2 (Theory)	2	2	20	30	50
	DSC		Subject 2 Paper 2 (Practical)	2	4	20	30	50
Subject- 3	DSC		Subject 3 Paper 2 (Theory)	2	2	20	30	50
	DSC		Subject 3 Paper 2 (Practical)	2	4	20	30	50
GE/OE_2	GE/OE	BAI2GOE02T	Web Technology (Theory) From other Faculty students [Refer GE/OE basket]	2	2	20	30	50
SEC_2	SEC	BAI2SEC02P	Data Visualization (Practical) [Refer SEC basket]	2	4	20	30	50
Language	AEC	BS2AEC02T	Second Language (Theory)	2	2	20	30	50
VEC 2	VEC	B2VEC02T	Constitution of India (Theory)	2	2	20	30	50
CC_1	CC	BS2CC01P	Co-Curricular (Practical) [Refer CC basket]	2	4	50	----	50
Total				22	32	250	300	550

Exit Option: Award of Certificate in Major with 44 credits and an additional 4 credits core NSQF Course/Internship or continue with major and minor.

Continue Options: Student will select one subject among the (Subject-1, Subject-2, and Subject-3) as major and another as minor and third subject will be dropped.

Level: 5.0 (Second Year) Semester: III

Course Type	Course Category	Course Code	Course Title	Credits	Teaching Scheme Hr/Week	Evaluation Scheme and Max Marks		
						CIE	SEE	Total
Major	DSC	BAI3DSC03T	Introduction to Artificial Intelligence Paper 3 (Theory)	2	2	20	30	50
	DSC	BAI3DSC04T	Operating System and Linux Paper 4 (Theory)	2	2	20	30	50
	DSC	BAI3DSC03P	Practical based on Paper 3 and Paper 4 (Practical)	2	4	20	30	50
	VSC	BAI3VSC01P	Web Design Using HTML and DHTML (Practical)	2	4	20	30	50
	FP	BAI3FP01P	Major Specific (Practical)	2	4	50	----	50
Minor	Minor	BAI3MN03T	Python for AI Paper 3 (Theory)	2	2	20	30	50
	Minor	BAI3MN03P	Python for AI Paper 3 (Practical)	2	4	20	30	50
GE/OE_3	GE/OE	BAI3GOE03T	Cyber Forensics (Theory) From other Faculty students [Refer GE/OE basket]	2	2	20	30	50
IKS_2	IKS	BAI3IKS02T	Major Specific (Theory)	2	2	20	30	50
Language	AEC	BS3AEC03T	Second Language (Theory)	2	2	20	30	50
CC_2	CC	BS3CC02P	Co-Curricular (Practical) [Refer CC basket]	2	4	50	----	50
Total				22	32	280	270	550








Level: 5.0 (Second Year) Semester: IV

Course Type	Course Category	Course Code	Course Title	Credits	Teaching Scheme Hr/Week	Evaluation Scheme and Max Marks		
						CIE	SEE	Total
Major	DSC	BAI4DSC05T	Python Programming Paper 5 (Theory)	2	2	20	30	50
	DSC	BAI4DSC06T	Database Management System Paper 6 (Theory)	2	2	20	30	50
	DSC	BAI4DSC04P	Practical based on Paper 5 and Paper 6 (Practical)	2	4	20	30	50
	VSC	BAI4VSC02P	Computer Animation (Practical)	2	4	20	30	50
	CEP	BAI4CEP01P	Community Engagement Program (Practical)	2	4	50	----	50
Minor	Minor	BAI4MN04T	PHP Paper 4 (Theory)	2	2	20	30	50
	Minor	BAI4MN04P	PHP Paper 4 (Practical)	2	4	20	30	50
GE/OE_4	GE/OE	BAI4GOE04T	Social Media Analytics (Theory) From other Faculty students [Refer GE/OE basket]	2	2	20	30	50
SEC_3	SEC	BAI4SEC03P	SQL and PL/SQL (Practical) [Refer SEC basket]	2	4	20	30	50
Language	AEC	BS4AEC04T	Compulsory English (Theory)	2	2	20	30	50
CC_3	CC	BS4CC03P	Co-Curricular (Practical) [Refer CC basket]	2	4	50	----	50
Total				22	34	280	270	550

Exit Option: Award of UG Diploma in Major and Minor with 88 credits and an additional 4 credits in core NSQF Course/Internship or continue with major and minor.

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Level: 5.5 (Third Year) Semester: V

Course Type	Course Category	Course Code	Course Title	Credits	Teaching Scheme Hr/Week	Evaluation Scheme and Max Marks		
						CIE	SEE	Total
Major	DSC	BAI5DSC07T	Generative AI Paper 7 (Theory)	2	2	20	30	50
	DSC	BAI5DSC08T	Social Network Analysis Paper 8 (Theory)	2	2	20	30	50
	DSC	BAI5DSC09T	Advanced Java Programming Paper 9 (Theory)	2	2	20	30	50
	DSC	BAI5DSC10T	Web Technology Paper 10 (Theory)	2	2	20	30	50
	DSC	BAI5DSC05P	Practical based on Paper- 7 and 8 (Practical)	2	4	20	30	50
	DSC	BAI5DSC06P	Practical based on Paper- 9 and 10 (Practical)	2	4	20	30	50
	DSE	BAI5DSE01AT BAI5DSE01BT	A. Neural Network (Theory) OR B. Deep Learning (Theory)	2	2	20	30	50
	DSE	BAI5DSE01P	A. Neural Network (Practical) OR B. Deep Learning (Practical)	2	4	20	30	50
	VSC	BAI5VSC03P	Multimedia Editing (Practical)	2	4	20	30	50
	CEP	BAI5CEP02P	Community Engagement Program (Practical)	2	4	50	---	50
Minor	Minor	BAI5MN05T	Data Security and Privacy Paper 5 (Theory)	2	2	20	30	50
Total				22	32	250	300	550

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Level: 5.5 (Third Year) Semester: VI

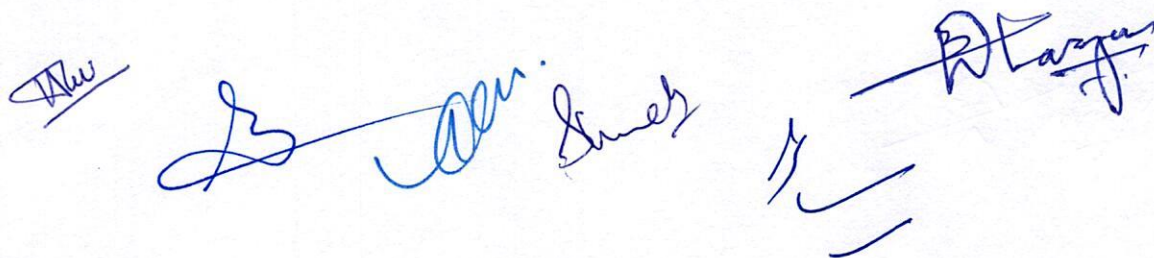
Course Type	Course Category	Course Code	Course Title	Credits	Teaching Scheme Hr/Week	Evaluation Scheme and Max Marks		
						CIE	SEE	Total
Major	DSC	BAI6DSC11T	Natural Language Processing Paper 11 (Theory)	2	2	20	30	50
	DSC	BAI6DSC12T	Data Communication and Networks Paper 12 (Theory)	2	2	20	30	50
	DSC	BAI6DSC13T	Predictive Analysis Paper 13 (Theory)	2	2	20	30	50
	DSC	BAI6DSC14T	Cyber Security Paper 14 (Theory)	2	2	20	30	50
	DSC	BAI6DSC07P	Practical based on Paper- 11 and 12 (Practical)	2	4	20	30	50
	DSC	BAI6DSC08P	Practical based on Paper- 13 and 14 (Practical)	2	4	20	30	50
	DSE	BAI6DSE02AT OR BAI6DSE02BT	A. Soft Computing (Theory) OR B. Explainable AI (Theory)	2	2	20	30	50
	DSE	BAI6DSE02P	A. Soft Computing (Practical) OR B. Explainable AI (Practical)	2	4	20	30	50
	VSC	BAI6VSC04P	Shell Programming (Practical)	2	4	20	30	50
	OJT	BAI6OJT01P	Major Specific (Practical)	4	8	40	60	100
Total				22	34	220	330	550

Exit Option: Award of UG Degree in Major with 132 credits or continue with major and minor.

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Level: 6.0 (Fourth Year) Semester: VII (Honors)

Course Type	Course Category	Course Code	Course Title	Credits	Teaching Scheme Hr/Week	Evaluation Scheme and Max Marks		
						CIE	SEE	Total
Major	DSC	BAI7DSC15T	Digital Image Processing Paper 15 (Theory)	2	2	20	30	50
	DSC	BAI7DSC16T	Cloud Computing Paper 16 (Theory)	2	2	20	30	50
	DSC	BAI7DSC17T	Speech Recognition Paper 17 (Theory)	2	2	20	30	50
	DSC	BAI7DSC18T	Fuzzy Logic Paper 18 (Theory)	2	2	20	30	50
	DSC	BAI7DSC19T	Internet of Things Paper 19 (Theory)	2	2	20	30	50
	DSC	BAI7DSC09P	Practical based on Paper-15 and 16 (Practical)	2	4	20	30	50
	DSC	BAI7DSC10P	Practical based on Paper-17 to 19 (Practical)	2	4	20	30	50
	DSE	BAI7DSE03AT BAI7DSE03BT	A. R Programming (Theory) OR B. Pattern Recognition (Theory)	2	2	20	30	50
	DSE	BAI7DSE03P	A. R Programming (Practical) OR B. Pattern Recognition (Practical)	2	4	20	30	50
	RM	BAI7RM01T	Research Methodology (Theory)	2	2	20	30	50
	RM	BAI7RM01P	Research Methodology (Practical)	2	4	20	30	50
Total				22	30	220	330	550

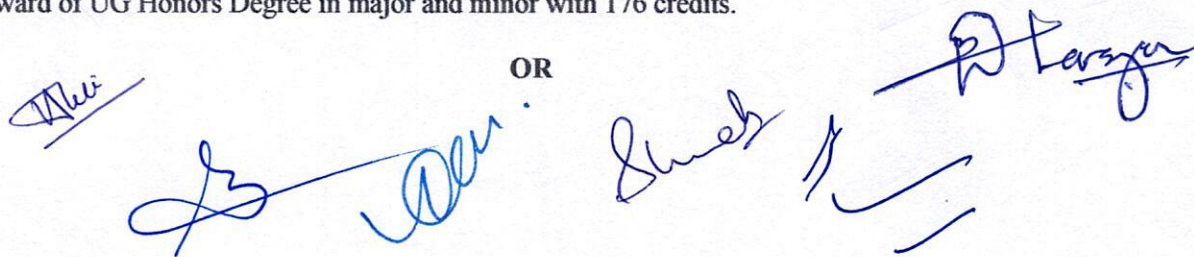


Level: 6.0 (Fourth Year) Semester: VIII (Honors)

Course Type	Course Category	Course Code	Course Title	Credits	Teaching Scheme Hr/Week	Evaluation Scheme and Max Marks		
						CIE	SEE	Total
Major	DSC	BAI8DSC20T	Augmented Reality and Virtual Reality Paper 20 (Theory)	2	2	20	30	50
	DSC	BAI8DSC21T	Security Aspects of Machine Learning Paper 21 (Theory)	2	2	20	30	50
	DSC	BAI8DSC22T	Computer Vision Paper 22 (Theory)	2	2	20	30	50
	DSC	BAI8DSC23T	Block-chain Technology Paper 23 (Theory)	2	2	20	30	50
	DSC	BAI8DSC24T	Knowledge Engineering Paper 24 (Theory)	2	2	20	30	50
	DSC	BAI8DSC11P	Practical based on Paper-20 and 21 (Practical)	2	4	20	30	50
	DSC	BAI8DSC12P	Practical based on Paper-22 to 24 (Practical)	2	4	20	30	50
	DSE	BAI8DSE04AT	A. Artificial Intelligence for Digital Media (Theory)	2	2	20	30	50
		BAI8DSE04BT	B. Ethical Hacking (Theory)					
	DSE	BAI8DSE04P	A. Artificial Intelligence for Digital Media (Practical) OR B. Ethical Hacking (Practical)	2	4	20	30	50
OJT		BAI8OJT02P	Major Specific (Practical)	4	8	40	60	100
Total				22	32	220	330	550

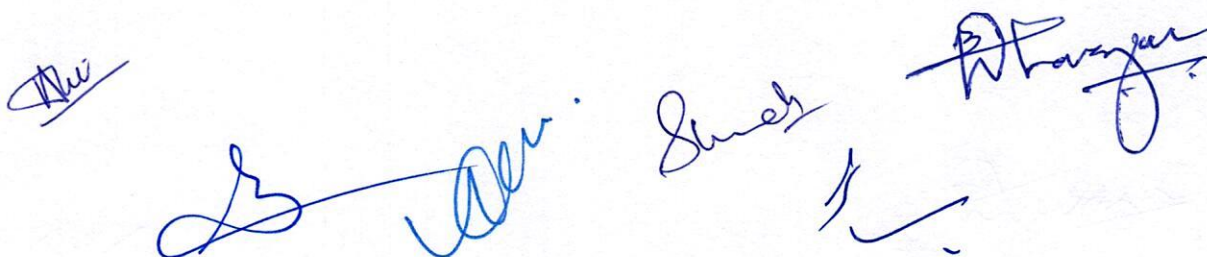
Exit Option: Award of UG Honors Degree in major and minor with 176 credits.

OR



Level: 6.0 (Fourth Year) Semester: VII (Honors with Research)

Course Type	Course Category	Course Code	Course Title	Credits	Teaching Scheme Hr/Week	Evaluation Scheme and Max Marks		
						CIE	SEE	Total
Major	DSC	BAI7DSC15T	Digital Image Processing Paper 15 (Theory)	2	2	20	30	50
	DSC	BAI7DSC16T	Cloud Computing Paper 16 (Theory)	2	2	20	30	50
	DSC	BAI7DSC17T	Speech Recognition Paper 17 (Theory)	2	2	20	30	50
	DSC	BAI7DSC09P	Practical based on Paper-15 and 16 (Practical)	2	4	20	30	50
	DSC	BAI7DSC10P	Practical based on Paper-17 (Practical)	2	4	20	30	50
	DSE	BAI7DSE03AT	A. R Programming (Theory)	2	2	20	30	50
		BAI7DSE03BT	B. Pattern Recognition (Theory)					
	DSE	BAI7DSE03P	A. R Programming (Practical)	2	4	20	30	50
			B. Pattern Recognition (Practical)					
	RM	BAI7RM01T	Research Methodology (Theory)	2	2	20	30	50
	RM	BAI7RM01P	Research Methodology (Practical)	2	4	20	30	50
	RP	BAI7RP01P	Research Project (Practical)	4	8	40	60	100
Total				22	34	220	330	550



Level: 6.0 (Fourth Year) Semester: VIII (Honors with Research)

Course Type	Course Category	Course Code	Course Title	Credits	Teaching Scheme Hr/Week	Evaluation Scheme and Max Marks		
						CIE	SEE	Total
Major	DSC	BAI8DSC20T	Augmented Reality and Virtual Reality Paper 20 (Theory)	2	2	20	30	50
	DSC	BAI8DSC21T	Security Aspects of Machine Learning Paper 21 (Theory)	2	2	20	30	50
	DSC	BAI8DSC22T	Computer Vision Paper 22 (Theory)	2	2	20	30	50
	DSC	BAI8DSC09P	Practical based on Paper-20 and 21 (Practical)	2	4	20	30	50
	DSC	BAI8DSC10P	Practical based on Paper-22 (Practical)	2	4	20	30	50
	DSE	BAI8DSE04AT OR BAI8DSE04BT	A. Artificial Intelligence for Digital Media (Theory) OR B. Ethical Hacking (Theory)	2	2	20	30	50
	DSE	BAI8DSE03P	A. Artificial Intelligence for Digital Media (Practical) OR B. Ethical Hacking (Practical)	2	4	20	30	50
	RP	BAI8RP02P	Research Project (Practical)	8	16	80	120	200
Total				22	36	220	330	550

Exit Option: Award of UG Honors with Research Degree in major and minor with 176 credits.

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Basket for Minor Category Courses (Artificial Intelligence)

Semester -III

Category	Course Code	Subject	Credits	Teaching Scheme Hr/Week	CIE	SEE	Total
Minor	BAI3MN03T	Python for AI Paper 3 (Theory)	2	2	20	30	50
Minor	BAI3MN03P	Python for AI Paper 3 (Practical)	2	4	20	30	50

Semester -IV

Minor	BAI4MN04T	PHP (Theory)	2	2	20	30	50
Minor	BAI4MN04P	PHP (Practical)	2	4	20	30	50

Semester -V

Minor	BAI5MN05T	Data Security and Privacy (Theory)	2	2	20	30	50
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Basket for ELECTIVE (DSE) Category Courses (Artificial Intelligence)

Semester -V

Category	Course Code	Subject	Credits	Teaching Scheme Hr/Week	CIE	SEE	Total
DSE	BAI5DSE01AT OR BAI5DSE01BT	A. Neural Network (Theory) OR B. Deep Learning (Theory)	2	2	20	30	50
DSE	BAI5DSE01P	A. Neural Network (Practical) OR B. Deep Learning (Practical)	2	4	20	30	50

Semester -VI

Category	Course Code	Subject	Credits	Teaching Scheme Hr/Week	CIE	SEE	Total
DSE	BAI6DSE02AT OR BAI6DSE02BT	A. Soft Computing (Theory) OR B. Explainable AI (Theory)	2	2	20	30	50
DSE	BAI6DSE02P	A. Soft Computing (Practical) OR B. Explainable AI (Practical)	2	4	20	30	50

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Semester-VII

Category	Course Code	Subject	Credits	Teaching Scheme Hr/Week	CIE	SEE	Total
DSE	BAI7DSE03AT BAI7DSE03BT	A. R Programming (Theory) OR B. Pattern Recognition (Theory)	2	2	20	30	50
DSE	BAI7DSE03P	A. R Programming (Practical) OR B. Pattern Recognition (Practical)	2	4	20	30	50

Semester -VIII

Category	Course Code	Subject	Credits	Teaching Scheme Hr/Week	CIE	SEE	Total
DSE	BAI8DSE04AT BAI8DSE04BT	A. Artificial Intelligence for Digital Media (Theory) OR B. Ethical Hacking (Theory)	2	2	20	30	50
DSE	BAI8DSE04P	A. Artificial Intelligence for Digital Media (Practical) OR B. Ethical Hacking (Practical)	2	4	20	30	50

Basket for Generic and Open Elective (GE/OE) Category Courses (Artificial Intelligence)
(For other faculty students)

Semester-I

Category		Course Code	Subject	Credits	Teaching Scheme Hr/Week	CIE	SEE	Total
GE/OE_1	GE/OE	BAI1GOE01T	Introduction to Google Tools (Theory)	2	2	20	30	50

Semester-II

GE/OE_2	GE/OE	BAI2GOE02T	Web Technology (Theory)	2	2	20	30	50
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Semester -III

GE/OE_3	GE/OE	BAI3GOE03T	Cyber Forensics (Theory)	2	2	20	30	50
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Semester-IV

GE/OE_4	GE/OE	BAI4GOE04T	Social Media Analytics (Theory)	2	2	20	30	50
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Basket for Skill Enhancement Courses (SEC) Category Courses (Artificial Intelligence)

Semester-I

Category	Course Code	Subject	Credits	Teaching Scheme Hr/Week	CIE	SEE	Total
SEC-1	BAI1SEC01P	Basics of Data Analytics using Spreadsheet (Practical)	2	4	20	30	50

Semester-II

SEC-2	BAI2SEC02P	Data Visualization (Practical)	2	4	20	30	50
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Semester-IV

SEC-3	BAI4SEC03P	SQL and PL/SQL (Practical)	2	4	20	30	50
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Basket for Vocational and Skill Courses (VSC) Category Courses (Artificial Intelligence)

Semester-III

Category	Course Code	Subject	Credits	Teaching Scheme Hr/Week	CIE	SEE	Total
VSC-1	BAI3VSC01P	Web Design Using HTML and DHTML (Practical)	2	4	20	30	50

Semester-IV

VSC-2	BAI4VSC02P	Computer Animation (Practical)	2	4	20	30	50
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Semester-V

VSC-3	BAI5VSC03P	Multimedia Editing (Practical)	2	4	20	30	50
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Semester-VI

VSC-4	BAI6VSC04P	Shell Programming (Practical)	2	4	20	30	50
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B. Sc. Computer Science (Honors/Research)

A Four-Year Bachelor's Degree Programme

1. Introduction to the Four-Year Bachelor's Degree Programme B. Sc. Artificial Intelligence:

The Four-Year Bachelor's Degree Programme is a comprehensive undergraduate education system designed to provide students with in-depth knowledge, practical skills, research exposure and multidisciplinary learning opportunities. The programme aims to develop intellectual competence, critical thinking, creativity, communication skills and professional ethics among students.

Aligned with the objectives of the National Education Policy (NEP) 2020, the four-year bachelor's programme offers flexibility in curriculum design, allowing students to explore subjects across various disciplines while specializing in their chosen field of study. The programme integrates theoretical learning with practical applications, project work, internships and research activities to enhance employability and prepare students for higher education and professional careers.

The curriculum is structured to promote holistic development by incorporating core courses, elective courses, skill enhancement courses, value-added courses and experiential learning components. Students are encouraged to engage in innovation, entrepreneurship, community service and lifelong learning.

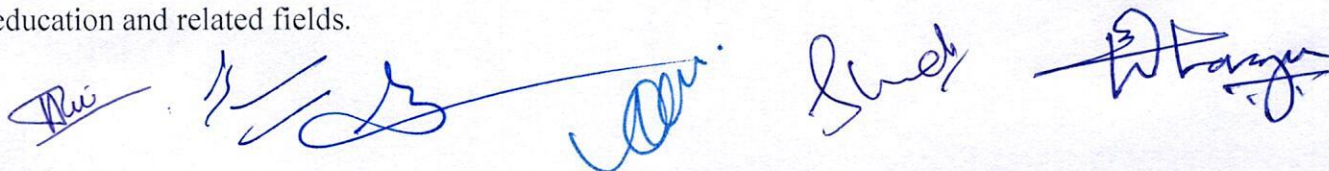
Upon successful completion of the programme, graduates will possess subject-specific expertise, analytical abilities, problem-solving skills, leadership qualities and a strong foundation for pursuing advanced studies, research or diverse career opportunities in their respective fields.

Programme Duration and Design: The B.Sc. (Honors/Res) Artificial Intelligence course is a eight semester course spread over four academic years. The teaching – learning process involves theory and practical classes and will be student-centred. Apart from the conventional chalk and talk method, power point presentations, audio–video tools, class discussions, simulations and virtual labs (wherever possible) will be used. Students will be encouraged to carry out short term projects and participate in industrial and institutional visits, seminars and workshops. Assessment will be based on continuous internal evaluation (CIE) and semester end examination (SEE). Each theory paper will be of 50 marks out of which 40% marks are for internal assessment. Practical paper will also be of 50 marks comprising 40% internal assessment. Minimum passing in each head (i.e. CIE and SEE) will be 40%

2. Learning Outcome-Based Curriculum Framework (LOCF) for B.Sc. (Honours/Research) in Artificial Intelligence

Introduction

The Learning Outcome-Based Curriculum Framework (LOCF) for the Bachelor of Science (Honours/Research) in Computer Science is designed to provide students with a strong foundation in mathematical concepts, analytical reasoning, computational techniques and research methodologies. The programme aims to develop logical thinking, problem-solving abilities and quantitative skills that are essential for higher studies, research and professional careers in science, technology, finance, education and related fields.



The curriculum follows the principles of the National Education Policy (NEP) 2020 and emphasizes student-centered learning, multidisciplinary education, skill development and research orientation. It integrates theoretical knowledge with practical applications through projects, seminars, internships, computational activities and research-based learning.

Nature and Extent: The B.Sc. (Honors/Research) Artificial Intelligence programme enables students to acquire a comprehensive understanding of core areas of computer science such as Numerical Methods, Probability and Statistics and Computer Science in physical sciences, data analytics, economics engineering, emerging technology and novel network.

Aims of the Programme: The Honours/Research track provides opportunities for advanced study and independent research, enabling students to undertake research projects, develop scientific inquiry skills and contribute to the creation of new knowledge. It equips students with vital cognitive and practical skills beyond coding, it foster computational thinking and logical problem solving. It prepares students for a rapidly evolving digital economy, shaping analytical abilities and future career readiness across all disciplines. Upon completion of the programme, graduates will possess the critical thinking abilities, computational proficiency, communication skills and ethical values necessary for successful careers and lifelong learning.

Programme Specific Outcomes (PSOs)

After successful completion of the B.Sc. (Honours/Research) in Artificial Intelligence programme, students will be able to:

1. Demonstrate comprehensive knowledge of fundamental and advanced concepts in computer science.
2. Apply techniques to solve theoretical and real-world problems.
3. Analyze, interpret, and evaluate computational arguments and proofs logically.
4. Use computational tools and mathematical software for modeling, simulation, and data analysis.
5. Formulate and solve problems using appropriate methods and techniques.
6. Conduct independent research and findings effectively.
7. Integrate computational knowledge with interdisciplinary applications.
8. Demonstrate critical thinking, creativity and innovation in addressing complex challenges.
9. Exhibit professional ethics, social responsibility and lifelong learning skills.
10. Pursue higher education, research, entrepreneurship and diverse career opportunities in mathematics and allied disciplines.

Graduate Attributes

The programme seeks to develop:

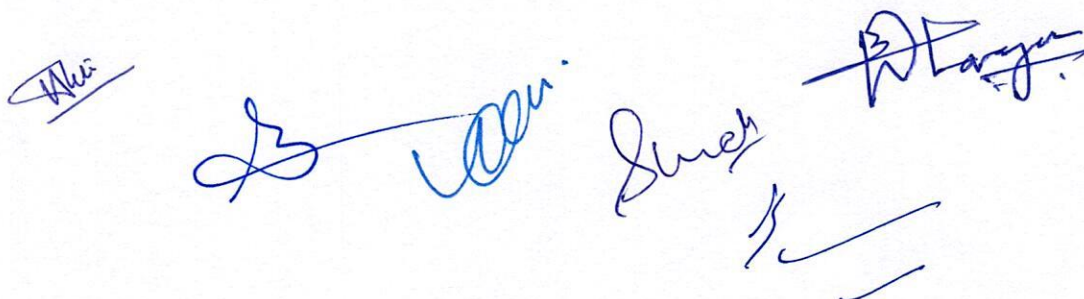
- Disciplinary Knowledge
- Critical and Analytical Thinking



- Problem-Solving Skills
- Research Competence
- Digital and Computational Literacy
- Effective Communication Skills
- Teamwork and Leadership
- Ethical and Professional Values
- Lifelong Learning Abilities
- Social and Environmental Responsibility

2. Structure of the Programme in B.Sc. (Honors/Research) Artificial Intelligence:

The programme includes Core Courses and Elective Courses. The Discipline Specific Core (DSC) Courses are all compulsory courses. There are three types of Elective Courses – Discipline Specific Elective (DSE), Generic Elective (GE), Vocational/ Skill Enhancement Courses (VSC). In addition there are Ability Enhancement Courses (AEC). Field based projects (FP) and research projects add to the skill component.

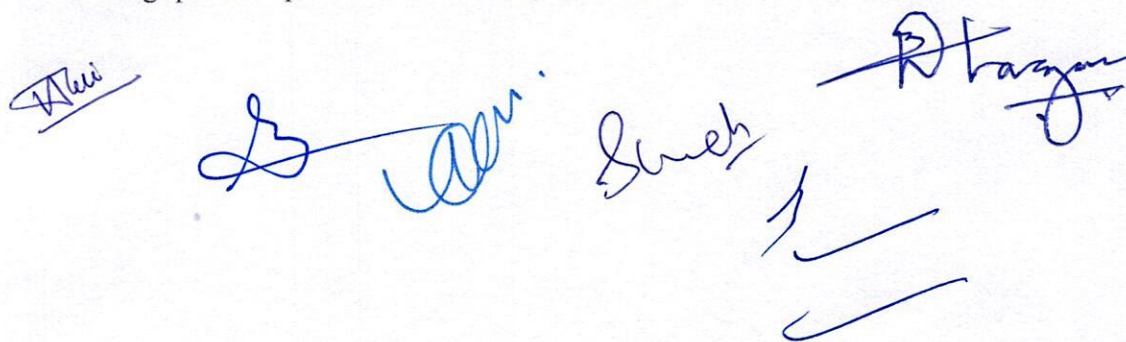


**Question Paper Pattern and Scheme to evaluate Semester End Examination
(SEE) & Continuous Internal Evaluation (CIE) of Four-Year Under
Graduate (U.G.) Programme as per NEP-2020 (3-2-1 Pattern)
B.Sc. (Honors/Research) (Major – Artificial Intelligence)**

Instructions to the Paper Setters

The duration of university theory semester end examination shall be of *Three Hours*.

1. The Question Paper shall consist of total *Five* questions (long answer/proof type and short answer/proof type sub questions) and each question carry equal marks (06) out of total maximum 30 marks. Out of these Five, there shall be Four questions on four units with *open choice* from the same unit and one question based on all four units.
2. The question paper should be set based on the Course Outcomes (COs) defined in the curriculum and ensure that all the outcomes are addressed through appropriate questions.
3. Read and study the COs of a paper/subject/course very carefully.
4. The questions should help to measure attainment of their corresponding COs as prescribed in the syllabus/curriculum. All questions must be mapped to their related COs.
5. Questions paper should try to address the different levels of learning i.e. Knowledge / Remembering, Understanding, Applying, Analysing, Evaluating and Creating.
6. All Units mentioned in the course (Paper) should be covered with equal weightage. The question paper shall be set so as to cover the entire syllabus of the respective course (Paper).
7. The degree of difficulty of the question paper should be such that a student, who has engaged himself in the continuous learning process should be able to clear with ease. However, for scoring further his all-round knowledge and skills should be tested.
8. Important note: There is separate passing of 40% in both theory and practical including CIE & SEE.
9. Follow the following question pattern while setting question papers:



**Question Paper Pattern for Theory Semester End Examination (SEE) For DSC, DSE, Minor, IKS
(Theory Papers)**

- **Theory Paper:** Maximum Marks: *30 (Thirty)*. Duration of Examination: *Three Hours*.
- Layout of the model question paper:

Bachelor of Science (B.Sc.) (Artificial Intelligence) Semester-I (NEP 3-2-1) Examination

DSC Paper 1: Programming in C
(Discipline Specific Course - 01)

Time: Three Hours

Maximum Marks: 30

- Note:** (1) All the questions are Compulsory.
(2) Each question carries equal marks.
(3) Draw neat and well labeled diagram wherever necessary.

Unit-I		
Q.1(A)	Long Answer Question	3
Q.1(B)	Long Answer Question	3
	OR	
Q.1(C)	Long Answer Question	3
Q.1(D)	Short Answer Question	3
Unit-II		
Q.2(A)	Long Answer Question	3
Q.2(B)	Long Answer Question	3
	OR	
Q.2(C)	Long Answer Question	3
Q.2(D)	Short Answer Question	3
Unit-III		
Q.3(A)	Long Answer Question	3
Q.3(B)	Long Answer Question	3
	OR	
Q.3(C)	Long Answer Question	3
Q.3(D)	Short Answer Question	3
Unit-IV		
Q.4(A)	Long Answer Question	3
Q.4(B)	Long Answer Question	3
	OR	
Q.4(C)	Long Answer Question	3
Q.4(D)	Short Answer Question	3
Question V		
Q.5	Attempt any SIX Short Answer Question from the following:	
(A)	From Unit I	1
(B)	From Unit I	1
(C)	From Unit II	1
(D)	From Unit II	1
(E)	From Unit III	1
(F)	From Unit III	1
(G)	From Unit IV	1
(H)	From Unit IV	1

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B. Sc. Semester I (Artificial Intelligence) PROBLEM SOLVING TECHNIQUES WITH C (Paper 1)			
DSC-1 Theory	Hours: 02 Hours/Week Course Code: BAI1DSC01T	Maximum Marks: (CIE + SEE = Total) 20 + 30 = 50	Credit 02
Course Outcomes: After completing this course satisfactorily, a student will be able to: 1. Apply simple algorithms for arithmetic and logical problems. 2. Implement conditional branching and iteration. 3. Divide complex tasks into reusable user define functions and handle recursion. 4. Analyze the use of pointers, structures, union and implement dynamic allocation.			
UNIT I Programming Structure: Sequence, Selection, Iteration and Modular. Problem Solving techniques: Development Tools: Algorithm, Flowcharts and Pseudo code (Definition and its characteristics) Developing Algorithm and Drawing flowcharts.			
UNIT II C Character set, Tokens: Identifier, Keywords, Variables, Data types, Qualifiers. Operators and Expressions: Arithmetic, Relational, Logical, Bit-Wise, Increment, Decrement, Conditional and Special operators. typedef, Type Conversion, Constants, Declaring Symbolic Constants, Character Strings, Enumerated Data Types, Operator Precedence and Associativity. Library functions: Maths, string handling Functions. Control Structure: Compound Statement, Selection Statement: if, if-else, Nested if, switch. Iteration statement: for, while, do...while, Nested loops, Jump statements: break, continue, goto (Special emphasis on problem solving)			
UNIT III Arrays: Need, Types, Single and Two Dimensional Array. Strings: Strings Manipulation, Arrays of Strings, Evaluation order. Function: Function Components, Return Data type, Parameter Passing, Return by Reference, Default Arguments, Recursive Functions, Arrays with Functions, Storage Classes. (Special emphasis on problem Solving)			
UNIT IV Structure: Declaration, Definition, Accessing structure members, Initialization, Nesting of Structures. Union: Union, Differences between Structure and Union. Pointer: Introduction, Address Operator (&), Pointer variables, void pointers, Pointer Arithmetic, Pointers to Pointers. File handling: Introduction, Opening & closing a file, Testing for errors, File Modes, File pointers and their manipulations, Sequential Access, Random Access, Command Line arguments.			
Text Books 1. Programming in C by E. Balagurusamy TMH Publications. 2. Let us 'C' by Yashwant Kanetkar, BPB Publication. 3. The Art of programming through flowcharts & algorithm by Anil B. Chaudhari Firewall Media, Laxmi publication, New Publication.			

B. Sc. Semester I (Artificial Intelligence) PROBLEM SOLVING TECHNIQUES WITH C (Practical)			
DSC-1 Practical	Hours: 04 Hours/Week Course Code: BAI1DSC01P	Maximum Marks: (CIE + SEE = Total) 20 + 30 = 50	Credit 02
Practical List			
1. Write a Program in c to find largest of three numbers. 2. Write a Program in c to print Fibonacci Series up to n terms. 3. Write a Program in c to find if a number is prime or not. 4. Write a Program in c to find sum of digits of any entered number. 5. Write a Program in c to find frequency of occurrence of a given number from array of N elements. 6. Write a Program in c to insert an element in one dimensional Array at a given position. 7. Write a Program in c to delete an element from one dimensional array. 8. Write a Program in c to search the element in an array of N elements using Linear Search method. 9. Write a Program in c to find largest element in Two Dimensional Array's (3*3matrix). 10. Write a Program in c to check if given String is Palindrome or not. 11. Write a Program in c to find Factorial of a number using Recursive function. 12. Write a Program in c using function to find sum of two numbers with no argument and no return values. 13. Write a Program in c using function to find sum of two numbers with argument and no return values. 14. Write a Program in c to swap values of two variables by passing pointers. 15. Write a program in c to demonstrate structure.			






B. Sc. Semester I (Artificial Intelligence) GE/OE-1 INTRODUCTION TO GOOGLE TOOLS			
GE/OE-1 Theory	Hours: 02 Hours/Week Course Code: BAI1GOE01T	Maximum Marks: (CIE + SEE = Total) 20 + 30 = 50	Credit 02
Course Outcomes: After completing this course satisfactorily, a student will be able to: 1. Understand the features, interface, and document management capabilities of Google Docs, including creating, importing, and exporting documents. 2. Apply text, paragraph, table, and page formatting techniques to create well-structured and professionally formatted documents. 3. Use advanced editing features and collaboration tools to create, share, review, and collaboratively edit documents in real time. 4. Integrate Google Docs with other Google Workspace applications, design professional documents using templates and headers/footers, and manage document security and sharing settings effectively.			
UNIT I Introduction to Google Docs: Google Docs, History and evolution of Google Docs, benefits of using Google Docs, Navigating the interface, Menus and toolbars, Document creation and management, Creating a new document, Importing and exporting documents.			
UNIT II Basic Editing and Formatting Text formatting (bold, italic, underline, fonts), Paragraph formatting (alignment, line spacing, indentation), Using styles and headings, customizing styles and headings, using columns and page breaks, Inserting and formatting tables.			
UNIT III Advanced Editing and Collaboration Adding images and shapes, Inserting and editing charts and graphs, Embedding videos, Collaboration Tools :- Sharing documents with others, Setting permissions and access levels, Using comments and suggestions. Real Time Collaboration: Tracking changes and version history, Working simultaneously with multiple users.			
UNIT IV Integrating Google Docs with Other Tools Connecting with Google Drive, Sheets, Slides, and Forms, Using Google Calendar and Gmail for document management Advanced Document Design: Creating and using templates, Customizing headers and footers Security and Privacy: Understanding document security features, Managing sharing settings.			
Text Books: 1. "Google Docs: A Step-by-Step Guide" by Timothy G. Owen 2. "Google Docs Made Easy: Learn How to Use Google Docs Like a Pro" by James Bernstein 3. "Google Drive & Docs In 30 Minutes (2nd Edition)" by Ian Lamont 4. "Google Workspace User Guide: From Gmail to Docs and Drive - Maximizing Your Google Workspace" by Andy Hodges 5. "The Ultimate Guide to Google Docs" by Robert Renke			

B. Sc. Semester I (Artificial Intelligence) SEC-1 BASICS OF DATA ANALYTICS USING SPREADSHEET (Practical)			
SEC-1 Practical	Hours: 02 Hours/Week Course Code: BAI1SEC01P	Maximum Marks: (CIE + SEE = Total) 20 + 30 = 50	Credit 02
Practical List 1. Explore and differentiate between structured, unstructured, and semi-structured data using sample datasets. 2. Familiarization with Microsoft Excel / Google Sheets interface entering, saving, and navigating a spreadsheet. 3. Use basic spreadsheet functions: SUM(), AVERAGE(), MIN(), MAX(), COUNT(), etc., on a sample sales dataset. 4. Import data from external sources (CSV, TXT) into Excel / Google Sheets and perform data cleaning (remove duplicates, handle missing values). 5. Apply formatting and conditional formatting to highlight specific data conditions (e.g., top 10%, below average). 6. Use logical functions (IF(), AND(), OR(), IFERROR()) on a dataset for decision-making scenarios. 7. Use text functions: LEFT(), RIGHT(), LEN(), CONCATENATE() to manipulate customer data. 8. Apply lookup functions: VLOOKUP(), HLOOKUP(), INDEX(), MATCH() to retrieve data from structured tables. 9. Create bar charts, line graphs, and pie charts to visualize sales or survey data. 10. Generate and analyze a pivot table from a multi-column dataset to summarize sales by region or category. 11. Use conditional formatting to visualize performance trends (e.g., color scales for marks/ratings). 12. Perform basic statistical analysis using: STDEV(), VAR(), and CORREL() on a dataset (e.g., height vs weight). 13. Implement data validation with dropdown lists for consistent data entry in a form-like setup. 14. Record a macro to automate a repetitive task (e.g., formatting a report layout). 15. Write a simple VBA script to highlight all rows with sales above a certain threshold (Excel only). 16. Implement simple Google Apps Script (JavaScript-based) to auto-fill today's date in a selected cell. 17. Work with multiple spreadsheets move data between sheets, rename, freeze panes, split screens. 18. Apply worksheet and cell protection, and restrict editing using passwords and protected ranges.			

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B. Sc. Semester II (Artificial Intelligence) PROGRAMMING IN C++ (Paper 2)			
DSC-2 Theory	Hours: 02 Hours/Week Course Code: BAI2DSC02T	Maximum Marks: (CIE + SEE = Total) 20 + 30 = 50	Credit 02
Course Outcomes: After completion of this course, students will be able to: 1. Realize the need, features of OOP, and idealize how C++ differs from C. 2. Infer knowledge on various types of overloading. 3. Choose suitable inheritance while proposing solution for the given problem. 4. Illustrate application of pointers in virtual functions.			
UNIT I Object Oriented Methodology: Elements of Object Oriented programming, Objects, Classes, OOPs features. Classes & Objects: Specifying a Class, Creating Objects, Accessing Class members, Defining member function, Outside Member Functions as inline, Accessing Member Functions within the class, Static data member, Access specifiers: private, protected and public Members.			
UNIT II Constructors & Destructors: Introduction, Parameterized Constructors, Constructor Overloading, Constructors with Default Arguments, Copy Constructor, Destructor, Order of Construction and Destruction, Static data members with Constructor and Destructors. Operator Overloading: Definition, Overloadable Operators, Unary Operator Overloading, Unary & Binary overloading, Rules for Operators Overloading.			
UNIT III Dynamic Objects: Pointers to Objects, Creating and Deleting Dynamic Objects, New and Delete operators, Array of Objects, Array of Pointers to Objects, Pointers to Object Members, this Pointer. Inheritance: Defining, Abstract classes, Single, Multilevel, Multiple, Hierarchical, Hybrid Inheritance, Constructor and Destructor in Derived Classes.			
UNIT IV Virtual Functions: Need for Virtual Functions, definition, Pure Virtual Functions, Abstract Classes, Rules for Virtual Functions. Exception Handling: Exception Handling Model, List of Exceptions, Handling Uncaught Exceptions, Fault Tolerant Design Techniques, Memory Allocation Failure Exception, Rules for Handling Exception Successfully.			
<u>Text Books</u> 1. Mastering C++ by K R Venugopal Tata McGraw-Hill, New Delhi. 2. The C++ Programming Language –Bjarne Stroustrup 3. Programming with C++ - Ravichandran 4. Programming with C++ - Robert Lafore 5. Object Oriented Programming with C++ by E. Balagurusamy, McGraw Hill			

**B. Sc. Semester II (Artificial Intelligence)
PROGRAMMING IN C++ (Practical)**

DSC-2 Practical	Hours: 02 Hours/Week Course Code: BAI2DSC02P	Maximum Marks: (CIE + SEE = Total) 20 + 30 = 50	Credit 02
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Practical List

- 1) Program to demonstrate, defining member functions inside outside the class.
- 2) Program to demonstrate, static data members and member functions.
- 3) Demonstrate the usage of Constructor and Destructor.
Define a class data with data member acct_no, balance containing constructor data to initialize data member and a member function display for output.
- 4) Program to demonstrate usage of a constructor and Destructor function. Declare a class with public data member count. The class containing one constructor and destructor to maintain updated information about active objects i.e. i) No of objects created. ii) No of objects Destroyed.
- 5) Program to accept the distance between city 1st & 2nd, city 2nd & 3rd. calculate the distance between city 1st & 3rd. Define a class road with private data member km, m, d1, d2, d3 containing member function getdata to accept values of d1, d2 and calculate for calculating distance.
- 6) Demonstrate the use of operators overloading (string manipulation: + for concatenation and relational operators for alphabetical comparison).
- 7) In a bank N depositor deposit the amount, write a program to find total amount deposited in the bank. Declare a class deposit with private data member Rupee and Paisa containing member function getdata, putdata.
i. Use array of objects
ii. Use Operator '+' overloading.
- 8) Declare class event and accept time of first event and second event and find the difference between 1st and 2nd event. Containing public member function getdata and display with private data member hour, minute, second and total.
i. Use Operator '-' overloading.
- 9) Program to demonstrate Single Inheritance. Declare a class B and derive publically class D from B.
i. The class B contains private data member a, public data member b with member function get_ab, get_a, show_a.
ii. The derived class D contains data member c with member function mul and display.
- 10) Program to demonstrate Multiple Inheritances. Declare class M and N and derive publically class P from M and N.
i. Declare a class M with protected data member m and public member function get_m.
ii. Declare a class N with protected data member n containing member function get_n.
iii. Declare class P containing member function display.
- 11) Program to demonstrate Multilevel Inheritance. Declare a class student and derive publically a class test and derive publically class result from class test.
i. The class student contains protected data member roll_number with public member functions get_number and put_number.
ii. The class test containing protected data member sub1, sub2 with public member function get_marks and put_marks.
iii. The class result contains data member total and public member function display.
- 12) Program to demonstrate Hierarchical Inheritance. Declare a class Side and derive

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publically class Square from base class side and also derive publically class cube from base class side.

i. Class Side contains protected data member L with a member function set_values.

ii. Class Square contains member function sq.

iii. Class Cube contains member function cub.

13) Program to demonstrate usage of normal virtual function and pure virtual Function with abstract class.

14) Program to determine whether the input is +ve or -ve through exception.

15) Program to raise exception if an attempt is made to perform divide-by-zero.

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B. Sc. Semester II (Artificial Intelligence) GE/OE-2 WEB TECHNOLOGY			
GE/OE-2 Theory	Hours: 02 Hours/Week Course Code: BAI2GOE02T	Maximum Marks: (CIE + SEE = Total) 20 + 30 = 50	Credit 02
Course Outcomes: After completing this course satisfactorily, a student will be able to: 1. Understand the fundamentals of the Internet, architecture and services. 2. Design and develop basic web pages using HTML by applying text formatting, hyperlink. 3. Illustrate the use of web browsers and e-mail services, and develop dynamic web pages using Dynamic HTML (DHTML) to create interactive web content and effects. 4. Apply Cascading Style Sheets (CSS) to control the presentation, layout, formatting, and styling of web pages using selectors, properties, classes, and CSS tags to create visually appealing websites.			
UNIT I Introduction to Internet, History of Internet, Internet users, Internet working, Information on Internet, Requirements for connecting to Internet, Basic Internet Terms, Introduction to world wide web, Evaluation of world wide web, basic features, web browsers, popular web browsers, web servers, HTTP, URL, Search Engines, Search Engines categories, how to use Search Engines, Searching criterion.			
UNIT II HTML: Introduction, Objective, HTML Browsers, Windows Switching, HTML Command Tags, URLs, links, new web page creation, main body of the text, putting headers, adding paragraph, formatting text in HTML and font mechanism: Color settings, superscripts and subscripts and other manipulations on text and paragraphs, using directory and menu lists, creation of links, inserting graphics, using images, all manipulations on tables and its display, Detailed working with forms, allowing visitors to upload files, active images, working with frames & framesets, Frames handling, scroll bars, alternatives to frames.			
UNIT III Introduction to browsers, Working with e-mail, Parts of e-mail text, working with messages. DHTML: using DHTML in internet explorer, heading and horizontal line, hidden message, the message at the center of the page, moving boxes, changeable box.			
UNIT IV Cascading Style Sheets Introduction to CSS, creating style sheets, common tasks with CSS, Colors, the font family, font metrics, length units, absolute units, relative units, the pixel unit ,percentages as values, keywords as values, various properties such as the font -size property, font size property etc, Assigning classes, tags and attributes for applying classes, applying classes to an HTML tag, applying classes to other document parts ,the layer tag, CSS Tags.			
Reference Books: 1. Internet and web design by R Bangia, Second edition, firewall media 2. Multimedia and Web technology by R Bangia 3. Internet and web designing by ITELS (Macmillan) 4. Web Enabled Commercial Application Development Using HTML, DHTML, JS, Perl by Ivan Bayross 5. Deitel, Deitel & Nieto, Internet and Worldwide Web how to Program, Pearson Education, PHI. 6. Internet Programming with VBScript and Java Script. Kathhleen Kalata, (Thomsaon Publication) 7. Programming the World Wide Web By. Robert W. Sebesta. (Pearson) 8. Web Technology Theory and Practice By: M Srinivasan (Pearson Publication)			

B. Sc. Semester II (Artificial Intelligence) SEC-2 DATA VISUALIZATION (Practical)			
SEC-2 Practical	Hours: 04 Hours/Week Course Code: BAI2SEC02P	Maximum Marks: (CIE + SEE = Total) 20 + 30 = 50	Credit 02
Practical List			
Identify Data Types - Classify a given dataset into numerical, categorical, temporal, and geographical types. Data Visualization Workflow - Collect a small dataset from a public source (e.g., Kaggle, government portal), clean it in Excel, and create basic charts. Tool Comparison - Create a simple bar chart using Excel, Tableau, and Power BI. Compare features (ease of use, customization, interactivity). Storytelling with Charts - Build a visual story using a dataset (e.g., COVID-19 data, sales data). Present a narrative using charts with annotations. Dashboard Narrative - Design a mockup for a dashboard that tells a story for a business scenario (e.g., sales trends or HR attrition). Presentation Analysis - Analyze a poorly designed presentation ("Death by PowerPoint") and redesign it with a storytelling approach. Connecting to Data - Load Excel/CSV data into Tableau and explore data fields. Create Basic Visualizations - Build a bar chart, line graph, and map using "Show Me". Create a Dashboard - Combine multiple visualizations into an interactive dashboard with filters. Use Calculations - Apply row-level and aggregate calculations to create custom fields. Quick Table Calculations - Use built-in functions like Running Total, Percent Difference, etc. Power BI Setup and Data Import - Install Power BI Desktop and import data from Excel and CSV. Basic Visualizations - Create bar, pie, and line charts using Power BI visuals. Data Cleaning in Power Query - Remove duplicates, handle missing values, change data types. Create a Dashboard - Develop a multi-page dashboard with slicers and visuals.			