CENTRAL UNIVERSITY OF SOUTH BIHAR

DEPARTMENT OF COMPUTER SCIENCE

School of Mathematics, Statistics, and Computer Science

Course Structure and Detailed Syllabus

Five Year Integrated
UG-PG Programme in Computer Science

(With an option of specialization in Artificial Intelligence)
Based on NEP-2020
w.e.f. 2025

(Prepared in light of National Education Policy-2020)

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About the School of Mathematics, Statistics, and Computer Science

Mathematics, Statistics, and Computer Science have played significant roles in the development of modern civilization by perfecting all sciences. The vision of the school is to provide quality education and to undertake and support interdisciplinary research through interaction between Mathematics, Statistics, Computer Science and other knowledge domains. It consists of three departments: the Department of Mathematics, the Department of Statistics, and the Department of Computer Science. Setting a novel trend of interdisciplinary, the three departments under the School are educating and training their respective students and helping other disciplines in their regular and special courses by providing relevant skills to solve academic and technical issues.

About the Department of Computer Science

The Department of Computer Science (DCSC) offers three programmes: M.Sc. in Computer Science, M.Sc. in Artificial Intelligence, and Ph.D. in Computer Science. Its goal is to provide possibilities for global excellence as well as local relevance in research, teaching, and technology development. The department also provides a variety of appealing training and workshop programmes, as well as industrial partnerships based on market needs.

Programme Objectives:

The main objective of the Five Year Integrated UG-PG Programme in Computer Science with an option of specialization in Artificial Intelligence is to develop the theoretical and practical knowledge in Computer Science and Artificial Intelligence aiming to shape innovative professionals. The core objective for Five Year Integrated UG-PG Programme in Computer Science with an option of specialization in Artificial Intelligence is given below:-

- ✓ Provide an opportunity to students for multiple entry and exit.
- ✓ To develop the practical knowledge of cutting edge technology
- ✓ The core courses encourage the computational problem solving abilities and AI based problem solving capabilities.
- ✓ The multidisciplinary courses are designed for an interdisciplinary and multidisciplinary nature for a border knowledge base.
- ✓ The labs are designed in skill based as well as in major courses to have a practical and in-depth knowledge of the concepts.
- ✓ The ability enhancement course are empowering tools in the developing the knowledge communication skills.

- ✓ The value added course is intended to develop the students in the good citizens
- ✓ The Dissertation is intended to give an essence of research work for excellence in specific areas.
- ✓ The Industrial Project is intended to have a real time work experience in the industry.

Programme Outcomes:

The main objective of the Five Year Integrated UG-PG Programme in Computer Science with an option of specialization in Artificial Intelligence are as follows:-

- ✓ Fulfill the objectives of New Education Policy 2020 and provide multiple entry and multiple exit option to the students.
- ✓ Empowering students to develop the problem solving skills and accordingly develop the programming skills.
- ✓ To have an understating of the data structures algorithms and complexity.
- ✓ To develop the understanding about the database and accordingly develop the concept of database management.
- ✓ Understanding software development skills along with all its components.
- ✓ To develop the understanding of Artificial Intelligence and also to have the in-depth knowledge of Advanced Artificial Intelligence.
- ✓ To have understanding about machine learning and to develop the machine learning algorithm along with practical knowledge.
- ✓ To have understanding about advanced computational domain like Blockchain technology, Social network analysis, Big data analysis, Cyber Security etc.
- ✓ To have a practical experience of research and industrial work exposure.

Minimum Eligibility Criteria for Fresh Admission:

The eligibility criteria for Five Year Integrated UG-PG Programme in Computer Science with an option of specialization in Artificial Intelligence are as follows:-

I. The candidate should have passed class 12 from a recognized board in Science Stream with Mathematics as a subject.

II. Candidates must appear in CUET in the Computer Science subject.

III. All the rules of admission will be applied in accordance to the Ordinance

Governing Five-Year Integrated UG-PG Programme for Science, Arts and Commerce -2024, CUSB, Gaya.

Minimum Eligibility for Admission at Multiple Entry Points:

S.No.	Entry Point	Basic Eligibility	Mode of Entrance
1	Semester I	Passed Class 12th with Mathematics in science stream	Common University Entrance Test (CUET)
2	Semester III	40 Credits with UG certificate in Computer Science or equivalent and 4 credits of skill enhancement course.	Counselling-cum-interaction comprising 100 marks
3	Semester V	80 Credits with UG diploma in Computer Science or equivalent and 4 credits of skill enhancement course.	Counselling-cum-interaction comprising 100 marks
4	Semester VII	120 Credits with UG degree (B.Sc. Degree) in Computer Science or equivalent.	Counselling-cum-interaction comprising 100 marks
5	Semester IX	For Computer Science:- 160 Credits with a Bachelor Degree (Honours/ Honours with Research) in Computer Science or equivalent For specialization in Artificial Intelligence:- 160 Credits with a Bachelor Degree (Honours/ Honours with Research) in Artificial Intelligence or equivalent	Counselling-cum-interaction comprising 100 marks

Award of Certificate/ Diploma/ Degree along with multiple exit option

S.No.	Exit Point	Qualification Title	NHEQF Level

1	After Completion of Semester I and II	UG Certificate in (Computer Science)	Level 4.5
2	After Completion of Semester I, II, III and IV	UG Diploma in (Computer Science)	Level 5
3	After Completion of Semester I, II, III, IV, V and VI	Bachelor of Science (Computer Science)	Level 5.5
4 (A)	After Completion of Semester I to VI and VII to VIII semesters in Computer Science.	B.Sc. (Honours) / (Honours with Research) degree in Computer Science	Level 6
4 (B)	After Completion of Semester I to VI and VII to VIII semesters with specialization in Artificial Intelligence.	B.Sc. (Honours) / (Honours with Research) degree in Computer Science with specialization in Artificial Intelligence.	Level 6
5 (A)	After Completion of Semester I to VI and VII to X semesters in Computer Science.	Integrated M.Sc. in Computer Science	Level 6.5
5 (B)	After Completion of Semester I to VI and VII to X semesters with specialization in Artificial Intelligence.	Integrated M.Sc. in Computer Science with Specialization in AI	Level 6.5

Note: The programme is governed by the Ordinance Governing Five-Year Integrated UG-PG Programme for Science, Arts and Commerce -2024, CUSB, Gaya

5-Year Integrated B.Sc. – M.Sc. Programme in Computer Science (with an option of Specialization in Artificial Intelligence)

Course Structure

I Semester				
Course Type	**Course Code**	**Course Title**	**L-T-P**	**Credits**
Major	CSC51MJ00104	Programming in C	3-0-1	4
Minor		From other Department/SWAYAM		4
Multidisciplinary		From other Department/SWAYAM		3
SEC	CSC51SE00403	Linux	2-0-1	3
AEC	ENG51AE00302	Language Skills Listening and Speaking	1-0-1	2
VAC-1	PHE51VA00102	Health and Wellness, Yoga Education, Sports and Fitness	2-0-0	2
VAC-2	GE051VA00402	Understanding Land and Culture of Bharat	2-0-0	2
Total Credits				**20**
Minor (For students of other departments)	CSC51MN00204	Programming in C	3-1-0	4
Multidisciplinary (For students of other departments)	CSC51MD00303	Fundamentals of Computer	2-1-0	3

II Semester				
Course Type	**Course Code**	**Course Title**	**L-T-P**	**Credits**
Major	CSC52MJ00504	Object-Oriented Programming	3-0-1	4
Minor		From other Department /SWAYAM		4
Multidisciplinary		From other Department /SWAYAM		3
SEC	CSC52SE00803	LaTeX	2-1-0	3
AEC	ENG52AE00902	Language Skills Reading and Writing	1-0-1	2
VAC-3	CSC52VA00102	Digital and Technological Solutions	2-0-0	2
VAC-4	ENV52VA00102	Environmental Science	2-0-0	2
Total Credits				**20**
Minor (For students of other departments)	CSC52MN00604	Object-Oriented Programming	3-1-0	4
Multidisciplinary (For students of other departments)	CSC52MD00703	Fundamentals of Web Development	2-1-0	3
Summer Internship (For those who want to exit)				4
After completion of semesters 1 and 2, a student may exit with a UG Certificate in Computer Science.				

III Semester				
Course Type	**Course Code**	**Course Title**	**L-T-P**	**Credits**
Major	CSC61MJ00904	Data Structures	3-0-1	4
Major	CSC61MJ01004	Computer Organizations	3-1-0	4
Minor		From other departments /SWAYAM		4
Multidisciplinary		From other Department /SWAYAM	2-1-0	3
SEC	CSC61SE01303	R Programming	2-1-0	3
AEC	ENG61AE01602	English for Academic Writing	1-1-0	2
Total Credits				**20**
Minor (For students of other departments)	CSC61MN01104	Data Structures	3-1-0	4
Multidisciplinary (For students of other departments)	CSC61MD01203	Python Basics	2-1-0	3

IV Semester				
Course Type	**Course Code**	**Course Title**	**L-T-P**	**Credits**
Major	CSC62MJ01404	Database Management Systems	3-0-1	4
Major	CSC62MJ01504	Design and Analysis of Algorithms	3-0-1	4
Major	CSC62MJ01604	Operating Systems	3-1-0	4
Major	CSC62MJ01702	Python Programming Concepts	1-0-1	2
Minor		From other Department /SWAYAM		4
AEC	ENG62AE02202	Creative Writing	1-1-0	2
Total Credits				**20**
Minor (for students of other departments)	CSC62MN01804	Database Management Systems	3-1-0	4
Summer Internship (For those who want to exit)				**4**
After completion of semesters 1, 2, 3, and 4, a student may exit with a UG Diploma in Computer Science.				

V Semester				
Course Type	**Course Code**	**Course Title**	**L-T-P**	**Credits**
Major	CSC71MJ01904	Mathematical Foundation of Computer Science	3-1-0	4
Major	CSC71MJ02004	Computer Networks	3-1-0	4
Major	CSC71MJ02104	Theory of Computation	3-1-0	4
Major	CSC71MJ02204	Artificial Intelligence	3-1-0	4
Minor		From other Department /SWAYAM		4
Total Credits				**20**
Minor (For students of other departments)	CSC71MN02304	Computer Networks	3-1-0	4

VI Semester				
Course Type	**Course Code**	**Course Title**	**L-T-P**	**Credits**
Major	CSC72MJ02404	Research Methodology and Ethics	3-1-0	4
Major	CSC72MJ02504	Software Engineering	3-1-0	4
Minor		From other Department /SWAYAM		4
Major	CSC72MJ02708	Project	0-0-8	8
Total Credits				**20**
Minor (For students of other Departments)	CSC72MN02604	Software Engineering	3-1-0	4
After completion of semesters 1, 2, 3, 4, 5, and 6, a student may exit with a B.Sc. in Computer Science.				

B.Sc. (Honours) in Computer Science

VII Semester B.Sc. (Honours) in Computer Science				
Course Type	**Course Code**	**Course Title**	**L-T-P**	**Credits**
Major	CSC81MJ02804	Computer Architecture	3-1-0	4
Major		Elective 1		4
Major		Elective 2		4
Major		Elective 3		4
Minor		From other Department /SWAYAM		4
Total Credits				**20**
Minor (For students of other departments)	CSC81MN02904	Computer Architecture	3-1-0	4

VII Semester Electives for B.Sc. (Honours) in Computer Science

Course Code	Course Title	L-T-P	Credits
CSC81MJ03004	Parallel and Distributed Systems	3-1-0	4
CSC81MJ03104	Computer Graphics	3-0-1	4
CSC81MJ03204	Cryptography & Network Security	3-1-0	4
CSC81MJ03304	Basics of Statistical Methods	3-1-0	4
CSC81MJ03404	Wireless and Mobile Networks	3-1-0	4
CSC81MJ03504	Fundamentals of Digital Image Processing	3-1-0	4
CSC81MJ03604	Compiler Design	3-1-0	4

VIII Semester B.Sc. (Honours) in Computer Science				
Course Type	**Course Code**	**Course Title**	**L-T-P**	**Credits**
Major		Elective 1		4
Major		Elective 2		4
Major	CSC82MJ05312	Project	0-0-12	12
Total Credits				20
After completing semesters 1, 2, 3, 4, 5, 6, 7, and 8, a student may exit with a B.Sc. (Honours) in Computer Science.				

VIII Semester Electives for B.Sc. (Honours) in Computer Science

Course Code	Course Title	L-T-P	Credits
CSC82MJ04504	Big Data	3-1-0	4
CSC82MJ04604	Fundamentals of Digital Signal Processing	3-1-0	4
CSC82MJ04704	Social Network Analysis	3-0-1	4
CSC82MJ04804	Soft Computing	3-0-1	4
CSC82MJ04904	Combinatorics for Computer Science	3-1-0	4
CSC82MJ05004	Fundamentals of Mobile Computing	3-1-0	4
CSC82MJ05104	Internet Technologies	3-0-1	4
CSC82MJ05204	Software Testing	3-0-1	4

B.Sc. (Honours with Research) in Computer Science

VII Semester B.Sc. (Honours with Research) in Computer Science (for students who have got 7.5 CPI or more upto VI Semester)				
Course Type	**Course Code**	**Course Title**	**L-T-P**	**Credits**
Major	CSC81MJ02804	Computer Architecture	3-1-0	4
Major		Elective 1		4
Major		Elective 2		4
Major		Elective 3		4
Minor		From other Departments /SWAYAM		4
Total Credits				**20**
Minor (For students of other departments)	CSC81MN02904	Computer Architecture	3-1-0	4

Note: The students are suggested to select minor courses from other departments such as Mathematics, Statistics, Physics, Geology, Geography, Commerce and Business Study, Economics, Bioinformatics, or SWAYAM.

VII Semester Electives for B.Sc. (Honours with Research) in Computer Science

Course Code	Course Title	L-T-P	Credits
CSC81MJ03004	Parallel and Distributed Systems	3-1-0	4
CSC81MJ03104	Computer Graphics	3-0-1	4
CSC81MJ03204	Cryptography & Network Security	3-1-0	4
CSC81MJ03304	Basics of Statistical Methods	3-1-0	4
CSC81MJ03404	Wireless and Mobile Networks	3-1-0	4
CSC81MJ03504	Fundamentals of Digital Image Processing	3-1-0	4

CSC81MJ03604	Compiler Designs	3-1-0	4

VIII Semester B.Sc. (Honours with Research) in Computer Science				
Course Type	**Course Code**	**Course Title**	**L-T-P**	**Credits**
Major	CSC82MJ05420	Research Project/Dissertation	0-0-20	**20**
Total Credits				
After completing semesters 1, 2, 3, 4, 5, 6, 7, and 8, a student may exit with a B.Sc. (Honours with Research) in Computer Science.				

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B.Sc. (Honours) in Computer Science with Specialization in AI

VII Semester B.Sc. (Honours) in Computer Science with Specialization in AI				
Course Type	**Course Code**	**Course Title**	**L-T-P**	**Credits**
Major	CSC81MJ03704	Advanced Artificial Intelligence	3-1-0	4
Major		Elective 1		4
Major		Elective 2		4
Major		Elective 3		4
Minor		From other Department /SWAYAM		4
Total Credits				**20**
Minor (For students of other departments)	CSC81MN02904	Computer Architecture	3-1-0	4

Note: The students are suggested to select minor courses from other departments such as Mathematics, Statistics, Physics, Geology, Geography, Commerce and Business Study, Economics, Bioinformatics, or SWAYAM.

VII Semester Electives for B.Sc. (Honours) in Computer Science with Specialization in AI

Course Code	Course Title	L-T-P	Credits
CSC81MJ03804	Data Mining	3-0-1	4
CSC81MJ03904	Statistical Method	3-1-0	4
CSC81MJ04004	Introduction to Cryptography & Network Security	3-1-0	4
CSC81MJ04104	Digital Image Processing	3-0-1	4
CSC81MJ04204	Introduction to Deep Learning	3-0-1	4
CSC81MJ04304	Internet of Things	3-1-0	4
CSC81MJ04404	Building Software Systems	3-0-1	4

VIII Semester B.Sc. (Honours) in Computer Science with Specialization in AI				
Course Type	**Course Code**	**Course Title**	**L-T-P**	**Credits**
Major		Elective 1		4
Major		Elective 2		4
Major	CSC82MJ06312	Project	0-0-12	12
Total Credits				**20**
After completion of semesters 1, 2, 3, 4, 5, 6, 7, and 8, a student may exit with a B.Sc. (Honours) in Computer Science with Specialization in AI.				

VIII Semester Electives for B.Sc. (Honours) in Computer Science with Specialization in AI

Course Code	Course Title	L-T-P	Credits
CSC82MJ05504	Data Science and Big Data Analytics	3-0-1	4
CSC82MJ05604	Digital Signal Processing	3-1-0	4
CSC82MJ05704	Social Network Analytics	3-0-1	4
CSC82MJ05804	Essentials of Soft Computing	3-0-1	4
CSC82MJ05904	Combinatorial Optimization	3-1-0	4
CSC82MJ06004	Natural Language Processing	3-0-1	4
CSC82MJ06104	Wireless and Mobile Computing	3-1-0	4
CSC82MJ06204	Machine Learning	3-0-1	4

B.Sc. (Honours with Research) in Computer Science with Specialization in AI

VII Semester B.Sc. (Honours with Research) in Computer Science with Specialization in AI (for students who have got 7.5 CPI or more upto VI Semester)				
Course Type	**Course Code**	**Course Title**	**L-T-P**	**Credits**
Major	CSC81MJ03704	Advanced Artificial Intelligence	3-1-0	4
Major		Elective 1		4
Major		Elective 2		4
Major		Elective 3		4
Minor		From other Department /SWAYAM		4
Total Credits				**20**
Minor (For students of other departments)	CSC81MN02904	Computer Architecture	3-1-0	4

Note: The students are suggested to select minor courses from other departments such as Mathematics, Statistics, Physics, Geology, Geography, Commerce and Business Study, Economics, Bioinformatics, or SWAYAM.

VII Semester Electives for B.Sc. (Honours with Research) in Computer Science with Specialization in AI

Course Code	Course Title	L-T-P	Credits
CSC81MJ03804	Data Mining	3-0-1	4
CSC81MJ03904	Statistical Method	3-1-0	4
CSC81MJ04004	Introduction to Cryptography & Network Security	3-1-0	4
CSC81MJ04104	Digital Image Processing	3-0-1	4
CSC81MJ04204	Introduction to Deep Learning	3-0-1	4
CSC81MJ04304	Internet of Things	3-1-0	4
CSC81MJ04404	Building Software Systems	3-1-0	4

VIII Semester B.Sc. (Honours with Research) in Computer Science with Specialization in AI				
Course Type	**Course Code**	**Course Title**	**L-T-P**	**Credits**
Major	CSC82MJ06420	Research Project/Dissertation	0-0-20	20
Total Credits				20
After completion of semesters 1, 2, 3, 4, 5, 6, 7, and 8, a student may exit with a B.Sc. (Honours with Research) in Computer Science with Specialization in AI.				

IX Semester Integrated M.Sc. in Computer Science				
Course Type	**Course Code**	**Course Title**	**L-T-P**	**Credits**
Major	CSC91MJ06504	Advanced Computer Networks	3-1-0	4
Major		Elective 1		4
Major		Elective 2		4
Major		Elective 3		4
Major		Elective 4		4
Total Credits				**20**

IX Semester Electives for Integrated M.Sc. in Computer Science

Course Code	Course Title	L-T-P	Credits
CSC91MJ06604	Introduction to Cloud Computing	3-1-0	4
CSC91MJ06704	Fundamentals of Wireless Sensor Networks	3-1-0	4
CSC91MJ06804	Operation Research Concepts	3-1-0	4
CSC91MJ06904	Algebraic and Number Theoretic Algorithms	3-1-0	4
CSC91MJ07004	Fundamentals of Speech Recognition	3-1-0	4
CSC91MJ07104	Complexity Theory	3-1-0	4
CSC91MJ07204	Introduction to Computer Vision	3-0-1	4
CSC91MJ07304	Foundations of Cryptography	3-1-0	4
CSC91MJ07404	Advanced Database Concepts	3-1-0	4
CSC91MJ07504	Fundamentals of Blockchain	3-0-1	4
CSC91MJ07604	Geometric Algorithms	3-1-0	4
CSC91MJ07704	Information and Cyber Security Concepts	3-1-0	4

CSC91MJ07804	Quantum Computing	3-1-0	4
CSC91MJ07904	Advanced Python Programming	3-0-1	4
CSC91MJ08004	Embedded Systems	3-1-0	4

X Semester Integrated M.Sc. in Computer Science				
Course Type	**Course Code**	**Course Title**	**L-T-P**	**Credits**
Major	CSC92MJ10320	Industrial Project	0-0-20	**20**
Total Credits				**20**
After completion of semesters 1, 2, 3, 4, 5, 6, 7, 8, 9, and 10, a student will get an Integrated M.Sc. in Computer Science.				

IX Semester Integrated M.Sc. in Computer Science with Specialization in AI				
Course Type	**Course Code**	**Course Title**	**L-T-P**	**Credits**
Major	CSC91MJ08104	ANN and Deep Learning	3-0-1	4
Major		Elective 1		4
Major		Elective 2		4
Major		Elective 3		4
Major		Elective 4		4
Total Credits				**20**

IX Semester Electives for Integrated M.Sc. in Computer Science with Specialization in AI

Course Code	Course Title	L-T-P	Credits
CSC91MJ08204	Cloud and Distributed AI Systems	3-1-0	4
CSC91MJ08304	Wireless Sensor Networks	3-1-0	4
CSC91MJ08404	Operation Research	3-1-0	4
CSC91MJ08504	Speech Processing & Recognition	3-1-0	4
CSC91MJ08604	Advanced Database Management Systems	3-1-0	4
CSC91MJ08704	Computer Vision	3-0-1	4
CSC91MJ08804	Randomized Algorithms	3-1-0	4
CSC91MJ08904	Blockchain Technologies	3-0-1	4
CSC91MJ09004	Approximation Algorithms	3-1-0	4
CSC91MJ09104	Information and Cyber Security	3-0-1	4
CSC91MJ09204	Privacy and Security in OSNs	3-1-0	4

Diary No.: CS/52/.....
Date: 10/03/2025

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Date: 10th March 2025

To,

Controller of Examination

Central University of South Bihar, Gaya

Subject: Regarding Successful Completion of BoS in Department of Computer Science

Dear Sir,

I am pleased to inform you that the Board of Studies of the Department of Computer Science, in its recent meeting dated on 7th and 8th February 2025, has finalized the course structure and detailed syllabus for the **'Five-Year Integrated UG-PG Program in Computer Science (*With an option of Specialization in Artificial Intelligence*)'.** The BoS also prepared one *Skill Development based Certificate Course* in the area of Cyber Security named as **'Four Months Certificate Course in Cyber Security'** in accordance with the '*UGC Guidelines for the Introduction of Short-term SDC Courses in HEIs-2023'*.

Further the BoS has observed that there is no such university regulation/ ordinance for smooth conduction/ running of *'Skill Development based Certificate Course'* and the same needed to be prepared to govern such certificate course. Also, the BoS recommended to pass the Course Structure and Syllabus of **'Four Months Certificate Course in Cyber Security'** and the same will be finally operated or governed by university regulation/ ordinance for the Skill Development Course when the ordinance would be framed.

The minutes of the meeting, along with the course structure and detailed syllabus, are attached herewith for your kind consideration and necessary action.

Thanks.

Warm Regards

Prabhat Ranjan 10/03/2025

(Prof. Prabhat Ranjan)

Professor & Head

Department of Computer Science

Head
Department of Computer Science
Central University of South Bihar, Gaya

Sanjay
10/03/25

Central University of South Bihar
Department of Computer Science

Minutes of the Meeting of BoS held on 7th and 8th, February 2025

A meeting of members of the Board of Studies was held on 7th and 8th, February 2025. The following members were present.

1.	Prof. Prabhat Ranjan	-	Head of Department (Chairman)
2.	Prof. Chiranjeev Kumar	-	External Member
3.	Prof. Vir Bahadur Singh*	-	External Member
4.	Dr. Rajesh Pratap Singh	-	Cognate Member
5.	Dr. Vijay Kumar Singh	-	Cognate Member
6.	Dr. Jainath Yadav	-	Member
7.	Dr. Nemi Chandra Rathore	-	Member
8.	Dr. Piyush Kumar Singh	-	Member
9.	Dr. Mrityunjay Singh	-	Member
10.	Dr. Surendra Kumar	-	Special Invitee
11.	Dr. Prakash Kumar	-	Special Invitee

*Attended the BoS meeting through online mode

At the onset the Chairman, BoS, Prof. Prabhat Ranjan, welcomed all the members and introduced the external members. The following agendas were discussed in the meeting.

Agenda 1: To finalize the course structure and detailed syllabus of Five Year Integrated UG-PG Programme in Computer Science/ Artificial Intelligence for AY 2025-26 as per the letter no. CUSB/Acad/1-3/2013/AE163 dated 21.01.2025.

Resolution: The course structure and detailed syllabus was discussed by the BoS in the light of the '*Ordinance Governing Five-Year Integrated UP-PG Programme*' received under notice no. CUSB/Acad/1-1/2023/AE7419 dated on 27.12.2023. The following decisions were made

I. The BoS decided that there will be one programme for Five Year Integrated UG-PG Programme in Computer Science with following specializations

A. Five Year Integrated UG-PG Programme in Computer Science

B. Five Year Integrated UG-PG Programme in Computer Science (with specialization in Artificial Intelligence)

II. There will be common course structure from I to VI semester for both specialization.

III. There will be respective specialization based courses from VII semester onwards.

IV. After analyzing the applied nature of Computer Science course the BoS decided to have a greater weightage on the Training/ Internship/ Dissertation and the same is introduced appropriately in 3rd, 4th and 5th years.

V. All the courses Major, Minor, MDC, SEC, AEC etc. will be followed as per '*Ordinance Governing Five-Year Integrated UP-PG Programme*' received under notice no. CUSB/Acad/1-1/2023/AE7419 dated on 27.12.2023.

VI. The course code were decide by the BoS in accordance to the rules for '*Course Coding for Undergraduate programme*' received as notice no. CUSB/Acad/57-2/2023/AE938 dated 20.06.2025.

VII. The list of minor and multidisciplinary courses from other department would be suggested in each semester based on the courses being offered in other departments.

VIII. The minor and multidisciplinary courses available on the SWAYAM Portal will be reviewed and student can choose any course from the list approved by the departmental committee.

IX. For smooth running of '*Five Year Integrated UG-PG Programme in Computer Science (regular + specialization in AI)*', the BoS recommended the establishment of some Hardware/ Software based lab and accordingly the specific Hardware/ Software may be procured.

X. The Departmental Committee of Computer Science Department is authorized to decide to conduct some minor changes in syllabi following NEP-2020. However the committee has to inform the BoS regarding the changes. The nature of such changes may include

A. Changes in Course Codes

B. Changes in Course Interaction Plan

C. Minor modifications in course content

D. Course code of SWAYAM Courses

E. Other minor modification

XI. The BoS recommended the attached Course Structure and Syllabus for the approval of the Academic Council.

Agenda 2: To finalize the course structure and detailed syllabus of '*Four Months Certificate Course in Cyber Security*'.

Resolution: The BoS discussed the course structure and detailed syllabus of '*Four Months Certificate Course in Cyber Security*'. The BoS proposed the following:

I. The Course Structure for the '*Four Months Certificate Course in Cyber Security*' was decided in light of *UGC Guidelines for the Introduction of Short-Term SDC Courses HEIs-2023.*

II. Further, the BoS has observed that there is no such university ordinance for '*Skill Development based Certificate Course*' and the same need to be prepared to govern such certificate courses.

III. Further, the BoS recommended here to pass the course structure and syllabus of '*Four Months Certificate Course in Cyber Security*' and same will be finally operated or governed by university ordinance for the Skill Development course when the ordinance would be framed.

IV. For smooth running of '*Four Months Certificate Course in Cyber Security*', a 'Cyber *Security Lab*' may be established and accordingly the specific Hardware/ Software may be procured.

V. The Departmental Committee of Computer Science Department is authorized to decide to conduct some minor changes in above mentioned certificate course. However the committee has to inform the BoS regarding the changes.

Agenda 3: To report the rectification made for the course code of the courses Project in Industry/ Academia, in currently running semesters of M.Sc. (CS) and M.Sc. (AI).

Resolution: The following is reported to the BoS

(28)

I. The course code of M.Sc. (CS), IV semester course '*Project in Industry/ Academia*' (20 credits) is rectified as CSC92DC01220

II. The course code of M.Sc. (AI), IV semester course '*Project in Industry/ Academia*' (20 credits) is rectified as CAI92DC03720.

The meeting ended with vote of thanks to chair

08/2/25
Dr. Prakash Kumar
(Special Invitee)

08/2/25
Dr. Mrityunjay Singh
(Member)

P.K. Singh 08.02.2025
Dr. Piyush Kumar Singh
(Member)

08/02/2025
Dr. Nemi Chandra Rathore
(Member)

08.02.2025
Dr. Vijay Kumar Singh
(Cognate Member)

Jainath Yadav
Dr. Jainath Yadav
(Member)

08/02/2025
Dr. Rajesh Pratap Singh
(Cognate Member)

Dr. Surendra Kumar
(Special Invitee)

Prof. Vir Bahadur Singh
(External Member)

08/02/25
Prof. Chiranjeev Kumar
(External Member)

8/2/25
Prof. Prabhat Ranjan
(Head of Department & Chairman, BoS)

DEPARTMENT OF COMPUTER SCIENCE
Fee Structure of Five Year Integrated
UG-PG Programme in Computer Science
(With an option of specialization in Artificial Intelligence)

Particulars	Semester I	Semester II	Semester III	Semester IV	Semester V	Semester VI	Semester VII	Semester VIII	Semester IX	Semester X
ONE TIME FEE										
Admission	500									
Enrolment No.	1000									
Identitty Card	100									
Development Fees	1000									
Security Deposit (Refundable)	1000*									
Student Aid/ Welfare Fund	100									
NSS/NCC/Community Engagement	100									
SEMESTER FEE										
Tution Fee	3500	3500	3500	3500	3500	3500	5000	5000	5000	5000
Computer Lab Fee	2500	2500	2500	2500	2500	2500	4000	4000	4000	4000
Econometric Fee	0	0	0	0	0	0	0	0	0	0
Examination Fee	500	500	500	500	500	500	500	500	500	500
Library/Magazine/News Letter	500	500	500	500	500	500	500	500	500	500
Cultural Activities	500	500	500	500	500	500	500	500	500	500
Games/Athletics	500	500	500	500	500	500	500	500	500	500
Professional Enrichment Fee	0	0	0	0	0	0	0	0	0	0
Total	10800	8000	8000	8000	8000	8000	11000	11000	11000	11000
Vidyarthi Mediclaim Premium (Optional)	618	618	618	618	618	618	618	618	618	618
Total Fee with (VMC)	11418	8618	8618	8618	8618	8618	11618	11618	11618	11618

Note: 1. Those Students who Opt for Specialization in AI needs to pay additional INR 1000/Semester towards Computer Lab Fee from VII Semester onwards.

*2. Rs. 500 Shall be refunded and remaining Rs. 500/ shall be credited as Alumni Fee.

8/2/25 08/02/2025 10/2/25

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CENTRAL UNIVERSITY OF SOUTH BIHAR

DEPARTMENT OF COMPUTER SCIENCE

School of Mathematics, Statistics, and Computer Science

Four Months

Certificate Course in Cyber Security

Based on NEP-2020

08/2/25

08/02/2025

8/2/25

8/2/25

8/2/25

P.K.S.
08.02.2025

08/2/25

About the School of Mathematics, Statistics, and Computer Science

Mathematics, Statistics, and Computer Science have played significant roles in the development of modern civilization by perfecting all sciences. The vision of the school is to provide quality education and to undertake and support interdisciplinary research through interaction between Mathematics, Statistics, Computer Science and other knowledge domains. It consists of three departments: the Department of Mathematics, the Department of Statistics, and the Department of Computer Science. Setting a novel trend of interdisciplinary, the three departments under the school are educating and training their respective students and helping other disciplines in their regular and special courses by providing relevant skills to solve academic and technical issues.

About the Department of Computer Science

The Department of Computer Science (DCSC) currently offers three programmes: M.Sc. in Computer Science, M.Sc. in Artificial Intelligence, and Ph.D. in Computer Science. Its goal is to provide possibilities for global excellence as well as local relevance in research, teaching, and technology development. The department also provides a variety of appealing training and workshop programmes, as well as industrial partnerships based on market needs.

Certificate Course Objectives:

The main objective of the *Four-Months Certificate Course in Cyber Security* is to develop theoretical and practical knowledge in Cyber Security among professionals/employees and students. The core objectives for this certificate course as given below-

- To provide an understanding of the basic concepts, terminologies, and importance of cybersecurity in today's digital world.
- To familiarize learners with different types of cyber threats, attacks, and vulnerabilities affecting individuals and organizations.
- To impart foundational knowledge of network security, encryption, authentication, and secure communication techniques.

- To introduce learners to key cybersecurity laws, regulations, data protection policies, and ethical hacking principles.
- To equip learners with practical experience in using cybersecurity tools like Wireshark, Kali Linux, Nmap, firewalls, and antivirus software.
- To teach learners the best practices for securing operating systems, cloud services, and web applications.
- To promote safe digital habits, including password management, phishing awareness, and secure browsing.
- To develop analytical and problem-solving skills in identifying, assessing, and mitigating cyber threats.
- Prepare learners for Entry-Level Cybersecurity Roles

Certificate Course Outcomes:

The main objectives of this Four Months Certificate Course in Cyber Security are as follows:

-

- Understand the basic concepts, principles, and terminologies in cybersecurity, including threats, vulnerabilities, and risk management.
- Identify various types of cyber threats (malware, phishing, ransomware, denial-of-service attacks, etc.) and understand their impact on individuals and organizations.
- Demonstrate awareness of cybersecurity laws, regulations, and ethical practices, particularly in the Indian and global contexts.
- Understand the basic principles of network security, including firewalls, VPNs, intrusion detection and prevention systems (IDS/IPS).
- Learn basic cryptographic principles and techniques (encryption, hashing, digital signatures) to ensure data confidentiality and integrity.
- Implement best practices for securing operating systems, web applications, and cloud services against common cyber threats.
- Gain hands-on experience with cybersecurity tools like Wireshark, Nmap, Kali Linux, antivirus software, and password managers.
- Understand basic incident handling, digital forensics, and risk management strategies to mitigate cyber incidents.
- Develop good cybersecurity hygiene practices, including strong password

management, safe browsing habits, and email security.

- Equip learners with the necessary skills to pursue entry-level roles in cybersecurity or advance to higher-level certifications and education in the field.

Minimum Eligibility for Admission:

The eligibility criteria for the Four Month Certificate Course in Cyber Security are as follows:

- The candidate should have passed class 12 from a recognized board.

Certificate Course Structure:

Total Credits: 14

Duration: 4 Months

Mode of Delivery: Hybrid

Code	Title	Credits	L-T-P
	Introduction to Cyber Security	4	3-1-0
	Cyber Crime & Laws	4	3-1-0
	Digital Forensic	2	1-1-0
	Tools & Technologies for Cyber Security	2	0-0-2
	Social Media Overview & Security	2	1-1-0
	Total Credits	**14**	

Course Intake: 35 (Thirty-Five)

Course Fee: INR 25,000 (Twenty-Five Thousand)

Details of Certificate Course			
Introduction to Cyber Security			
Code	.....	**Credits**	4
L + T + P	3 + 1+ 0		
Methods of Content Interaction	Lectures, Tutorials, Group discussion; self-study, seminars, presentations by students,		
Assessment and Evaluation	As per University ordinance		

Objectives

- To provide understanding of basics of Computer Networks and Internet.
- To learn the foundations of Cyber Security and the threat landscape.
- To learn the concepts of E-Commerce and Digital Payment.
- Understand the modern concepts of Cryptography.
- To equip students with the technical knowledge and skills needed to protect and defend against cyber threats.

Learning Outcomes

After completion, the learners will be able to:

- Understand fundamentals Computer Network, its types, Internet and some of the popular services developed on Internet,
- Understand various privacy and security concerns on online social media.
- Understand the reporting procedure for inappropriate content, underlying legal aspects, and best practices for the use of social media platforms.
- Understand the basic concepts related to E-Commerce and digital payments.
- Understand various digital payment modes and related cyber security aspects, RBI guidelines, and preventive measures against digital payment frauds.

Contents:

Unit -I Fundamentals of Computer Networks **(25% Weightage)**

Computer Network, Internet, Advent of Internet, LAN and its Types, LAN Topologies, Network Devices: Hub, Switches, Routers, IP Addressing and Physical Addressing, LAN Card, DNS, Email Service, and other popular services

Unit II: Introduction to Cyber security **(25% Weightage)**

Defining Cyberspace and Overview of Computer, Communication & Web-technology, Architecture of cyberspace, World Wide Web, Internet infrastructure for data transfer and governance, Concept of cyber security, Issues and challenges of cyber security.

Unit III: E-Commerce & Digital Payments **(25% Weightage)**

Definition of E-Commerce, Main components of E-Commerce, Elements of E-Commerce security, E-Commerce threats, E-Commerce security best practices.

Introduction to digital payments, Components of digital payment and stakeholders, Modes of digital payments- Banking Cards, Unified Payment Interface (UPI), e-Wallets, Unstructured Supplementary Service Data (USSD), Aadhar enabled payments, Digital payments related common frauds and preventive measures. RBI guidelines on digital payments and customer protection in unauthorized banking transactions.

Unit IV: Cryptography **(25% Weightage)**

Cryptography, Substitution Ciphers, Transpositions Cipher, Symmetric, Asymmetric Encryption, Uses of Encryption, Hash Function, Key Exchange, Digital Signatures, Digital Certificates.

Content Interaction Plan:

Lecture cum Discussion (Each session of 1 Hour)	**Unit/Topic/Sub-Topic**
1-2	Computer Network, Internet, Advent of Internet,
3-4	LAN and its Types, LAN Topologies,
5-6	Network Devices: Hub, Switches, Routers
7-7	IP Addressing and Physical Addressing, LAN Card
8-10	DNS, Email Service and other popular services.
11-14	Defining Cyberspace and Overview of Computer, Communication & Web-technology, Architecture of cyberspace
15-17	Internet infrastructure for data transfer and governance, Internet society.
18-19	Concept of cyber security, Issues and challenges of cyber security.
19-20	Definition of E- Commerce, Main components of E-Commerce, Elements of E-Commerce security.

21-22	E-Commerce threats, E-Commerce security best practices.
23-25	Introduction to digital payments, Components of digital payment and stake holders.
26-28	Modes of digital payments- Banking Cards, Unified Payment Interface (UPI), e-Wallets, Unstructured Supplementary Service Data (USSD), Aadhar enabled payments
29-30	Digital payments related common frauds and preventive measures. RBI guidelines on digital payments and customer protection in unauthorized banking transactions.
31-35	Cryptography, Substitution Ciphers, Transpositions Cipher
36-39	Symmetric, Asymmetric Encryption, Uses of Encryption,
40-43	Hash Function, Key Exchange
44-45	Digital Signatures, Digital Certificates.
15 Hours	*Tutorials*

Essential Readings:

- Cyber Crime Impact in the New Millennium, by R. C Mishra, Author Press. Edition
- 2010.
- Electronic Commerce by Elias M. Awad, Prentice Hall of India Pvt Ltd.
- Fundamentals of Network Security by E. Maiwald, McGraw Hill.
- W. Stallings; Network Security Essentials: Applications and Standards, 4/E, 2010.
- Jim Kurose and Keith W. Ross, Computer Networking: A Top-down Approach, Pearson Education, 8th Edition;

Suggested Readings:

- Basta, W. Halton, Computer Security: Concepts, Issues and Implementation, Cengage Learning India, 2008.
- C.P. Pfleeger, S.L. Pfleeger; Security in Computing, Pentice Hall of India, 2006.
- Ravi Kalakota, Andrew B. Whinston, "Electronic Commerce-A Manager's guide", Addison-Wesley.
- Efraim Turban, Jae Lee, David King, H. Michael Chung, "Electronic Commerce–A Managerial Perspective", Addison-Wesley.

8/12/25

8/12/25

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Cyber Crime & Laws			
Code	.....	**Credits**	4
L + T + P	3 + 1+ 0		
Methods of Content Interaction	Lectures, Class Tests, Assignments, Case Studies		
Assessment and Evaluation	As per University ordinance		

Objectives

The primary objective is to provide students with a comprehensive understanding of cybercrimes—from their definitions and classifications to the technical, investigative, and legal responses in the digital era. The course aims to:

- Examine the nature and evolution of cybercrimes, differentiating them from traditional crimes.
- Explore the legal frameworks, specifically the IT Act 2000 and its amendments, governing cyber offences in India.
- Develop practical insights into cybercrime investigation methodologies, including evidence collection and enforcement procedures.
- Familiarize students with the roles and powers of various investigation agencies and the legal processes involved in prosecuting cyber criminals.

Learning Outcomes:

After successful completion, students will be able to:

- Differentiate Cyber and Traditional Crimes:
  - Define cybercrimes and computer-related offences.
  - Classify various types of cybercrimes (e.g., data theft, hacking, virus/worm propagation, phishing, cyber stalking, identity theft, financial frauds, obscenity-related offences, cyber defamation, DoS attacks, and cyber terrorism).
  - Contrast cybercrimes with traditional crimes in terms of methods, impacts, and challenges in investigation.

- Understand Legal Frameworks:
  - Explain the key provisions and amendments of the IT Act 2000.
  - Analyze the legal perspective on cybercrime, including the offences defined under Indian law.
  - Identify the organizations and authorities responsible for cyber security and cybercrime management in India.
- Apply Cyber Crime Investigation Techniques:
  - Describe the procedural aspects of cybercrime investigations including crime scene management, search and seizure, and digital evidence collection.
  - Identify the roles of various reporting agencies and investigative bodies.
  - Evaluate methodologies for investigating cybercrimes and malicious applications.
- Examine Investigative Agencies and Enforcement:
  - Outline the structure, powers, and constitutional basis of investigation agencies in India.
  - Discuss the procedures followed by first responders at the cybercrime scene.
  - Assess the legal consequences and punishments associated with cybercrimes under Indian law.

Prerequisite Course: None

Contents:

Unit I: Introduction to Cyber Crime

Cyber Forensic and Computer Crimes, Crimes targeting Computers: Definition of Cyber Crime & Computer related crimes, Classification & Differentiation between traditional crime and cybercrimes, Types of Cyber Criminals, Types of Cybercrime

a. Data Theft
b. Hacking
c. Spreading Virus & Worms
d. Phishing
e. Cyber Stalking/Bullying
f. Identity Theft & Impersonation
g. Credit card & Online Banking Frauds

h. Obscenity, Pornography & Child Pornography

i. Cyber Defamation, Defacement,

j. Illegal online selling & Gambling

k. Denial of Service Attacks

l. Cyber terrorism

Unit II: Legal Perspective of Cyber Crimes

Legal perspective of cybercrime, IT Act, 2000 and its amendments, Bhartiya Sakshya Adhiniyam, 2023, Bhartiya Nyaya Sanhita, 2023, DPDP Act, 2023 and other relevant laws related to Cybercrime and Cyber security in India.

Unit III: Search And Seizure Procedure

Crime scene in investigation, Search and seizure, Collection of digital evidence, Reporting agencies for cybercrimes, A case study

Unit IV: Investigation And Punishment

Investigation of Cyber Crimes, Investigation of malicious applications, Agencies for investigation in India, their powers, and constitution as per Indian Laws, Procedures followed by First Responders, Punishment for cyber crimes

Content Interaction Plan:

Lecture cum Discussion (Each session of 1 Hour)	**Unit/Topic/Sub-Topic**
1-3	Cyber Forensic and Computer Crimes, Crimes targeting Computers: Definition of Cyber Crime & Computer related crimes,
4-9	Classification & Differentiation between traditional crime and cybercrimes, Types of Cyber Criminals, Types of Cybercrime
10-14	Data Theft, Hacking, Spreading Virus & Worms, Phishing, Cyber Stalking/Bullying, Identity Theft & Impersonation
15-18	Credit card & Online Banking Frauds, Obscenity, Pornography & Child Pornography, Cyber Defamation, Defacement,

19-22	Illegal online selling & Gambling, Denial of Service Attacks, Cyber terrorism
23-27	Legal perspective of cybercrime, IT Act 2000 and its amendments
28-33	Bhartiya Sakshya Adhiniyam, 2023, Bhartiya Nyaya Sanhita, 2023, DPDP Act, 2023 and other relevant laws related to Cybercrime and Cyber security in India.
33-36	Crime scene in investigation, Search and seizure, Collection of digital evidence, Reporting agencies for cybercrimes, A case study
36-40	Investigation of Cyber Crimes, Investigation of malicious applications
41-45	Agencies for investigation in India, their powers and their constitution as per Indian Law, Procedures followed by First Responders, Punishment for cyber crimes
15 Hours	Tutorials

Essential Readings:

- Cyber Law & Cyber Crimes by Advocate Prashant Mali; Snow White Publications, Mumbai
- Cyber Law in India by Farooq Ahmad; Pioneer Books
- Information Technology Law and Practice by Vakul Sharma; Universal Law Publishing Co. Pvt. Ltd.
- Guide to Cyber and E-Commerce Laws by P.M. Bukshi and R.K. Suri; Bharat Law House, New Delhi
- The Information Technology Act, 2000; Bare Act- Professional Book Publishers, New Delhi.
- Computer Forensics: Principles and Practices by Linda Volonino, Reynaldo Anzaldua, and Jana Godwin; Pearson Prentice-Hall 2007.
- Cyber Crime Impact in the New Millennium, by R. C Mishra, Author Press. Edition 2010.
- Cyber Security Understanding Cyber Crimes, Computer Forensics and Legal Perspectives by Sumit Belapure and Nina Godbole, Wiley India Pvt. Ltd. (First

Edition, 2011)

Suggested Readings:

- Guide to Cyber Laws by Rodney D. Ryder; Wadhwa and Company, Nagpur
- First Responder's Guide to Computer Forensics by Richard Nolan et al; Carnegi Mellon, 2005.
- Security in the Digital Age: Social Media Security Threats and Vulnerabilities by Henry A. Oliver, Create Space Independent Publishing Platform. (Pearson, 13th November, 2001)
- The Indian Cyber Law by Suresh T. Vishwanathan; Bharat Law House New Delhi

Digital Forensic			
Code		**Credits**	2
L + T + P	1 + 1+0		
Methods of Content Interaction	Lectures, Tutorials, Group discussion; self-study, seminar, presentations by students,		
Assessment and Evaluation	As per University ordinance		

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Objectives

- Understanding the digital forensic process.
- To learn the foundations of Digital system
- Digital security and the threat landscape.
- To develop skills in students that can help them plan, implement, and monitor Digital Forensics mechanisms.
- To understand Network forensics.

Learning Outcomes

After completion, the learners will be able to:

- Understand the role of digital forensics and the relationship of digital forensics to traditional forensic science, traditional science and the appropriate use of scientific methods.
- outline a range of situations where digital forensics may be applicable
- Identify and document potential security breaches of computer data that suggest violations of legal, ethical, moral, policy, and/or societal standards.
- Understand the Digital System.

Prerequisite: None

Contents:

Unit I: Introduction to Digital Forensics **(50% Weightage)**

Overview of Digital System - Number Systems, Operations and Codes, Decimal Numbers, Binary Numbers, Decimal to Binary Conversion, Binary Arithmetic,1's and 2's complement of binary numbers, Signed numbers, Arithmetic operations with signed numbers, Hexadecimal numbers, Binary to hexadecimal conversion, Hexadecimal to binary conversion.

Introduction to Cyber forensics: Information Security Investigations, Corporate Cyber Forensics, Scientific method in forensic analysis, investigating large scale Data breach cases.

Unit II: Computer Forensics **(50% Weightage)**

Types of Computer Forensics Systems: Internet Security Systems, Intrusion Detection Systems, Firewall Security Systems, Storage Area Network Security Systems. Systems, Wireless Network Security System, IP security architecture, Security protocols, IPSec.

Content Interaction Plan:

Lecture cum Discussion (Each session of 1 Hour)	**Unit/Topic/Sub-Topic**
1-5	Overview of Digital System - Number Systems, Operations and Codes, Decimal Numbers, Binary Numbers, Decimal to Binary Conversion, Binary Arithmetic,1's and 2's complement of binary numbers, Signed numbers, Arithmetic operations with signed numbers, Hexadecimal numbers, Binary to hexadecimal conversion, Hexadecimal to binary conversion,
6-8	Introduction to Cyber forensics: Information Security Investigations, Corporate Cyber Forensics, Scientific method in forensic analysis, investigating large scale Data breach cases.
9-15	Types of Computer Forensics Systems: Internet Security Systems, Intrusion Detection Systems, Firewall Security Systems, Storage Area Network Security Systems. Systems, Wireless Network Security System, IP security architecture, Security protocols, IPSec.
15 Hours	*Tutorials*

Essential Readings:

- Floyd and Jain- Digital Fundamentals, Eighth Edition, Pearson Education.
- Cyber Forensics - Concepts and Approaches, Ravi Kumar & B Jain, 2006, Icfai university press
- Computer Forensics: Investigating Network Intrusions and Cyber Crime (Ec-Council Press Series: Computer Forensics),2010
- Internet Complete Reference, Harley Hahn, second Edition, 1996, Osborne/McGraw-Hill.

Suggested Readings:

- A P Malvino and D P Leach - Digital Principles and Applications, Fourth edition,

Tata McGraw Hill Publishers, co Ltd.

- Live Hacking: The Ultimate Guide to Hacking Techniques & Countermeasures for Ethical
- Hackers & IT Security Experts, Ali Jahangiri, First edition, 2009
- Internet and Web design, Ramesh Bangia Firewall Media, (An imprint of Laxmi Publications Pvt Limited)

Tools & Technologies for Cyber Security			
Code	……..	**Credits**	2
L + T + P	0 + 0+2		
Methods of Content Interaction	Lecture, Practical		
Assessment and Evaluation	As per University ordinance		

Objectives:

- To provide foundational knowledge of device security, including endpoint and mobile security threats and mitigation strategies.
- To familiarize learners with security policies such as password policies, security patch management, and data backup procedures.
- To equip students with practical skills for managing third-party software and implementing device security policies.
- To introduce key cyber security tools and technologies, including host firewalls, antivirus software, and their configurations.
- To develop competency in applying best practices for cybersecurity, including Wi-Fi security and configuring security policies and permissions.

Learning Outcomes:

Students will be able to:

- understand the basic security aspects related to Computer and Mobiles.
- use basic tools and technologies to protect their devices.

Contents:

Unit – I Device Security **(50% Weightage)**

End Point device and Mobile phone security, Password policy, Security patch management, Data backup, Downloading and management of third-party software, Device security policy

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Unit – II Cyber Security Tools **(50% Weightage)**

Cyber Security best practices, Significance of host firewall and Antivirus, Management of host firewall and Anti-virus, Wi-Fi security, Configuration of basic security policy and permissions. Introduction to Windows Defender, pfSense, Wireshark, Nmap

Content Interaction Plan:

Practical cum Discussion (Each session of 1 Hour)	**Unit/Topic/Sub-Topic**
1-3	End Point device and Mobile phone security, Password policy
4-6	Security patch management, Data backup, Downloading and management of third-party software, Device security policy
7-9	Cyber Security best practices, Significance of host firewall and Ant-virus, Management of host firewall and Anti-virus
10-14	Wi-Fi security, Configuration of basic security policy and permissions, Introduction to Windows Defender, pfSense, Wireshark & Nmap
15-15	**Course Wrap-Up & Review** • Comprehensive review and synthesis of Unit I and Unit II topics • Q&A session, discussion of real-world applications, and interactive feedback • Guidance on further study and readings
30 Hours	Lab

Essential Readings:

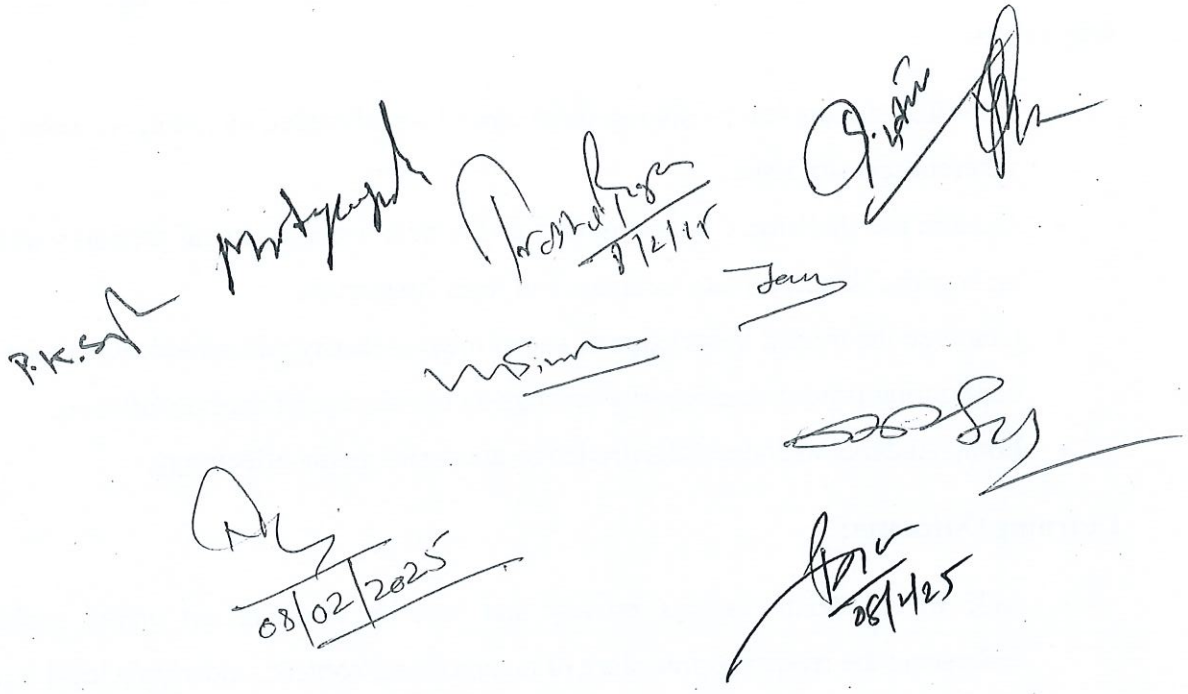
- Stallings, W., & Brown, L. (2018). *Computer security: Principles and practice* (3rd ed.). Pearson.
- Ciampa, M. (2018). Security+ guide to network security fundamentals (6th ed.). Cengage Learning.

Suggested Readings:

- National Institute of Standards and Technology. (2015). NIST Special Publication 800-124

Revision 1: Guidelines for managing the security of mobile devices in the enterprise. https://csrc.nist.gov/publications/detail/sp/800-124/rev-1/final.

- OWASP. (n.d.). OWASP mobile security project. Retrieved February 7, 2025, from https://owasp.org/www-project-mobile-security
- SANS Institute. (n.d.). *White papers*. Retrieved February 7, 2025, from https://www.sans.org/white-papers/
- Cisco. (n.d.). Cybersecurity advisories and best practices. Retrieved February 7, 2025, from https://tools.cisco.com/security/center/publicationListing.x



Social Media Overview & Security			
Code	.....	**Credits**	2
L + T + P	1 + 1+0		
Methods of Content Interaction	Lecture, Practical & Tutorial		
Assessment and Evaluation	As per the University ordinance		

Objectives:

- Introduce students to the diverse landscape of social media, including its types, platforms, and inherent security issues.
- Explore the challenges, opportunities, and pitfalls in online social networks with an emphasis on security issues, privacy settings, and legal constraints.
- Combine theoretical knowledge of social media security with practical exercises that involve configuring privacy and security settings on popular social media platforms.
- Equip students with the skills needed to use social media effectively,

Learning Outcomes:

- Able to appreciate various privacy and security concerns on online social media and understand the reporting procedure of inappropriate content, underlying legal aspects and best practices for the use of social media platforms.
- can describe the evolution of social networks, identify various types of social media platforms, and explain their roles in modern communication and marketing.
- can interpret the laws and regulations governing the posting of inappropriate content and assess best practices for flagging, reporting, and managing such content.

Prerequisite: None

Contents:

Unit – I Introduction to Social Media **(70% Weightage)**

Introduction to Social networks. Types of social media, social media platforms, Social media monitoring, Hashtag, Viral content, Social media marketing, Social media privacy, Challenges, opportunities and pitfalls in online social network, Security issues related to social media, Flagging

and reporting of inappropriate content, Laws regarding posting of inappropriate content, Best practices for the use of Social media, Case studies.

Unit -II: Hands-on with Social Media Platforms **(30% Weightage)**

Basic checklist, privacy and security settings for popular social media platforms.

Reporting and redressal mechanism for violations and misuse of social media platforms.

Content Interaction Plan:

Lecture cum Discussion (Each session of 1 Hour)	**Unit/Topic/Sub-Topic**
1-3	Introduction to Social networks. Types of social media, social media platforms
4-8	Social media monitoring, Hashtag, Viral content, social media marketing
9-15	Social media privacy, Challenges, opportunities and pitfalls in online social network, Security issues related to social media
16-17	Flagging and reporting of inappropriate content
18-20	Laws regarding posting of inappropriate content, best practices for the use of social media,
21-25	Case studies.
26-27	Basic checklist, privacy and security settings for popular social media platforms.
28-29	Reporting and redressal mechanism for violations and misuse of social media platforms.
30-30	**Course Wrap-Up & Review** • Comprehensive review and synthesis of Unit I and Unit II topics • Q&A session, discussion of real-world applications, and interactive feedback • Guidance on further study and readings

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Essential Readings:

- L. Safko and D. K. Brake, *The Social Media Bible: Tactics, Tools, and Strategies for Business Success*, 2nd ed. Wiley, 2009.
- D. Halliday, *Social Media Law*, 2nd ed. Prentice Hall, 2010.

Suggested Readings:

- M. Kaplan and M. Haenlein, "Users of the world, unite! The challenges and opportunities of Social Media," *Business Horizons*, vol. 53, no. 1, pp. 59–68, Jan. 2010.
- J. P. Treem and M. L. Leonardi, "Social media use in organizations: Exploring the affordances of visibility, editability, persistence, and association," *Annals of the International Communication Association*, vol. 35, no. 1, pp. 143–189, Mar. 2011.
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