



Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore

Shri Vaishnav Institute of Information Technology

Choice Based Credit System (CBCS) in the light of NEP-2020

B. Tech (All Branches)

SEMESTER-I (2026-30)

COURSE CODE	CATEGORY	COURSE NAME	TEACHING & EVALUATION SCHEME						L	T	P	CREDITS
			Marks	THEORY			PRACTICAL					
				END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
HUCS101	AEC	Communication Skills	Max	60	20	20	0	20	1	0	2	2
			Min	24	16		0	8				

Legends: L - Lecture; T - Tutorial/Teacher Guided Student Activity; P – Practical; C - Credit; *Teacher Assessment shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

COURSE OBJECTIVES:

The student will have ability to:

1. Develop an understanding of the fundamentals of professional and organizational communication.
2. Improve verbal, non-verbal, listening, and interpersonal communication skills required in engineering environments.
3. Enhance grammatical accuracy, vocabulary usage, and confidence in workplace communication.

COURSE ALIGNMENT WITH UNSDG:

The Course aims to fulfill the United Nations Sustainable Development Goals, SDG 4 (Quality Education): Effective communication and language proficiency for lifelong learning, SDG 5 (Gender Equality): Inclusive and respectful communication practices, SDG 8 (Decent Work and Economic Growth): Workplace communication and employability skills.

COURSE OUTCOMES:

After completion of the course, the student will be able to:

- CO1** Demonstrate understanding of communication process, barriers, and professional communication ethics.
- CO2** Apply verbal and non-verbal communication skills effectively in academic and workplace situations.
- CO3** Use correct grammar, vocabulary, pronunciation, and listening skills for effective communication.
- CO4** Participate confidently in presentations, group discussions, and interpersonal interactions.

TEACHING PEDAGOGY:

- T1** Classroom teaching (white board), Power Point Presentations, Audio-Visual Learning and Peer Learning
- T2** Assignments, Language Lab Sessions, Seminars, Quizzes, Oral Viva-voce examination

ASSESSMENT TOOLS:

- ATL1** Quiz
- ATL2** Activity Based Learning
- ATL3** Midterm Exams

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ATL4 Group Discussion

ATL5 Seminar Presentation

ATL6 Assignments

ATL7 Language Lab Performance

ATL8 Oral Viva-voce examination

PREREQUISITES:

Basic understanding of English language and communication.

SYLLABUS:

Module	Descriptors/Topics	Hours	Assessment Tools
I	Introduction to Communication: Meaning, Nature, Process and Importance of Communication; Principles of Communication, Types of Communication; Verbal and Non-Verbal Communication; Channels of Communication, Communication Barriers.	6	ATL1, ATL4
II	Listening and Reading Skills: Listening Skills: Process, Types, Difference between Hearing and Listening, Barriers to Effective Listening. Reading Skills: Reading Comprehension, Process, Reading speed Strategies, SQ3R Reading technique.	6	ATL2, ATL7
III	Grammar and Vocabulary Building: Parts of Speech; Tenses; Subject-Verb Agreement; Sentence Structure; Active Passive Voice, Direct Indirect Speech.	6	ATL3, ATL4
IV	Business Correspondence: Business Letter, Parts & Layouts of Business letters, Calling/ Sending Quotations/ Orders/ Complaints.	6	ATL5, ATL6

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V	Speaking Skills: Public Speaking, Presentation Skills and Group Discussion and Debate.	6	ATL6, ATL8
	Total Hours	30	

ADDITIONAL RESOURCES

A. Value addition to course content/ Skill enhancement content:

Professional email writing, digital communication etiquette, teamwork, presentation skills, interview skills, and workplace communication

B. Remedial classes for slow learners:

Grammar reinforcement sessions, vocabulary building exercises, guided speaking practice, listening exercises, and individual mentoring.

SUGGESTED READINGS:

1. Raman, M., & Sharma, S. (2015). Technical communication: Principles and practice (3rd ed.). Oxford University Press.
2. Raman, M., & Sharma, S. (2018). Communication skills (2nd ed.). Oxford University Press.
3. Kumar, S., & Lata, P. (2018). Communication skills (2nd ed.). Oxford University Press.
4. Rizvi, A. M. (2017). Effective technical communication (2nd ed.). McGraw Hill Education.
5. Murphy, R. (2019). Essential grammar in use: A self-study reference and practice book for elementary learners of English (4th ed.). Cambridge University Press.

Suggested e- resources (Websites/e- books)

1. British Council Learn English
2. BBC Learning English

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3. Cambridge English Resources
4. NPTEL Communication Skills Courses
5. SWAYAM Communication Courses

LIST OF PRACTICAL

	Title	CO Mapping
1.	Self-Introduction	CO2
2.	Active Listening Exercise	CO3
3.	Conversation Practice	CO2
4.	Telephone Etiquette	CO2
5.	Role Play	CO2
6.	Group Discussion	CO4
7.	Presentation Skills Activity	CO4
8.	JAM Session	CO4
9.	Extempore Speaking	CO4

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COURSE ARTICULATION MATRIX (MAPPING OF COs WITH POs)

Course Outcomes	Correlation with POs												Correlation with PSOs		
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO1 1	PO1 2	PSO 1	PSO 2	PSO 3
CO1	-	1	-	-	-	1	-	3	2	3	-	1	1	-	-
CO2	-	1	-	-	1	1	-	2	3	3	-	2	2	1	-
CO3	1	1	-	-	1	-	-	-	2	3	-	2	2	-	-
CO4	-	2	1	-	1	1	-	2	3	3	-	3	1	2	-

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BTPH101		Applied Physics	Max	60	20	20	30	20	3	1	2	5
			Min	24	16		14	9				

Legends: L - Lecture; T - Tutorial/Teacher Guided Student Activity; P – Practical; C - Credit;

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COURSE OBJECTIVES:

The student will have the ability to:

1. Explain the fundamental concepts of quantum mechanics, including wave-particle duality, the uncertainty principle, the Schrödinger wave equation, and the particle-in-a-box model.
2. Describe the principles of solid-state physics, semiconductor devices, Hall effect, and superconductivity, and relate them to modern electronic applications.
3. Explain nuclear structure, nuclear models, particle accelerators, and radiation detectors used in nuclear science and technology.
4. Illustrate the principles of laser operation, optical fibre communication, and their applications in science, medicine, industry, and communication systems.
5. Analyze the phenomena of interference, diffraction, and polarisation of light and their applications in optical instruments and experimental physics.
6. Perform physics experiments systematically, record and analyse experimental data and draw scientifically valid conclusions.

COURSE ALIGNMENT WITH UNSDG: The Course aims to fulfil the United Nations Sustainable Development Goals, **SDG 4 (Quality Education)**.

COURSE OUTCOMES:

After completion of the course, the student will be able to:

1. Explain the fundamental concepts of Quantum Physics, Solid State Physics, Semiconductors, and Superconductivity.
2. Describe the principles of Nuclear Physics and Laser Physics and their technological

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applications.

- Analyze the behaviour of light using the principles of geometrical and wave optics and related optical devices.
- Apply the laws and concepts of Physics to solve problems relevant to engineering and technological applications.
- Perform physics experiments, analyze experimental data, evaluate results, and draw scientifically valid conclusions.
- Perform experimental investigations, process and interpret the collected data, and draw logical conclusions supported by scientific evidence.

Teaching Pedagogy:

T1	Classroom teaching (white board), Power Point Presentations, Interactive lectures, Inquiry-based teaching
T2	ABL activities, Assignments, Flip Class/ Seminars, Quizzes, Oral Viva-voce examination

Assessment Tools

AT1-1	Quiz
AT1-2	Activity Based Learning
AT1-3	Midterm Exams
AT1-4	Flip Class
AT1-5	Seminar Presentation

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AT1-6	Assignments
AT1-7	Poster
AT1-8	Oral Viva-voce examination
AT1-9	Industrial Visit Report

Prerequisites: SSC Standard knowledge of Physics.

Module	Descriptors/Topics	Hours	Assessment tools
I	Quantum Physics: Introduction to Quantum hypothesis, Matter wave concept, Wave Group and Particle velocity and relation between them, Uncertainty principle, Compton Effect (without derivation), Wave function and its physical significance, Energy and Momentum Operator, Development of time-dependent and time-independent Schrödinger wave equation, Determination of wavefunction and energy of particle in a one-dimensional box, Introduction to quantum computer, Applications of AI in Physics.	08	AT1 AT2 AT3 AT6 AT8
II	Solid State Physics: Basic formulation of the free electron model and Kronig-Penney model, Intrinsic and Extrinsic semiconductors, P-N junction diode, Zener diode, Tunnel diode, Photodiode, Solar cells, Hall	08	AT1 AT2 AT3

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	Effect, Introduction to Superconductivity, Meissner effect, Type I & II Superconductors.		AT6 AT8
III	Nuclear Physics: Nuclear Structure & Properties, Binding Energy and Mass Defect, Nuclear models: Comparative Study of Liquid drop and Shell Model, Particle accelerators: LINAC, Cyclotron and Betatron. Detectors and Counters: Bainbridge Mass Spectrograph, Giger-Muller counters.	08	AT1 AT2 AT3 AT6 AT8
IV	Laser & Fiber Optics: Stimulated and Spontaneous Emission, Einstein's A&B Coefficients, Population Inversion, Pumping, Optical Resonator, Properties and Applications of Laser, Ruby, He-Ne lasers. Introduction to Optical fibre, Acceptance angle and cone, Numerical Aperture, applications of optical fibre.	08	AT1 AT2 AT3 AT6 AT8
V	Wave Optics: Introduction to Interference, Constructive and Destructive interference. Interference in Thin films, Newton's rings experiment, Michelson's interferometer, Introduction to Diffraction and its Types, Qualitative Study of Diffraction at a single slit, double slit and n-slit (without derivation), resolving power, Rayleigh criterion, Concept of Polarized light, Brewsters law. Indian Knowledge System (IKS) in	8	AT1 AT2 AT3 AT6 AT8

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	Astronomical Instrumentation.		
	Total Hours	40	

List of experiments (Any Eight)	1. Determination of radius of curvature "R" of convex lens by Newton's ring experiment.
	2. Determination of Frequency of A.C. mains by electrically maintained vibrating rod.
	3. Determination of Resolving Power of Telescope.
	4. Determination of wavelength of LASER using Diffraction Grating.
	5. Determination of Planck's constant using Photocell.
	6. To study forward and reverse characteristics of Zener diode.
	7. To study forward and reverse characteristics of P-N diode.
	8. To study V-I characteristics of Tunnel diode.
	9. To determine Young's Modulus using Cantilever method.
	10. To determine the mass of cane sugar dissolved in water using Half shade Polarimeter.
	11. To study characteristics of a photodiode.
	12. Determination of Energy band gap (Eg) using PN Junction Diode.
	13. Determination of μ and ω of a given Prism using a spectrometer.
	14. Measurement of height of a given object using Sextant.

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	15. Measurement of Numerical aperture of fiber by LASER.
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Additional Resources

A. Value addition to course content/ Skill enhancement content:

nptel.ac.in/courses/108106181

<https://nptel.ac.in/courses/115103129>

<https://nptel.ac.in/courses/104104082>

B. Remedial classes for slow learners: As per the AUMP SOP for slow and fast learners.

Suggested Readings:

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Reference Books	"Engineering Physics", by Dr. S. L. Gupta and Sanjeev Gupta, Dhanpat Rai Publication, New Delhi. "Engineering Physics", by Navneet Gupta, Dhanpat Rai Publication, New Delhi. "Engineering Physics", by H. J Sawant, Technical Publications, Pune, Maharashtra. "Engineering Physics". by MN. Avdhanulu & P. G. Kshirsagar, S. Chand & Co. Edition (2012). "Fundamentals of Physics", by Halliday, Wiley, India. "Concepts of Modern Physics", by Beiser, TMH, New Delhi. "Atomic and Nuclear Physics", by Brijlal and Subraminayan. - LASERSs and Electro Optics by Christopher C. Davis, Cambridge Univ. Press (1996). "LASER theory and applications", by A. K. Ghatak & Tyaga raja n, TMH (1984). - Introduction to Atomic Physics, H. E. White Quantum Mechanics: Schaums Outlines, Y. Peleg, R. Pnini, E. Zaarur, E. Hecht. - B.Sc. Practical Physics, C. L. Arora, S. Chand Publishing, Revised Edition - Advanced Practical Physics for Students, B. L. Flint & H. T. Worsnop, Asia Publishing House / CBS Reprint, Reprint Edition.
Suggested e- resources (Websites/e-books)	https://swayam.gov.in https://ndl.iitkgp.ac.in Virtual Labs https://epgp.inflibnet.ac.in

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B. Tech (CSE/ IT): All Programs

SEMESTER-I (2026-30)

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				END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BTCSH107	BS	Linear Algebra	Max	60	20	20	0	0	3	1	0	4
			Min	24	16		0	0				

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COURSE OBJECTIVES:

The student will have ability to:

1. Know the fundamental principles of the Linear algebra.
2. Understand and apply the basics of the Matrices and Vector Space.

COURSE ALIGNMENT WITH UNSDG:

“The Course aims to fulfill the United Nations Sustainable Development Goals, **SDG 4 (Quality Education)**.”

COURSE OUTCOMES:

After completion of the course, the student will be able to:

- CO1** Apply the techniques to find the Solution of Linear equations.
- CO2** Apply the basics of the calculus of the Determinants.
- CO3** Apply the basics of the calculus of the Matrices.
- CO4** Apply the concept of Singular value decomposition and Principal component analysis in Image Processing and Machine Learning.

TEACHING PEDAGOGY:

- T1** Classroom teaching (white board), Power Point Presentations, Interactive lectures, Inquiry-based teaching
- T2** ABL activities, Assignments, Flip Class/ Seminars, Quizzes, Oral Viva-voce examination

ASSESSMENT TOOLS:

- ATL1** Quiz
- ATL2** Activity Based Learning
- ATL3** Midterm Exams
- ATL4** Flip Class
- ATL5** Seminar Presentation
- ATL6** Assignments
- ATL7** Poster

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Choice Based Credit System (CBCS) in the light of NEP-2020

B. Tech (CSE/ IT): All Programs

SEMESTER-I (2026-30)

COURSE CODE	CATEGORY	COURSE NAME	TEACHING & EVALUATION SCHEME						L	T	P	CREDITS
			Marks	THEORY			PRACTICAL					
				END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BTCSH107	BS	Linear Algebra	Max	60	20	20	0	0	3	1	0	4
			Min	24	16		0	0				

Legends: L - Lecture; T - Tutorial/Teacher Guided Student Activity; P – Practical; C - Credit; *Teacher Assessment shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

ATL8 Oral Viva-voce examination

ATL9 Industrial Visit Report

PREREQUISITES:

SYLLABUS:

Module	Descriptors/Topics	Hours	Assessment Tools
I	Introduction to Matrices and Determinants: Solution of Linear Equations; Cramer's rule; Inverse of a Matrix.	9	ATL1 ATL3 ATL6
II	Vectors and linear combinations: Rank of a matrix; Gaussian elimination; LU Decomposition; Solving Systems of Linear Equations using the tools of Matrices	9	ATL1 ATL3 ATL6
III	Vector space: Dimension; Basis; Orthogonally; Projections; Gram-Schmidt or thogonalization and QR decomposition	9	ATL1 ATL3 ATL6
IV	Eigenvalues and Eigenvectors; Positive definite matrices; Linear transformations; Hermit Ian and unitary matrices	9	ATL1 ATL3 ATL6
V	Singular value decomposition and Principal component analysis; Introduction to their applications in Image Processing and Machine Learning.	9	ATL1 ATL3 ATL6
Total Hours		45	

ADDITIONAL RESOURCES

A. Value addition to course content/ Skill enhancement content:

- MIT OpenCourseWare Lecture Portal (18.06): <https://ocw.mit.edu/courses/18-06-linear-algebra-spring-2010/>

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B. Tech (CSE/ IT): All Programs

SEMESTER-I (2026-30)

COURSE CODE	CATEGORY	COURSE NAME	TEACHING & EVALUATION SCHEME						L	T	P	CREDITS
			Marks	THEORY			PRACTICAL					
				END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BTCSH107	BS	Linear Algebra	Max	60	20	20	0	0	3	1	0	4
			Min	24	16		0	0				

Legends: L - Lecture; T - Tutorial/Teacher Guided Student Activity; P – Practical; C - Credit; *Teacher Assessment shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

B. Remedial classes for slow learners:

As per the SVVV SOP for slow and fast learners.

SUGGESTED READINGS:

TEXTBOOK:

1. G. Strang, *Linear Algebra and Its Applications*, 4th ed. Belmont, CA: Thomson, Brooks/Cole, 2006.

REFERENCE BOOKS:

1. E. Kreyszig, *Advanced Engineering Mathematics*, 9th ed. Hoboken, NJ, USA: Wiley, 2005.
2. R. G. Bartle and D. R. Sherbert, *Introduction to Real Analysis*, 5th ed. New York, NY, USA: Wiley, 1999.
3. J. Stewart, *Calculus: Early Transcendentals*, 5th ed. Boston, MA, USA: Thomas Learning (Brooks/Cole), 2003.

Suggested e- resources (Websites/e- books)

1. MIT OpenCourseWare: MIT 18.06 Linear Algebra, Spring 2010.
2. NPTEL: Linear Algebra.

COURSE ARTICULATION MATRIX (MAPPING OF COs WITH POs)

Course Outcomes	Correlation with POs												Correlation with PSOs		
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO1 1	PO1 2	PSO 1	PSO 2	PSO 3
CO1	3	3	2	-	2	-	-	-	-	-	-	2	2	2	-
CO2	3	2	1	-	-	-	-	-	-	-	-	1	1	2	-
CO3	3	3	2	2	2	-	-	-	-	-	-	2	2	2	1
CO4	3	3	3	3	3	-	-	-	-	-	-	3	2	3	1

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B. Tech (CSE/IT), CSE (ES, MA, AIML-IBM, DS, FSDB, AIML-M, MLCC, ICS, BDCE)

SEMESTER-II (2026-30)

COURSE CODE	CATEGORY	COURSE NAME	TEACHING & EVALUATION SCHEME						L	T	P	CREDITS
			Marks	THEORY			PRACTICAL					
				END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BTCS202M	BEC	Object Oriented Programming with C++	Max	60	20	20	30	20	3	0	2	4
			Min	24	16		15	10				

Legends: L - Lecture; T - Tutorial/Teacher Guided Student Activity; P – Practical; C - Credit; *Teacher Assessment shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

COURSE OBJECTIVES:

The student will have ability to:

1. To explain abstract data types, classes and different types of objects.
2. To analyze the public, protected and private modes of inheriting the classes.
3. To demonstrate the overloading of functions and operators to grant them a different meaning.
4. To provide complete knowledge of Object Oriented Programming through C++ and to enhance the programming skills of the students by giving practical assignments to be done in labs.

COURSE ALIGNMENT WITH UNSDG:

The Course aims to fulfill the United Nations Sustainable Development Goals, **SDG 4 (Quality Education)**.

COURSE OUTCOMES:

After completion of the course, the student will be able to:

- CO1** Identify and describe the components of object-oriented technology and justify their relevance.
- CO2** Implement inheritance for code reusability and polymorphism.
- CO3** Implement object-oriented approach for real world scenarios.
- CO4** Use advance features like templates and exception to make programs supporting reusability and sophistication
- CO5** Develop the applications using object oriented programming with C++.

TEACHING PEDAGOGY:

- T1** Classroom teaching (white board), Power Point Presentations, Interactive lectures, Inquiry-based teaching
- T2** ABL activities, Assignments, Flip Class/ Seminars, Quizzes, Oral Viva-voce examination

ASSESSMENT TOOLS:

- ATL1** Quiz
- ATL2** Activity Based Learning
- ATL3** Midterm Exams
- ATL4** Flip Class
- ATL5** Seminar Presentation

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SEMESTER-II (2026-30)

COURSE CODE	CATEGORY	COURSE NAME	TEACHING & EVALUATION SCHEME						L	T	P	CREDITS
			Marks	THEORY			PRACTICAL					
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Legends: L - Lecture; T - Tutorial/Teacher Guided Student Activity; P – Practical; C - Credit; *Teacher Assessment shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

- ATL6 Assignments
- ATL7 Poster
- ATL8 Oral Viva-voce examination
- ATL9 Industrial Visit Report

PREREQUISITES:

Knowledge of Object Oriented Programming with C++ (BTCS202M)

SYLLABUS:

Module	Descriptors/Topics	Hours	Assessment Tools
I	Concepts of OOP: Introduction OOP, Procedural vs. Object Oriented Programming, Principles of OOP, Benefits and applications of OOP. C++ Basic Overview, Program structure, namespace, identifiers, variables, constants, enum, operators, typecasting, control structures.	9	ATL1 ATL4 ATL8
II	C++ Functions: The Main Function, Function prototyping, Simple functions, Call and Return by reference, Inline functions, Macro Vs. Inline functions, Overloading of functions, default arguments.	9	ATL1 ATL4 ATL8
III	Objects and Classes: Basics of object and class in C++, Private and public members, static data and function members, constructors and their types, destructors, operator overloading, friend function. Inheritance: Concept of Inheritance, types of inheritance, access modifiers, overriding, virtual base class	9	ATL1 ATL4 ATL8
IV	Polymorphism: Polymorphism and its types, Pointers in C++, Pointers and Objects, this pointer, virtual and pure virtual functions, Implementing polymorphism, Abstract Methods and Classes. Exception Handling, Templates function and class in C++	9	ATL1 ATL4 ATL8
V	I/O and File management: Concept of Streams, Cin and Cout Objects, C++ Stream Classes, Unformatted and	9	ATL1 ATL4

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			Marks	THEORY			PRACTICAL					
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	Formatted I/O, Manipulators, File Stream, C++ File Stream Classes, File Management Functions, File Modes, Binary and Random Files.		ATL8
	Total Hours	45	

ADDITIONAL RESOURCES

A. Value addition to course content/ Skill enhancement content:

<https://www.youtube.com/watch?v=vLnPwxZdW4Y>

B. Remedial classes for slow learners:

As per the SVVV SOP for slow and fast learners.

SUGGESTED READINGS:

TEXTBOOKS:

1. B. Stroustrup, Programming: *Principles and Practice Using C++*, 3rd ed. Boston, MA, USA: Addison-Wesley, 2024.
2. G. Ruggiero, *Software Architecture with C++: Design modern systems using effective architecture concepts, design patterns, and techniques with C++20*. Birmingham, UK: Packt Publishing, 2022.

REFERENCE BOOKS:

1. P. Deitel and H. Deitel, *C++ How to Program*, 11th ed. Boston, MA, USA: Pearson, 2024.
2. N. M. Josuttis, *C++23 - The Complete Guide*. Hamburg, Germany: Leanpub, 2026.
3. J. Galowicz, *C++20 STL Cookbook*. Birmingham, UK: Packt Publishing, 2020.
4. B. Cyganek, *Introduction to Programming with C++ for Engineers*. Hoboken, NJ, USA: Wiley-IEEE Press, 2020.

Suggested e- resources (Websites/e- books)

1. MIT OpenCourseWare Core Object-Oriented C++ Programming Guide: <https://ocw.mit.edu/courses/6-096-introduction-to-c-january-iap-2011/pages/lecture-notes/>

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SEMESTER-II (2026-30)

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LIST OF PRACTICALS

S.No.	Title	Co Mapping
1.	Write a program to display the following output using a single cout statement. Maths=90, Physics=74, Chemistry=76	CO1
2.	Write a program to read 2 numbers from the keyboard and display the larger value on the screen.	CO1
3.	Write a function using reference variables as arguments to swap the values of a pair of integers.	CO1
4.	Write a macro that obtains the largest of 3 numbers.	CO1
5.	Create two classes DM and DB which store the value of distances. DM stores distances in meters and centimeters and DB in feet and inches. Write a program that can read values for the class objects and add one object of DM with another object of DB. Use a friend function to carry out the addition operation. The object that stores the results may be a DM object or DB object, depending on the units in which the result are required. The display should be in the format of feet and inches or meters and centimeters depending on the object on display.	CO3
6.	Define a class to represent a bank account. Include the following members: Data members 1. Name of the depositor 2. Account number 3. Type of account 4. Balance amount in the account Member functions 1. To assign initial values 2. To deposit an amount 3. To withdraw an amount after checking the balance 4. To display name and balance Write a main program to test the program.	CO3
7.	Design a constructor for bank account class.	CO3
8.	A book shop maintains the inventory of books that are being sold at the shop. The list includes details such as author, title, price, publisher and stock position. Whenever a customer wants a book, the sales person inputs the title and author and the system searches the list and displays whether it is available or not. If it is not, an appropriate message is displayed. If it is, then the system	CO3

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SEMESTER-II (2026-30)

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			Marks	THEORY			PRACTICAL					
				END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BTCS202M	BEC	Object Oriented Programming with C++	Max	60	20	20	30	20	3	0	2	4
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displays the book details and requests for the number of copies required. If the requested copies book details and requests for the number of copies required. If the requested copies are available, the total cost of the requested copies is displayed; otherwise the message "Required copies not in stock" is displayed.

Design a system using a class called books with suitable member functions and Constructors. Use new operator in constructors to allocate memory space required.

9. Improve the system design in exercise 8 to incorporate the following features: CO3
 - (a) The price of the books should be updated as and when required. Use a private member function to implement this.
 - (b) The stock value of each book should be automatically updated as soon as a transaction is completed.
 - (c) The number of successful transactions should be recorded for the purpose of statistical analysis. Use static data members to keep count of transaction.
10. Design a C++ Class 'Complex' with data members for real and imaginary part. Provide default and parameterized constructors. Write a program to perform arithmetic operations of two complex numbers using operator overloading (using either member functions or friend functions). CO2, CO3
11. Create a base class shape. Use this class to store two double type values that could be used to compute area of figures. Derive two specific classes called triangle and rectangle from the base shape. Add to the base a member function getdata() to initialize base class data member and another member function display_area() to compute and display the area of figures. Make display_area() as a virtual function and redefine it the derived class to suit their requirements. CO2
12. Assume that a bank maintains two kinds of accounts for customers, one called as savings account and the other as current account. The savings account provides compound interest and withdrawal facilities but no cheque book facility. The current account provides cheque book facility but no interest. Current account holders should also maintain a minimum balance and if the balance falls below this level, a service charge is imposed. Create a class account that stores customer name, account number and type of account. From this derive the classes curacct and savacct to make them more specific to their requirements. Include necessary member functions in order to achieve the following tasks: CO2, CO5
 - a. Accept deposit from a costumer and update the balance.
 - b. Display the balance
 - c. Compute and deposit interest.
 - d. Permit withdrawal and update the balance.

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SEMESTER-II (2026-30)

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			Marks	THEORY			PRACTICAL					
				END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BTCS202M	BEC	Object Oriented Programming with C++	Max	60	20	20	30	20	3	0	2	4
			Min	24	16		15	10				

Legends: L - Lecture; T - Tutorial/Teacher Guided Student Activity; P – Practical; C - Credit; *Teacher Assessment shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

e. Check for the minimum balance, impose penalty, necessary and update balance.

COURSE ARTICULATION MATRIX (MAPPING OF COs WITH POs)

Course Outcomes	Correlation with POs												Correlation with PSOs		
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO1 1	PO1 2	PSO 1	PSO 2	PSO 3
CO1	3	1	-	-	2	-	-	-	-	-	-	2	2	1	-
CO2	3	2	2	-	3	-	-	-	-	-	-	2	3	1	-
CO3	3	3	3	2	3	1	1	-	-	-	-	2	3	2	1
CO4	3	2	2	1	3	-	-	-	-	-	-	2	3	2	2
CO5	3	3	3	3	3	-	-	-	2	1	1	3	3	2	1

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SEMESTER-II (2026-30)

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			Marks	THEORY			PRACTICAL					
				END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BTIT201M	DCC	Data Communication	Max	60	20	20	0	0	3	0	0	3
			Min	24	16		0	0				

Legends: L - Lecture; T - Tutorial/Teacher Guided Student Activity; P – Practical; C - Credit; *Teacher Assessment shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

COURSE OBJECTIVES:

The student will have ability to:

1. To understand the concepts of data communications.
2. To be familiar with the Transmission media and Tools.
3. To study the functions of OSI layers.
4. To learn about IEEE standards in computer networking.
5. To get familiarized with different protocols and network components.

COURSE ALIGNMENT WITH UNSDG:

The Course aims to fulfill the United Nations Sustainable Development Goals, **SDG 4 (Quality Education)**.

COURSE OUTCOMES:

After completion of the course, the student will be able to:

- CO1** Understand the Process and functions of data communications
- CO2** Understand Transmission media and Tools
- CO3** Understand the functions of OSI layers
- CO4** Understand IEEE standards in computer networking
- CO5** Understand different protocols and network components

TEACHING PEDAGOGY:

- T1** Classroom teaching (white board), Power Point Presentations, Interactive lectures, Inquiry-based teaching
- T2** ABL activities, Assignments, Flip Class/ Seminars, Quizzes, Oral Viva-voce examination

ASSESSMENT TOOLS:

- ATL1** Quiz
- ATL2** Activity Based Learning
- ATL3** Midterm Exams
- ATL4** Flip Class
- ATL5** Seminar Presentation
- ATL6** Assignments
- ATL7** Poster

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			Marks	THEORY			PRACTICAL					
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BTIT201M	DCC	Data Communication	Max	60	20	20	0	0	3	0	0	3
			Min	24	16		0	0				

Legends: L - Lecture; T - Tutorial/Teacher Guided Student Activity; P – Practical; C - Credit; *Teacher Assessment shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

ATL8 Oral Viva-voce examination

ATL9 Industrial Visit Report

PREREQUISITES:

Basic Computer Knowledge

SYLLABUS:

Module	Descriptors/Topics	Hours	Assessment Tools
I	Introduction: Data Communication Components, Types of Connections, Transmission Modes, Network Devices, Topologies, Protocols and Standards, OSI Model, Transmission Media, Bandwidth, Bit Rate, Bit Length, Baseband and Broadband Transmission, Attenuation, Distortion, Noise, Throughout, Delay and Jitter.	9	ATL3 ATL8 ATL6
II	Data Encoding: Unipolar, Polar, Bipolar, Line and Block Codes. Multiplexing: Introduction and History, FDM, TDM, WDM, Synchronous and Statistical TDM. Synchronous and Asynchronous transmission, Serial and Parallel Transmission.	9	ATL3 ATL8 ATL6
III	Error Detection & Correction: Correction, Introduction–Block Coding–Hamming Distance, CRC, Flow Control and Error Control, Stop and Wait, Error Detection and Error Go Back– N ARQ, Selective Repeat ARQ, Sliding Window, Piggybacking, Random Access, CSMA/CD, CDMA/CA.	9	ATL3 ATL8 ATL6
IV	Network Switching Techniques: Circuit, Message, Packet and Hybrid Switching Techniques.X.25, ISDN.Logical Addressing, Ipv4, Ipv6, Address Mapping, ARP, RARP, BOOTP and DHCP, User Datagram Protocol, Transmission Control Protocol, SCTP.	9	ATL3 ATL8 ATL6
V	Application Layer Protocols: Domain Name Service	9	ATL3

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Choice Based Credit System (CBCS) in the light of NEP-2020

B. Tech (CSE/IT), CSE (ES, MA, ICS, BDCE)

SEMESTER-II (2026-30)

COURSE CODE	CATEGORY	COURSE NAME	TEACHING & EVALUATION SCHEME						L	T	P	CREDITS
			Marks	THEORY			PRACTICAL					
				END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BTIT201M	DCC	Data Communication	Max	60	20	20	0	0	3	0	0	3
			Min	24	16		0	0				

Legends: L - Lecture; T - Tutorial/Teacher Guided Student Activity; P – Practical; C - Credit; *Teacher Assessment shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

	Protocol, File Transfer Protocol, TELNET, WWW and Hyper Text Transfer Protocol, Simple Network Management Protocol, Simple Mail Transfer Protocol, Post Office Protocol v3.		ATL6 ATL8
	Total Hours	45	

ADDITIONAL RESOURCES

A. Value addition to course content/ Skill enhancement content:

https://www.youtube.com/playlist?list=PLU14u3cNGP60_JNv2MmK3wkOt9syvfQWY (MIT OCW)

B. Remedial classes for slow learners:

As per the SVVV SOP for slow and fast learners.

SUGGESTED READINGS:

TEXTBOOK:

1. B. A. Forouzan, *Data Communication and Networking*, 4th ed. New Delhi, India: Tata McGraw Hill, 2011.

REFERENCE BOOKS:

1. L. L. Peterson and P. S. Davie, *Computer Networks*, 5th ed. Amsterdam, Netherlands: Elsevier, 2012.
2. W. Stallings, *Data and Computer Communication*, 8th ed. Upper Saddle River, NJ, USA: Pearson Education, 2007.
3. J. F. Kurose and K. W. Ross, *Computer Networking: A Top–Down Approach Featuring the Internet*. Upper Saddle River, NJ, USA: Pearson Education, 2005.

Suggested e- resources (Websites/e- books)

1. MIT OpenCourseWare Data Communication and Networks Companion:

<https://ocw.mit.edu/courses/6-263j-data-communication-networks-fall-2002/>

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			Marks	THEORY			PRACTICAL					
				END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
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COURSE ARTICULATION MATRIX (MAPPING OF COs WITH POs)

Course Outcomes	Correlation with POs												Correlation with PSOs		
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO1 1	PO1 2	PSO 1	PSO 2	PSO 3
CO1	3	2	1	-	-	-	-	-	-	-	-	2	2	2	1
CO2	3	2	2	2	3	-	1	-	-	-	-	2	2	1	1
CO3	3	3	2	-	2	-	-	-	-	-	-	2	3	2	2
CO4	3	2	3	-	-	1	-	1	-	-	-	2	3	1	2
CO5	3	3	3	2	3	-	-	-	-	-	-	2	3	2	3

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Choice Based Credit System (CBCS) in the light of NEP-2020

B. Tech CSE (ICS)

SEMESTER-I (2026-30)

COURSE CODE	CATEGORY	COURSE NAME	TEACHING & EVALUATION SCHEME						L	T	P	CREDITS
			Marks	THEORY			PRACTICAL					
				END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BTICS210	SEC	Secure Programming for Linux	Max	0	0	0	30	20	0	0	2	1
			Min	0	0		15	10				

Legends: L - Lecture; T - Tutorial/Teacher Guided Student Activity; P – Practical; C - Credit; *Teacher Assessment shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

COURSE OBJECTIVES:

The student will have ability to:

1. Provide students with a fundamental understanding of the Linux command-line environment and essential administration tasks.
2. Enable students to manage users, groups, file permissions, and software packages within a Red Hat Enterprise Linux (RHEL) environment.
3. Equip students with the skills to configure networking, secure remote access, and monitor system processes for effective server management.

COURSE ALIGNMENT WITH UNSDG:

The Course aims to fulfill the United Nations Sustainable Development Goals, **SDG 4 (Quality Education)** and **SDG 9 (Industry, Innovation and Infrastructure)**.

COURSE OUTCOMES:

After completion of the course, the student will be able to:

- CO1** To introduce students to the basics of the Linux operating system and command-line usage
- CO2** Students will understand core cybersecurity principles and identify common security threats
- CO3** Deploy, monitor, and troubleshoot system services, networking configurations, and virtualized environments in a professional RHEL setting.
- CO4** Students will identify and prevent common vulnerabilities such as buffer overflow and injection attacks
- CO5** Students will apply input validation and proper error handling in programs

TEACHING PEDAGOGY:

- T1** Classroom teaching (white board), Power Point Presentations, Interactive lectures, Inquiry-based teaching
- T2** ABL activities, Assignments, Flip Class/ Seminars, Quizzes, Oral Viva-voce examination

ASSESSMENT TOOLS:

- ATL1** Quiz
- ATL2** Activity Based Learning

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ATL3 Midterm Exams

ATL4 Flip Class

ATL5 Seminar Presentation

ATL6 Assignments

ATL7 Poster

ATL8 Oral Viva-voce examination

ATL9 Industrial Visit Report

PREREQUISITES:

Basic Computer Knowledge

SYLLABUS:

Module	Descriptors/Topics	Hours	Assessment Tools
I	Introduction to Linux & Security Basics Introduction to Linux operating system, features and architecture, basic Linux commands for file handling and process management, Linux file system structure, users and groups, file permissions and access control. Introduction to cybersecurity concepts including confidentiality, integrity and availability (CIA triad), types of security threats such as malware, phishing, and unauthorized access.	6	ATL1 ATL2 ATL6
II	Secure Programming Fundamentals Concept of secure programming, importance of writing secure code, common programming errors and risks. Introduction to C programming in Linux environment, compilation process using GCC, basics of input/output handling, input validation techniques, secure vs insecure functions, and safe coding practices.	8	ATL1 ATL4 ATL8
III	Common Vulnerabilities in Linux Programs	6	ATL2

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	Overview of common software vulnerabilities including buffer overflow, format string vulnerabilities, integer overflow, race conditions, command injection, and file handling issues. Understanding causes, examples, and basic methods to identify vulnerabilities in programs.		ATL3 ATL8
IV	Secure Coding Practices Techniques for secure coding include input validation and sanitization, safe memory management, avoiding buffer overflow, proper error and exception handling, principle of least privilege, and writing secure shell scripts. Guidelines for developing robust and secure applications.	8	ATL2 ATL5 ATL6
V	Linux System Security & Testing Linux security mechanisms including file permissions and access control, basic concepts of SELinux/AppArmor, firewall configuration using iptables/ufw, user authentication methods, password management and hashing, logging and monitoring using system logs. Introduction to debugging tools such as GDB, basics of static and dynamic code analysis, vulnerability scanning concepts, and secure code review techniques.	8	ATL2 ATL3
Total Hours		36	

ADDITIONAL RESOURCES:

A. Value addition to course content/ Skill enhancement content:

<https://www.udemy.com/course/linux-basics-for-beginners/>

B. Remedial classes for slow learners:

As per the SVVV SOP for slow and fast learners.

SUGGESTED READINGS:

Textbooks

1. Secure Programming Cookbook for C and C++, McGraw-Hill, 2003.

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- The Linux Programming Interface, No Starch Press, 2010.

LIST OF PRACTICAL

	Title	CO Mapping
1.	Study and practice basic Linux commands for file and directory operations (ls, cp, mv, rm, mkdir, etc.)	CO1
2.	Create and manage users and groups; assign and modify file permissions using chmod, chown, and umask. e files from command line	CO1, CO3
3.	Write, compile, and execute simple C programs in Linux using GCC.	CO1, CO5
4.	Demonstrate unsafe input handling (e.g., gets, scanf without limits) and implement input validation techniques.	CO5
5.	Develop programs to illustrate buffer overflow concepts (basic demonstration).	CO4
6.	Identify and fix format string vulnerabilities in sample C programs.	CO4
7.	Implement secure C programs using safe functions (fgets, strncpy, etc.) and proper error handling.	CO5
8.	Write basic shell scripts and apply secure scripting practices.	CO5
9.	Perform file handling securely in C (open, read, write with proper checks).	CO5
10.	Experiment with Linux file permissions and access control mechanisms.	CO1, CO3
11.	Configure basic firewall rules using iptables or ufw.	CO3
12.	Use system logging tools (syslog) to monitor system activities.	CO3
13.	Debug C programs using GDB (breakpoints, step execution, variable tracking).	CO5
14.	Perform basic static code analysis using available tools.	CO4, CO5
15.	Conduct simple vulnerability assessment and code review of sample programs.	CO2, CO4, CO5

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CO3	3	3	3	3	3	2	1	1	2	2	2	3	3	3	2
CO4	3	3	3	3	3	2	-	3	1	2	1	2	3	2	3
CO5	3	3	3	2	3	1	-	2	1	2	1	2	3	2	3

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