



Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore

Shri Vaishnav Institute of Information Technology

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

B.Tech(CSE/IT), B.Tech+MBA(CSE/IT) and B.Tech+M.Tech(CSE/IT)

SEMESTER-II (2025-2029)

COURSE CODE	CATEGORY	COURSE NAME	TEACHING & EVALUATION SCHEME					L	T	P	CREDITS
			THEORY			PRACTICAL					
			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
HUCS101	BS	Communication Skills	60	20	20	0	50	1	0	2	2

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 the second language learners 'ability to enhance and demonstrate LSRW Skills.
2. Enable students to acquire English Language Skills to further their studies at advanced levels.
3. Prepare students to become more confident and active participants in all aspects of their under graduate programs

COURSE OUTCOMES:

Upon completion of the subject, students will be able to:

1. Enhance confidence in their ability to read, comprehend, organize, and retain written in formation.
2. Write grammatically correct sentences for various forms of written communication to express oneself.

SYLLABUS

UNIT I

10 HOURS

Communication: Nature, Meaning, Definition, Verbal and Non Verbal Communication Barriers to Communication.

UNIT II

9 HOURS

Basic Language Skills: Grammar and usage- Parts of Speech, Tenses, S-V Agreement, Preposition, Article.

UNIT III

8 HOURS

Basic Language Skills: Types of Sentence, Direct - Indirect, Active - Passive voice, Phrases& Clauses.

UNIT IV

7 HOURS

Business Correspondence :Business Letter, Parts & Layouts of Business Resume and Job application, E-mail writing

UNIT V

8 HOURS

Report Writing: Importance of Report, Types of Report, Structure of a Report.

TEXTBOOKS:

1. Ashraf Rizvi (2005). Effective Technical Communication. New Delhi: Tata McGrawHill.
2. Adair, John (2003). Effective Communication. London: Pan Macmillan Ltd.

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REFERENCE:

1. A. J. Thomson and A. V. Martinet (1991). A Practical English Grammar (4th ed). New York: Ox-Ford IBH Pub.
2. Kratz, Abby Robinson (1995). Effective Listening Skills. Toronto: ON: Irwin Professional Publishing.
3. Prasad, H. M. (2001) How to Prepare for Group Discussion and Interview. New Delhi: Tata McGraw-Hill.
4. Pease, Allan. (1998). Body Language. Delhi: Sudha Publications.

LIST OF PRACTICALS

1. Self-Introduction
2. Reading Skills and Listening Skills
3. Oral Presentation
4. Linguistics and Phonetics
5. JAM (Just a Minute)
6. Group Discussion

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BTPH101	BS	Applied Physics	60	20	20	30	20	3	1	2	5

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COURSE OBJECTIVES:

The student will have ability to:

1. To develop the comprehensive understanding of laws of physics.
2. To develop ability to apply laws of physics for various engineering applications.
3. To develop the experimental skills, ability to analyze the data obtained experimentally to reach substantiated conclusions.

COURSE OUTCOMES:

Upon completion of the subject, students will be able to:

1. Comprehend laws of physics.
2. Apply laws of physics for various engineering applications.
3. Determine physical parameter experimentally and will be able to analyze the data obtained experimentally to draw substantiate conclusions.

SYLLABUS

UNIT I

10 HOURS

Quantum Physics: Introduction to Quantum hypothesis, Matter wave concept, Wave Group and Particle velocity and their relations, Uncertainty principle with elementary proof. Compton Effect (Without derivation), Wave function and its physical significance, Energy and Momentum Operator, Development of time dependent and time independent Schrodinger wave equation, Determination of wave function and energy of particle in a one-dimensional box.

UNIT II

9 HOURS

Solid State Physics: Basic formulation of Free electron model and Kronig Penny Model, Intrinsic and Extrinsic semiconductors, P-N junction diode, Zener diode, Tunnel diode, Photodiode, Solar-cells, Hall Effect, Introduction to Superconductivity, Meissner effect, Type I & II Superconductors.

UNIT III

8 HOURS

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.

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UNIT IV

7 HOURS

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.

UNIT V

8 HOURS

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 single slit, double slit and n-slit (without derivation), Resolving power, Rayleigh criterion, Concept of Polarized light, Brewsters law, Double refraction, Nichol Prism.

TEXTBOOKS:

1. Engineering Physics by Dr. S. L. Gupta and Sanjeev Gupta, Dhanpat Rai Publication, New Delhi.
2. Engineering Physics by Navneet Gupta, Dhanpat Rai Publication, New Delhi.
3. Engineering Physics by H. J. Sawant, Technical Publications, Pune, Maharashtra.
4. Engg Physics by M. N. Avdhanulu & P. G. Kshirsagar, S. Chand & Co. Edition (2010).
5. Fundamentals of Physics by Halliday, Wiley, India.

REFERENCE:

1. Concepts of Modern Physics by Beiser, TMH, New Delhi.
2. Solid State Physics by Kittel, Wiley India
3. Atomic and Nuclear physics by Brijlal and Subraminiyan.
4. LASERS and Electro Optics by Christopher C. Davis, Cambridge Univ. Press (1996).
5. Opto electronics an Introduction by J. Wilson & J. F. B. Hawkes, "" Prentice-Hall II Edition.
6. LASER theory and applications by A. K. Ghatak & Tyagarajan, TMH (1984). Optics by Ghatak, TMH.

LIST OF PRACTICALS

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.

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8. To study V-I characteristics of Tunnel diode.

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 Photo diode.

12. Determination of Energy band gap (E_g) using PN Junction Diode.

13. Determination of μ and ω of given Prism using Spectrometer.

14. Measurement of height of a given object using Sextant.

15. Measurement of Numerical aperture of fiber by LASER.

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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)

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			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				

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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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SEMESTER-I (2026-30)

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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. 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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BTCS202M	DCC	Object Oriented Programming with C++	60	20	20	30	20	3	0	2	4

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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 OUTCOMES:

Upon completion of the subject, students will be able to:

1. Identify and describe the components of object-oriented technology and justify their relevance.
2. Implement inheritance for code reusability and polymorphism.
3. Implement object-oriented approach for real world scenarios.
4. Use advance features like templates and exception to make programs supporting reusability and sophistication
5. Develop the applications using object oriented programming with C++.

SYLLABUS

UNIT I

10 HOURS

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.

UNIT II

9 HOURS

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.

UNIT III

8 HOURS

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

UNIT IV

7 HOURS

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++

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UNIT V

8 HOURS

I/O and File management: Concept of Streams, Cin and Cout Objects, C++ Stream Classes, Unformatted and Formatted I/O, Manipulators, File Stream, C++ File Stream Classes, File Management Functions, File Modes, Binary and Random Files.

TEXTBOOKS:

1. David Parsons; Object oriented programming with C++; Second edition; BPB publication; 1997.
2. Robert Lafore; Object oriented programming in C++; Fourth edition; Pearson publication; 2002 .
3. E Balagurusamy; Object oriented programming with C++; Seven edition; TMH; 2017.
4. Herbert Schildt; Java Complete Reference; Seven edition; McGrawHill; 2006.

REFERENCE:

1. John R Hubbard; Programming in C++ (Schaum); Third edition; TMH; 2000.
2. Venugopal; Mastering C++; second edition; TMH; 2006.
3. Steven Holzner; C++ Programming Black Book; First Edition; Coriolis Group, U.S; 2001.
4. E Balagurusamy; Programming with java a primer; Fourth edition; TMH; 2011.

LIST OF PRACTICALS

1. Write a program to display the following output using a single cout statement. Maths=90, Physics=74, Chemistry=76
2. Write a program to read 2 numbers from the keyboard and display the larger value on the screen.
3. Write a function using reference variables as arguments to swap the values of a pair of integers.
4. Write a macro that obtains the largest of 3 numbers.
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.
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

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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.

7. Design a constructor for bank account class.

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 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:

- (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).

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 in the derived class to suit their requirements.

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

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

B.Tech(CSE/IT), B.Tech+MBA(CSE/IT) and B.Tech+M.Tech(CSE/IT)

SEMESTER-II (2025-2029)

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

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.

member functions in order to achieve the following tasks:

- Accept deposit from a costumer and update the balance.
- Display the balance
- Compute and deposit interest.
- Permit withdrawal and update the balance.
- Check for the minimum balance, impose penalty, necessary and update balance.

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

B. TECH CSE (AIML- Microsoft)

SEMESTER-II (2026-2030)

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*				
BTAIML201M	DCC	Data Fundamentals on Azure	Max	60	20	20	0	0	3	0	0	3
			Min	0	0	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. Understand core data concepts including structured, semi-structured, and unstructured data.
2. Learn roles in data ecosystem (Data Engineer, Analyst, DBA).
3. Explore relational and non-relational data systems on Azure.
4. Gain hands-on exposure to Azure data services (SQL, Storage, Cosmos DB, Synapse).
5. Understand analytics workloads including batch and real-time processing.

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 core data concepts and data workloads on Azure.
- CO2** Work with relational databases and SQL on Azure.
- CO3** Implement and manage non-relational data solutions.
- CO4** Design analytics workflows including data ingestion and processing.
- CO5** Create dashboards and visualizations using Power BI.

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 (AIML- Microsoft)

SEMESTER-II (2026-2030)

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*				
BTAIML201M	DCC	Data Fundamentals on Azure	Max	60	20	20	0	0	3	0	0	3
			Min	0	0		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:

Python

SYLLABUS:

Module	Descriptors/Topics	Hours	Assessment Tools
I	Core Data Concepts: Describe features of structured data, Describe features of semi-structured, Describe features of unstructured data, Describe common formats for data files, Describe types of databases, Describe features of transactional workloads, Describe features of analytical workloads, Identify roles and responsibilities for data workloads, Describe responsibilities for database administrators, Describe responsibilities for data engineers, Describe responsibilities for data analysts.	9	ATL1 ATL3
II	Relational Data On Azure: Identify features of relational data, Describe normalization and why it is used, Identify common structured query language (SQL) statements, Identify common database objects, Describe the Azure SQL family of products including Azure SQL Database, Azure SQL Managed Instance, and SQL Server on Azure Virtual Machines, Identify Azure database services for open source database systems.	9	ATL2 ATL3 ATL6
III	Non-Relational Data ON Azure: Describe capabilities of Azure storage, Describe Azure Blob storage, Describe Azure File storage, Describe Azure Table storage, and Identify use cases for Azure Cosmos DB, Describe Azure Cosmos DB APIs	9	ATL1 ATL3 ATL6

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B. TECH CSE (AIML- Microsoft)

SEMESTER-II (2026-2030)

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*				
BTAIML201M	DCC	Data Fundamentals on Azure	Max	60	20	20	0	0	3	0	0	3
			Min	0	0		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.

IV	Analytics Workloads ON Azure: Describe common elements of large-scale analytics, Describe considerations for data ingestion and processing, Describe options for analytical data stores, Describe Azure services for data warehousing, including Azure Synapse Analytics, Azure Data bricks, Azure HD Insight, and Azure Data Factory, Describe consideration for real-time data analytics, Describe the difference between batch and streaming data, Describe technologies for real-time analytics including Azure Stream Analytics, Azure Synapse Data Explorer, and Spark structured streaming.	9	ATL1 ATL3
V	Power BI & Data Visualization: Describe data visualization in Microsoft Power BI, Identify capabilities of Power BI, Describe features of data models in Power BI, Identify appropriate visualizations for data.	9	ATL1 ATL3 ATL8
Total Hours		45	

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

Microsoft Certified Azure Data Fundamentals (Exam DP-900) Certification Guide, Marcelo Leite, Packt Publishing, 1st Edition, 2022.

B. Remedial classes for slow learners:

As per the SVVV SOP for slow and fast learners.

SUGGESTED READINGS:

TEXTBOOKS

1. N. Farquharson, *Microsoft Azure Data Fundamentals*, 2nd ed. Redmond, WA, USA: Microsoft Press, 2024.
2. N. Kumar M, *Azure Data Fundamentals Certification Companion*, 1st ed. New York, NY, USA: Apress, 2025.

REFERENCE BOOKS

1. *The Azure Cloud Native Architecture Mapbook*, 1st ed. Birmingham, U.K.: Packt Publishing, 2023.

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B. TECH CSE (AIML- Microsoft)

SEMESTER-II (2026-2030)

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*				
BTAIML201M	DCC	Data Fundamentals on Azure	Max	60	20	20	0	0	3	0	0	3
			Min	0	0		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.

2. N. Farquharson, *Azure Data Fundamentals*, 2nd ed. Redmond, WA, USA: Microsoft Press, 2024.
3. M. Leite, *Azure Data Fundamentals Certification Guide*, 1st ed. Birmingham, U.K.: Packt Publishing, 2022.
4. B. Ward, *Azure SQL Revealed*, 1st ed. New York, NY, USA: Apress, 2020.
5. A. Osama, *Azure Data Engineering Cookbook*, 2nd ed. Birmingham, U.K.: Packt Publishing, 2024.

Suggested e- resources (Websites/e- books)

1. <https://learn.microsoft.com/training/paths/azure-data-fundamentals/>
2. <https://github.com/Azure-Samples>

COURSE ARTICULATION MATRIX (MAPPING OF COs WITH POs)

Course Outcome s	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	1	2	–	–	–	–	1	–	2	2	2	1
CO2	2	2	2	1	2	–	–	–	1	2	–	2	2	2	2
CO3	3	3	3	2	3	–	–	–	–	2	–	2	3	3	3
CO4	3	3	3	2	3	1	–	–	1	2	–	2	3	3	3
CO5	2	2	3	1	3	-	-	-	2	3	-	1	2	3	2

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

B. Tech (CSE/IT), CSE(AIML-IBM, DS, GenAI, FSDB, QC, AIML, MLCC, 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*				
BTIT208M	SEC	Unix Programming	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 introduction to UNIX Operating System and its File System.
2. Gain an understanding of important aspects related to the SHELL and the process
3. Develop the ability to formulate regular expressions and use them for pattern matching.
4. Provide a comprehensive introduction to SHELL programming, services and utilities
5. Develop the ability to perform different networking tasks

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 Describe the architecture and features of UNIX Operating System .
- CO2 Distinguish UNIX Operating System from other Operating Systems
- CO3 Demonstrate UNIX commands for file handling and process control.
- CO4 Show the working of vi editor in all its modes using various commands
- CO5 Write Regular expressions for pattern matching and apply them to various filters for a specific task
- CO6 Analyze a given problem and apply requisite facets of SHELL programming in order to devise a SHELL script to solve the problem.
- CO7 Diagnose network using different networking utilities of UNIX

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

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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*				
BTIT208M	SEC	Unix Programming	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.

- ATL5 Seminar Presentation
- ATL6 Assignments
- ATL7 Poster
- ATL8 Oral Viva-voce examination
- ATL9 Industrial Visit Report

PREREQUISITES:

None

SYLLABUS:

Module	Descriptors/Topics	Hours	Assessment Tools
I	Introduction to UNIX: The UNIX Operating System, The UNIX Architecture, Features of UNIX, Internal and External Commands, Command Structure. General purpose utilities: cal, date, echo, printf, bc, script, passwd, path, who, uname, tty, pwd, cd, mkdir, rmdir	6	ATL4 ATL8
II	Handling Files : The File System, touch, cat, cp, rm, mv, more, file, ls, wc, pg, comm, gzip, tar, zip, df, du, The vi editor. Security by file Permissions: chmod, umask. Networking commands: ping, telnet, ftp, finger, arp, rlogin.	6	ATL4 ATL8
III	Shell Basics : Types of shells, Shell Functionality, Work Environment, Writing script & executing basic script, Debugging script, Making interactive scripts, Variables (default variables), Mathematical expressions. Conditional statements: If-else-elif, Test command, Logical operators - AND, OR, NOT, Case –esac. Loops: While, For, Until, Break & continue.	6	ATL4 ATL8
IV	Command Line Arguments & Regular Expression: Command line arguments: Positional parameters, Set & shift, IFS. Functions & file manipulations: Processing file	6	ATL4 ATL8

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

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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*				
BTIT208M	SEC	Unix Programming	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.

	line by line, Functions. Regular Expression & Filters: Regular expression, grep, cut, paste, sort, head, tail, nl, pipe, tr, tree, meta characters.		
V	SED and AWK - SED: Scripts, Operation, Addresses, commands, Applications. AWK: Execution, Fields and Records, Scripts, Operations, Patterns, Actions, Associative Arrays, String Functions, String Functions, Mathematical Functions, User – Defined Functions, Using System commands in awk, Applications awk.	6	ATL4 ATL8
	Total Hours	30	

ADDITIONAL RESOURCES

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

RH104 RedHat Learning Platform RHA OLE

B. Remedial classes for slow learners:

As per the SVVV SOP for slow and fast learners.

SUGGESTED READINGS:

TEXTBOOKS:

1. S. Das, YOUR UNIX: *The Ultimate Guide*. New Delhi, India: Tata McGraw-Hill, 2001.

REFERENCE BOOK:

1. B. A. Forouzan and R. F. Gilberg, *Unix and Shell Programming: A Textbook*. New Delhi, India: Cengage Learning India, 2003.
2. G. Glass and K. Ables, *Unix for Programmers and Users*, 3rd ed. Noida, India: Pearson Education, 2003.
3. N. B. Venkateswarlu, *Advanced Unix Programming*. Hyderabad, India: B S Publications, 2008.
4. Y. Kanetkar, *Unix Shell Programming*, 1st ed. New Delhi, India: BPB Publications, 2003.
5. S. Prata, *Advanced UNIX: A Programming's Guide*. New Delhi, India: BPB Publications, 2017.
6. M. J. Bach, *Design of the UNIX Operating System*. New Delhi, India: PHI Learning, 2015.

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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*				
BTIT208M	SEC	Unix Programming	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.

7. B. W. Kernighan and R. Pike, *The UNIX Programming Environment*. New Delhi, India: PHI Learning, 1988.

Suggested e- resources (Websites/e- books)

1. UC Berkeley CS162 Advanced Unix Environment System Software Resources:
<https://inst.eecs.berkeley.edu/~cs162/sp26/>

LIST OF PRACTICALS

S.No.	Title	Co Mapping
1.	Perform installation of UNIX/LINUX operating system.	CO1,CO2
2.	Study of UNIX general purpose utility commands	CO3
3.	Execution of various file/directory handling commands.	CO3
4.	Working with the vi editor: Creating and editing a text file with the vi text editor using the standard vi editor commands.	CO4
5.	Write a shell script for calculator (to perform basic arithmetic and logical calculations).	CO6
6.	Write a shell script that will take an input file and remove identical lines (or duplicate lines from the file).	CO5,CO6
7.	Shell scripts to explore system variables such as PATH, HOME etc	CO6
8.	Execution of various system administrative commands.	CO3
9.	Write awk script that uses all its features	CO5
10.	Write a shell script to display list of users currently logged in	CO6
11.	Write a shell script to delete all the temporary files.	CO6
12.	Write shell script to perform different string operations of arrays.	CO6

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	PO10	PO11	PO12	PSO 1	PSO 2	PSO 3
CO1	3	1	-	-	2	-	-	-	-	-	-	2	2	1	1
CO2	2	2	-	-	1	-	-	-	-	-	-	1	1	-	-
CO3	3	2	2	2	3	-	-	-	-	-	-	2	3	2	2

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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*				
BTIT208M	SEC	Unix Programming	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.

CO4	2	-	-	-	3	-	-	-	-	-	-	1	2	1	-
CO5	3	3	2	2	3	-	-	-	-	-	-	2	3	3	1
CO6	3	3	3	3	3	-	-	-	2	2	1	3	3	3	2
CO7	3	2	2	3	3	-	-	-	-	-	-	2	2	2	3

Chairperson

Board of Studies,
Shri Vaishnav Vidyapeeth
Vishwavidyalaya, Indore

Chairperson

Faculty of Studies,
Shri Vaishnav Vidyapeeth
Vishwavidyalaya, Indore

Controller of Examination

Shri Vaishnav Vidyapeeth
Vishwavidyalaya, Indore

Registrar

Shri Vaishnav Vidyapeeth
Vishwavidyalaya, Indore