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*				
BTMACS 201	BS	Mathematics-II	60	20	20	0	0	3	1	0	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.

Course Educational Objectives (CEOs):

The student will have ability to:
1. To introduce the students to the Fundamentals of the Calculus of Matrices, Differential Equations, Numerical Analysis and Statistics.

Course Outcomes (COs):

After completion of this course the students are expected to be able to demonstrate the following knowledge, skills and attitudes.

The students will be able to

1. Understand and apply the basics of the calculus of matrices.
2. Solve the fundamental problems of the ordinary differential equations.
3. Apply advanced techniques to find the solution of the ordinary differential equations.
4. Know the techniques of numerical analysis.
5. Find the numerical solution of the ODE.
6. Understand and apply the basics of the statistical methods.

Syllabus:

UNIT I   10HRS
Calculus of Matrices
Systems of linear equations and their solutions. Matrices, determinants, rank and inverse. Linear transformations. Range space and rank, null space and nullity. Eigenvalues and eigen vectors. Similarity transformations. Diagonalization of Hermitian matrices.

UNIT II   9HRS
Differential Equation
Ordinary Differential Equations: First order linear and nonlinear ordinary differential equations, exactness and integrating factors. Ordinary linear differential equations of n-th order, solutions of homogeneous and non-homogeneous equations. Operator method Method of undetermined coefficients and variation of parameters.

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*				
BTMACS 201	BS	Mathematics-II	60	20	20	0	0	3	1	0	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.

UNIT III   8**HRS**
Numerical Analysis
Interpolation and Curve Fitting: Introduction to Interpolation; Calculus of Finite Differences; Finite Difference and Divided Difference Tables; Newton-Gregory Polynomial Form; Lagrange Polynomial Interpolation; Approximation by Least Square Method.

Numerical Differentiation and Integration: Discrete Approximation of Derivatives: Forward and Backward, Difference Forms, Numerical Integration, Simple Newton-Cotes Rules: Trapezoidal and Simpson's (1/3) Rules; Weddle's Rule.

UNIT IV   7**HRS**
Numerical Solution of ODE: Euler's Method for Numerical Solution of ODE; Modified Euler's Method; Runge-Kutta Method (RK2, RK4); Multistep Method: Predictor-Corrector method.

UNIT V   8**HRS**
Probability Theory and Random Process
Axiomatic construction of the theory of probability, independence, conditional probability, and basic formulae, random variables, binomial, Poisson and normal random variable, probability distributions, functions of random variables; mathematical expectations, Definition and classification of random processes, discrete-time Markov chains.

Text Books:
1. G. Strang, Linear Algebra and Its Applications, 4th Edition, Brooks/Cole, 2006
2. S. L. Ross, Differential Equations, 3rd Edition, Wiley, 1984.
3. E. A. Coddington, An Introduction to Ordinary Differential Equations, Prentice Hall, 1995.
4. W.E. Boyce and R.C. DiPrima, Elementary Differential Equations and Boundary Value Problems, 7th Edition, Wiley, 2001.
5. E,   K. E. Atkinson, Numerical Analysis, John Wiley, Low Price Edition (2004).
6. S. D. Conte and C. de Boor, Elementary Numerical Analysis - An Algorithmic Approach, McGraw-Hill, 2005.
7. B. S. Grewal, Higher Engineering Mathematics, Khanna Publishers, Delhi.

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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*				
BTMACS 201	**BS**	**Mathematics-II**	60	20	20	0	0	3	1	0	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.

References:
1. E. Kreyszig, Advanced Engineering Mathematics, 9th Edition, Wiley, 2005.
2. R. G. Bartle and D. R. Sherbert, Introduction to Real Analysis, 5th Ed, Wiley,1999.
3. J. Stewart, Calculus: Early Transcendentals, 5th Ed, Thomas Learning (Brooks/ Cole), Indian Reprint, 2003.
4. J. Stoer and R. Bulirsch, Introduction to Numerical Analysis, 2nd Edition, Texts in Applied Mathematics, Vol. 12, Springer Verlag, 2002.
5. J. D. Hoffman, Numerical Methods for Engineers and Scientists, McGraw Hill, 2001.
6. M.K Jain, S.R.K Iyengar and R.K Jain, Numerical methods for scientific and engineering computation (Fourth Edition), New Age International (P) Limited, New Delhi,2004.
7. S. C. Chapra, Applied Numerical Methods with MATLAB for Engineers and Scientists, McGraw Hill2008.

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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*				
BTEC104	DCC	Digital Logic & Circuit Design	60	20	20	30	20	3	1	2	5

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 Educational Objectives (CEOs):

The objective of this course is to:
1.Use Boolean algebra and Karnaugh Map to simplify logic function.
2.Describe the operation of different Combinational and Sequential Logic Circuits.

Course Outcomes (COs):

After completion of this course the students are expected to be able to demonstrate following knowledge, skills and attitudes.
The students will be able to
1.Design an optimal digital logic circuit to meet the given specifications.
2.Evaluate the performance of the given digital logic circuit based on specific criteria for reliable system implementation.

Syllabus:

UNIT I   10HRS
Number System & Codes: Introduction to number systems, Binary numbers, Octal & Hexadecimal Numbers, Number base Conversion, Signed binary numbers: 1‟s Complement & 2‟s Complement representation and their arithmetic operation, Floating point representation, binary codes, BCD,ASCII, EBCDIC, Gray codes, Error detecting and Correcting codes, Hamming codes.

UNIT II   9HRS
Boolean algebra and Logic gates: Introduction, Logic operations, Axioms and laws of Boolean algebra, Demorgan‟s theorem, Boolean functions, Canonical and standard forms. Logic gates and their applications, universal gates, NAND-NOR implementation of logic functions. Minimization techniques for logic functions-K-map, Tabular / QuineMcCluskey method.

UNIT III   8HRS
Combinational logic: Arithmetic circuits- Half adder, Full adder, Halfsubtractor, Full subtractor, Parallel and Serial adder, BCD adder, Multiplexer, De-multiplexer, Encoder & Decoder.

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*				
BTEC104	DCC	**Digital Logic & Circuit Design**	60	20	20	30	20	3	1	2	5

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.

UNIT IV   7HRS
   Sequential logic: Introduction, Latch and Flip Flop- S-R, D, JK and T, State diagram, characteristic equation, state table and excitation table, Flip flop conversion, applications of Flip flop, Counters, Registers.

UNIT V   8HRS
Semiconductor Memories and A/D and D/A converters: Semiconductor Memory – RAM, ROM- Organization, operation and their Types, PLD- PAL, PLA, PROM, FPGA, Analog to Digital (A/D)and Digital to Analog (D/A) converters and their types.

Text Books:
1.M. Morris Mano,"Digital Logic and Computer Design", Pearson Education, 2016.
2.SSalivahanan and S Arivazhagan: Digital Circuits and Design,4th Edition, VikasPublishing House,2012.

Reference Books:
1.   A. Anand Kumar, "Fundamentals of Digital Circuits", 4th Edition, PHI,2016.
2.   Floyd and Jain,"Digital Fundamentals", 10th Edition, Pearson Education India,2011.
3.   Roland J.Tocci,Widmer,Moss, "Digital Systems Principles and Applications", 10th Edition, Pearson 2009.
4.   Stephen Brown, ZvankoVranesic, "Fundamentals of Digital Logic Design", 3rd Edition, McGraw Hill, 2017.

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			THEORY			PRACTICAL					
			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BTEC104	**DCC**	**Digital Logic & Circuit Design**	**60**	**20**	**20**	**30**	**20**	**3**	1	2	5

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.

List of Practical's:
1.   To study and test of operation of all logic gates for various IC"s(IC7400, IC7403,IC408,IC74332,IC7486).
2.   Verification of DeMorgan"stheorem.
3.   To construct half adder and fulladder.
4.   To construct half subtractor and full subtractorcircuits.
5.   Verification of versatility of NANDgate.
6.   Verification of versatility of NORgate.
7.   Design a BCD to excess 3codeconverter.
8.   Design a Multiplexer/Demultiplexer
9.   Analysis of various flip flops with Preset and Clearcapability.
10.   Design of Johnson and Ringcounter.
11.   Design of synchronous and asynchronous up/downcounters

COURSE CODE	CATEGORY	COURSE NAME	TEACHING & EVALUATION SCHEME					L	T	P	CREDITS
			THEORY			PRACTICAL					
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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.

Course Educational Objectives (CEOs):

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 (COs):

After completion of this course the students are expected to be able to demonstrate following knowledge, skills and attitudes.

The 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 temples and exception to make programs supporting reusability and sophistication
5. Develop the applications using object oriented programming with C++.

Syllabus

Unit-I   **10HRS**
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   **9HRS**
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.

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			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;
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Unit-III 8HRS

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 7HRS

Polymorphism: Polymorphism and its types, Pointers in C++, Pointes and Objects, this pointer, virtual and pure virtual functions, Implementing polymorphism, Abstract Methods and Classes.
Exception Handling, Templates function and class in C++

Unit-V 8HRS

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.

Text Books:
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 .

References:
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.

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Vishwavidyalaya, Indore	Vishwavidyalaya, Indore		

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.

List of Experiments:

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. 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.
6. 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 odd 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.
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.

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.

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 meneber 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. 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 *cur acct and sav*acct to make them more specific to their requirements. Include necessary member functions in order to achieve the following tasks:
   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.
   e. Check for the minimum balance, impose penalty, necessary and update balance.

12. 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.

COURSE CODE	CATEGORY	COURSE NAME	TEACHING & EVALUATION SCHEME					L	T	P	CREDITS
			THEORY			PRACTICAL					
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BTIT201M	DCC	Data Communication	60	20	20	0	0	3	0	0	3

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 Educational Objectives (CEOs):

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 Outcomes (COs):

After completion of this course the students are expected to be able to demonstrate following knowledge, skills and attitudes.

The students will be able to:
1. Understand the Process and functions of data communications
2. Understand Transmission media and Tools
3. Understand the functions of OSI layers
4. Understand IEEE standards in computer networking
5. Understand different protocols and network components

Syllabus

UNIT–I   10HRS

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.

UNIT–II   9HRS
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.

COURSE CODE	CATEGORY	COURSE NAME	TEACHING & EVALUATION SCHEME					L	T	P	CREDITS
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BTIT201M	DCC	Data Communication	60	20	20	0	0	3	0	0	3

Legends: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical; C - Credit.
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UNIT–III   8HRS

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

UNIT–IV   7HRS

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.

UNIT–V   8HRS

Application Layer Protocols: Domain Name Service Protocol, File Transfer Protocol, TELNET, WWW and Hyper Text Transfer Protocol, Simple Network Management Protocol, Simple Mail Transfer Protocol, Post Office Protocol v3.

TEXT BOOKS:
1. Behrouz A. Forouzan, "Data communication and Networking", FourthEdition,Tata McGraw Hill, 2011.

REFERENCES:
1. Larry L.Peterson, Peter S. Davie, "Computer Networks", Fifth Edition,Elsevier, 2012.
2. William Stallings, "Data and Computer Communication", Eighth Edition, Pearson Education,2007.
3. James F. Kurose, Keith W. Ross, "Computer Networking: A Top–Down Approach Featuring theInternet", Pearson Education, 2005.

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*				
BTCS102M	DCC	Introduction to Design Thinking	60	20	20	30	20	2	0	2	3

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 Educational Objectives (CEOs):

The student will have ability to:
1.The objective of this Course is to provide the new ways of creative thinking and Learn the innovation cycle of Design Thinking process for developing innovative products which useful for a student in preparing for an engineering career.

Course Outcomes (COs):

After completion of this course the students are expected to be able to demonstrate following knowledge, skills and attitudes.

The students will be able to

1.   Compare and classify the various learning styles and memory techniques and Apply them in their engineering education.
2.   Analyze emotional experience and Inspect emotional expressions to better understand users while designing innovative products.
3.   Develop new ways of creative thinking and Learn the innovation cycle of Design Thinking process for developing innovative products.
4.   Propose real-time innovative engineering product designs and Choose appropriate frameworks, strategies, techniques during prototype development.
5.   Perceive individual differences and its impact on everyday decisions and further create a better customer experience.

Syllabus:

UNIT I
An Insight to Learning   10 HRS

Understanding the Learning Process, Kolb's Learning Styles, Assessing and Interpreting.
Remembering Memory- Understanding the Memory process, Problems in retention, Memoryenhancement techniques.

UNIT II   9HRS
Emotions: Experience & Expression

Understanding Emotions: Experience & Expression, Assessing Empathy, Application with Peers.

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			THEORY			PRACTICAL					
			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BTCS102M	DCC	Introduction to Design Thinking	60	20	20	30	20	2	0	2	3

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.
Basics of Design Thinking- Definition of Design Thinking, Need for Design Thinking, Objective of Design Thinking, Concepts & Brainstorming, Stages of Design Thinking Process (explain with examples) – Empathize, Define, Ideate, Prototype, Test.

UNIT III   8HRS
Being Ingenious & Fixing Problem

Understanding Creative thinking process, Understanding Problem Solving, Testing CreativeProblem Solving.
Process of Product Design- Process of Engineering Product Design, Design Thinking Approach, Stages of Product Design, Examples of best product designs and functions, Assignment – Engineering Product Design.

UNIT IV   7HRS
Prototyping & Testing

What is Prototype? Why Prototype? Rapid Prototype Development process, Testing, SampleExample, Test Group Marketing.
Celebrating the Difference- Understanding Individual differences & Uniqueness, Group Discussion and Activities to encourage the understanding, acceptance and appreciation of Individual differences.

UNIT V   8HRS
Design Thinking & Customer Centricity
Practical Examples of Customer Challenges, Use of Design Thinking to Enhance CustomerExperience, Parameters of Product experience, Alignment of Customer Expectations with Product Design.
Feedback, Re-Design & Re-Create- Feedback loop, Focus on User Experience, Address
"ergonomic challenges, User focused design, rapid prototyping & testing, final product, Final Presentation – "Solving Practical Engineering Problem through Innovative Product Design & Creative Solution".

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*				
BTCS102M	DCC	Introduction to Design Thinking	60	20	20	30	20	2	0	2	3

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.
Text Book:

1.   -E Balaguruswamy (2022), Developing Thinking Skills (The way to Success), Khanna BookPublishing Company.

References:
1.   -E Balaguruswamy (2022), Developing Thinking Skills (The way to Success), Khanna BookPublishing Company.

List of Practical:
1.Write a Love/Breakup Letter relating to any product covering its positive & negative features, strength, and fix, enhance and rethink.
2.Write the Design Thinking Steps i.e.. Empathize, Define the problem, Ideate, Prototype and Test relating to the product you choose.
3.Understand a real-world problem and try solving it through an Empathy Map
4.Write a persona of any celebrity or personal.
5.Understand the way advertisement make use of storytelling. Pick a particular advertisement and make a presentation on it, covering - character, plot, conflict, climax, resolution.
6.Develop a collage using four/five pictures, do storyboarding based on the collage.
7. Develop a low-level prototype like Paper Prototype
8.Find a problem statement and perform testing on it using certain testing technique.
9. Demonstrate a project using design thinking process.
10. Demonstrate the tools and techniques used in design thinking.

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BTIT208M	**SEC**	**Unix Programming**	0	0	0	30	20	0	0	2	1

Legends: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical; **C**-Credit.
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Course Educational Objectives (CEOs):

The student will have ability to: -

1. Provide an 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 OUTCOMES:

After completion of this course the students are expected to be able to demonstrate following knowledge, skills and attitudes.
The students will be able to:-
1. Describe the architecture and features of UNIX Operating System .
2. Distinguish UNIX Operating System from other Operating Systems.
3. Demonstrate UNIX commands for file handling and process control.
4. Show the working of vi editor in all its modes using various commands.
5. Write Regular expressions for pattern matching and apply them to various filters for a specific task.
6. Analyze a given problem and apply requisite facets of SHELL programming in order to devise a SHELL script to solve the problem.
7. Diagnose network using different networking utilities of UNIX.

SYLLABUS:

UNIT I: **10HRS**
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.

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BTIT208M	SEC	Unix Programming	0	0	0	30	20	0	0	2	1

Legends: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical; **C**-Credit.
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UNIT II: **9 HRS**
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.

UNIT III**:**   **8 HRS**
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.

UNIT IV: **7HRS**
Command Line Arguments & Regular Expression - Command line arguments: Positional parameters, Set & shift, IFS. Functions & file manipulations: Processing file line by line, Functions. Regular Expression & Filters: Regular expression, grep, cut , paste, sort , head , tail , nl , pipe ,tr, tree , meta characters.

UNIT V: 8**HRS**
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 .

TEXT BOOKS:
1. Sumitabha Das: "YOUR UNIX – The Ultimate Guide", Tata McGraw Hill.

REFERENCES:
1. Behrouz A. Forouzan, Richard F. Gilbery, "Unix and Shell Programming",Cengage Learning India.
2. Graham Glass, King Ables, "Unix for programmers and users", Pearson Education.
3. N.B. Venkateswarlu, "Advanced Unix programming", B S Publications.
4. YashavantKanetkar, "Unix Shell programming", 1ˢᵗ Edition, BPB Publisher.
5. Stephen Prata "Advanced UNIX: A Programming's Guide", BPB Publications.
6. Maurice J. Bach "Design of UNIX O.S. ", PHI Learning.
7. Brian W. Kernighan & Robe Pike, "The UNIX Programming Environment", PHI Learning.

Chairperson	Chairperson	Controller of Examination	Joint Registrar
Board of Studies	Faculty of Studies	ShriVaishnavVidyapeeth	ShriVaishnavVidyapeeth
ShriVaishnavVidyapeeth	ShriVaishnavVidyapeeth	Vishwavidyalaya, Indore	Vishwavidyalaya, Indore
Vishwavidyalaya, Indore	Vishwavidyalaya, Indore		

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BTIT208M	SEC	**Unix Programming**	0	0	0	30	20	0	0	2	1

Legends: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical; **C**-Credit.
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SUGGESTED LIST OF PRACTICALS:
1. Perform installation of UNIX/LINUX operating system.
2. Study of UNIX general purpose utility commands.
3. Execution of various file/directory handling commands.
4. Working with the vi editor: Creating and editing a text file with the vi text editor using the standard vi editor commands.
5. Write a shell script for calculator (to perform basic arithmetic and logical calculations).
6. Write a shell script that will take an input file and remove identical lines (or duplicate lines from the file).
7. Shell scripts to explore system variables such as PATH, HOME etc.
8. Execution of various system administrative commands.
9. Write awk script that uses all of its features.
10. Write a shell script to display list of users currently logged in.
11. Write a shell script to delete all the temporary files.
12. Write shell script to perform different string operations of arrays.

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Vishwavidyalaya, Indore	Vishwavidyalaya, Indore		