Shri Vaishnav Vidyapeeth Vishwavidyalaya

Bachelor of Technology (Electronics and Communication-IOT)

SEMESTER V

COURSE CODE	CATEGORY	COURSE NAME	TEACHING & EVALUATION SCHEME								
			THEORY			PRACTICAL		Th	T	P	CREDITS
			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BTEC501	EC	Microprocessors & Interfacing	60	20	20	30	20	3	1	2	5

Legends: **Th** - 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:

To provide a theoretical & practical knowledge of Microprocessor architecture, interfacing and assembly language programming techniques.

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. Demonstrate knowledge of the architecture, organization and operation of microprocessors (8085 and 8086), peripherals and memories typically interfaced with microprocessors.
2. Execute assembly language programs efficiently for solving problems by using instruction sets of microprocessor.
3. Use an Integrated Development Environment (IDE) as a modern software tool for microprocessor and embedded systems development. (Application &Synthesis).

Syllabus:

UNIT I **8 Hours**

8085 Microprocessor Architecture and Interfacing

Introduction to microprocessor, 8085 microprocessor, 8085 Pin Functions, Architecture, Register Set, Flag Classification, ALU and control & timing unit, Memory Interfacing, Interfacing Input Output Devices, Memory-Mapped I/O. Timing diagram for I/O and memory read/write cycle.

UNIT II **10 Hours**

Addressing Modes and Instruction set

Addressing Modes of 8085 Microprocessor, Instruction Format, Opcode and operand, Classification of Instructions: Data transfer, Arithmetic, Logical, Rotate, Branch and machine Control instructions. Development of 8085 assembly language programs. Concept of stack and Instruction related to stack. 8085 interrupts, RST, RIM, SIM instructions. Subroutines and conditional call instruction. Counter and Time Delay Programs.

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UNIT III **8 Hours**

Introduction of 8086 Microprocessor

Architecture of 8086 Microprocessor, BIU and EU, pin diagram, register organization, memory organization, Segments, maximum and minimum modes, Interrupts of 8086.

UNIT IV **10 Hours**

Addressing Modes and Assembly Language

Instruction formats, addressing modes, 8086 assembly language programming using Instruction set of 8086 Microprocessor: data transfer instructions, arithmetic instructions, branch instructions, looping instructions, NOP and HLT instructions, flag manipulation instructions, logical instructions shift and rotate instructions.

UNITV **9 Hours**

Peripheral Devices and Interfacing

Programmable input/output ports 8255A: Configuration, Modes and Operation. Programmable interval timer 8253, keyboard/display controller 8279, Programmable communication interface 8251 USART, DMA controller 8257.

Text Books:

1. Ramesh S. Gaonkar, "Microprocessor Architecture, Programming and application with 8085", 6th Edition, Penram International Publishing, 2013.
2. B. Ram, "Fundamentals of Microprocessors and Microcontrollers", 6th Edition, Dhanpat Rai Publications, 2010.
3. Douglas V. Hall, "Microprocessors and Interfacing: Programming and Hardware", 3rd Edition, Tata McGraw Hill Publishers, 2012.

References:

1. A. K. Ray and K. M. Burchandi, "Intel Microprocessors Architecture Programming and Interfacing", 3rd Edition, McGraw Hill International Edition, 2012.
2. Barry B. Brey, "The Intel Microprocessors – Architecture, Programming And Interfacing", 8th Edition, Pearson Education, 2008.
3. Adithya P Mathur, "Introduction to Microprocessor", 3rd Edition, Tata McGraw Hill Publishers, 2001.
4. John Uffenbeck, "The 80x86 Families, Design, Programming and Interfacing", 3rd Edition, Pearson Education, 2002.

List of Practicals:

Develop/Execute a program:-

1. To move data from one register to another.
2. To move immediate data between different registers.
3. For addition and subtraction.
4. For multiplication.
5. For division.
6. To check whether given no is odd or even.
7. To transfer a block of data from one memory location to another memory location.
8. To add two 32-bit numbers.
9. To add 2 decimal numbers in BCD format.

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10. To convert data from gray code to binary code.
11. To convert data from binary code to gray code.
12. Based on 8 bit Logical instructions.
13. To sum integers from 0 to 9.
14. To count negative values in given block of data.
15. To find the smallest number from an array of N numbers.
16. Develop/Execute a Subroutine to find the square of given integer.

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Name of Program: Bachelor of Technology in Electronics & Communication with Specialization in IOT

COURSE CODE	CATEGORY	COURSE NAME	L	T	P	CREDITS	TEACHING & EVALUATION SCHEME				
							THEORY		PRACTICAL		
							END SEM University Exams	Two Term Exams	Teacher Assessments	END SEM University Exams	Teacher Assessments
BTCS405		Data Base Management System	3	1	2	5	60	20	20	30	20

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 dissimilar issues concerned in the intend and implementation of a database system.
2. To learn the physical and logical database design, database modelling, relational, hierarchical, and network models
3. To understand and develop data manipulation language to query, modernize, and manage a database
4. To expand an understanding of necessary DBMS concepts such as: database security, integrity, concurrency,
5. To intend and build a straightforward database system and show competence with the fundamental tasks involved with modelling, designing, and implementing a DBMS.

COURSE OUTCOMES:
Upon completion of the subject, students will be able to:
1. Evaluate business information problem and find the requirements of a problem in terms of data.
2. Understand the uses the database schema and need for normalization.
3. Design the database schema with the use of appropriate data types for storage of data in database.
4. Use different types of physical implementation of database
5. Use database for concurrent use.
6. Backup data from database.

SYLLABUS:
UNIT-I
Introduction: Concept & Overview of DBMS, Three Schema Architecture of DBMS, Database Approach v/s Traditional File Accessing Approach, Advantages of Database Systems, Data Models, Schema and Instances, Data Independence, Data Base Language and Interfaces, Overall Database Structure, Functions of DBA and Designer, Database Users.
Entity-Relationship Model: Basic concepts, Design Issues, Mapping Constraints, Keys, Entity-

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Relationship Diagram, Weak Entity Sets and Extended E-R features.ER Diagram to Relational Table conversion.

UNIT-II

Relational Model: Structure of Relational Databases, Relational Algebra, Relational Calculus, Extended Relational Algebra Operations, Views, Modifications of the Database. Domains, Tuples, Attributes, Relations, Characteristics of Relations, Joins and its type. Keys, Key Attributes of Relation, Relational database, Schemas, Integrity Constraints. Referential Integrity, Intension and Extension.

UNIT-III

SQL and Integrity Constraints: Concept of DDL, DML and DCL. Basic Structure, Set operations, Aggregate Functions, Null Values, Domain Constraints, Referential Integrity Constraints, Assertions, Views, Nested Sub Queries, Database Security Application development using SQL, Stored Procedures and Triggers.

Relational Database Design: Functional Dependency, Different Anomalies in designing a Database.Normalization using Functional Dependencies, Decomposition, Boyce-Codd Normal Form, 3NF, Normalization using Multi-Valued Dependencies, 4NF, Join Dependency, 5NF.

UNIT- IV

Transaction and Concurrency Control: Physical Data Structures, Query Optimization: Join Algorithm, Statistics and Cost based Optimization. Transaction Processing, Concurrency Control and Recovery Management: Transaction Model properties, State Serializability, Lock base protocols, Two Phase Locking, Time Stamping Protocols for Concurrency Control, and Validation Based Protocol, Multiple Granularities, Granularity of Data Item. Multi version schemes, Recovery with Concurrent Transaction, Recovery technique based on Deferred Update and Immediate Update, Shadow Paging, Recovery in MultiDatabase System and Database Backup and Recovery from Catastrophic Failure

UNIT-V

File Organization and Index Structure: File & Record Concept, Placing file records on Disk, Fixed and Variable sized Records, Types of Single-Level Index (primary, secondary, clustering), Multilevel Indexes, Dynamic Multilevel Indexes using B tree and B+ tree . Mongo DB, No SQL types, Features and tools.

TEXT BOOKS:

1. Henry F. Korth and Silberschatz Abraham, “Database System Concepts”, Mc.GrawHill, 6th Edition,2015.
2. C J Date, “An Introduction to Database System”, Pearson Educations, 8th Edition, 2004
3. Elmasri, Navathe, “Fundamentals of Database Systems”, Pearson Educations 7th Edition, 2016.
4. SeemaKedar, Database Management System, Technical Publications, 2009.
5. Rajiv Chopra,Database Management System (DBMS) A Practical Approach. Kindle Edition, S Chand (December 1, 2010), 2017.

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REFERENCES:

1. R Elmasri and S Navathe "Fundamentals of Database Systems" 7th edition Publisher: Pearson 2017.
2. Abraham Silberschatz and S Sudarshan "Database System Concepts" 6th Edition McGraw-Hill Education – Europe 2013.
3. Raghu Ramakrishnan and Johannes Gehrke "Database Management Systems" McGraw-Hill Education, 2003.
4. Kahate, Atul "Introduction to Database Management Systems"Pearson Education India, 2006.

LIST OF EXPERIMENTS:

1. Design a Database and create required tables. For e.g. Bank, College Database.
2. Apply the constraints like Primary Key, Foreign key, NOT NULL to the tables.
3. Write a SQL statement for table and record handling like implementing INSERT statement, Using SELECT and INSERT together, DELETE, UPDATE, TRUNCATE statements and DROP, ALTER statements.
4. Write the queries for Retrieving Data from a Database Using the WHERE clause , Using Logical Operators in the WHERE clause , Using IN, BETWEEN, LIKE , ORDER BY, GROUP BY and HAVING Clause, Using Aggregate Functions and Combining Tables Using JOINS.
5. Write the query for implementing the following functions: MAX (), MIN (), AVG (), COUNT ().
6. Write the query to implement the concept of Integrity constrains.
7. Write the query to create the views.
8. Perform the queries for triggers.
9. Perform the following operation for demonstrating the insertion , updating and deletion using the referential integrity constraints.
10. Write the query for creating the users and their role. Using GRANT and REVOKE operations.

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SEMESTER V

COURSE CODE	CATEGORY	COURSE NAME	TEACHING & EVALUATION SCHEME								
			THEORY			PRACTICAL		Th	T	P	CREDITS
			End Sem University Exam	Two Term Exam	Teachers Assessment*	End Sem University Exam	Teachers Assessment*				
BTECIOT 501	EC	Communication Systems	60	20	20	30	20	3	1	2	5

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

Course Objectives:

To provide the basic fundamentals, principles, concepts of communication systems and various modulation techniques of analog and digital communication systems.

Course Outcomes:

After completion of this course the students will be able to:

1. Analyze various analog modulation and demodulation techniques and apply suitable modulation techniques for various applications.
2. Analyze various digital modulation and demodulation techniques and apply suitable modulation techniques for various applications.
3. Understand different types of source and channel coding techniques.

Syllabus:

UNIT I **8 Hours**

Amplitude modulation Techniques

Need of modulation, Amplitude modulation: mathematical representation of AM, modulation index, frequency spectrum, single tone and multi tone AM, generation of AM (square law modulator, switching modulator), Detection of AM (Square law detector, envelope detector), Power distribution, DSB-SC: generation and detection techniques, SSB: generation and detection techniques, VSB.

UNIT II **8 Hours**

Angle modulation Techniques

Frequency and phase modulation, spectrum and bandwidth, Narrowband FM, Wideband FM, FM Modulators: Direct and Indirect method of frequency modulation, FM Detectors: Slope

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Detector, Foster Seeley Discriminators, Ratio-Detectors and PLL detectors, AFC, Pre-Emphasis and De-Emphasis filters.

UNIT III **10 Hours**

Digital conversion of Analog Signals

Sampling theorem, types of sampling, signal reconstruction and reconstruction filters, Pulse Amplitude Modulation (PAM), Pulse Width Modulation (PWM), Pulse Position Modulation (PPM), Quantization, quantization error, Pulse Code Modulation (PCM), Companding, TDM-PCM, Differential PCM, Delta modulation, Adaptive Delta modulation.

UNIT IV **10 Hours**

Digital Modulation Techniques

Phase shift Keying (PSK)- Binary PSK, differential PSK, differentially encoded PSK, Quadrature PSK, M-ary PSK and associated Prob. of Error. Frequency Shift Keying (FSK)- Binary FSK (orthogonal and nonorthogonal), M-ary FSK and associated Prob. of Error. Comparison of BPSK and BFSK, Quadrature Amplitude Shift Keying (QASK), Minimum Shift Keying (MSK).

UNIT V **9 Hours**

Information Theory & Coding

Introduction to Information Theory, Channel Capacity, Source Coding, Entropy Codes: Huffman Coding & Shannon-Fano Coding, Linear Block Codes, Hamming Weight and Distance Properties, Syndrome Decoding, Cyclic Codes, Convolutional Codes.

Text Books:

1. B.P. Lathi and Zhi Ding, "Modern Digital and Analog Communication System"; 4th Edition, Oxford University Press, 2011.
2. Herbert Taub, Donald L Schilling, Gautam Saha, "Principles of Communication Systems, McGraw Hill Education; 4th Edition, 2013.

References:

1. Simon Haykin, Michael Moher, "Communication System", John Wiley, 5th Edition, 2010.
2. R.P. Singh and S.D. Sapre, "Communication Systems: Analog and Digital", McGraw Hill Education; 3rd Edition, 2012
3. H P. Hsu: "Schaum's Outline Analog and Digital Communications", McGraw Hill Education, 3rd Edition, 2009.
4. John G. Proakis,،Masoud Salehi, "Fundamental of Communication Systems", Pearson Edition, 2nd Edition, 2014.

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List of Practicals:

1. To synthesize the Fourier series for periodic Signals.
2. To generate the Frequency Spectrum of various signals using Spectrum Analyzer.
3. To analyze characteristics of AM modulator & Demodulators and calculate the modulation Index.
4. To analyze characteristics of FM modulators & Demodulators.
5. To study signal reconstruction and aliasing and calculate sampling frequency for various signals.
6. To observe the waveforms of PAM, PPM and PWM.
7. To analyze the waveform of PCM signal and reconstruct the baseband signal by synchronizing the transmitter and receiver clock.
8. To analyze the Delta modulation waveform and observe the distortion.
9. To analyze Adaptive delta modulation waveform and compare the waveform with DM waveform.
10. To generate the ASK, PSK and FSK modulated signals and their reconstructed signals.

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SEMESTER V

UBJECT CODE	Category	SUBJECT NAME	TEACHING & EVALUATION SCHEME								
			THEORY			PRACTICAL		Th	T	P	CREDITS
			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BTEE503	EE	Control System Engineering	60	20	20	0	0	3	1	0	4

Legends: **Th** - 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 course will provide understanding of open loop and closed loop systems. Students will understand the stability, time and frequency domain responses of first and second order system inputs.

Course Outcomes (COs):

After the successful completion of this course students will be able to

1. Demonstrate the understanding of basic elements and modeling of the control system.
2. Determine mathematical models of physical systems.
3. Analyze the stability in time domain and frequency domain.
4. Design the controllers and compensators for the system.

Syllabus:

Unit I **8 Hours**

Introduction: Basic Elements of Control System, Open loop and Closed loop systems, Differential equation, Transfer function, Modeling of Electrical systems, Translational and rotational mechanical systems, Block diagram reduction Techniques, Signal flow graph, Constructional and working concept of ac servomotor.

Unit II **10 Hours**

Time Domain Analysis: Standard test signals, Time response of first order systems, Characteristic Equation of Feedback control systems, Transient response of second order systems, Time domain specifications, Steady state response, Steady state errors and error constants. P, PI, PD and PID Compensation.

Unit III **10 Hours**

Stability Analysis and Root locus: The concept of stability – Routh's stability criterion: qualitative stability and conditional stability, limitations of Routh's stability. The root locus concept: construction of root loci, effects of adding poles and zeros to G(s) H(s) on the root loci.

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Unit IV **10 Hours**

Frequency domain Analysis: Frequency domain specifications: Bode diagrams, determination of Frequency domain specifications and Phase margin and Gain margin, Stability Analysis from Bode Plots, Polar Plots, Nyquist Plots Stability Analysis, Compensation techniques: Lag, Lead, Lead-Lag Controllers design in frequency Domain.

Unit V **7 Hours**

State Space Analysis of Continuous Systems: Concepts of state, state variables and state model, derivation of state models from block diagrams, Diagonalization- Solving the Time invariant state Equations, State Transition Matrix and it's Properties, Concepts of Controllability and Observability.

Textbooks:

1. J.Nagrath and M.Gopal," Control System Engineering", New Age International Publishers, 5th Edition, 2007.
2. M.Gopal, "Control System – Principles and Design", Tata McGraw Hill, 2nd Edition, 2002.

References:

1. Benjamin.C.Kuo, "Automatic control systems", Prentice Hall of India, 7th Edition, 1995.
2. M.Gopal, "Digital Control and State Variable Methods", 2nd Edition, TMH, 2007. Schaum's Outline Series, "Feedback and Control Systems", Tata McGraw- Hill, 2007.
3. John J.D'azzo & Constantine H.Houpis, "Linear control system analysis and design", Tata McGrow-Hill, Inc., 1995.
4. Richard C. Dorf & Robert H. Bishop, "Modern Control Systems", Addidon – Wesley, 1999.

List of Practicals:

1. To generate step response of a transfer function.
2. To generate impulse response of a transfer function.
3. To generate ramp response of a transfer function.
4. To determine the torque speed characteristics and transfer function of a DC servomotor.
5. To analyze the characteristics of a small AC servomotor and determine its transfer function.
6. To determine the transient and frequency response of a second order system.
7. To analyze the performance of various types of controllers used to control the temperature of an oven.
8. To analyze the stability using Nyquist plot from a transfer function.
9. To generate root locus from a transfer function.
10. To analyze the stability using Bode plot from a transfer function.
11. To analyze the performance characteristics of analog PID Controller using simulated system.
12. To design different cascade compensation network for a given system.

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SUBJECT CODE	Category	SUBJECT NAME	TEACHING & EVALUATION SCHEME								
			THEORY			PRACTICAL		Th	T	P	CREDITS
			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BTEC504	EC	**CMOS VLSI 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):

To inculcate the concepts of CMOS VLSI Design and relate its importance in today's scenario.
To impart knowledge based on design of analog as well as digital VLSI 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. Demonstrate the working and device physics related to CMOS.
2. Design circuits based on combinational logic.
3. Design analog circuits related to CMOS.
4. Draw stick diagrams and design layouts for different devices and circuits.

Syllabus:

Unit I **9 Hours**

Introduction / Orientation: VLSI Design flow, Y- Chart, Structured design strategies: Hierarchy, Regularity, Modularity and Locality. Design Methods: Microprocessor/DSP, Programmable Logic, GA and SOG, Cell based design, Full custom Design; Platform based design/SOC. Design Economics.

Unit II **10 Hours**

MOS Transistor Theory: MOS device equations, Second order effects: Mobility degradation and velocity saturation, Body effect, Short channel effects, Narrow width effects. CMOS Inverter DC Characteristics-VI Characteristics, Beta Ratio effects, Noise Margin. Scaling - Transistor Scaling, Supply Voltage Scaling, Interconnect Scaling.

Unit III **10 Hours**

Delay and Power Considerations: Delay Definitions, Transient response, RC Delay model, Linear Delay Model. CMOS Logic implementations and Logical Effort. Power Definitions, Dynamic Power, Static Power, Latch up triggering and prevention.

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Unit IV **6 Hours**

CMOS Processing Technology: Wafer Formation, Photolithography, N-well process, Twin tub process, Stick Diagrams, layout design rules, CMOS process enhancements.

Unit V **10 Hours**

Analog CMOS design: Introduction to analog design, Current Mirror, Single stage amplifier: Common source with diode, resistive and current source connected load, Source follower, Differential amplifiers. Frequency response: Miller effect, Association of Poles with nodes, common source stage and source followers.

Text Books:

1. Neil H.E. Weste, David Money Harris, "CMOS VLSI Design, A circuits and systems perspective", IV Edition, Pearson, 2010.
2. Neil H.E. Weste, David Money Harris Ayan Banerjee, "CMOS VLSI Design, A circuits and systems perspective", III Edition, Pearson Education, 2004.
3. Behzad Razavi, "Design of Analog CMOS Integrated Circuits", Tata McGraw-Hill Education, 2002.
4. Peter Van Zant, "Microchip Fabrication, A Practical Guide to Semiconductor Processing", Sixth Edition, McGraw Hill Professional, 2013.

References:

1. Randall L. Geiger, Philip E. Allen, Noel R. Strader, "VLSI Design Techniques for analog and digital circuits", Tata McGraw Hill, 1989.
2. Sung Mo Kang, Yusuf Lebliabici, "CMOS Digital Integrated Circuits: Analysis and Design", IV Edition, Tata McGraw Hill, 2015.
3. Douglas A. Pucknell, Kamran Eshraghian, "Basic VLSI Design", III Edition, Prentice Hall, 1994.
4. S M Sze, VLSI Technology, II Edition, Tata McGraw-Hill Education, 2003.

List of Practicals:

1. Introduction to layout EDA tools and Technologies.
2. Study of Stick Diagrams and Euler's Path.
3. Layout design of Resistors, Capacitors and MOSFETS.
4. Implementation of Logic gates.
5. Implementation of Half adder and Full adder using logical effort.
6. Layout Design for Multiplexer.
7. Layout Design for Encoders and Decoders.
8. Layout Design for SRAM.
9. Layout Design for Flip Flops.
10. Layout Design for 4-Bit Multiplier.
11. Study of different packages and Bonding pads.

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COURSE CODE	CATEGORY	COURSE NAME	TEACHING & EVALUATION SCHEME								
			THEORY			PRACTICAL					
			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*	Th	T	P	CREDITS
BTCS701	CS	Cloud Computing	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 Objectives:

The student will have ability to:

1. Analyze the SAAS, PAAS IAAS services of Cloud Computing to represent how engineering agility inan organization can be created.
2. Assess the exploitation of web services from cloud computing.
3. Configure essential infrastructural components used contained by the cloud.
4. Critically analyze dissimilar techniques for implementing Cloud.
5. Significantly study case studies to derive the most excellent practice model to be appropriate when deploying cloud based applications.

Course Outcomes:

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

1. Investigate the trade-offs among deploying applications in the cloud and over the local infrastructure.
2. Compute the real-world problems using cloud computing through group collaboration.
3. Development and Deployment applications over commercial cloud computing infrastructures.
4. Analyze and investigation of application & hardware performance, scalability, and availability of the underlying cloud technologies and software.
5. Classify security and privacy issues in cloud computing.

Syllabus:

UNIT I

Overview of Cloud Computing **6 Hours**

Advantages, History, and Characteristics of Cloud Computing, Service & Deployment Models, Infrastructure, and Consumer View, Functioning of Cloud Computing, Cloud Architecture, Cloud Storage, Cloud Services, Industrial Applications.

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SEMESTER V

UNIT II **12 Hours**

Dynamic Interactions and Computing Architectures

Overview , Service, Deployment, Scope, and Control ,SaaS Interaction Dynamics and Software Stack Control ,SaaS Benefits, Issues and Concerns, Suitability, and Recommendations ,PaaS Dynamics and Software Stack Control ,PaaS Benefits, Issues and Concerns, Suitability, and Recommendations , IaaS Abstract Interaction Dynamics and Software Stack Control Hardware and Infrastructure- Clients, Security, Network, Services. Software as a Service (SaaS)-Understanding the Multitenant Nature of SaaS Solutions, Understanding SOA. Platform as a(PaaS)-IT Evolution Leading to the Cloud, Benefits of PaaS Solutions, Disadvantages ofPaaS Solutions. Infrastructure as a Service (IaaS)-Understanding IaaS, Improving Performancethrough Load Balancing, System and Storage Redundancy.

UNIT III **8 Hours**

Economics of Cloud Computing and Securing the Cloud

Overview, Review of Service Models, SWOT Analysis and Value Proposition, General Cloud Computing Risks. Service Level Agreements and Monitoring- Support Services- Accounting Services, Resource Management- IT Security- Performance Management- Provisioning- Service Management, Untangling Software Dependencies.

UNIT IV **10 Hours**

Developing Applications and Migrating to the Cloud

Technologies and the processes required when deploying web services; Deploying a web service from inside and outside a cloud architecture, advantages and disadvantages ,Analyzing the Services- Establishing a Baseline and Metrics- Tools, Best Practices- Finding the Right vendor- Phased-in Vs Flash-cut Approaches- Bringing in Creativity, How Cloud computing might evolve- Researcher Predictions- Responding to Changes- Getting ready.

UNIT V **9 Hours**

Designing Cloud Based Solutions and Coding Cloud Based Applications

System Requirements, Design Is a Give-and-Take Process. Creating a Simple Yahoo Pipe, Amazon Web Services, Using Google App Engine and creating Windows Azure Applications.

Text Books:

1. Cloud Computing: A Practical Approach by Anthony T. Velte Toby J. Velte, Robert Elsenpeter, 2010 by The McGraw-Hill.
2. Cloud Computing Theory And Practice Danc.Marinercus, Elsevier, 2013.
3. Cloud Computing: Principles and Paradigms, Editors: RajkumarBuyya, James Broberg, Andrzej M. Goscinski, Wile, 2011.
4. Buyya, Selvi ," Mastering Cloud Computing ",TMH Pub.
5. Cloud Computing: Principles, Systems and Applications, Editors: Nikos Antonopoulos, Lee Gillam, Springer, 2012.

References:

1. Kumar Saurabh, "Cloud Computing" , Wiley Pub,2012.
2. Krutz , Vines, "Cloud Security " , Wiley Pub,2013.
3. Sosinsky, " Cloud Computing" , Wiley Pub,2012.
4. Murray Woodside ; John Chinneck ; Marin Litiou on "Adaptive Cloud Deployment Using

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Persistence Strategies and Application Awareness"IEEEXplore, Year: 2017, Page(s):277 – 290.
5. ImanSadooghi ; Jesús Hernández Martin ; Tonglin Li on "Understanding the Performance and Potential of Cloud Computing for Scientific Applications" IEEE Xplore, **ISSN:** 2168-7161Page(s): 358 – 371.

List of Practicals:

1. Service deployment & Usage over cloud using Virtual Box.
2. Performance evaluation of services over cloud using VMware tool.
3. Management of cloud resources using VMware tool.
4. Working on Aneka for Cloud application.
5. Working of Goggle Drive to make spreadsheet.
6. Working and installation of Google App Engine.
7. Working and installation of Microsoft Azure.
8. Java Application deployment with Azure.
9. Installation and configuration of IBM Smart Cloud.
10. Installation and configuration of Hadoop.
11. Installation and configuration of Euceliptus.
12. Working & usage of Amazon Web Services.

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SEMESTER V

COURSE CODE	CATEGORY	COURSE NAME	TEACHING & EVALUATION SCHEME								
			THEORY			PRACTICAL		Th	T	P	CREDITS
			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BTECIOT503	EC	Embedded Systems - Raspberry Pi & Arduino	0	0	0	30	20	0	0	2	1

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:

- To understand the basic functional knowledge of the Arduino controller board.
- To understand the basic functional knowledge of the Raspberry Pi controller board.
- To get familiar with the programming environment of the different controllers.

Course Outcomes:

After completion of this course the students are expected to be able to demonstrate following attributes-

- Ability to design and implement an embedded system by interfacing various circuit elements.
- Ability to handle and demonstrating the various tasks with microcontroller.

Syllabus:

UNIT I **9 Hrs**

Introduction and familiarization with Arduino

Introduction to Arduino with Hardware Overview board with pin layout, Download and Installation of the Arduino IDE, Arduino IDE and Sketch Overview, Understanding Arduino Syntax, Program notation: variables, functions, control flow, Arduino conventions, Analog I/O and Serial Communications.

UNIT II **8 Hrs**

Microcontroller overview with specifications

Microcontroller overview and Architecture Atmel ATmega 328 / AVR family, overview of main features such as I/O Ports, Timers, interrupts serial port, PWM, ADC, Timers, PWM, analog / digital IO, , Pin functions, Atmega328p specifications, I/O interfacing with Atmega328p.

UNIT III **8 Hrs**

Interfacing with Arduino board

Introduction to Arduino IDE, writing, saving, compiling and uploading sketches, interfacing discrete LEDs, Binary counter, Seven Segment LEDs, Interfacing LCD, switch Interface, Interfacing with different type of sensors and communication modules.

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SEMESTER V

UNIT IV **9 Hrs**

Introduction and familiarization with Raspberry Pi board

Introduction to Raspberry Pi board and installation, introduction to Linux, preparation of Boot SD card, configuration of Raspberry Pi and networking with host computer, interfacing with Raspberry Pi board, accessing GPIO pins.

UNIT V **10 Hrs**

Introduction to Python Programming

Python IDE for Raspberry Pi, Python expressions, functions and operations for controlling the pins of Raspberry Pi,

Text Books:

1. Mike McRoberts: "Beginning Arduino"
2. Adrian McEwen, Hakim Cassimally "Designing the Internet of Things", John Wiley & Sons (2013), ISBN - 9781118430620

References:

1. Massimo Banzi, "Getting Started with Arduino", O'Reilly Media, Inc." (2011), ISBN - 9781449309879
2. Wolfram Donat "Learn Raspberry Pi programming in python", Apress (2014), ISBN – 9781430264255
3. Richard Grimmett, "Raspberry Pi Robotics Essentials", Packt Publishing Ltd (2015), ISBN – 9781785285646

List of Practicals:

1. Understanding Arduino IDE and Arduino board family.
2. Understanding I/O access on ATMega328p.
3. Experimenting data transfer using Serial Communication.
4. Experimenting data transfer using SPI Communication.
5. Establishing i2c interface with ATMega328p.
6. Understanding Raspberry Pi Board Architecture.
7. Installing and configuring Raspbian OS on Raspberry Pi.
8. Blinking LED using Raspberry Pi.
9. Network configuration on Raspberry Pi.
10. Interfacing Sensor using Raspberry Pi.

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SEMESTER V

UBJECT CODE	Category	SUBJECT NAME	TEACHING & EVALUATION SCHEME								
			THEORY			PRACTICAL		Th	T	P	CREDITS
			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BTIT406	IT	Unix and Shell Programming Lab	-	-		30	20	-	0	2	1

Legends: L-Lecture; T-Tutorial/Teacher Guided Student Activity; P–Practical; C-Credit; Q/A Quiz/Assignment/Attendance, MST Mid Semester Test.

***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 course content should be taught and implemented with the aim to develop required skills so that students are able to acquire following competency:

1. Know the basics of UNIX operating system and shell programming.

Course Outcomes:

1. Work on any Unix platform with confidence
2. Write the code in C language on UNIX platform.
3. Write effective scripts for their day to day jobs
4. Understand and use most of the Unix features and commands

Syllabus:

Unit 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, stty, pwd, cd, mkdir, rmdir, od.

Unit II

Handling Files and C Environment

The File System, cat, cp, rm, mv, more, file, ls, wc, pg, cmp, comm, diff, gzip, tar, zip, df, du, mount, umount, chmod, The vi editor ,security by file Permissions. NETWORKING COMMANDS: ping, telnet, ftp, finger, arp, rlogin.

The C compiler, vi editor, compiler options, and run the programs.

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SEMESTER V

Unit-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.

Unit IV

Command Line Arguments and Regular Expression

Command line arguments: Positional parameters, Set & shift, IFS. Functions & file manipulations: Processing file line by line, Functions. Regular Expression & Filters: What is regular expression, Grep, cut, sort commands, Grep patterns.

Unit V

SED and AWK

SED: Scripts, Operation, Addresses, commands, Applications, grep and sed.
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 and grep, sed and awk.

References:

1. Graham Glass, King Ables, "Unix for programmers and users", 3rd Edition, Pearson Education, 2009.
2. N.B Venkateswarlu, "Advanced Unix programming", 2ndEdition, BS Publications, 2010.
3. YashwanthKanitkar,"Unix Shell programming", 1stEdition, BPB Publisher, 2010.
4. Sumitabha Das, "Unix Concepts and Applications", 4thEdition. TMH, 2006.
5. Behrouz A. Forouzan, Richard F. Gilbery, "Unix and shell Programming", 1stEdition, Cengage Learning India, 2003.

List of Practicals:

1. Installation of Unix/Linux operating system.
2. Study of Unix general purpose utility command list obtained from (man, who, cat, cd, cp, ps, ls, mv, rm, mkdir, rmdir, echo, more, date, time, kill, history, chmod, chown, finger, pwd, cal, logout, shutdown) commands.
3. Study of vi editor.
4. Study of Bash shell, Bourne shell and C shell in Unix/Linux operating system.
5. Write a C program to check whether the given string is palindrome or not using Command line substitution.
6. Write a C program to check the given integer is prime or not.
7. Write a C program to check whether the given number is Avogadro number or not.
8. Write a C program that accept two integers as its arguments and computes the value of first number raised to the power of second number.
9. Write a shell script program to display list of user currently logged in.
10. Write a shell script program to display "HELLO WORLD".
11. Write a shell script program to develop a scientific calculator.
12. Write a shell Script program to check whether the given number is even or odd.

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SEMESTER V

13. Shell script Program to search whether element is present is in the list or not.
14. Shell script program to check whether given file is a directory or not.
15. Shell script program to count number of files in a Directory.
16. Shell script program to copy contents of one file to another.
17. Create directory, write contents on that and Copy to a suitable location in your home directory.
18. Use a pipeline and command substitution to set the length of a line in file to a variable.
19. Write a program using sed command to print duplicated lines of Input.
20. Write a grep/egrep script to find the number of words character, words and lines in a file.

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