Shri Vaishnav Vidyapeeth Vishwavidyalaya

Name of Program: Bachelor of Technology in Electronics & Communication

SUBJECT CODE	Category	SUBJECT NAME	TEACHING & EVALUATION SCHEME								
			THEORY			PRACTICAL		L	T	P	CREDITS
			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BTEC714	EC	Embedded Systems for Robotics	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):

1. To inculcate the concepts of robotic features including actuator and control processes.
2. To explore robot learning in the context of current robots.
3. To impart knowledge of designing robots to perform tasks from simple movement to complex interactions with the world.
4. To explore robotic concepts with hands-on experiments using the Microchips-AVR Controller.

Course Outcomes:

Students will be able to

1. Design and create robots to perform tasks from simple movement to complex interactions with the world.
2. Articulate design decisions and create a diary describing learning experiences that form a portfolio of competence.
3. Discuss emergent behavior and distinguish this from normal robotic behavior.

Syllabus:

UNIT- I **6 Hrs.**

Basics of Embedded Systems and Robotics: Introduction, Classifications of Embedded Systems, Application-Specific Processors, Mobile Robots Embedded Controllers, Operating System. Logic Gates, Function Units Registers and Memory, Arithmetic Logic Unit Control Unit, Central Processing Unit.

UNIT-II **8 Hrs.**

Sensors: Sensor Categories, Binary Sensor, Analog versus Digital Sensors. Shaft Encoder, A/D Converter, Position Sensitive Device, Compass, Gyroscope, Accelerometer, Inclinometer, Digital Camera.

UNIT- III **8 Hrs.**

Actuators: DC Motors, H-Bridge, Pulse Width Modulation, Stepper Motors, Servos, On-Off Control, PID Control, Velocity Control and Position Control, Multiple Motors – Driving Straight.

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UNIT- IV **9 Hrs.**

Embedded Communication Interface: I2C Communication, SPI and SCI Communication, UART Communication, USB Communication, Hard and Soft Real-Time System, Thread-Oriented Design.

UNIT- V **14 Hrs.**

Case Study: Line followers, Balancing Robots, Walking Robots, Robots manipulator, Maze exploration, Map generation, Robot Soccer.

Text Books:

1. Embedded Systems and Robotics with Open Source Tools, Nilanjan Dey, Amartya Mukherjee, CRC Press, 1 edition (April 1, 2016).
2. Embedded Robotics: Mobile Robot Design and Application with Embedded Systems, III Edition, Springer, 2008.

References:

1. Embedded Systems & Robots Projects Using the 8051 Microcontroller, Subrata Ghoshalm, hardcover, I Edition, Cengage, 2009.
2. Embedded Robotics, Mobile Robot Design and Applications with Embedded Systems, Bräunl, Thomas, III Edition, Springer-Verlag Berlin Heidelberg.2013
3. The 8051 Microcontroller and Embedded Systems: Using Assembly and C Paperback – 2007, Mazidi and Mazidi, Pearson Education India; 2 edition , 2007.
4. AVR Microcontroller and Embedded Systems: Using Assembly and C, Muhammad Ali Mazidi, Sarmad Naimi, and Sepehr Naimi Education India, 2010.

List of Practicals:

1. Introduction to Microcontrollers like AVR Controller, etc.
2. Interfacing with LED and Buzzer.
3. Interfacing with LCD Display.
4. Interfacing with DC motors.
5. Interfacing with IR sensors
6. Interfacing with White-line sensors
7. Interfacing with Position sensors
8. Interfacing with Sharp sensors
9. Line following robot
10. Project based on typical system design.

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Name of Program: Bachelor of Technology in Electronics & Communication

(w.e.f. 2018)

SUBJECT CODE	CATEGORY	SUBJECT NAME	TEACHING & EVALUATION SCHEME								
			THEORY			PRACTICAL		L	T	P	CREDITS
			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BTEC702	EC	Advanced Communication Systems	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 Objectives:

1. To develop an understanding of OFDM and MIMO systems.
2. To enable the students to differentiate between various type of receiver and fading characteristics.
3. To provide the knowledge of cognitive and cooperative systems.

Course Outcomes:

The student will be able to:

1. Analyze MIMO and OFDM systems and design systems with different fading channels.
2. Understand the concepts of 5G and its technologies
3. Analyze the concept of cognitive and cooperative communication systems.

Syllabus:

UNIT I **8 Hrs.**

Introduction, principle of OFDM, implementation of transceivers, frequency-selective channels, channel estimation, peak to average power ratio, inter carrier interference, adaptive modulation and capacity, multiple access, Code division multiple access, multi carrier code division multiple access, single carrier modulation with frequency-domain equalization.

UNIT II **8 Hrs.**

Smart antennas, multiple input multiple output systems, spatial multiplexing, multi user MIMO, transmitter diversity, receiver diversity, Channel state information, MIMO System Model, Zero Forcing Receiver, MMSE receiver, Singular Value Decomposition of MIMO Channel, MIMO capacity, Asymptotic MIMO Capacity, Alamouti and Space-time codes.

UNIT III **9 Hrs.**

Introduction to 5G, 5G Requirements, 5G Technology, Massive MIMO and its advantages and challenges, Homogeneous and Heterogeneous Network Scenarios, Millimetre Communication Technology, millimetre wave Propagation characteristics and beamforming, Filter bank multi-carriers (FBMC) and Universal filtered multi-carrier (UFMC).

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UNIT IV **8 Hrs**

Introduction and motivation for Cooperative Communication, fundamentals of relaying, relaying with multiple parallel relays, routing and resource allocation in multi hop networks, routing and resource allocation in collaborative networks, applications, network coding.

UNIT V **9 Hrs**

Cognitive Radios, Problem description, cognitive transceiver architecture, principle of interweaving, spectrum sensing, spectrum management, spectrum sharing, overlay, underlay. Primary user detection techniques – energy detection, feature detection, matched filtering, cooperative detection and other approaches, Spectrum Sharing Models of Dynamic Spectrum Access – Unlicensed and Licensed Spectrum Sharing, Fundamental Limits of Cognitive Radio.

Text Books:

1. David Tse, Pramod Viswanath, "Fundamentals of Wireless Communication", Cambridge University Press, 2011.
2. Aditya K. Jagannatham, "Principles of Modern Wireless Communication System", McGraw Hill, 1st Edition, 2017
3. Molisch, "Wireless Communications", Wiley India, 2nd Edition , 2013.
4.

References:

1. Gordon L. Stuber, "Principles of Mobile Communication", Springer International Ltd, 3rd Edition 2011.
2. Marvin K. Simon, Mohamed-Slim Alouini, "'Digital Communication over Fading Channels", Wiley-IEEE Press, 2nd Edition., 2004.
3. Long Zhao, Hui Zhao, Kan Zheng and Wei Xiang, "Massive MIMO in 5G Networks: Selected Applications", Springer.

List of Experiments:

1. To study SIMULINK.
2. To study BerTool.
3. To implement SIMULINK model for BPSK
4. To implement SIMULINK model for QPSK
5. Implementation of CDMA
6. Implementation of orthogonal frequency division multiple access
7. To calculate the bit error rate for OFDM system.
8. Channel capacity of MIMO systems in Wireless communication.
9. Energy detection simulation for cognitive radio.
10. Water filling model in a MIMO system.

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Shri Vaishnav Vidyapeeth Vishwavidyalaya

Name of Program: Bachelor of Technology in Electronics & Communication

(w.e.f. 2018-2019)

SUBJECT CODE	CATEGORY	SUBJECT NAME	TEACHING & EVALUATION SCHEME								
			THEORY			PRACTICAL		L	T	P	CREDITS
			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BTEC713	EC	Wireless Networks	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 Objectives:

1. To study about Wireless networks, protocol stack and standards.
2. To study about fundamentals of 3G Services, its protocols and applications.
3. To study about evolution of 4G Networks, its architecture and applications.

Course Outcomes:

After completing the course, the students will be able to

1. Conversant with the latest 3G/4G and WiMAX networks and its architecture.
2. Design and implement wireless network environment for any application using latest wireless protocols and standards.
3. Implement different type of applications for smart phones and mobile devices with latest network strategies

Syllabus:

UNIT I **9 Hrs**

Wireless LAN: Introduction to WLAN technologies: Infrared, UHF narrowband, spread spectrum -IEEE802.11: System architecture, protocol architecture, 802.11b, 802.11a – Hiper LAN: WATM, BRAN, HiperLAN2 – Bluetooth: Architecture, Radio Layer, Baseband layer, Link manager Protocol, IEEE802.16-WIMAX: Physical layer, MAC, Spectrum allocation for WIMAX.

UNIT II **8 Hrs**

Mobile Network Layer Introduction – Mobile IP: IP packet delivery, Agent discovery, tunneling and encapsulation, IPV6-Network layer in the internet- Mobile IP session initiation protocol – mobile ad-hoc network: Routing, Destination Sequence distance vector, Dynamic source routing.

UNIT III **9 Hrs**

Mobile Transport Layer TCP enhancements for wireless protocols – Traditional TCP: Congestion control, fast retransmit/fast recovery, Implications of mobility – Classical TCP improvements: Indirect TCP, Snooping TCP, Mobile TCP, Time out freezing, Selective retransmission, Transaction oriented TCP – TCP over 3G wireless networks.

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UNIT IV **8 Hrs**

Wireless Wide Area Network Overview of UTMS Terrestrial Radio access network-UMTS Core network Architecture: 3G-MSC, 3G-SGSN, 3G-GGSN, SMS-GMSC/SMS-IWMSC, Firewall, DNS/DHCP-High speed Downlink packet access (HSDPA)- LTE network architecture and protocol.

UNIT V **10 Hrs**

4G & 5G Networks Introduction to 4G- features and challenges, Applications of 4G Technologies, Next generation (5G) wireless technologies, Upper Gigahertz and Terahertz wireless communications, Millimeter wave networking, Directionality and beamforming, Mobility and signal blockage, IEEE 802.11ad (60 GHz WLAN) MAC and PHY overview.

Text Books:

1. Jochen Schiller, "Mobile Communications", Second Edition, Pearson Education 2012.
2. Vijay Garg , "Wireless Communications and networking", First Edition, Elsevier 2007.

References:

1. Erik Dahlman, Stefan Parkvall, Johan Skold and Per Beming, "3G Evolution HSPA and LTE for Mobile Broadband", Second Edition, Academic Press, 2008.
2. Anurag Kumar, D.Manjunath, Joy kuri, "Wireless Networking", First Edition, Elsevier 2011.
3. Simon Haykin , Michael Moher, David Koilpillai, "Modern Wireless Communications", First Edition, Pearson Education 2013
4. K. Pahlavan and P. Krishnamurthy, "Principles of WirelessNetworks", Pearson Education, 2002.

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SUBJECT CODE	CATEGORY	SUBJECT NAME	TEACHING & EVALUATION SCHEME								
			THEORY			PRACTICAL		L	T	P	CREDITS
			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BTEC701	EC	Optical and Satellite 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 Objectives:

1. The objective of this course is to have an introduction of optical and satellite communication with an increased emphasis on the various optical sources, detectors, amplifiers, test equipments & components.
2. Students will also get to know about the detailed working of satellite transmission & its applications.
3. This course will enable the students to understand the fundamentals of optical communication and detailed working of satellites.

Course Outcomes:

Student will be able to:

1. Classify optical source and detector & their characteristics.
2. Analyze various optical amplifiers and understand advance optical fiber systems.
3. Analyze various optical components & test equipments.
4. Understand space segment of satellite & its link design.
5. Understand earth segment and the satellite applications.

Syllabus:

UNIT I **9 Hrs**

Overview of Optical fiber Communications: Elements of an optical fiber transmission link with the functional description of each block, WDM concepts, Light emitting diode (LEDs)-structures, materials, Figure of merits, characteristics & Modulation. Laser Diodes -Modes & threshold conditions, Diode Rate equations, resonant frequencies, structures, characteristics and figure of merits, Principles of operation.

UNIT II **8 Hrs**

Optical Amplifier & Advances in Optical Fiber Systems: Semiconductor optical Amplifier, EDFA, Raman Amplifier, Wideband Optical Amplifiers, Principles of WDM, DWDM, Telecommunications & broadband application, SONET/SDH, MUX, Analog & Digital broadband, optical switching.

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UNIT III **9 Hrs**

Optical Components & Measurement: Optical couplers, Tunable sources and Filters ,optical MUX/DEMUX, Arrayed waveguide grating, optical add drop multiplexer (OADM), optical cirulators, attenuators, optical cross connects, wavelength converter, Mach-Zender Interferometer Test Equipments, OTDR , Set ups for Measurement of Attenuation, Dispersion, NA and EYE pattern.

UNIT IV **9 Hrs**

Space Segment and Satellite Link Design: Spacecraft Technology- Structure, Primary power, Attitude and Orbit control, Thermal control and Propulsion, communication Payload and supporting subsystems, Telemetry, Tracking and command. Satellite uplink and downlink Analysis and Design, link budget, E/N calculation- performance impairments-system noise, inter modulation and interference, Propagation Characteristics and Frequency considerations- System reliability and design lifetime.

UNIT V **10 Hrs**

Earth Segment & Satellite Applications: Introduction, receive-only home TV systems, master antenna TV system, Community antenna TV system, transmit-receive earth station.
INTELSAT Series, INSAT, VSAT, Mobile satellite services: GSM, GPS, INMARSAT, LEO, MEO, Satellite Navigational System. Direct Broadcast satellites (DBS)- Direct to home Broadcast (DTH), Digital audio broadcast (DAB)- Worldspace services, Business TV(BTV), GRAMSAT, Specialized services – E –mail, Video conferencing, Internet.

Text Books:

1. John M Senior, "Optical Fiber Communication", Third Edition, , Pearson
2. Gerd Keiser, "Optical Fiber Communication", Fifth Edition, , Tata McGraw Hill
3. Timothy Pratt, "Satellite Communication" , Wiley India
4. Roddy, "Satellite Communications", TMH

References:

1. Ghatak and Thyagrajan, "Fiber Optics and Lasers", Macmillan India Ltd.
2. Agarwal, "Fiber Optic Communication Systems", Wiley India.
3. Agarwal, "Satellite Communications", Khanna Publishers
4. Monojit Mitra, "Satellite Communication", PHI Learning.

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Name of Program: B.Tech. in Electronics and Communication

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SUBJECT CODE	Category	SUBJECT NAME	TEACHING & EVALUATION SCHEME								
			THEORY			PRACTICAL		L	T	P	CREDITS
			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BTECIOT711	EC	Principles of Artificial Intelligence and Machine Learning	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. Know how to build simple knowledge-based systems.
2. Know various AI search algorithms (uninformed, informed, heuristic, constraint satisfaction, genetic algorithms).
3. Ability to apply knowledge representation, reasoning, and machine learning techniques to real world problems.

Course Outcomes (COs):
Upon completion of the subject, students will be able to:
1. Describe the key components of the artificial intelligence (AI) field.
2. Identify and describe artificial intelligence techniques, including search heuristics, knowledge representation, automated planning and agent systems, machine learning, and probabilistic reasoning.
3. Identify and apply AI techniques to a wide range of problems, including complex problem solving via search, knowledge-base systems, machine learning, probabilistic models, agent decision making.
4. Analyze and understand the machine learning and various algorithms

Syllabus

UNIT-I **10 Hrs.**

Introduction To Al And Production Systems

Introduction to AI-Problem formulation, Problem Definition Production systems, Control strategies, Search strategies. Problem characteristics, Production system characteristics, Specialized production system, Problem solving methods, Problem graphs, Matching, Indexing and Heuristic functions -Hill Climbing-Depth first and Breath first, Constraints satisfaction, Related algorithms, Measure of performance and analysis of search algorithms.

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UNIT-II **8 Hrs.**

Representation of knowledge

Knowledge Representation Issues: Representations and Mappings, Approaches to Knowledge Representation. Knowledge representation using Predicate logic, Introduction to predicate calculus, Resolution, Use of predicate calculus, Knowledge representation using other logic-Structured representation of knowledge.

UNIT-III **8 Hrs.**

Knowledge inference

Knowledge Inference -Production based system, Frame based system. Inference - Backward chaining, Forward chaining, Rule value approach, Fuzzy reasoning - Certainty factors, Bayesian Theory Bayesian Network-Dempster - Shafer theory.

UNIT-IV **10 Hrs.**

Machine Learning (ML)

Types of ML, Supervised ML. Unsupervised ML, Semi Supervised ML. Reinforecent ML. Regression Algorithms: Simple Linear Regression, Multiple Regression, Polynomial Regression, Support Vector Regression SVR, Decision Tree Regression, Random Forest Regression, Metrics evaluation of Regression

UNIT-V **9 Hrs.**

Classification of Algorithms

Supervised ML; Classification Algorithms: Logistic Regression, K Nearest Neighbours, Support Vector Machine(SVM), Kernel SVM, Decision Trees Classification, Random Forest Classification, Ensemble Techniques, Semi-supervised learning with EM using labeled and unlabeled data, Overfitting and Underfitting, Unsupervised Learning, Dimension reductionality PCA and LDA, clustering and Association algorithm.

Text books:

1. Rich E and Knight K, "Artificial Intelligence", Third Edition, TMH, 2017.
2. Nelsson N.J., "Principles of Artificial Intelligence", First Edition, Springer Verlag, Berlin.
3. Oliver Theobald ,"Machine Learning For Absolute Beginners: A Plain English Introduction" , 2nd Edition , 2017

References:

1. S.Rajasekaran and G.A. VijayalaksmiPai "Neural Network, Fuzzy Logic, and Genetic Algorithm Synthesis and Applications", Second Edition, Prentice Hall, 2017
2. Stuart Russell and Peter Norvig, "Artificial Intelligence: A Modern Approach", Prentice Hall,. 2002
3. Ethem Alpaydin, "Introduction to Machine Learning", Second Edition, The MIT Press, 2010
4. Barr A, Fergenbaub E.A. and Cohen PR, "Artificial Intelligence", Addison Wesley,
5. Kos Ko B, "Neural Networks and Fuzzy system" Prentice Hall India Learning Private Limited.

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SUBJECT CODE	CATEGORY	SUBJECT NAME	TEACHING & EVALUATION SCHEME								
			THEORY			PRACTICAL		L	T	P	CREDITS
			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BTEC723	EC	Advanced Microcontroller and Embedded Systems	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 Objectives:

1. To teach programming for MSP432 using high level language such as C.
2. To teach students how a microcontroller can be used as a computer within a single integrated circuit.
3. To present the microcontrollers input/output interface capabilities for developing embedded systems with microcontrollers.
4. To illustrate how a microcontroller is a component within embedded systems controlling the interaction of the environment with system hardware and software.

Course Outcomes:

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

1. To understand the generalized architecture of advanced microcontroller MSP432 and its programming.
2. To interface MSP432 with analog peripherals & communication systems.
3. To design an embedded system using MSP432 for a particular task.

Syllabus

UNIT I **9 Hrs**

Introduction to Microcontrollers & Embedded System

Background of Microcontrollers: Definition, Classification, Features & Applications, Architecture of Cortex M4 and its features, MSP–EXP432P401R and its Booster Packs, Energia: Development Environment, Libraries, Fundamental Programming Concepts.

Embedded System: Definition, Characteristics, Block diagram, Design Process, Case study: Weather monitoring system.

UNIT II **7 Hrs**

MSP432 Operating Parameters and Interfacing

Operating Parameters, Input Devices, Output Devices, High Power DC Interfaces, Interfacing to DC Devices, AC Devices, Educational Booster Pack Mk-II, Grove Starter Kit for LaunchPad Application.

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UNIT III **9 Hrs**

MSP432 Memory System and Power System

Memory System: Basic Memory Concepts, Memory Operations in C Using Pointers, Memory Map, Flash Memory, Direct Memory Access (DMA), External Memory: Bulk Storage with an MMC/SD Card.

Power Systems: Operating Modes and Speed of Operation, Power Supply System, Power Control Module, Operating Modes, Transition PSS and PCM Registers, Battery Operation.

UNIT IV **8 Hrs**

Time-Related Systems, Resets and Interrupts

Time-related Signal Parameters: Frequency, Period, Duty Cycle, MSP432 Clock System, Energia-related Time Functions, Watchdog Timer, Timer32, Timer A, Real-Time Clock, MSP432 Resets, Interrupts, MSP432 Interrupt System, Energia Interrupt.

UNIT V **9 Hrs**

Analog Peripherals & Communication Systems

Programming the MSP432 ADC System, Voltage Reference, Comparator, Serial Communication Concepts, MSP432 UART, Serial Peripheral Interface-SPI, Inter-Integrated Communication - I2C Module

Text Books:

1. Dung Dang, Daniel J. Pack, Steven F. Barrett, "Embedded Systems Design with the Texas Instruments MSP432 32-bit Processor" Morgan & Claypool Publisher, 2017.
2. Ying Bai, "Microcontroller Engineering with MSP432: Fundamentals and Applications" Taylor & Francis,CRC Press, 2017

References:

1. Chris Nagy, "Embedded Systems Design using the TI MSP430 Series" Newnes, 2003.
2. John H. Davies, "MSP430 Microcontroller Basics" Newnes, 2008.
3. Manuel Jiménez, Rogelio Palomera, Isidoro Couvertier, "Introduction to Embedded Systems: Using Microcontrollers and the MSP430" Springer, 2014.
4. Raj Kamal, "Embedded Systems: Architecture, Programming and Design" TMH, 2008.

List of Experiments:

1. Introduction to MSP–EXP432P401R Launch Pad, Code Composer Studio and Energia.
2. Interfacing LED using MSP432.
3. Interfacing 7-segment display to MSP432.
4. Interfacing dot-matrix display to MSP432.
5. Setting up communication interface using IR sensors.
6. Interfacing MSP432 with various sensors
7. Driving stepper motor using MSP432.
8. Interfacing memory to MSP432
9. Setting up wireless communication Network.
10. Setting up IoT link for various sensors using MSP432.

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

SUBJECT CODE	Category	SUBJECT NAME	TEACHING & EVALUATION SCHEME								
			THEORY			PRACTICAL		L	T	P	CREDITS
			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BTECIOT601	EC	Application Development for IOT	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 Objective:

1. To understand the concept of Web Application Development and its Architecture.
2. To understand and practice web page designing techniques.
3. To understand embedded dynamic scripting on client side Internet Programming.
4. To understand the differences between client side & server side technologies to develop Web Application.

Course Outcome:

After completion of the course students will be able to:

1. Describe the concepts of WWW including browser and HTTP protocol.
2. List the various HTML tags and use them to develop the user friendly web pages.
3. Define the CSS with its types and use them to provide the styles to the web pages at various levels.
4. Develop the modern web pages using the HTML and CSS features with different layouts as per need of applications.
5. Use the JavaScript to develop the dynamic web pages.
6. Use server side scripting with PHP to generate the web pages dynamically using the database connectivity.

Syllabus:

UNIT I **08 Hrs.**

Introduction to WWW and Internet Protocols, HTTP Protocol: Request and Response, Web browser and Web servers, web page designing using HTML, introduction to dynamic web pages.

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Introduction to HTML: HTML Elements, Attributes, Standard HTML Document Structure, HTML Headings, Paragraphs and Line Break Tags, Commenting, HTML Formatting, Fonts, Styles, Colors, HTML Links, Images, Tables, HTML Lists, Forms, Frames.

UNIT II **08 Hrs.**

Introduction to HTML5: HTML5 - New standard for HTML, Rules for HTML5, Browser Support, New Elements in HTML5, New Markup Elements, New Media Elements, The Canvas Element, New Input Type Attribute Values, New Form Elements and Attributes, HTML5 Event Attributes, Audio and Video on the Web, various audio and video Formats and Attributes.

UNIT III **08 Hrs.**

Introduction to CSS, need for CSS, basic syntax and structure, CSS Selectors, Inline Styles, Embedding Internal Style Sheets, Linking External Style Sheets, Creating Classes and IDs, Specifying class within HTML document, Style placement: Inline style, Span & div tags, header styles, Colors and properties, Backgrounds, Manipulating Texts, Fonts, Borders and Boxes, Margins and Padding, Box properties and Positioning using CSS.

UNIT IV **08 Hrs.**

Introduction to JavaScript: Utility of JavaScript, Client side scripting with JavaScript, Differences between Client-Side vs. Server-Side scripting, Statements, JavaScript Data types, Variable Declarations, Operators and Operator Precedence, Implementing Control Constructs, Functions, JavaScript and objects, JavaScript own objects, String, Date and Array Objects, Introduction to DOM.

UNIT V **08 Hrs.**

PHP : Introduction and basic syntax of PHP, Installation and configuration, Declaring variables, Data types, arrays, strings, operators, expressions, control structures, Functions, PHP Form handling.

PHP and MySQL : Connecting to database, Basic commands with PHP examples, Connection to server, creating database, selecting a database, listing database, listing table names, creating a table, inserting data, altering tables, queries, deleting database, deleting data and tables.

Text Books:

1 Ralph Moseley and M. T. Savaliya, "Developing Web Applications", Wiley India, 2nd edition, 2013.

2 Steven M. Schafer, "HTML, CSS, JavaScript, Perl, Python and PHP", Wiley India, 1st edition 2005.

References:

1 Paul S. Wang, G. Keller, S. Katila, "An Introduction to Web Design + Programming", Cengage Learning. 2016

2 Robin Nixon, "Learning PHP, MySQL, and JavaScript", O'Reilly Publications, 2009.

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3 Jeffrey C. Jackson, "Web Technologies-A Computer Science Perspective", Pearson Education, 2007.
4 Robert. W. Sebesta, "Programming the World Wide Web", Fourth Edition, Pearson Education.

List of Experiments:

1. Create a simple html file to demonstrate the use of different tags.
2. Create a webpage with HTML describing you. Use paragraph and list tags. Apply various colors to suitably distinguish key words. Also apply font styling like italics, underline and two other fonts to words you find appropriate. Also use header tags.
3. Create a web page that contains form, frame, table, list, link using HTML.
4. Create a registration form using table.
5. Create an html file to link to different html page which contains images, tables, and also link within a page.
6. Create an html page to explain the use of various predefined functions in a string and math object in java script.
7. Create an html registration form and validate the form using javascript code.
8. Create an html page to change the background color for every click of a button using javascript.
9. Write down a simple php program that displays a welcome message.
10. Write a program for creating form using buttons, textboxes and other form elements using $_GET and $_POST method to retrieve data.
11. Write a php script to connect php with mysql database.
12. Write a php script to retrieve data contains in mysql databse.

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B.Tech. Electronics and Instrumentation

SUBJECT CODE	CAEGORY	SUBJECT NAME	TEACHING & EVALUATION SCHEME								
			THEORY			PRACTICAL					
			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*	L	T	P	CREDITS
BTEI601		Biomedical Instrumentation	60	20	20	30	20	3	0	2	4

Legends: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical; **C** - Credit; **Q/A** – Quiz/Assignment/Attendance, **MST** Mid Sem. 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 Objective (CEOs):

1. It gives the introductory idea about human physiology system which is very important with respect to design consideration
2. With widespread use and requirements of medical instruments, knowledge of the principle of operation of biomedical instruments.

Course Outcomes (COs):

1. Students will have a clear knowledge about human physiology system.
2. They will have knowledge of the principle operation of biomedical instruments.
3. Student will be able to understand the design and the background knowledge of biomedical instruments and specific applications of biomedical engineering.

UNIT I **7hr**

Bioelectric Signals and Electrodes: Bio-potentials and their origin: ECG, EEG, EMG, Bio-potential electrodes, generalized medical instrumentation system-Man machine interface.

UNIT II **8hr**

Diagnostic Equipments: ECG: normal and abnormal waveform, diagnosis interpretation, ECG leads connections, Einthoven triangle, Plethysmography, Blood pressure measurement: direct and indirect methods, Cardiac output measurements, Phonocardiography, EEG: signal amplitudes and frequency bands, EEG machine.

UNIT III **9hr**

Therapeutic Equipments: Dialyzers: basic principle of dialysis, different types of dialyzer, membranes, Cardiac pacemakers: external and Implantable pacemaker. Cardiac defibrillator: DC defibrillator, implantable defibrillator and defibrillator analyzer. Short wave diathermy, microwave diathermy, ultrasonic therapy unit.

UNIT IV **10hr**

Imaging Instruments: Digital X-Rays: Principles and production of soft and hard x-rays, Scattered radiation, Radiation detectors, X-ray Computerized Tomography (X-ray CT) imaging modes and types.

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Magnetic Resonance Imaging (MRI): Physics of nuclear magnetic resonance, T1 and T2 relaxation time, spin-echo sequences.

UNIT V **8hr**

Ultrasound: Propagation of ultrasound waves in fluids, solids and tissue, Ultrasonic transducers and instrumentation, modes of ultrasonic imaging.

Patient Safety: Electric shock hazards, leakage currents, electrical safety analyzer.

List of Experiments:

1. Study of various types of electrodes.
2. Measure blood pressure using sphygmomanometer.
3. Measure respiration rate using respiration rate-meter
4. Measure body temperature using analog and digital thermometer.
5. Identify various leads selector network of ECG machine.
6. Obtain Lead –I, II, III, aVr , aVl , V1 … V6 type of ECG.
7. Demonstrate the Performance of EMG.
8. Demonstration of Phono-cardiograph machine.
9. EEG Alpha RMS Derivation – **(VIRTUAL Lab IIT Roorkee)**
10. EEG Entropy Calculation -**(VIRTUAL Lab IIT Roorkee)**

Text Books:

1. R.S.Khandpur, "Handbook of Biomedical Instrumentation", TMH Third Edition 2014.
2. Cromwell, "Biomedical Instrumentation and Measurements", Prentice Hall of India, New Delhi, 2007

References:

1. Joseph J. Carr and John M. Brown, "Introduction to Biomedical Equipment Technology", Pearson Education India, Delhi, 2004.
2. Webster, "Medical Instrumentation – Application & Design," John Wiley and sons Inc, Netherlands, 2009.
3. Arumugam.M. "Biomedical Instrumentation", Anuradha Agencies Publishers, Kumbakonam, 2006.

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BBA Hons.-V SEMESTER (20-23)

BBAI501 HUMAN VALUES AND PROFESSIONAL ETHICS

SUBJECT CODE	SUBJECT NAME	TEACHING & EVALUATION SCHEME								
		THEORY			PRACTICAL		L	T	P	CREDITS
		END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BBAI501	Human Values and Professional Ethics	60	20	20	-	-	4	-	-	4

Legends: **L** - 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 Objective

The objective of the course is to disseminate the theory and practice of moral code of conduct and familiarize the students with the concepts of "right" and "good" in individual, social and professional context

Examination Scheme

The internal assessment of the students' performance will be done out of 40 Marks. The semester Examination will be worth 60 Marks. The question paper and semester exam will consist of two sections A and B. Section A will carry 36 Marks and consist of 5 questions, out of which student will be required to attempt any three questions. Section B will comprise of one or more cases / problems worth 24 marks.

Course Outcomes

1. Help the learners to determine what action or life is best to do or live.
2. Right conduct and good life.
3. To equip students with understanding of the ethical philosophies, principles, models that directly and indirectly affect business.

COURSE CONTENT

Unit I: Human Value

1. Definition, Need for Human Values, Sources of Values

2. Essence of Values
3. Classification of Values (Temporal Values, Universal Values, Instrumental Values, Terminal Values)
4. Values Across Culture

Unit II: Morality

1. Morality its meaning and definition
2. Values Vs Ethics Vs Morality
3. Concept of Impression Management
4. Impression Management Strategies (Intimidation, Ingratiation, Self-promotion, Supplication, Exemplification)

Unit III: Leadership in Indian Ethical Perspective.

1. Leadership, Pre-requisites of Leadership
2. Approaches to Leadership, Leadership Styles
3. Ethical Leadership
4. Values in Leadership

Unit IV: Business Ethics

1. Business Ethics its meaning and definition
2. Relevance of Ethics in Business organizations.
3. Theories of Ethics (Teleological, Deontological)
4. Code of Ethics

Unit V: Globalization and Ethics

1. Globalization and Business Changes
2. Values for Global Managers
3. Corporate Social Responsibility
4. Benefits of Managing Ethics in Work Place.

Suggested Readings

1. Kaur, T. (2004). ***Values and Ethics in Management.*** Galgotia Publishing Company: New Delhi
2. Kaushal, S.L. (2006). ***Business Ethics. Concepts, Crisis and Solutions.*** Deep & Deep Publications Pvt. Ltd.: New Delhi
3. Beteille, Andre (1991). ***Society and Politics in India***. AthlonePress: New Jersey.
4. Chakraborty, S. K. (1999). ***Values and Ethics for Organizations***. Oxford University Press
5. Fernando, A.C. (2009). ***Business Ethics - An Indian Perspective .***India: Pearson Education: India

6. Fleddermann, C. D. (2012). ***Engineering Ethics***. New Jersey: Pearson Education / Prentice Hall.

7. Boatright, J.R. (2012). ***Ethics and the Conduct of Business.*** Pearson. Education: New Delhi.

8. Crane, A.and Matten, D. (2015). ***Business Ethics***. Oxford University Press Inc:New York.

9. Murthy, C.S.V. (2016). Business ***Ethics – Text and Cases***. Himalaya Publishing House Pvt. Ltd:Mumbai

10. Naagrajan, R.R (2016). ***Professional Ethics and Human Values***. New Age International Publications: New Delhi.