EKLAVYA UNIVERSITY
ज्ञान प्राप्तये लक्ष्य संधानम्
Estd. by Madhya Pradesh Niji Vishvavidyalaya (Sthapna Evam Sanchalana) Adhyadesh, 2020

SCHOOL OF ENGINEERING

SYLLABUS
ELECTRONICS & COMMUNICATION ENGIEERING

Class		**B.Tech. (EC)**	**L**	**T**	**P**	**C**
Semester/Year		**VII SEM/IV YEAR**	**3**	**1**	**-**	**4**
Subject		**Wireless Communication**				
Subject Code		**BEC20S701**				
Paper	**English**					
	Hindi					
Max. Marks		**100**				

Course Objective:

1. Identify and discuss the fundamental operational and design problems of wireless communication systems.
2. Apply basic techniques to design radio links and basic communication systems.

Course Outcome:-

After successful completing this course, the students will be able to:

CO1. Explain and compare the various cellular systems and its components.

CO2. Apply and analyze mobile communication concepts.

CO3. Describe network and system architecture, channel concept and system Operations in TDMA and CDMA systems.

CO4. Apply and analyze radio propagation models, coding and modulation Techniques in Wireless Communication systems.

CO5. Analyze improved data services in cellular communication.

Unit	Syllabus	Periods
UNIT - I	Introduction Applications and requirements of wireless services: history, types of services, requirements for the services, economic and social aspects. Technical challenges in wireless communications: multipath propagation, spectrum limitations, limited energy, user mobility, noise and interference-limited systems. Propagation mechanism: free space loss, reflection and transmission, diffraction, scattering by rough surfaces, wave guiding.	10

UNIT - II	Wireless Propagation channels Statistical description of the wireless channel: time invariant and variant two path models, small-scale fading with and without a dominant component, Doppler spectra, temporal dependence of fading, large scale fading. Wideband and directional channel characteristics: causes of delay dispersion, system theoretic description of wireless channels, WSSUS model, condensed parameters, ultra wideband channels, directional description.	9
UNIT - III	Channel models: Narrowband, wideband and directional models, deterministic channel modeling methods. Channel sounding: Introduction, time domain measurements, frequency domain analysis, modified measurement methods, directionally resolved measurements. Antennas: Introduction, antennas for mobile stations, antennas for base stations.	9
UNIT - IV	Transceivers and signal processing: Structure of a wireless communication link: transceiver block structure, simplified models. Modulation formats, demodulator structure, error probability in AWGN channels, error probability in flat-fading channels, error probability in delay and frequency-dispersive fading channels.	8
UNIT - V	Diversity: Introduction, micro diversity, macro diversity and simulcast, combination of signals, error probability in fading channels with diversity reception, transmit diversity. Equalizers: Introduction, linear equalizers, decision feedback equalizers, maximum likelihood sequence estimation (Viterbi detector), comparison of equalizer structures, fractional spaced equalizers, blind equalizers.	11

Text Book:

1. Molisch: Wireless Communications, Wiley India.
2. Taub and Schilling: Principles of Communication Systems, TMH.

References Books:

1. Haykin: Mordern Wireless Communication, Pearson Education.
2. Upena Dalal: Wireless Communication, Oxford University Press.
3. Rappaport: Wireless Communication, Pearson Education.

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Class		**B.Tech. (EC)**	**L**	**T**	**P**	**C**
Semester/Year		**VII SEM/IV YEAR**	**2**	**1**	**-**	**3**
Subject		**Satellite & Radar Communication Systems**				
Subject Code		**BEC20S702**				
Paper	**English**					
	Hindi					
Max. Marks		**100**				

Course objective:

1. The main objective of the course is to provide a comprehensive and state of the art knowledge in the area of satellite communication and radar Systems.

Course Outcome:-

After successful completing this course, the students will be able to:

CO1: Explain Basic Concepts and Terminologies of Satellite Communication.
CO2: Design the Earth Station and Space Craft System.
CO3: Calculate the Link Power Budget Including Propagation Effects in Satellite.
CO4: Evaluate the Various Performance Factors Related to the RADAR.
CO5: Explain Target Detection and Tracking using Radar Systems.

Unit	Syllabus	Periods
UNIT - I	Introduction to Satellite Communication, Origin and History of Satellite Communication, Current State of Satellite Communication, Orbital Aspect of Satellite Communication , Orbital Mechanism, Equation of Orbit, Locating Satellite in Orbit , Orbital Elements ,Orbital Perturbation Frequency Allocations and Applications	10
UNIT - II	Altitude and Orbit Control System , Telemetry Tracking and Commend Power System, Communication Sub System, Earth Station Design , Antenna Tracking, LNA, HPA,RF, Multiplexing Factor Affecting Orbit Utilization, Tracking, Equipment for Earth Station.	9
UNIT - III	Satellite Link Design, System Noise Temperature and G/T Ratio, Downlink Design, Domestic Satellite System, Uplink Design, Earth Path Propagation Effect, Losses in Link Design.	9

UNIT - IV	Principles Of RADAR, Radar Frequencies, Pulse RADAR, RADAR Range Equation, RADAR Application, RADAR Cross Section of Targets RADAR Indicator, Noise Figure of Receiver, Mixer Duplexer, LinePulsar.	8
UNIT - V	MTI RADAR, Delay Line Canceller, Digital Signal Processing, Limitation of MTI RADAR, CW RADAR, FM CW RADAR.	11

Text Book:

1. Satellite Communications – Timothy Pratt, Charles Bostian and Jeremy Allnutt, WSE, Wiley Publications, 2nd Edition, 2003.
2. RADAR System –Skolnik, 4th Edition, Tata McGraw-Hill, 2006.

References Books:

1. Satellite Communications Engineering – Wilbur L. Pritchard, Robert A Nelson and Henri G. Suyderhoud, 2nd Edition, Pearson Publications, 2003.
2. Satellite Communication - D.C Agarwal, Khanna Publications, 5th Ed, 2007.
3. Satellite Communications – Dennis Roddy, McGraw Hill, 2nd Edition, 1996.

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ELECTRONICS & COMMUNICATION ENGIEERING

Class		**B.Tech. (EC)**	**L**	**T**	**P**	**C**
Semester/Year		**VII SEM./IV YEAR**	**2**	**1**	**-**	**3**
Subject		**VLSI Design**				
Subject Code		**BEC20S703**				
Paper	**English**					
	Hindi					
Max. Marks		**100**				

Course objective:

1. To understand the fundamental properties of digital CMOS logic circuits using basic MOSFET equations and to develop skills for various logic circuits using CMOS design.

Course Outcome:

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

CO1. Analyze the working of CMOS Transistors in different Modes of Operation.
CO2. Derive the Static Characteristics of Resistive Load, N-Type MOSFET Load CMOS Inverters.
CO3. Evaluate the Propagation Delay and Power Dissipation of a CMOS Inverter.
CO4. Design a CMOS Logic Circuit and Layout Design for a Given Boolean Function.
CO5. Analyze the Design and Operation of Various Semiconductor Memories.

Unit	Syllabus	Periods
UNIT - I	**MOS Transistor:** The Metal Oxide Semiconductor (MOS) Structure, The MOS System under External Bias, Structure and Operation of MOS Transistor (MOSFET), MOSFET Current-Voltage Characteristics, MOSFET Scaling and Small-Geometry Effects, MOSFET Capacitances.	8
UNIT - II	**MOS Inverters Static Characteristics:** Introduction, Voltage Transfer Characteristic (VTC), Noise Immunity and Noise margins, Resistive-Load Inverter, Inverters with n-Type MOSFET Load and CMOS Inverter, DC Characteristics of CMOS Inverter, Calculation of VIL, VIH, VOL, VOH and Vth, Design of CMOS Inverters, Supply Voltage Scaling in CMOS Inverters, Power and Area considerations.	9
UNIT - III	**MOS Inverters Dynamic Characteristics:** Switching Characteristics and Interconnect Effects, Switching Characteristics of CMOS Inverter- Delay-Time Definitions, CMOS Propagation Delay, Calculation of Delay times, Power Dissipation-Switching, Short-Circuit and Leakage Components of Energy and Power, Power-Delay Product.	9

UNIT - IV	**CMOS Logic Structures and Layout Design:** Combinational MOS logic circuits- CMOS Logic circuits (NAND, NOR and Complex Logic Gates, Multiplexers etc.), CMOS Transmission Gates (Pass Gates). CMOS n-Well Process, layout design rules, layout design of CMOS Inverter, designing of stick diagram.	8
UNIT - V	**Semiconductor Memories and Low-Power CMOS Logic Circuits:** Semiconductor memories: non- volatile and volatile memory devices, flash memories, SRAM cell design, 1T DRAM cell design, dynamic CMOS logic circuits, domino logic CMOS circuits.	9

Text Books

1. Sung-Mo Kang & Yusuf Leblebici, "CMOS Digital Integrated Circuits – Analysis and Design", 3rd Edition, Tata McGraw-Hill, New Delhi, 2003.
2. Jan M. Rabaey, Anantha Chandrakasan and Borivoje Nikolic, "Digital Integrated Circuits: a design perspective", 2nd Edition, Pearson Education, 2003.

Reference Books

1. David A. Hodges, Horace G. Jackson, Resve A. Saleh, "Analysis and Design of Digital Integrated Circuits: In Deep Submicron Technology", McGraw, 2003.
2. David A. Johns and Ken Martin, "Analog Integrated Circuit Design" John Wiley and Sons Inc., 1997.
3. Neil Weste and David Harris, "CMOS VLSI Design: A Circuits and Systems Perspective", 4th Edition, Addison-Wesley, 2010
4. John P.Uyemura, "CMOS Logic Circuit Design", Springer International Edition.2005.Logic Circuit Design", Springer InternationalEdition.2005.

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SYLLABUS
ELECTRONICS & COMMUNICATION ENGIEERING

Class		B.Tech. (EC)	L	T	P	C
Semester/Year		VII SEM/IV YEAR	2	1	-	3
Subject		Microwave Engineering				
Subject Code		BEC20S704				
Paper	English					
	Hindi					
Max. Marks		100				

Course objectives:

1. The goal of this course is to introduce students to the concepts and principles of the advanced microwave engineering, theory and design of passive and active microwave components, and microwave circuits.

Course Outcomes

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

CO1. Analyze Rectangular and Circular Waveguides.
CO2. Calculate S- parameters of Microwave components.
CO3. Describe the working characteristics and applications of Microwave Tubes.
CO4. Explain the working characteristics and applications of Microwave Diodes.
CO5. Measure VSWR, Impedance, Frequency, Dielectric Constant Power, Attenuation and phase shift and planar transmission lines.

Unit	Syllabus	Periods
UNIT - I	**Waveguides**: Review of Maxwell's equation, Rectangular Waveguides, Characteristics of TE and TM wave in Rectangular Wave Guides, Dominant mode in Rectangular Waveguide, Cylindrical Waveguides, Waveguide Excitation.	8
UNIT - II	**Microwave components & their S-parameters Analysis**: Microwave Resonator, Microwave Network representations. Scattering Matrix, S-Matrix for two, three & four port Networks such as E- plane Tee, H-plane Tee, Magic Tee, Directional Coupler, Tuning Screw, Quarter Wave Transformer, Matched Load, Isolator, Circulator.	9

UNIT - III	**Microwave Tubes** : Transit Time Effect, Tubes for very high frequency, Limitation of Conventional Tubes, Reflex Klystron, Two Cavity Klystron, Magnetron, Travelling Wave Tube.	9
UNIT - IV	**Microwave Solid State Devices**: Pin diode, Tunnel diode, Gunn Effect devices, Varactor diode, IMPATT diode, Circuit applications of above devices.	8
UNIT - V	**Microwave Measurement and Introduction to Planer Transmission lines:** Measurement of VSWR, Impedance, Frequency, Dielectric Constant Power, Attenuation and Phase Shift, Planar Transmission lines, Introduction to Micro Strip Lines, Slotlines, Coplanar lines.	9

Text books:

1. Microwave Devices and Circuits, Samuel Y. Liao, Prentice Hall, 3rd edition, 2003.
2. Microwave engineering-David M. Pozar, 4th ed., John Wiley & Sons, Inc., 2004.

Reference Books:

1. Introduction to Microwaves -Wheeler G.J., Literary Licensing, LLC,2012
2. Microwave circuits & passive devices- Sisodia and Raghuvanshi, New age International, 1st edition, 1987.
3. Microwave and Radar Engineering. Kulkarni, 5th edition, Dipan, 2016.

SYLLABUS

B.TECH.

Class		**B. Tech.(EC/EX/CSE/ME/CE)**	**L**	**T**	**P**	**C**
Semester/Year		**VII/IV**	**2**	**1**	**-**	**3**
Subject Name		**Digital and Social Media Marketing**				
Subject Code		**BOC20S705**				
Paper	**English**					
	Hindi					
Max. Marks		**100**				

Course Objective:

1. The program aims at developing an overall understanding of digital marketing / online marketing platforms, mainly web analytics, social media tools, marketing through search engines, search engine optimization, mobile marketing, email marketing, Pay per click, digital display marketing, content marketing and Strategizing marketing.

Course Outcomes:

By the end of the course students will be able to:

CO1. To use Social Media Platforms like Facebook, Instagram, Twitter, Instagram, YouTube, pinterest, LinkedIn, etc. for the organic promotion of any business or service.

CO2. To identifies the niche areas where you can become an influencer.

CO3. To identifies and incorporates widely used tools for the social media activities.

CO4. To starts as a freelancer.

CO5. To promote own / ancestral business organically using Social Media.

Unit	Syllabus	Periods
UNIT-I	Introduction of the Digital Marketing Mastermind Program; Creating initial Digital Marketing Plan; SWOT Analysis; Target Group Analysis; Content management; Optimization of Web Sites; MS Excel for PPC Campaign Optimization; SEO Optimization; CRM platform; Google Analytics; Social Media Marketing; Budgeting.	**10**

UNIT-II	SWOT Analysis, Finding Target Audience, Content Creation and Promotion, Website Design and Optimization, Persuation Tactics, Search Engine Optimization (SEO), CRM Platforms, Email Marketing, Website/Data/Google Analytics, Social Media Marketing & Optimization, Budgeting and Market and Competitor Analysis.	**10**
UNIT-III	Define a Target Group; Creating Web Sites; Writing the SEO content; SEO Optimizacija; Google AdWords; CRM Platform; Social Media Marketing Plan; Making a Facebook page; Budgeting; Final presentation.	**8**
UNIT-IV	An overview of Social Media Marketing + What is Social Media and the broadening scope of Social Media + Social Media Statistics + Social Media Marketing Strategy + Impact of Social Media on SEO.	**5**
UNIT-V	Facebook: Setup an Account in Facebook. + The Facebook Marketing Strategy, What Makes your Facebook Page Awesome? (If you can't answer that question...this below lecture is a must watch!) - Orientation to Facebook Brand Pages - Facebook business page setup - Types of Facebook Business pages, Facebook: Post Types and its Dimensions + All You Need to know the Best Time to Post on Facebook, Facebook Audience Insights & Analytics, Facebook Competitor Analysis , Facebook Groups , Facebook Live , Successful Case Studies on Facebook , A Successful Study on How to Make Money Through Facebook.	**15**

TEXT BOOKS:

1. Digital Marketing for Dummies Author: Ryan Deiss & Russ Henne berry Publisher: John Wiley & Sons, Inc.
2. Epic Content Marketing Author: Joe Pulizzi Publication: McGraw Hill Education.

REFERENCE BOOKS:

1. The End of Marketing: Humanizing Your Brand in the Age of Social Media and AI by Carlos Gil.
2. See You On The Internet: Building Your Small Business With Digital Marketing by Avery Swartz.

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SYLLABUS

B.TECH.

Class		**B. Tech. (EC/EX/CSE/ME/CE)**	**L**	**T**	**P**	**C**
Semester/Year		**VIII/IV**	**3**	**-**	**-**	**3**
Subject Name		**Entrepreneurship Development**				
Subject Code		**BOC20S706**				
Paper	**English**					
	Hindi					
Max. Marks						

Course Objective:

1. Learn how to start an enterprise and design business plans those are suitable for funding by considering all dimensions of business. Understand entrepreneurial process by way of studying different case studies and find exceptions to the process model of entrepreneurship.

Course Outcomes:

By the end of the course students will be able to
CO1: Develop idea generation, creative and innovative skills
CO2: Aware of different opportunities and successful growth stories
CO3: Learn how to start an enterprise and design business plans those are suitable for funding by considering all dimensions of business.
CO4: Understand entrepreneurial process by way of studying different case studies and find exceptions to the process model of entrepreneurship.
CO5: Run a small enterprise with small capital for a short period and experience the science and art of doing business.

Unit	Syllabus	Periods
UNIT-I	**INTRODUCTION TO ENTREPRENEURSHIP** Understanding the Meaning of Entrepreneur; Characteristics and Qualities of an Entrepreneur; Entrepreneurs Vs. Entrepreneurs and Managers; Classification of Entrepreneurs; Factors Influencing	**10**

	Entrepreneurship; Entrepreneurial Environment; Entrepreneurial Growth; Problems and Challenges of Entrepreneurs; Entrepreneurial Scenario in India.	
UNIT-II	**MICRO, SMALL AND MEDIUM ENTERPRISES (MSMES)** MSMEs – Definition and Significance in Indian Economy; MSME Schemes, Challenges and Difficulties in availing MSME Schemes, Forms of Business; Women Entrepreneurship; Rural Entrepreneurship; Family Business and First Generation Entrepreneurs.	**8**
UNIT-III	**IDEA GENERATION AND FEASIBILITY ANALYSIS** Idea Generation; Creativity and Innovation; Identification of Business Opportunities; Market Entry Strategies; Marketing Feasibility; Financial Feasibilities; Political Feasibilities; Economic Feasibility; Social and Legal Feasibilities; Technical Feasibilities; Managerial Feasibility, Location and Other Utilities Feasibilities.	**8**
UNIT-IV	**BUSINESS MODEL AND PLAN IN RESPECTIVE INDUSTRY** Business model – Meaning, designing, analyzing and improvising; Business Plan – Meaning, Scope and Need; Financial, Marketing, Human Resource and Production/Service Plan; Business plan Formats; Project report preparation and presentation; Why some Business Plan fails?	**10**
UNIT-V	**FINANCING AND HOW TO START UP BUSINESS?** Financial opportunity identification; Banking sources; Non-banking Institutions and Agencies; Venture Capital – Meaning and Role in Entrepreneurship; Government Schemes for funding business; Pre launch, Launch and Post launch requirements; Procedure for getting License and Registration; Challenges and Difficulties in Starting an Enterprise.	**10**

TEXT BOOKS:

1. Entrepreneurial Development Author: Jayshree Suresh Publication: Margham Publishers, Chennai.
2. Entrepreneurship development small business enterprises Author: Poornima M Charantimath. Publication: Pearson, 2013.

REFERENCE BOOKS:

1. Name: The Design of Business Author: Martin Roger Publication: Harvard Business Publishing, 2009.
2. Name: Entrepreneurship Author: Roy Rajiv Publication: Oxford University Press, 2011.
3. Name: Innovation and Entrepreneurship Author: Drucker. F, Peter Publication: Harper.

SYLLABUS

B.TECH.

Class		**B. Tech.(EC/EX/CSE/ME/CE)**	**L**	**T**	**P**	**C**
Semester/Year		**VIII/IV**	**3**	**-**	**-**	**3**
Subject Name		**Biometrics**				
Subject Code		**BOC20S707**				
Paper	**English**					
	Hindi					
Max. Marks		**100**				

Course Objective:

1. To understand the concepts of Biometrics, to enable design of biometric system.

Course Outcomes:

By the end of the course students will be able to

CO1: Apply biometric matching for identification.
CO2: Identify algorithms for finger biometric technology.
CO3. Apply facial biometrics for identification.
CO4: Apply iris biometric, voice biometric, physiological biometrics etc. for identification.
CO5: Will able to understand Biometrics System security.

Unit	Syllabus	Periods
UNIT-I	Introduction of biometric traits and its aim, Image processing/pattern recognition/statistics, Error types. Image processing basic: what is image, acquisition, type, point operations, Geometric transformations. Llinear interpolation, brightness correction, histogram, Basic image operations: Convolution, linear/non-linear filtering, Guassian, Median, Min, gray level reduction.	**8**
UNIT-II	Special filters, enhancement filter, Edge detection, derivatives, Laplacian, unsharp masking, high boot filtering, sharpening special filtering, Edge detection. First and second derivative, steps in edge detection, smoothening, enhancement, thresholding, localization, Robert's method, Sobal's method, Pervitt and sobal, Laplacian of Gaussian, Zero crossing.	**8**

UNIT-III	Canny edge detection, Fourier Series, DFT, inverse of DFT. Biometric system, authentication, physiological and behavioral properties, properties of biometric system, application areas. PCA, Eigen vectors and values, 2D-PCA, generalization to p-dim, covariance and correlation, algebra of PCA, projection of data.	**8**
UNIT-IV	Identification/verification, Threshold, Score distribution, FAR/FRR, System design issues, Positive/negative identification, Biometric system security, Authentication protocols, Authentication methods.	**5**
UNIT-V	Matching, null and alternative hypothesis h0, h1,Error type I/II, Matching score distribution, FM/FNM, ROC curve, DET curve, FAR/FRR curve. Comparing two systems using ROC curve, Expected overall error, EER, available best error rates, cost function, biometric myths and misrepresentations, negative authentication, trade-offs b/w security and convenience.	**15**

TEXT BOOKS:

1. Reid, P., Biometrics for Network Security, Dorling Kingsley (2007).
2. Woodward, J.D. and Orlans, Nicholos M., Biometrics, McGraw Hill (2002).

REFERENCE BOOKS:

1. Digital Image Processing using MATLAB, By: Rafael C. Gonzalez, Richard Eugene Woods, 2nd Edition, Tata McGraw-Hill Education 2010.
2. Guide to Biometrics, By: Ruud M. Bolle, Sharath Pankanti, Nalini K. Ratha, Andrew W. Senior, Jonathan H. Connell, Springer 2009.
3. Pattern Classification, By: Richard O. Duda, David G. Stork, Peter E. Hart, Wiley 2007.

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ELECTRONICS & COMMUNICATION ENGIEERING

Class		**B.Tech. (EC)**	**L**	**T**	**P**	**C**
Semester/Year		**VII SEM/IV YEAR**	**2**	**-**	**-**	**2**
Subject		**Intellectual Property Rights(IPR)**				
Subject Code		**BIP20S708**				
Paper	**English**					
	Hindi					
Max. Marks		**100**				

Course objective:

1. To acquaint the learners with the basic concepts of Intellectual Property Rights. To develop expertise in the learners in IPR related issues and sensitize the learners with emerging issues in IPR and the rationale for the protection of IPR.

Course Outcomes:

At the end of this course, the student will be able to:

CO1. Imbibe the knowledge of Intellectual Property and its protection through various laws.

CO2. Apply the knowledge of IPR for professional development.

CO3. Develop a platform for protection and compliance of Intellectual Property Rights & knowledge.

CO4. Create awareness amidst academia and industry of IPR and Copyright compliance.

CO5. Deliver the purpose and function of IPR and patenting.

Unit	Syllabus	Periods
UNIT - I	**Introduction**: Introduction to IPRs, Basic concepts and need for Intellectual Property – Meaning and practical aspects of Patents, Copyrights, Geographical Indications, IPR in India and Abroad. Nature of Intellectual Property, Industrial Property, technological Research, Inventions and Innovations – Important examples of IPR.	10
UNIT - II	**Intellectual Property Rights**: The IPR tool kit, Patents, the patenting process, Patent cooperation treaties: International Treaties and conventions on IPRs, TRIPS Agreement, PCT Agreement, Patent Act of India, Patent Amendment Act, Design Act, Trademark Act, Geographical Indication Act.	9

UNIT - III	**Intellectual Property Protections**: IPR of Living Species, protecting inventions in biotechnology, protections of traditional knowledge, biopiracy and documenting traditional knowledge, Digital Innovations and Developments as Knowledge Assets – IP Laws, Cyber Law and Digital Content Protection. Case studies: The basmati rice issue, revocations of turmeric patent, revocation of neem patent.	9
UNIT - IV	**Exercising and Enforcing of Intellectual Property Rights**: Rights of an IPR owner, licensing agreements, criteria for patent infringement. Case studies of patent infringement, IPR – a contract, unfair competitions and control, provisions in TRIPs.	8
UNIT - V	**Role of Patents in Product Development & amp**: Commercialization, Recent changes in IPR laws impacting patents and copy rights, intellectual cooperation in the science and allied industry. Patentable and non-patentable research. Case studies.	11

Text Book:

1. P.B. Ganguli, Intellectual Property Rights: Unleashing the Knowledge Economy. Tata Mc Graw Hill, 2001.
2. Steve Smith, The Quality Revolution.1st ed., Jaico Publishing House, 2002.
3. Kompal Bansal and Praishit Bansal. Fundamentals of IPR for Engineers, 1st Edition, BS Publications, 2012.

References Books:

1. R Radha Krishnan & S Balasubramanian. Intellectual Property Rights. 1st Edition, Excel Books, 2012.
2. M Ashok Kumar & Mohd. Iqbal Ali. Intellectual Property Rights. 2nd Edition, Serial Publications, 2011.
3. Vinod V. Scople, Managing Intellectual Property. Prentice Hall of India PvtLtd, 2012.
4. Deborah E. Bouchoux. Intellectual Property: The Law of Trademarks, Copyrights, Patents and Trade Secrets. Cengage Learning, 3rd ed. Edition, 2012.

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ELECTRONICS & COMMUNICATION ENGIEERING

Class		**B.Tech. (EC)**	**L**	**T**	**P**	**C**
Semester/Year		**VII SEM/IV YEAR**	**-**	**-**	**4**	**2**
Subject		**VLSI Lab**				
Subject Code		**BEC20S709**				
Paper	**English**					
	Hindi					
Max. Marks		**100**				

Course objective:

1. To learn the fundamental principles of CMOS VLSI circuit design using SYMICA EDA CAD tool.

Course Outcomes:

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

CO1. Demonstrate a clear understanding in hardware design language Verilog and SPICE.
CO2. Model a combinational circuit using hardware description language Verilog and SPICE Netlist.
CO3. Model a sequential circuit using hardware description language Verilog and SPICE Netlist.
CO4. Model a computational circuit using hardware description language Verilog and SPICE Netlist.
CO5. Simulate and validate the functionality of the CMOS VLSI circuits using CAD tools.

List of Experiments:

Digital CMOS logic circuit design using SYMICA CAD tool:

1. Design and simulate basic CMOS logic Gates: AND, OR, NOT.
2. Design and simulate CMOS logic universal gates: NAND and NOR.
3. Design and simulate CMOS logic 2:1MUX.
4. Design and simulate CMOS logic 2 x 4Decoder.
5. Design and simulate CMOS logic Half-Adder and Full Adder.
6. Design and simulate CMOS logic RS, JK and D flip-flops.

Gate level design using SYMICA CAD tool:

1. Design and simulate a Verilog program for the following combinational designs:
   a) 2 to 4decoder
   b) 8 to 1multiplexer
   c) 4 bit binary to gray converter
2. Design and simulate a Verilog code to describe the functions of a full adder using three modeling styles.
3. Design and simulate a model for 32 bit ALU.

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SYLLABUS

ELECTRONICS & COMMUNICATION ENGIEERING

Class		**B.Tech. (EC)**	**L**	**T**	**P**	**C**
Semester/Year		**VII SEM/IV YEAR**	**-**	**-**	**4**	**2**
Subject Name		**Summer Internship Project-III**				
Subject Code		**BEC20S710**				
Paper	**English**					
	Hindi					
Max. Marks		**100**				

COURSE OBJECTIVES:

1. To encourage students to read, study & understand different topics of Computer Science engineering.
2. To make student acquire good oral & written communication skills.
3. To promote the habit of lifelong learning.

COURSE OUTCOMES:

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

CO1: Observe various activities in field.
CO2: Examine the utility of general and specific Software tool for Development.
CO3: Differentiate the construction projects individually and in team.
CO4: Develop the writing and communication skills for various engineering problems.
CO5: Adapt lifelong learning for benefit of society.

Syllabus:

1. Each candidate shall go for 1 month (4 week) on field training at different organizations/ sites of his / her choice after completion of their 6th Semester exams (in summer vacations) and shall submit a detailed report after completion of training.
2. Candidates will be taken to nearby places where electrical and electronics engineering works are being carried out during the semester and they shall have to submit a detailed report of their visit.

SYLLABUS

ELECTRONICS & COMMUNICATION ENGIEERING

Class		B.Tech. (EC)	L	T	P	C
Semester/Year		VII SEM/IV YEAR	-	-	4	2
Subject Name		Major Project -I				
Subject Code		BCS20S711				
Paper	English					
	Hindi					
Max. Marks		50				

Course Objective:

1. The internship/project experience gives students an opportunity to integrate theory and practice by working in a supervised setting. Consultation and reporting to the faculty advisor guides the student's experience to maximize learning.

Course Outcomes:

By the end of the course students will be able to

CO1. Integrate and apply theory and understandings from CS courses in a work environment.
CO2. Use common techniques and skills of the computer and information technology field.
CO3. Observe and take part in the management of technology changes within an organization.
CO4. Understand the industry environment of the organization providing the internship.
CO5. Understand the impact and role of computer and information technology on an organization.
CO6. Demonstrate community involvement and reflect on the issues encountered in that involvement.

Syllabus:

Students should keep an activities and impressions throughout the internship/Project experience. At the mid-point of the experience, a summary report of those experiences is due which gives an overview of the typical daily or weekly activities including: tasks performed, interactions made with employees, meetings attended, project Developed and the overall atmosphere of the work environment. Identify the positive and negative things about the

internship along with observations and reservations made about the job or career. Note any new skills, knowledge, or insights acquired or new perspectives on older skills, knowledge, or insights. The final report summarizes the internship experience by identifying the significant learning experiences and contributions to the organization served. Include what you have learned about your own aptitudes and abilities, what you have learned about the way an organization operates, and specific skills that you were able to develop or enhance during your internship. Describe the contribution that you feel you made to your organization during the internship/project. Describe the highlights of your internship/ project and how the experience could have been improved.

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SCHOOL OF ENGINEERING

SYLLABUS
ELECTRONICS & COMMUNICATION ENGIEERING

Class		**B.Tech. (EC)**	**L**	**T**	**P**	**C**
Semester/Year		**VIII SEM/IV YEAR**	**2**	**1**	**-**	**3**
Subject		**Applied Electromagnetics for Engineers**				
Subject Code		**BEC20S801**				
Paper	**English**					
	Hindi					
Max. Marks		**100**				

Course objective:

1. This course covers Maxwell's equations, boundary conditions for electromagnetics, plane-wave propagation in lossless and lossy media, wave reflection and transmission, transmission lines and waveguides, cavity resonators, radiation, antennas, antenna radiation characteristics.

Course Outcome:-

After successful completing this course, the students will be able to:

CO1. Learn the basics of transmission lines (TL), propagation of harmonic signals on TL, TL parameters and equations. Be able to apply the knowledge in basic analysis and design problems.

CO2. Learn the basics of the Smith Chart as a tool for transmission line calculations, and be able to use it for basic parameter calculation and analysis of transmission lines.

CO3. Emphasize understanding of Maxwell's equations in differential and integral forms in solving electromagnetic problems.

CO4. Understand the concept of plane-wave propagation in a lossless and lossy media.

CO5. Use knowledge on wave reflection and transmission of plane waves for normal and oblique incidence, and basic analysis of transmission in optic fibers and rectangular cavities.

Unit	Syllabus	Periods
UNIT - I	Static Electric Fields: Co-ordinate systems – Review - Line integral - Surface integral – Gradient – Divergence – Curl- Stoke's theorem - Divergence theorem - Helmholtz theorem.	10
UNIT - II	Electrostatics - Postulates - Coulomb's law - Gauss law - Electric potential - Behaviour of conductors and dielectric in static fields - Dielectric constant - Poisson's and Laplace equation.	9

UNIT - III	Steady currents and magnetic fields: Current density - Point form of Ohm's law – Continuity equation - Lorentz force - Magneto statics.	9
UNIT - IV	Postulates - Magnetic vector potential – Biot-Savart law - Relative permeability - Hall effect.	8
UNIT - V	Electromagnetic Fields: Faraday's law of Induction - Maxwell's equations - Differential and Integral Forms - Boundary Conditions for electromagnetic fields - Wave equation - Time harmonic electromagnetic fields.	11

TEXTBOOKS

1. David K. Cheng, "Field and Wave Electromagnetics", Pearson Education, Second Edition, 2002.

REFERENCES

1. Clayton R. Paul, Keith W. Whites, Syed A. Nasar, "Introduction to Electromagnetic Fields", Tata McGraw-Hill Education Private Limited, Third Edition (Fifth Reprint), 2009.
2. 2. Kraus, Fleisch, "Electromagnetics with Applications", Tata McGraw Hill Education Private Limited, Fifth Edition, 2004.

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ELECTRONICS & COMMUNICATION ENGIEERING

Class		**B.Tech. (EC)**	**L**	**T**	**P**	**C**
Semester/Year		**VIII SEM/IV YEAR**	**2**	**1**	**-**	**3**
Subject		**Op-Amp Practical Applications: Design, Simulation and Implementation**				
Subject Code		**BEC20S802**				
Paper	**English**					
	Hindi					
Max. Marks		**100**				

Course objective:

1. This course is a system design-oriented course aimed to provide exposure on applications of op-amps and its importance in the real world. Since analog circuits play a crucial role in the implementation of an electronic system, this course emphasis 0n complete system design with initial discussion on circuit design.

Course Outcome:-

After successful completing this course, the students will be able to:

CO1. Understanding the Datasheet of Op-Amp.

CO2. Understand the basics of Hysteresis and the need of hysteresis in switching circuits.

CO3. To design and build a function generator capable of generating square wave .

CO4. To design and build a constant current drive circuit for measuring unknown resistance using simulation.

CO5. To design and build a signal conditioning circuit for the thermocouple.

Unit	Syllabus	Periods
UNIT - I	Understanding the Datasheet of Op-Amp Introduction to op-amps and discussion on its characteristics by simulation and experiment. Understand the basics of Hysteresis and the need of hysteresis in switching circuits. Op-Amp Circuits Analog-to-Digital Converter (ADC).	10
UNIT - II	Digital-to-Analog Converter (DAC) using Op-Amps. To design and build a function generator capable of generating square wave and a triangular wave of a known frequency using simulation and experiment by TI analog system	9

	lab kit.	
UNIT - III	To design and build a voltage-controlled oscillator using simulation and TI analog system lab kit. To design and build an automatic volume control using simulation and TI analog system lab kit.	9
UNIT - IV	To design and build a constant current drive circuit for measuring unknown resistance using simulation and Experiment on bread. To design and build a temperature controlled system using op-amps as ON-OFF controller and Proportional controller by simulation and Experiment on bread board.	8
UNIT - V	To design and build a signal conditioning circuit for the thermocouple to compensate for temperature correction.To design and Implement a speed controller of a DC motor using simulation and experiment.	11

TEXT BOOKS:

1. David K. Cheng, "Field and Wave Electromagnetics", Pearson Education, Second Edition, 2002.

REFERENCE BOOKS:

1. Clayton R. Paul, Keith W. Whites, Syed A. Nasar, "Introduction to Electromagnetic Fields", Tata McGraw-Hill Education Private Limited, Third Edition (Fifth Reprint), 2009.
2. Kraus, Fleisch, "Electromagnetics with Applications", Tata McGraw Hill Education Private Limited, Fifth Edition, 2004.

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SYLLABUS

ELECTRONICS & COMMUNICATION ENGIEERING

Class		**B.Tech. (EC)**	**L**	**T**	**P**	**C**
Semester/Year		**VIII SEM/IV YEAR**	**2**	**1**	**-**	**3**
Subject Name		**Digital VLSI Testing**				
Subject Code		**BEC20S803**				
Paper	**English**					
	Hindi					
Max. Marks		**100**				

Course Objective:

1. To learn the basic of DFT.
2. To learn the ATPG Basics.
3. To understand the operation of Fault Simulation.

Course Outcomes:

By the end of the course students will be able to

CO1: Analyze the use of procedural statements and routines in test bench design with system verilog.

CO2: Apply OOP concepts in designing test bench with system verilog.

CO3: Apply randomization concepts in designing test bench.

CO4: Understand use of multithreading and inter process communication in test bench design.

CO5: Interface a system verilog test bench with system C.

Unit	Syllabus	Periods
UNIT-I	Introduction: Importance, Challenges, Levels of abstraction, Fault Models, Advanced issues Design for Testability: Introduction, Testability Analysis, DFT Basics, Scan cell design, Scan Architecture.	**10**
UNIT-II	Design for Testability: Scan design rules, Scan design flow Fault Simulation: Introduction, Simulation models. Fault Simulation: Logic simulation, Fault simulation. Test Generation: Introduction, Exhaustive testing, Boolean	**12**

	difference, Basic ATPG algorithms.	
UNIT-III	Test Generation: ATPG for non stuck-at faults, Other issues in test generation Built-In-Self-Test: Introduction, BIST design rules .Built-In-Self-Test: Test pattern generation, Output response analysis, Logic BIST architectures	**11**
UNIT-IV	Test Compression: Introduction, Stimulus compression. Test Compression: Stimulus compression, Response compression. Memory Testing: Introduction, RAM fault models, RAM test generation.	**13**
UNIT-V	Memory Testing: Memory BIST Power and Thermal Aware Test: Importance, Power models, Low power ATPG. Power and Thermal Aware Test: Low power BIST, Thermal aware techniques	**10**

TEXT BOOK:

1. Cracking Digital VLSI Verification Interview Interview Success Ramdas Mozhikunnath, Robin Garg.

REFERENCE BOOK:

1. Characterization and Modeling of Digital Circuits second edition Rohit Sharma.

SYLLABUS

B.TECH.

Class		**B.TECH. (EC/EX/CS/ME/CE)**	**L**	**T**	**P**	**C**
Semester/Year		**VIII/IV**	**2**	**1**	**-**	**3**
Subject Name		**Ecology and Sustainable Development**				
Subject Code		**BOC20S804**				
Paper	**English**					
	Hindi					
Max. Marks		**100**				

Course Objectives:

1. This course introduces students to environment concerns.

2. Students are expected to learn about environment, factors affecting it, environmental ethics.

3. Its protection through lectures, presentations, documentaries and field visits.

Course Outcomes:

CO1: Understanding to solve technical /research problems in new contexts.

CO2: Describe a system, component, or process to meet desired needs within realistic constraints such as Economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability.

CO3: Critically analyze technical subject matter (written or oral) for scientific merit apply learned environmental knowledge.

CO4: This course has two primary objectives: first, to provide a structured way to think about.

CO5: Conduct research in—the field of sustainable development. Second, to introduce formal models of dynamic, coupled human and environmental systems.

Unit	Syllabus	Periods
UNIT-I	**Nature of ecology and sustainable development** Definition, scope of ecology and sustainable development, geomorphology, oceanography, climatology and biogeography.	**8**

UNIT-II	**Energy and environment** Introduction of energy environment, use of solar cells for heating and operated drills, methane gas digesters, environmentally friendly method of energy conservation, difference between conventional and non-conventional energy sources, future trends of energy systems.	**12**
UNIT-III	**Theory of isostasy** Concept of isostasy for sustainable development, discovery of the concept, concept of Hayford and Bowie, Jolly, and Holmes, Global isotactic adjustment.	**13**
UNIT-IV	**Physical geography and man human impact on the natural environment** Modification of land forms, direct alternation of land forms, wind deflation, coastal erosion and deposition, modification of the atmosphere, ultration process in eco and energy systems.	**11**
UNIT-V	**Obstacles in sustainable development** Pollution growth, species extinction, restriction of bat lands, desertification, soil erosion, soil pollution, characterisation of contaminated soil, global warming and ozone depletion etc.	**12**

TEXT BOOKS:

1. Energy and environment – Fowler (McGraw Hill, New Delhi)
2. Restoration Ecology and sustainable development – Krystyna M. Urbanska et.al. (Cambridge University Press, U.K.)
3. Evaluating Sustainable Development: Giving People a voice in their destiny.

REFERENCE BOOKS:

1. Reuniting Economy and Ecology in Sustainable Development – Russ Beaton et.al.
2. Theory and implementation of economic models for sustainable development–Jeroen C.J.M. Van Den Bergh.
3. Economy and Ecology: Towards sustainable development – F. Archibugi et.al.

SYLLABUS

B.TECH.

Class		B.TECH. (EC/EX/CS/ME/CE)	L	T	P	C
Semester/Year		VIII/IV	2	1	-	3
Subject Name		Renewable Energy Resources				
Subject Code		BOC20S805				
Paper	English					
	Hindi					
Max. Marks		100				

Course Objective

1. The objectives of this course is understand need of these sources due to crisis of conventional sources and the familiarize with nonconventional sources
2. To understand the importance of renewable energy resources.
3. Its utilization for the thermal and electrical energy needs
4. The environmental aspects of these resources.
5. To make students understand about various essential requirements of different type of building.

Course Outcomes:

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

CO1: Explain renewable energy sources & systems.

CO2: Apply engineering techniques to build solar, wind, tidal, geothermal, biofuel, fuel cell, Hydrogen and sterling engine.

CO3: Analyze and evaluate the implication of renewable energy. Concepts in solving numerical problems pertaining to solar radiation geometry and wind energy systems.

CO4: Demonstrate self -learning capability to design & establish renewable energy systems.

CO5: Conduct experiments to assess the performance of solar PV, solar thermal and biodiesel systems

Unit	Syllabus	Periods
UNIT-I	**Introduction**: Various non- conventional energy resources- Introduction, availability, classification, relative merits and demerits.	10

	Solar Cells: Theory of solar cells. Solar cell materials, solar cell array, solar cell power plant, limitations.	
UNIT-II	**Solar Thermal Energy**: Solar radiation, flat plate collectors and their materials, applications and performance, focussing of collectors and their materials, applications and performance; solar thermal power plants, thermal energy storage for solar heating and cooling, limitations.	**12**
UNIT-III	**Geothermal Energy**: Resources of geothermal energy, thermodynamics of geo- thermal energy conversion-electrical conversion, non-electrical conversion, environmental considerations. **Magneto-hydrodynamics (MHD)**: Principle of working of MHD Power plant, performance and limitations. **Fuel Cells**: Principle of working of various types of fuel cells and their working, performance and limitations.	**11**
UNIT-IV	Thermo-electrical and thermionic Conversions: Principle of working, performance and limitations. **Wind Energy**: Wind power and its sources, site selection, criterion, momentum theory, classification of rotors, concentrations and augments, wind characteristics. Performance and limitations of energy conversion systems.	**13**
UNIT-V	Bio-mass: Availability of bio-mass and its conversion theory. **Ocean Thermal Energy Conversion (OTEC)**: Availability, theory and working principle, performance and limitations. **Wave and Tidal Wave**: Principle of working, performance and limitations. Waste Recycling Plants	**10**

Textbooks:

1. Raja etal, "Introduction to Non-Conventional Energy Resources" Scitech Publications.
2. John Twideu and Tony Weir, "Renewal Energy Resources" BSP Publications, 2006.
3. M.V.R. Koteswara Rao, "Energy Resources: Conventional & Non - Conventional" BSP Publications, 2006.

Reference books

1. D.S. Chauhan,"Non-conventional Energy Resources" New Age International.
2. C.S. Solanki, "Renewal Energy Technologies: A Practical Guide for Beginners" PHI Learning.
3. Peter Auer "Advances in Energy System and Technology". Vol. 1 & II Edited by Academic Press.

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SYLLABUS

B.TECH.

Class		B.TECH. (EC/EX/CS/ME/CE)	L	T	P	C
Semester/Year		VIII/IV	3	-	2	4
Subject Name		Human Values In Madhyasth Darshan				
Subject Code		BOC20S806				
Paper	English					
	Hindi					
Max. Marks		100				

Course Objectives:

1. To help students understand the basic principles of Sankhya, Yoga and Vedanta Darshan
2. To help students understand the existential realities including the human existence through Sankhya, Yoga and Vedanta Darshan
3. To help them to see the participation of human beings in the nature/ existential realities (i.e. human values) and therefore the human conduct through each one of them
4. To help students apply this understanding to make their living better at different levels individual, family, society and nature.
5. To facilitate the students in applying this understanding in their profession and lead an ethical life.

Course Outcomes:

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

CO1: Understand the basic concepts of Sankhya, Yoga and Vedanta Darshan.

CO2: Understand the human being, the needs and activities of human being through Sankhya, Yoga and Vedanta Darshan.

CO3: Understand the whole existence.

CO4: Understand the role of human being in the entire existence, thus getting clarity about values at all levels of living and human conduct**.**

CO5: Understand the foundation of human society and human tradition.

Unit	Syllabus	Periods
UNIT-I	**Introduction to Madhyasth Darshan and its Basics** Need to study Madhyasth Darshan; introduction, basic formulations of the darshan;	

	the complete expanse of study and the natural outcome of living according to the darshan.	**8**
UNIT-II	**Submergence of Nature in Space-** The ever-present existence in the form of nature submerged in space; nature classified into two categories – material and consciousness, and four orders; the form, property, natural characteristic and self- organisation of the four orders, General direction and process of evolution in the nature/ existence.	**14**
UNIT-III	**Human Being as an indivisible part of Nature-** Human being as an indivisible part of nature; various types (five classes) of human beings; human being in the combination of self and body; purpose of self as realization, prosperity for the body; need of behavior and work for attaining the goals of realization and prosperity.	**11**
UNIT-IV	**Fulfillment of human goal of realization and prosperity-** Following natural, social and psychological principles for actualizing the human goal; Form of conducive society and order for such practices, study process- achieving realization through self-study and practice while living in such a society (social order).	**12**
UNIT-V	**Human Conduct based on Madhyasth Darshan-** Description of such a realized self, continuity of happiness, peace, satisfaction and bliss through realization, conduct of a realized human being. Possibility of finding solutions to present day problems (such as inequality of rich and poor, man and woman etc.) in the light of it.	**12**

Text-Book:

1. Nagraj, A., "Manav Vyavahar Darshan", Jeevan Vidya Prakashan, 3rd edition, 2003.
2. Vachaspati, M., "Sankhya Tatva Kaumudi", Motilal Banarasi Das Publication, Varanasi, 1921.

Reference Books:

1. Nagraj, A., "Vyavaharvadi Samajshastra", Jeevan Vidya Prakashan, 2nd edition, 2009.
2. Nagraj, A., "Avartanasheel Arthashastra", Jeevan Vidya Prakashan, 1st edition, 1998.

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SYLLABUS

ELECTRONICS & COMMUNICATION ENGIEERING

Class		**B.Tech. (EC)**	**L**	**T**	**P**	**C**
Semester/Year		**VIII SEM/IV YEAR**	-	-	12	6
Subject Name		**Major Project-II**				
Subject Code		**BEC20S807**				
Paper	**English**					
	Hindi					
Max. Marks		**400**				

Course Objective:

1. To encourage students to read, study & understand different topics of Computer Science engineering.
2. To make student acquire good oral & written communication skills.
3. To promote the habit of lifelong learning.

Course Outcomes:

By the end of the course students will be able to

CO1: Observe various activities in field.

CO2: Examine the utility of general and specific Software tool for Development.

CO3: Differentiate the construction projects individually and in team.

CO4: Develop the writing and communication skills for various engineering problems.

CO5: Adapt lifelong learning for benefit of society.

Syllabus:

The candidate shall undertake internship or project either individually or in small groups and work on the internships/ projects assigned/ approved by competent authorities. They shall submit a detailed report after completion of training.

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SYLLABUS
ELECTRONICS & COMMUNICATION ENGIEERING

Class		**B.TECH.**	**L**	**T**	**P**	**C**
Semester/Year		**VIII/IV**	**-**	**-**	**2**	**1**
Subject Name		**Professional Development**				
Subject Code		**BPD20S808**				
Paper	**English**					
	Hindi					
Max. Marks		**50**				

Course Objective:

1. The course is intended to guide you through the process of creating formal business documents, including revisions of documents after receiving feedback and constructive criticism.
2. Types of business documents examined in this course include memos, letters, resumes, executive summaries, and position papers.

Course Outcomes: Upon completion of the course, the students will be able to:

CO1: Communicate effectively and professionally in business situations through writing, speaking, and listening.

CO2: Construct a career development plan (roadmap) that outlines a path to a chosen career by delineating the skills required for the type of job, recognizing individual skill strengths and gaps, and identify activities that can be used to acquire the skills associated with the gaps.

CO3: Explain the value of networking strategies relevant to professional development; apply networking strategies to demonstrate effective networking conversations and written communications.

CO4: Demonstrate the skills needed to create, format and tailor a professional resume.

CO5: Demonstrate understanding of behavioral interview process by preparing interview questions and participating in practice behavioral interviews.

CO6: Perform research on companies identifying major products and markets, size, and growth potential within the industry.

CO7: Understand how to get a successful start in a job by demonstrating awareness of behavioral norms within a business in relationship to communication, appearance, business etiquette, and day-to-day business functions.

Syllabus:

The Professional Development course is designed to improve the ability of students to describe their accomplishments and sell their ideas in situations like professional networking, company meetings, response to proposals for services, and interviews. It teaches writing skills and workplace integration for new jobs. Particular emphasis is put on verbal communication and preparation for verbal communication. Students will learn to create career plans that require them to research career options and potential employers, and prepare a developmental roadmap that will lead them success within the chosen profession.