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

SCHOOL OF ENGINEERING

SYLLABUS

VLSI & Embedded System

Class		**M.TECH.**	**L**	**T**	**P**	**C**
Semester/Year		**III/II**	**3**	**-**	**-**	**3**
Subject Name		**Communication Networks**				
Subject Code		**MECVES20S301**				
Paper	**English**					
	Hindi					
Max. Marks:		**100**				

Course Objectives:

1. Understanding of data communication and computer networks, and gaining practical experience in installation, monitoring, and troubleshooting of current LAN systems.

Course Outcomes:

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

CO1: Analyze protocols and algorithms, acknowledge trade - offs and rationale.
CO2: Use routing, transport protocols for the given networking scenario and application.
CO3: Evaluate and develop small network applications.
CO4: Understand Traffic Modelling.
CO5: Understand Network Security and Management.

Unit	Syllabus	Periods
UNIT-I	Introduction: Network Architecture, Performance.	**8**
UNIT-II	Connecting nodes: Connecting links, Encoding, framing, Reliable transmission, Ethernet and Multiple access networks, Wireless networks.	**9**
UNIT-III	Queuing models: For a) one or more servers. b) With infinite and finite queue size. c) Infinite population. Internetworking: Switching and bridging, IPv4, Addressing, Routing Protocols, Scale issues, Routers - Architecture, IPv6.	**11**
UNIT-IV	End-to-End Protocols: Services, Multiplexing, De-multiplexing, UDP, TCP, RPC, RTP.	**13**
UNIT-V	Congestion control and Resource Allocation Issues, Queuing disciplines, TCP congestion control, Congestion Avoidance, QoS Applications: Domain Name Resolution, File Transfer, Electronic Mail, WWW, and Multimedia Applications.	**14**

	Text Book: 1. "Data and Computer Communication" by William Stallings, Prentice Hall; Fifth Edition, 1997. 2. "Data **Communication** and **Networking**" by Behrouz A Forouzan, Mc Grahill. 3. "Computer **Networks**" by Andrew S Tanenbaum, Prentice Hall.	
	Reference Book: 1. Aaron Kershenbaum, "Telecommunication Network Desig Algorithms", MGH, International Edition 1993. 2. Vijay Ahuja, "Communications Network Design and Analysi ofComputer Communication Networks", MGH, Internationa Editions. 3. Douglas E. Comer, "Internetworking with TCP/IP", Pearson Education, 6thEdition.	

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SYLLABUS

VLSI & Embedded System

Class		M.TECH.	L	T	P	C
Semester/Year		III/II	3	-	-	3
Subject Name		Selected Topics in Mathematics				
Subject Code		MECVES20S302				
Paper	English					
	Hindi					
Max. Marks:		100				

Course Object:

1. The course is aimed to develop the basic Mathematical skills of engineering students that are imperative for effective understanding of engineering subjects.
2. The topics introduced will serve as basic tools for specialized studies in many fields.

Course Outcomes:

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

CO1: Characterize and represent data collected from experiments using statistical methods.

CO2: Model physical process/systems with multiple variables towards parameter estimation and prediction.

CO3: Represent systems/architectures using graphs and trees towards optimizing desired objective.

CO4: Apply the knowledge of matrices to solve the problems.

CO5: Know and to understand various types of numerical methods.

Unit	Syllabus	Periods
UNIT-I	Probability and Statistics: Definitions, conditional probability, Bayes Theorem and independence. Random Variables: Discrete, continuous and mixed random variables, probability mass, probability density and cumulative distribution functions, mathematical expectation, moments, moment generating function, Chebyshev inequality.	**8**
UNIT-II	Special Distributions: Discrete uniform, Binomial, Geometric, Poisson, Exponential, Gamma, Normal distributions. Pseudo random sequence generation with given distribution, Functions of a Random Variable.	**9**
UNIT-III	Joint Distributions: Joint, marginal and conditional distributions, product moments, correlation, independence of random variables, bi-variate normal distribution. Stochastic Processes: Definition and classification of stochastic processes, Poisson process Norms, Statistical methods for ranking data.	**11**
UNIT-IV	Multivariate Data Analysis Linear and non-linear models, Regression, Prediction and Estimation Design of Experiments – factorial method	**13**

	Response surface method.	
UNIT-V	Graphs and Trees: Graphs: Basic terminology, multi graphs and weighted graphs, paths and circuits, shortest path Problems, Euler and Hamiltonian paths and circuits, factors of a graph, planar graph and Kuratowski's graph and theorem, independent sets, graph colouring.	**14**
	Text Book(s): 1. Number Theory. George E. Andrews: Number Theory, Dower Publication. 2. I.N. Herstein: Topics in Algebra — A good place to start; excellent on groups, rings, fields, and linear algebra with very good problems, Wiley India Pvt. Limited. 2006.	
	Reference Book: 1. Henry Stark, John W. Woods, "Probability and Random Process with Applications to Signal Processing", Pearson Education, 3rdEdition. 2. C. L. Liu, "Elements of Discrete Mathematics", Tata McGraw-Hill, 2nd Edition. 3. Douglas C. Montgomery, E.A. Peck and G. G. Vining, "Introduction to Linear Regression Analysis", John Wiley and Sons,2001. 4. Douglas C. Montgomery, "Design and Analysis of Experiments", John Wiley and Sons, 2001. 5. B. A. Ogunnaike, "Random Phenomena: Fundamentals of Probability and Statisticssssfor Engineers", CRC Press, 2010.	

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Class		M.TECH.	L	T	P	C
Semester/Year		III/II	3	-	-	3
Subject Name		Nanomaterials and Nanotechnology				
Subject Code		MECVES20S303				
Paper	English					
	Hindi					
Max. Marks:		100				

Course Objective:
1. To foundational knowledge of the Nanoscience and related fields.
2. To make the students acquire an understanding the Nanoscience and Applications.
3. To help them understand in broad outline of Nanoscience and Nanotechnology.

Course Outcomes:
At the end of this course, students will be able:

CO1: To understand the basic science behind the design and fabrication of nano scale systems.

CO2: To understand and formulate new engineering solutions for current problems and competing technologies for future applications.

CO3: To be able make inter disciplinary projects applicable to wide areas by clearing and fixing the boundaries in system development.

CO4: To gather detailed knowledge of the operation of fabrication and characterisation devices to achieve precisely designed systems.

CO5: To understand carbon nanotubes.

Unit	Syllabus	Periods
UNIT-I	Nanomaterials in one and higher dimensions.	8
UNIT-II	Applications of one and higher dimension nano-materials.	10
UNIT-III	Nano-lithography, micro electro-mechanical system (MEMS) and nano - phonics.	12
UNIT-IV	Carbon nanotubes – synthesis and applicationsJERS, RADARSAT, RISAT – Scatterometer, Altimeter - LiDAR remote sensing, principles, applications.	13
UNIT-V	Interdisciplinary arena of nanotechnology.	12

	Text Book(s). 1. BIOMEMS AND BIOMEDICAL NANOTECHNOLOGY, Teja Deshai Sangeeta Bhatia edited by Mauro Ferrari, Springer. **2.** Nanoscale Materials in Chemistry edited by Kenneth J. Klabunde and Ryan M. Richards, 2nd edn, John Wiley and Sons, 2009.	
	Reference Book: **1.** Nanocrystalline Materials by A I Gusev and A ARempel, Cambridge International Science Publishing, 1st Indian edition by Viva Books Pvt. Ltd. 2008. **2.** Springer Handbook of Nanotechnology by Bharat Bhushan, Springer, 3rdedn, 2010. **3.** Carbon Nanotubes: Synthesis, Characterization and Applications by Kamal K. Kar, Research Publishing Services, 1st edn, 2011, ISBN - 13:978-9810863975.	

SYLLABUS

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Class		M.TECH.	L	T	P	C
Semester/Year		III/II	3	-	-	3
Subject Name		Business Analytics				
Subject Code		MECDC20S304				
Paper	English					
	Hindi					
Max. Marks:		100				

Course Objective:

1. Understand the role of business analytics within an organization.
2. Analyze data using statistical and data mining techniques and understand relationships between the underlying business processes of an organization.
3. To gain an understanding of how managers use business analytics to formulate and solve business problems and to support managerial decision making.

Course Outcomes:

At the end of this course, students will be able to

CO1: Students will demonstrate knowledge of data analytics.

CO2: Students will demonstrate the ability of think critically in making decisions based on data and deep analytics.

CO3: Students will demonstrate the ability to use technical skills in predicative and prescriptive modelling to support business decision-making.

CO4: Students will demonstrate the ability to translate data into clear, actionable Insights.

CO5: Analyze and solve problems from different industries such as manufacturing, service, retail, software, banking and finance, sports, pharmaceutical, aerospace etc.

Unit	Syllabus	Periods
UNIT-I	Business analytics: overview of business analytics, scope of business analytics, business analytics process, relationship of business analytics process and organisation, competitive advantages of business analytics. Statistical tools: statistical notation, descriptive statistical methods, review of probability distribution and data modelling, sampling and estimation methods overview.	**8**
UNIT-II	Trendiness and regression analysis: modelling relationships and trends in data, simple linear regression. Important resources, business analytics personnel, data and models for business analytics, problem solving, visualizing and exploring data, business analytics technology.	**9**

UNIT-III	Organization structures of business analytics, team management, management issues, designing information policy, outsourcing, ensuring data quality, measuring contribution of business analytics, managing changes. Descriptive analytics, predictive analytics, predicative modelling, predictive analytics analysis, data mining, data mining methodologies, prescriptive analytics and its step in the business analytics process, prescriptive modelling, nonlinear optimization.	**11**
UNIT-IV	Forecasting techniques: qualitative and judgmental forecasting, statistical forecasting models, forecasting models for stationary time series, forecasting models for time series with a linear trend, forecasting time series with seasonality, regression forecasting with casual variables, selecting appropriate forecasting models. Monte carlo simulation and risk analysis: monte carle simulation using analytic solver platform, new-product development model, newsvendor model, overbooking model, cash budget model.	**13**
UNIT-V	Decision analysis: formulating decision problems, decision strategies with the without outcome probabilities, decision trees, the value of information, utility and decision making. Recent trends in : embedded and collaborative businessintelligence, visual data recovery, data storytelling and data journalism.	**14**
	Text book(s): **1.** "Big data demystified: how to use big data, data science and ai to make better. Business decisions and gain competitive advantage" by david Stephenson PhD. **2.** "Data analytics for beginners: your ultimate guide to learn and master data analysis. Get your business intelligence right – accelerate growth and close more sales" by victor finch. **1.** Business analytics principles, concepts, and applications by marc j. Schniederjans, dara g. Schniederjans, Christopher m. Starkey, Pearson FT press.	
	Reference Book: 1. Business analytics Principles, Concepts, and Applications by Marc J. Schniederjans, Dara G. Schniederjans, Christopher M. Starkey, Pearson FT Press. 2. Business Analytics by James Evans, persons Education.	

SYLLABUS

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Class		M.TECH.	L	T	P	C
Semester/Year		III/II	3	-	-	3
Subject Name		Industrial Safety				
Subject Code		MECDC20S305				
Paper	English					
	Hindi					
Max. Marks:		100				

Course Objective:

1. Industrial Safety Engineering is to train personnel of scientific know-how and orientation in theory and practice in safety, health, and hygiene.
2. The course is beneficial and career orienting in nature that opens many jobs for them after its completion.

Course Outcomes:

At the end of this course, students will be able to

CO1: Identify and eradicate risks and hazards to attain zero accident industry.

CO2: Develop and knowledge to use software for toxic release scenarios.

CO3: Research, analyse and purpose the changes which an organization needs to make to exploit this knowledge for a comfortable, safe and occupational disease free environment.

CO4: Design various parameters with respect to hazard free and environment friendly in the operation of process systems.

CO5: Inspect and Investigate the hazardous situations and take preventive measures.

Unit	Syllabus	Periods
UNIT-I	Industrial safety: Accident, causes, types, results and control, mechanical and electrical hazards, types, causes and preventive steps/procedure, describe salient points of factories act 1948 for health and safety, wash rooms, drinking water layouts, light, cleanliness, fire, guarding, pressure vessels, etc. Safety colour codes. Fire prevention and firefighting, equipment and methods.	**8**
UNIT-II	Fundamentals of maintenance engineering: Definition and aim of maintenance engineering, Primary and secondary functions and responsibility of maintenance department, Types of maintenance, Types and applications of tools used for maintenance, Maintenance cost & its relation with replacement economy, Service life of equipment.	**9**
UNIT-III	Wear and Corrosion and their prevention: Wear- types, causes, effects, wear reduction methods, lubricants-types and applications, Lubrication methods, general sketch, working and applications, i. Screw down grease cup, ii. Pressure grease gun, iii. Splash lubrication, iv. Gravity lubrication, v. Wick	**11**

	feed lubrication vi. Side feed lubrication, vii. Ring lubrication, Definition, principle and factors affecting the corrosion. Types of corrosion, corrosion prevention methods.	
UNIT-IV	Fault tracing: Fault tracing-concept and importance, decision treeconcept, need and applications, sequence of fault finding activities, show as decision tree, draw decision tree for problems in machine tools, hydraulic, pneumatic,automotive, thermal and electrical equipment's like, I. Any one machine tool, ii. Pump iii. Air compressor, iv. Internal combustion engine, v. Boiler,vi. Electrical motors, Types of faults in machine tools and their general causes.	**13**
UNIT-V	Periodic and preventive maintenance: Periodic inspection-concept and need, degreasing, cleaning and repairing schemes, overhauling of mechanical components, overhauling of electrical motor, common troubles and remedies of electric motor, repair complexities and its use, definition, need, steps and advantages of preventive maintenance. Steps/procedure for periodic and preventive maintenance of: I. Machine tools, ii. Pumps, iii. Air compressors, iv. Diesel generating (DG) sets, Program and schedule of preventive maintenance of mechanical and electrical equipment, advantages of preventive maintenance. Repair cycle concept and importance.	**14**
	Text Book(s): 1. Pump-hydraulic Compressors, Audels, Mcgrew Hill Publication. 2. . Maintenance Engineering, H. P. Garg, S. Chand and Company.	
	Reference Book: 1. Pump-hydraulic Compressors, Audels, Mcgrew Hill Publication. 2. Foundation Engineering Handbook, Winterkorn, Hans, Chapman & Hall London.	

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SCHOOL OF ENGINEERING

SYLLABUS

VLSI & Embedded System

Class		M.TECH.	L	T	P	C
Semester/Year		III/II	3	-	-	3
Subject Name		Operations Research				
Subject Code		MECDC20S306				
Paper	English					
	Hindi					
Max. Marks:		100				

Course Objective:

1. Optimization Techniques, Formulation of a LPP, Nonlinear programming problem, Scheduling and sequencing.

Course Outcomes:

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

CO1: Understand apply the dynamic programming to solve problems of discreetand continuous variables.
CO2: Understand apply the concept of non-linear programming.
CO3: Understand carry out sensitivity analysis.
CO4: Understand model the real world problem and simulate it.
CO5: Understand Competitive and Sequencing Models.

Unit	Syllabus	Periods
UNIT-I	Optimization Techniques, Model Formulation, models, General L.R Formulation, Simplex Techniques, Sensitivity Analysis, Inventory Control Models.	8
UNIT-II	Formulation of a LPP - Graphical solution revised simplex method - duality theory – dualsimplex method - sensitivity analysis - parametric programming.	9
UNIT-III	Nonlinear programming problem - Kuhn-Tucker conditions min cost flow problem – max flow problem - CPM/PERT.	11
UNIT-IV	Scheduling and sequencing - single server and multiple server models – deterministic inventory models - Probabilistic inventory control models - Geometric Programming.	13
UNIT-V	Competitive Models, Single and Multi-channel Problems, Sequencing Models, Dynamic Programming, Flow in Networks, Elementary Graph Theory, Game Theory Simulation.	14

	Text Book(s): 1. Hitler Libermann Operations Research: McGraw Hill Pub. 2009. 2. Pannerselvam, Operations Research: Prentice Hall of India 2010.	
	Reference Book: 1. H.A. Taha, Operations Research, An Introduction, PHI, 2008. 2. H.M. Wagner, Principles of Operations Research, PHI, Delhi, 1982. 3. J.C. Pant, Introduction to Optimisation: Operations Research, Jain Brothers, Delhi,2008. 4. Hitler Libermann Operations Research: McGraw Hill Pub. 2009. 5. Pannerselvam, Operations Research: Prentice Hall of India 2010. 6. Harvey M Wagner, Principles of Operations Research: Prentice Hall of India 2010.	

SYLLABUS

VLSI & Embedded System

Class		M.TECH	L	T	P	C
Semester/Year		III/II	-	-	20	10
Subject Name		Dissertation Phase – I				
Subject Code		MECVES20S307				
Paper	English					
	Hindi					
Max. Marks		250				

Course Objectives:-

1. In this course unit, students will learn the process of research proposal writing, conducting research, and political science writing.
2. The focus is on preparing the Special Degree students for their research and dissertation writing.
3. To enable students to learn practical aspects of research.

Course Outcomes:-

CO1: Ability to synthesize knowledge and skills previously gained and applied to an in-depth

CO2: Capable to select from different methodologies, methods and forms of analysis to produce a suitable research design, and justify their design.

CO3: Ability to present the findings of their technical solution in a written report.

CO4: Presenting the work in International/ National conference or reputed journals.

CO5: Using linear programming approach using software.

Dissertation Phase – I

Guidelines for Dissertation Phase – I

1. As per the AICTE directives, the dissertation is a yearlong activity, to be carried out and evaluated in two phases i.e. Phase – I: July to December and Phase – II: January to June.
2. The dissertation may be carried out preferably in-house i.e. department's laboratories and centers OR in industry allotted through department's T & P coordinator.
3. After multiple interactions with guide and based on comprehensive literature survey, the student shall identify the domain and define dissertation objectives. The referred Model Curriculum of Engineering & Technology PG Courses [Volume -II].
4. Literature should preferably include IEEE/IET/IETE/Springer/Science Direct/ACM journals in the areas of Computing and Processing (Hardware and Software), Circuits- Devices and Systems, Communication-Networking and Security, Robotics and Control Systems, Signal Processing and Analysis and any other related domain. In case of Industry sponsored projects, the relevant application notes, while papers, product catalogues should be referred and reported.
5. Student is expected to detail out specifications, methodology, resources required, critical issues involved in design and implementation and phase wise work distribution, and submit the proposal within a month from the date of registration.
6. **Phase – I deliverables:** A document report comprising of summary of literature survey, detailed objectives, project specifications, paper and/or computer aided design, proof of concept/functionality, part results, A record of continuous progress.
7. **Phase – I evaluation:** A committee comprising of guides of respective specialization shall assess the progress/performance of the student based on report, presentation and Q & A.
8. In case of unsatisfactory performance, committee may recommend repeating the Phase-I work.

SYLLABUS

VLSI & Embedded System

Class		**M.TECH**	**L**	**T**	**P**	**C**
Semester/Year		**IV/II**	**-**	**-**	**32**	**16**
Subject Name		**Dissertation Phase – II**				
Subject Code		**MECVES20S401**				
Paper	**English**					
	Hindi					
Max. Marks		**500**				

Course Objectives:

1. In this course unit, students will learn the process of research proposal writing, conducting research, and political science writing.
2. The focus is on preparing the Special Degree students for their research and dissertation writing.
3. To enable students to learn practical aspects of research.

Course Outcomes:

Students will be able to:-

CO1: Synthesize knowledge and skills previously gained and applied to an in-depth

CO2: Select from different methodologies, methods and forms of analysis to produce a suitable research design, and justify their design.

CO3: Present the findings of their technical solution in a written report.

CO4: Present the work in International/ National conference or reputed journals.

CO5: Design Using linear programming approach using software.

Dissertation Phase – II

Guidelines for Dissertation Phase – II

1. As per the AICTE directives, the dissertation is a yearlong activity, to be carried out and evaluated in two phases i.e. Phase – I: July to December and Phase – II: January to June.
2. The dissertation may be carried out preferably in-house i.e. department's laboratories and centers OR in industry allotted through department's T & P coordinator.
3. After multiple interactions with guide and based on comprehensive literature survey, the student shall identify the domain and define dissertation objectives. The referred Model Curriculum of Engineering & Technology PG Courses [Volume -II]
4. literature should preferably include IEEE/IET/IETE/Springer/Science Direct/ACM journals in the areas of Computing and Processing (Hardware and Software), Circuits- Devices and Systems, Communication-Networking and Security, Robotics and Control Systems, Signal Processing and Analysis and any other related domain. In case of Industry sponsored projects, the relevant application notes, while papers, product catalogues should be referred and reported.
5. Student is expected to detail out specifications, methodology, resources required, critical issues involved in design and implementation and phase wise work distribution, and submit the proposal within a month from the date of registration.
6. **During phase – II,** student is expected to exert on design, development and testing of the proposed work as per the schedule. Accomplished results/contributions/innovations should be published in terms of research papers in reputed journals and reviewed focused conferences OR IP/Patents.
7. **Phase – II deliverables:** A dissertation report as per the specified format, developed system in the form of hardware and/or software, A record of continuous progress.
8. **Phase – II evaluation:** Guide along with appointed external examiner shall assess the progress/performance of the student based on report, presentation and Q & A. In case of unsatisfactory performance, committee may recommend for extension or repeating the work.