KLS Vishwanathrao Deshpande Institute of Technology

(Accredited by NAAC with "A" Grade)

(Approved by AICTE, New Delhi, Affiliated to VTU, Belagavi)
(Recognized Under Section 2(f) by UGC, New Delhi)
Udyog Vidya Nagar, Haliyal - 581 329, Dist.: Uttara Kannada
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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

ADD-ON COURSE SYLLABUS

TITLE: Physics of Semiconductor Devices

Semester: 3rd   Total Hour: 30

MODULES
MODULE1: **Physics and Properties of Semiconductors:** Introduction, Crystal Structure, Carrier-Transport Phenomena, Phonon, Optical and Thermal Properties, Heterojunctions and Nanostructures, Basics Equation and Examples.
MODULE2: **The Junction Field-Effect Transistor:** JFET Concepts, Basic pn JFET Operation, Basic MESFET Operation, The MESFET, Nonideal Effects, Channel Length Modulation, Velocity Saturation Effects, Subthreshold and Gate Current Effects, High Electron Mobility Transistor, Quantum Well Structures, Transistor Performance.
MODULE3: **Semiconductor Microwave and Power Devices:** Tunnel Diode, Gunn Diode, Impact Diode, The Thyristor, Basic Characteristics, Triggering the SCR, SCR Turn – OFF, Device Structures, Verification of Logic Gates, Implementation of Demorgan's Theorem, Implementation of Half Adder, Full Adder, Half Subtractor and Full subtractor using Multisim.

Text Book:

T1: S. M. SZE, "Physics of Semiconductor Devices", A JOHN WILEY & SONS,INC.,PUBLICATION.
T2: Donald A. Neamen, "Semiconductor Physics and Devices", McGraw-Hill publishing, 3rd Edition.

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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

ADD-ON COURSE SYLLABUS

Title: Importance of Transient Analysis and Laplace Transform

Semester: 4th   **Total Number of Lecture Hours: 30Hrs**

Modules
Module-1
Transient behaviour: Time Line of Transient Analysis, Behaviour of R, L and C during Transient Conditions, Numerical on Series RL, RC and RLC and Parallel RC, RL and RLC Circuits, Steady state analysis of first order Circuits
Module-2
Laplace Transform of Signals: Laplace transform of Constant, Various Unit Step Signal, Various Ramp Signal, Periodic function, Synthesis of Periodic Functions and Numerical Examples
Module-3
Laplace Transform of Electrical Elements: Voltage and Current Variables, R, L and C Circuit Elements, Basic Operations on a Signals, Initial Value and Final Value theorem, Waveform Synthesis, Numerical Examples

Text Books:

T1: Fundamentals of Electric Circuits | 7th Edition Paperback by Charles K. Alexander , Matthew N. O. Sadiku.

T2: Network Analysis Paperback – 1 January 2015 by Valkenburg (Author)

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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

ADD-ON COURSE SYLLABUS

TITLE: ARTIFICIAL INTELLIGENCE WITH PYTHON

Semester: 5th   **Total Hour: 30**

MODULES
MODULE 1: **Introduction to AI:** What is AI? The History of AI, AI Hypes and AI Winters, Types of AI, State of AI, AI Resources, AI Development Tools, AI Hardware Tools, AI Software Tools.
MODULE 2: **Introduction to Python, ML, DL:** Basics of Python, Python Development Environment, Examples of Python Programming, Python AI Framework, Machine Learning, Deep Learning. Different Categories of Machine Learning, Solving examples on SVM, K-Mean Clustering, Deep Learning, Conventional Neural Networks.
MODULE 3: **AI Applications:** Image Classification, Face Detection and Face Recognition, Object Detection and Image Segmentations, Introduction and Display Images in Python, Image Normalization, Adding and removing noise of an Image, Thresholding of an Image, Edge detection of Image, Object detection within Image using Python.

Text Book:

T1. Perry Xiao, "Artificial Intelligence Programming with Python", A JOHN WILEY & SONS, INC., PUBLICATION.

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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

ADD-ON COURSE SYLLABUS

TITLE: RECENT TRENDS IN WIRELESS SENSOR NETWORKS

Semester: 6th

Total Hour: 30

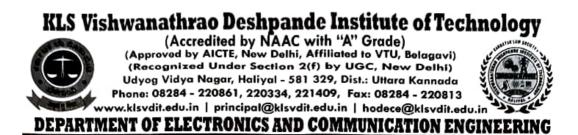| MODULES |
|---|
| **MODULE1:**

Introduction: Introduction to wireless sensor networks, Wireless sensor architectures, Hardware components of WSN, Network characteristics and challenges, Enabling technologies for WSN, Applications of WSN, Advantages of WSN, Limitations of WSN, Types of wireless sensor networks. |
| **MODULE2:**

Network Architectures: Introduction to network architectures, Network architecture scenarios, Physical layer and transceiver design considerations, Optimization goals, Quality of service parameters, Figure of merit and gateway concepts, Operating systems, Introduction to Tiny OS, Introduction to nes C internet for WSN. |
| **MODULE3:**

Infrastructure Establishment: Introduction to infrastructure establishment, Topology control, Clustering, Time synchronization, Localization and positioning, Sensor tracking and controlling, Issues and challenges faced in WSN, Recent advances in WSN, Routing techniques in WSN, MAC protocol and its implementations. |

Text Book:

T1. Waltenegus Dargie, Christian Poellabauer, —Fundamentals of Wireless Sensor Networks: Theory and Practice, Wiley 2010

T2. Anna Hac, "Wireless Sensor Network Designs", John Wiley, 2003

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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

ADD-ON COURSE SYLLABUS

Title: Advances in Automotive Electronics

Semester: 7th   Total Number of Lecture Hours: 30Hrs

Modules
Module-1
Sensors in Automotive Electronics: Introduction to Automotive Electronics, Basic concepts of Sensors, Automotive Control System - Applications of Sensors and Actuators, Air Flow Rate Sensor, Engine Crankshaft Angular Position Sensor, Magnetic Reluctance Position Sensor 10Hrs
Module-2
Projects in Automotive Electronics using Fritzing: Introduction to Low Power Microcontrollers, Introduction to Fritzing, Design of Electronic Circuits for Automotive applications in Fritzing 10Hrs
Module-3
Virtual Automotive Projects using Fuzzy logic Toolbox in MATLAB: Introduction to Fuzzy Logic, Introduction to Fuzzy Logic Toolbox in MATLAB, Project on Automotive Electronics using Fuzzy Logic 10Hrs

Text Books:

T1: William B. Ribbens , "Understanding Automotive Electronics", SAMS/Elsevier publishing, 6th Edition, 1997.

T2: Robert Bosch Gmbh, "Automotive Electrics and Automotive ElectronicsSystems and Components, Networking and Hybrid Drive", Springer Vieweg, 5th Edition, 2007.

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ADD-ON COURSE SYLLABUS

TITLE: MACHINE LEARNING FOR SIGNAL PROCESSING

Semester: 8th   **Total Hour: 30**

MODULES
MODULE1: **Introduction to Signals and Systems:** Definition of signal and systems , Sampling of analog signals, Continuous time and discrete time signal, Classification of signals as even, odd, periodic and non-periodic, deterministic and non-deterministic, energy and power. Elementary signals Functions: exponential, sinc, impulse, step and its properties, ramp, rectangular, triangular. Operations on signals: Amplitude scaling, addition, multiplication, differentiation, integration (Accumulator for DT), time scaling, time shifting and time folding. Systems: Definition, Classification: linear and nonlinear, time variant and invariant, causal and non-causal, static and dynamic, stable and unstable, invertible. Case Study
MODULE2: **Concepts of Machine learning**: Concept learning task, Concept learning as search, Find-S algorithm, Version space, Candidate Elimination algorithm & Inductive Bias. Outlines: Decision Tree Learning, Artificial Neural Networks & Bayesian Learning. Case study
MODULE3: **Machine Learning Algorithms:** convolution neural networks (CNNs) and other deep learning. **Speech recognition**: acoustic modeling, language modeling, and speech-to-text conversion. **Image processing**: Image classification, object detection, image segmentation, and image enhancement.

Text Book:

T1. Simon Haykins and Barry Van Veen, "Signals and Systems", 2nd Edition, 2008, Wiley India. ISBN 9971-51-239-4.

T2. Tom M. Mitchell, Machine Learning, India Edition 2013, McGraw Hill Education.

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