UNIVERSITY OF ENGINEERING & MANAGEMENT, JAIPUR

Course Description

Title of Course: Organizational Behavior
Course Code: HU801
L-T Scheme: 3-0 **Course Credits: 2**

Introduction:

This course helps students to learn about the intricacies of work and politics within an organization. The basic outcome of this course would be:

- To understand the term organization
- To understand how it works in professional field.
- To brush up skills that will lead to success
- To understand Leadership
- To learn theories that will help to relate
- To handle stress
- To avoid conflicts
- To understand the basics of workplace and beyond.

Objectives:

Students in this course learn to get accustomed to workplace and they understand how to keep going in this world called profession. This course teaches them to be more confident and the theories which talks about the basic survival within the professional world.

Learning Outcomes:
Knowledge:

1. Learning about organization
2. Personality development
3. Job satisfaction and factors responsible for the same
4. Motivation theories
5. Group behavior
6. Communication process
7. Organizational politics
8. Handling stress

Course Contents:

Unit 1: Organizational Behaviour: Definition, Importance, Historical Background, Fundamental Concepts of OB,Challenges and Opportunities for OB.

Personality and Attitudes: Meaning of personality, Personality Determinants and Traits, Development ofPersonality, Types of Attitudes, Job Satisfaction.

Perception: Definition, Nature and Importance, Factors influencing Perception, Perceptual Selectivity, Linkbetween Perception and Decision Making.

Motivation: Definition, Theories of Motivation - Maslow's Hierarchy of Needs Theory, McGregor's TheoryX & Y, Herzberg's Motivation-Hygiene Theory, Alderfer's ERG Theory, McClelland's Theory of Needs,Vroom's Expectancy Theory.

Unit 2: Group Behaviour: Characteristics of Group, Types of Groups, Stages of Group Development, GroupDecision Making.

Course Description

Communication: Communication Process, Direction of Communication, Barriers to Effective Communication.

Leadership: Definition, Importance, Theories of Leadership Styles.

Unit 3: Organizational Politics: Definition, Factors contributing to Political Behaviour.

Conflict Management: Traditional vis-a-vis Modern View of Conflict, Functional and Dysfunctional Conflict, Conflict Process, Negotiation – Bargaining Strategies, Negotiation Process.

Unit 4: Organizational Design: Various Organizational Structures and their Effects on Human Behaviour, Conceptsof Organizational Climate and Organizational Culture.

Text Books

Robbins, S. P. & Judge, T.A.: Organizational Behavior, Pearson Education, 15th Edn.

Resources, PHI, 10th Edn.

UNIVERSITY OF ENGINEERING & MANAGEMENT, JAIPUR

Course Description

Title of Course: Smart Antenna
Course Code: EC801A
L-T Scheme: 3-0 **Course Credits: 3**

Introduction:

This course examines basic concepts of antenna design, algorithms, and measurement parameters basics. The Topics to be covered (tentatively) include:

- Basic array principles, linear (broadside, end-fire and scanning) arrays, planar arrays, sidelobe and half-power beam width controlling techniques (i.e., binomial arrays, etc.)
- Frequency independent (wide-band) antennas, helix, etc.
- Aperture antenna concepts, design of microstrip patch antennas
- Antenna measurement principles

Objectives:

In this course we will study the basic components of Propagated fields of elemental dipole, directivity and gain, radiation resistance, the half-wave dipole, Multiple Input- Multiple Output(MIMO) Communications Systems, arrays, broadband antennas, Neural network approach, Spectral estimation methods, and antenna temperature.

Learning Outcomes:
Knowledge:

1. Understand important and fundamental antenna engineering parameters and terminology,
2. Learn the basic concepts of electromagnetic wave radiation and reception,
3. Develop the basic skills necessary for designing a wide variety of practical antennas and antenna arrays.

Application:

1. Students are introduced to the design of practical antenna systems used for communications, radar and other applications
2. Students learn and analyze design issues and the necessary trade-offs that are required in complex systems with antenna design as a significant aspect of the overall system design and development.
3. based on DOA beam former design using simulation and hard ware and Adaptive beam forming implementation using Altera Stratix® Series FPGA

Course Contents:

Unit 1: Antenna Basics, Phased array antenna, power pattern, beam steering, degree of freedom, adaptive antennas, smart antennas- key benefits of smart antenna technology, wide band smart antennas, Propagation Channels.

[Introduction to Smart Antennas, C.A.Balanis, Morganand Claypool,2007(Chapter-2)]

Unit 2: Spatial Processing for Wireless Systems, Key Benefits of Smart Antenna Technology, The Vector Channel Impulse Response and the Spatial Signature, Spatial Processing Receivers, Fixed Beam forming Networks, Switched Beam Systems, Adaptive Antenna Systems, Wide band Smart Antennas, Diversity Techniques, Multiple Input- Multiple Output(MIMO) Communications Systems, MIMO for frequency selective scenarios.

[Smart Antenna for Wireless Communication, T.S.RappaportandJ.C.Liberti, Prentice Hall,1999(Chapter-8)

Course Description

Introduction to Smart Antennas, C.A.Balanis, Morganand Claypool,2007(Chapter-3)]

Unit 3: Sample matrix inversion algorithm, unconstrained LMS algorithm, normalized LMS algorithm, Constrained LMS algorithm, Perturbation algorithms, Neural network approach, Adaptive beam space processing, Implementation issues.

[Smart Antenna for Wireless Communication, T.S.RappaportandJ.C.Liberti,PrenticeHall,1999(Chapter-9)]

Unit 4: Spectral estimation methods, linear prediction method, Maximum entropy method, Maximum likelihood method, Eigen structure methods, MUSIC algorithm–root music and cyclic music algorithm, the ESPRIT algorithm.

[Smart Antenna for Wireless Communication, T.S.RappaportandJ.C.Liberti,PrenticeHall,1999(Chapter-10)]

Unit 5: DOA based beam former design using simulation and hard ware. Adaptive beam forming implementation using Altera Stratix® Series FPGA, QRDRLS Algorithm. CORDIC algorithm.

[Smart Antenna for Wireless Communication, T.S.RappaportandJ.C.Liberti,PrenticeHall,1999(Chapter-10)]

Text Books

1. Smart Antenna for Wireless Communication, T.S.RappaportandJ.C.Liberti,PrenticeHall,1999
2. Smart Antennas, L.C.Godra,CRCPress,2004.

References

1. Adaptive Filter Theory, S. Haykin. Prentice Hall, 1985
2. Introduction to Smart Antennas, C.A.Balanis, Morganand Claypool,2007

UNIVERSITY OF ENGINEERING & MANAGEMENT, JAIPUR

Course Description

Title of Course: Material Sc. & Engg. (Mat. Sc)
Course Code: EC801B
L-T Scheme: 3 **Course Credits: 3**

Introduction:

This course examines the understanding of how materials behave like they do, and why they differ in properties.It is only possible with the atomistic understanding allowed by quantum mechanics, that first explained atoms and then solids starting in the 1930s. The combination of physics, chemistry, and the focus on the relationship between the properties of a material and its microstructure is the domain of Materials Science. The development of this science allowed designing materials and provided a knowledge base for the engineering applications (Materials Engineering).

Objectives:

In this course the studentswill:

1. Understand structure-properties and relationship
2. Know the fundamental science and engineering principles relevant to materials.
3. Understand the relationship between nano/microstructure, characterization, properties and processing and design of materials.
4. Possess a knowledge of the significance of research, the value of continued learning and environmental/social issues surrounding materials.

Learning Outcomes:
Knowledge:

1. The ability to apply knowledge of mathematics, science, and engineering in case of materials.
2. The ability to design 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.
3. The ability to function on multidisciplinary teams.
4. The ability to identify, formulate, and solve engineering problems.
5. Be able to apply core concepts in Materials Science to solve engineering problems.
6. Be knowledgeable of contemporary issues relevant to Materials Science and Engineering.
7. Be able to select materials for design and construction.

Application:

1. Manipulate atomic/microstructural processes to create desired structure & properties
2. To be able to select a material for a given use based on considerations of cost and performance.
3. To understand the limits of materials and the change of their properties with use.
4. To be able to create a new material that will have some desirable properties.

Course Contents:

Unit 1: Structure of Solids: Atoms and their binding, Bonds, Crystal Systems, Bravais Lattice Miller Indices, Crystalline, Polycrystalline and Amorphous Materials; Metals, Semiconductors and Insulators, Lattice defects-Qualitative ideas of point, line, surface and volume defects.

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Course Description

Unit 2: Dielectric Properties: Dielectric Polarization and Mechanism Internal or local field, Dielectric Loss, Temperature and Frequency dependence of dielectric constant, Elementary ideas of Piezoelectric, Ferroelectrics and Pyroelectric Materials and its Applications.

Unit 3: Magnetic Properties: Elementary ideas of classification of magnetic materials– Diamagnetism, Para magnetism, Ferromagnetism, Ferrimagnetism, Magnetic Domains.

Unit 4: Superconductors: Basic concepts of superconductivity, Transition temperature, Meissner effect High-T superconductors, Hard and Soft Materials, SQUID

Unit 5: Optical properties: Absorption, Emission, Luminescence, Electro-optic and Acousto optic effects, Photo refractive effects.

Unit 6: Materials for Optical Communication: LED and Laser Materials, Optical Fiber.

Unit 7: Materials for Data Storage: Magnetic Cores, Tapes, Disks, Harddisk, Floppydisk, Magneto-optic devices, Bubble memories, Magneto electronic Materials, CD, DVD, CCD.

Unit 8: Materials for Display Devices: CRT, LED, LCD, TFT, Plasma Display.

Unit 9: Advanced Materials: Metallic Glasses, Nano materials,etc.

Text Books

1. Electrical Engineering Materials–A.J. Dekker(PHI)
2. Material Science and Engineering–A First Course–V. Raghavan (PHI Learning Pvt. Ltd)

References

1. Principles of Electronic Materials and Devices– S. Kasap (McGraw-Hill)
2. An Introduction to Solid State Physics- Charles Kittel (John Wiley & sons)
3. An IntroductiontoElectronicMaterialsforEngineers–W.Kao,Z.LeeandN.Sannes(WorldScientific)

UNIVERSITY OF ENGINEERING & MANAGEMENT, JAIPUR

Course Description

Title of Course: Satellite Communication & Remote Sensing
Course Code: EC801C
L-T Scheme: 3 **Course Credits: 3**

Introduction:

The benefits of space technology, both direct and indirect, have introduced new dimensions into the study and understanding of Earth's processes and in improving the quality of life for the people living on it. All countries should have access to space technology and must share the benefits. An essential pre-requisite to partaking in these opportunities is the building of various indigenous capacities for the development and utilization of space science and technology. Identification of specific data and methodologies for effective mapping and evaluation ofnatural resources; development of geospatial models and tools to address the social and engineeringproblems; Application of geospatial technologies for hazard mitigation and management and several others demand the need of satellite remote sensing.

Objectives:

1. The course aims at providing students a basic knowledge about satellite communication, its services and problems associated with it
2. To provide exposure to students in gaining knowledge on concepts and applications leading to modeling of earth resources management using Remote Sensing
3. To acquire skills in advance techniques such as hyper spectral, thermal and LiDAR scanning for mapping, modeling and monitoring

Learning Outcomes:
Knowledge:

1. Prepare the students with basic concepts of satellite and problems associated with it
2. Knowledge about different modulation techniques used in satellitecommunication
3. Knowledge about orbits,GEO,LEO, Orbital transfer
4. Learn about RF link, optimization link, intersatellite links
5. Learn about multiple access techniques, error correcting codes
6. Fully equipped with concepts, methodologies and applications of Remote Sensing Technology.
7. Prepare the candidates for National and Global Employability
8. Acquire skills in handling instruments, tools, techniques and modeling while using Remote Sensing Technology

Application:

1. Apply principles of Remote sensing and GIS to collect, map and retrieve spatial information.
2. Plan, assess and evaluate natural and manmade systems using geospatial models and methods
3. Use geospatial tools and techniques for hazard mitigation and resource planning.
4. Pursue research and develop capabilities to handle multi-disciplinary field projects

Course Contents:

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Course Description

Unit 1: Historical background, Basic concepts: Frequency allocation for satellite services, orbital & spacecraft problems, Comparison of networks and services, modulation techniques used for satellite communication

Unit 2: Orbits: Two body problem, orbital mechanics, geostationary orbit, change in longitude, orbital maneuvers, orbital transfer, orbital perturbations.

Unit 3: Launch Vehicles: principles of Rocket propulsion, powered flight, Launch vehicles for communication satellite

Unit 4: RF link: noise, the basic RF link, satellite links (up and down), optimization RF link, inter satellite link, noise temperature, Antenna temperature, overall system temperature, propagation factors, rain attenuation model. Tropospheric and Ionospheric EFFECT

Unit 5: Multiple access: FDMA, TDMA, CDMA techniques, comparison of multiple access techniques, error connecting codes

Unit 6: Satellite subsystems and satellite link design: AOCS, TT&C, power system, space craft antenna, transponder, Friis transmission equation, G/T ratio of earth station.

Unit 7: Basic of remote sensing: Electromagnetic Radiation principles, Atmospheric window, Indian satellite sensings at ellite system, Active, Passive, ground based and space based remote sensing.

Unit 8: Spatial, spectral, Radiometric and temporal resolution, satellite sensors, detectors and scanning technique, FOV and error sources, Image analysis and Interpretation weather RADAR, LIDAR, acoustic sounding systems, TRMM, AURA-MLS, Megha Tropiques Alitmeter, Scatterometer, Radiometer

Unit 9: Ground based and radio osculation techniques, spectral response of water, Sea surface temperature, wind speed, color monitor, Clouds and acrosal, water vapor, convective system, Trace gases.

Text Books

1. Remote Sensing and GIS- B.Bhatta(oxford university press) Remote sensing of the Environment– J.R.Jenson(Pearson)
2. Global Navigation satellite systems - B. S. Rao(TMH)

References

1. Satellite communication– D.Roddy (TMH)
2. Remote Sensing- R.A. Schowengerdt (Academic press)

UNIVERSITY OF ENGINEERING & MANAGEMENT, JAIPUR

Course Description

Title of Course: Neural Network & Application
Course Code: EC802A
L-T Scheme: 3-0 **Course Credits: 3**

Introduction:

This course examines Artificial Neural Network concepts and prolog programming basics. The Topics to be covered (tentatively) include:

- Introduction to artificial neural networks
- Linear models for regression and classification
- Feed forward neural networks
- Radial basis function networks
- Kernel methods for pattern analysis
- Self-organizing maps
- Feedback neural networks
- Kernel methods for pattern analysis

Objectives:

In this course we will study the basic components of an Artificial Neural Network, their functions, mechanisms and techniques used in their implementation and examples from Prolog. The way different modules in the ANN interact and work together to provide the basic services of an ANN.

Learning Outcomes:

Knowledge:

1. Understand the theory and logic behind the design and construction of ANN.
2. You will examine the algorithms used for various operations on ANN.
3. You will differentiate between various ANN functionalities in terms of performance.
4. Know the problems in the design of ANN and study the probable solutions.
5. Learn to calculate the performance of Kononen.
6. An overview of advanced ANN and compare the technical aspects of all the advanced ANN.

Application:

1. To develop, implement, and debug various algorithms
2. To develop, implement, and demonstrate the algorithms of SVM
3. To develop algorithms to find RBF.
4. To develop Kononen algorithms.

Course Contents:

Unit 1: Biological neural networks, Pattern analysis tasks: Classification, Regression, Clustering, Computational models of neurons, Structures of neural networks, Learning principles.

Unit 2: Polynomial curve fitting, Bayesian curve fitting, Linear basis function models, Bias-variance decomposition, Bayesian linear regression, Least squares for classification, Logistic regression for classification, Bayesian logistic regression for classification.

Unit 3: Pattern classification using perceptron, Multilayer feed forward neural networks(MLFFNNs), Pattern classification and regression using MLFFNNs, Error back propagation learning, Fast learning methods: Conjugate gradient method, Auto associative neural networks, Bayesian neural networks.

Course Description

Unit 4: Regularization theory, RBF networks for function approximation, RBF networks for pattern classification.

Unit 5: Pattern clustering, Topological mapping, Kohonen's self-organizing map.

Unit 6: Pattern storage and retrieval, Hopfield model, Boltzmann machine, Recurrent neural networks.

Unit 7: Statistical learning theory, Support vector machines for pattern classification, Support vector regression for function approximation, Relevance vector machines for classification and regression.

Text Books

1. B.Yegnanarayana, Artificial Neural Networks, Prentice Hall ofIndia,1999.
2. C.M.Bishop, Pattern Recognition and MachineLearning,Springer,2006.

References

1. . S.Haykin, Neural Networks–AComprehensiveFoundation,PrenticeHall,1998.

UNIVERSITY OF ENGINEERING & MANAGEMENT, JAIPUR

Course Description

Title of Course:Digital Image Processing
Course Code: EC802B
L-T Scheme: 3 **Course Credits: 3**

Introduction:

This course is an introduction to the fundamental concepts and techniques in basic digital image processing and their applications to solve real life problems. The topics covered include Digital Image Fundamentals, Image Transforms, Image Enhancement, Restoration and Compression, Morphological Image Processing, Nonlinear Image Processing, and Image Analysis. Application examples are also included. Upon completion of this course, students will be familiar with basic image processing techniques for solving real problems. Student will also have sufficient expertise in both the theory of two-dimensional signal processing and its wide range of applications, for example, image restoration, image compression, and image analysis

Objectives:

The course objectives include: overview of digital image processing field; understand the fundamental DIP algorithms and implementation; gain experience in apply in image processing algorithms to real problems.
Major Learning Objectives are:

1. Develop a theoretical foundation of fundamental Digital Image Processing concepts.
2. Provide mathematical foundations for digital manipulation of images; image acquisition; preprocessing; segmentation; Fourier domain processing; and compression.
3. Gain experience and practical techniques to write programs for digital manipulation of images; image acquisition; preprocessing; segmentation; Fourier domain processing; and compression.
4. Describe and explain basic principles of digital image processing;
5. Design and implement algorithms that perform basic image processing (e.g., noise removal and image enhancement).
6. Design and implement algorithms for advanced image analysis (e.g., image compression, image segmentation).
7. Assess the performance of image processing algorithms and systems.

Learning Outcomes:
Knowledge:

Students who complete this course will be able to:

1. Analyze general terminology of digital image processing.
2. Examine various types of images, intensity transformations and spatial filtering.
3. Develop Fourier transform for image processing in frequency domain.
4. Evaluate the methodologies for image segmentation, restoration etc.
5. Implement image process and analysis algorithms.
6. Apply image processing algorithms in practical applications.

Application:

Visual information is the most important type of information perceived, processed and interpreted by the human brain. One third of the cortical area of the human brain is dedicated to visual information processing. Digital image processing, as a computer-based technology, carries out automatic processing, manipulation and interpretation of such visual information, and it plays an increasingly important role in many aspects of our daily life, as well as in a wide variety of disciplines and fields in science and

technology, with applications such as television, photography, robotics, remote sensing, medical diagnosis and industrial inspection.

• Computerized photography (e.g., Photoshop)
• Space image processing (e.g., Hubble space telescope images, interplanetary probe images)
• Medical/Biological image processing (e.g., interpretation of X-ray images, blood/cellular microscope images)
• Automatic character recognition (zip code, license plate recognition)
• Finger print/face/iris recognition
• Remote sensing: aerial and satellite image interpretations
• Reconnaissance
• Industrial applications (e.g., product inspection/sorting)

Course Contents:

Unit 1: Digital Image Processing Systems:
Introduction to structure of human eye, Image formation in the human eye, Brightness adaptation and discrimination, Image sensing and acquisition, storage, Processing, Communication, Display Image Sampling and quantization, Basic relationships between pixels.

Unit 2: Image Transforms(implementation): Introduction to Fourier transform, DFT and 2-D DFT, Properties of 2-D DFT, FFT, IFFT, Walsh transform, Hadamard transform, Discrete cosine transform, Slant transform, Optimum transform: Karhunen-Loeve (Hotelling) transform.

Unit 3: Image Enhancement in the Spatial and Frequency Domain: Gray level transformations, Histogram processing, Arithmetic and logic operations, Spatial filtering: Introduction, Smoothing and sharpening filters. Frequency domain filters: Homo morphic filtering.

Unit 4: Image Data Compression: Fundamentals, Redundancies: Coding, Inter pixel Psycho-visual, fidelity criteria, Image compression models, Error free compression, Lossy compression, Image compression standards: Binary image and Continuous Tone Still Image compression standards, Video compression standards.

Unit 5: Morphological Image Processing: Introduction, Dilation, Erosion, Opening, closing, Hit-or-miss transformation, Morphological algorithm operations on binary Images, Morphological algorithm operations on gray-scale Images.

Unit 6: Image Segmentation, Representation and Description:
Detection of discontinuities, Edge linking and Boundary detection, Thresholding, Region based segmentation, Image Representation schemes, Boundary descriptors and Regional descriptors.

Text Books

1. R.C Gonzalez and R. Woods:-Digital Image Processing, (Indian reprint: Pearson publication, 2001)
2. Anil K. Jain:-Digital Image Processing (Prentice-Hall, India)

References

1. W.K. Pratt:-Digital Image Processing, -2nd Edition, (John Wiley &Sons).
2. B.Chanda & D.Dutta Majumder, Digital Image Processing and Analysis, (Prentice-Hall, India)

UNIVERSITY OF ENGINEERING & MANAGEMENT, JAIPUR

Course Description

Title of Course: Renewable Energy
Course Code: EC802C
L-T Scheme: 3-0 **Course Credits: 3**

Introduction:

This course introduces the alternative energy sources yet to be fully employed by humans. It covers the basic principles behind the processes required to generate energy from them. It helps to understand the future prospects of these energy sources in the world especially in India. The Topics to be covered (tentatively) include:

- Introduction to Energy sources
- Solar Energy
- Wind Energy
- Energy from biomass
- Geothermal energy
- Energy from ocean,
- Magneto hydrodynamic power generation
- Hydrogen energy
- Fuel cell

Objectives:

In this course we will study about the non-conventional sources of energies. We will understand the mechanism of the different devices run by these alternative energy sources. . We will learn about the future prospects of these energy sources in India. .

Learning Outcomes:

Knowledge:

1. To introduce the alternative and renewable energy sources.
2. To familiarize with the mechanisms used to harness renewable sources of energy.
3. To enable the students to understand the advantages and prospects of these energy resources.
4. To familiarize the students with the devices and machineries to get power from these sources.

Application:

1. To understand the fundamentals of different energy sources
2. To familiarize with the condition of upcoming energy crisis.
3. To understand the future scope and challenges faced by this field.
4. To understand the technology to harness these sources.

Course Contents:

Unit 1: Introduction to Energy sources:

Renewable and non-renewable energy sources, energy consumption as a measure of Nation's development; strategy for meeting the future energy requirements, Global and National scenarios, Prospects of renewable energy sources. Impact of renewable energy generation on environment, Kyoto Protocol.

Unit 2: Solar Energy:

Solar radiation -beam and diffuse radiation, solar constant, earth sun angles, attenuation and measurement of solar radiation, local solar time, derived solar angles, sunrise, sunset and day length. Flat plate collectors, concentrating collectors, Solar air heaters types, solar driers, storage of solar energy-thermal storage, solar pond, solar water heaters of PV Cells, Mono-poly Crystalline and amorphous Silicon solar cells. Solar distillation, solar still, solar cooker, solar heating & cooling of buildings, photovoltaic-solar

cells, different types, Design of PV array. Efficiency and cost of PV systems & its applications. PV hybrid systems.

Unit 3: Wind Energy:
Principle of wind energy conversion; Basic components of wind energy conversion systems; Wind mill components, various types and their constructional features, Design considerations of horizontal and vertical axis wind machines: analysis of aerodynamic or cesacting on wind mill blades and estimation of power output; wind data and site selection considerations

Unit 4: Energy from Biomass:
Biomass conversion technologies, Biogas generation plants, classification, advantages and disadvantages, Constructional details, site selection, digester design consideration, filling a digester for starting, maintaining biogas production, Fuel properties of bio gas, utilization of biogas

Unit 5: Geothermal Energy:
Introduction, Basic definitions, Estimation and nature of geothermal energy, geothermal sources and resources like hydrothermal, geo-pressured hot dry rock , magma, Advantages, disadvantages and application of geothermal energy, prospects of geothermal energy in India.

Unit 6: Energy from Ocean:
Ocean Thermal Electric Conversion (OTEC) systems like open cycle, closed cycle, Hybrid cycle, prospects of OTEC in India, Energy from tides, basic principle of tidal power, single basin and double basin tidal power plants, advantages, limitation and scope of tidal energy, Wave energy and power from wave, wave energy conversion devices, advantages and disadvantages of wave energy.

Unit 7: Magneto Hydrodynamic power generation:
Principle of MHD power generation, MHD system, Design problems and developments, Gas conductivity, materials for MHD generators and future prospects.

Unit 8: Hydrogen Energy:
Introduction, Hydrogen Production methods, Hydrogen storage, hydrogen transportation, Utilization of hydrogen gas, hydrogen as alternative fuel for vehicles.

Unit 9: Fuel cell:
Introduction, Design principle and operation of fuel cell, Types of fuel cells, conversion efficiency of fuel cell, application of fuel cells

Text Books
1. G.D. Rai, Non conventional Energy sources, Khanna Publishers

References
1. Ashok V. Desai, Non conventional Energy, New Age International Publishers Ltd.
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UNIVERSITY OF ENGINEERING & MANAGEMENT, JAIPUR

Course Description

Title of Course: Digital Image Processing
Course Code: EC892B
L-T-P scheme: 0-0-3 **Course Credit: 2**

Objectives:

Introduces practice of digital image processing. Topics presented include, two-dimensional signal processing theory, image acquisition, representation, elementary operations, enhancement, filtering, coding, compressing, restoration, and analysis, as well as image processing hardware.
The students will learn about state-of-the-art techniques in the lecture, and experiment with selected methods during the lab sessions. The computer lab session is an essential part of this course as it is supposed to lower the barrier and the reservations that some students might have towards using computer-based biomedical imaging technology for their own work.

Learning Outcomes:

Students who complete this course will be able to:
1. Describe different modalities and current techniques in image acquisition
2. Describe how digital images are represented and stored efficiently depending on the desired quality, color depth, dynamics (time-varying data)
3. Use the mathematical principles of digital image enhancement (contrast, gradients, noise)
4. Describe and apply the concepts of feature detection and contour finding algorithms.
5. Analyze the constraints in image processing when dealing with larger data sets (efficient storage and compression schemes)
6. Apply the knowledge primarily obtained by studying examples and cases in the field of biomedical imaging to other engineering disciplines

Course Contents:
Exercises that must be done in this course are listed below:

Exercise No.1: Histogram display and histogram equalization
Exercise No.2: Kernel processing on images leading to image enhancement
Exercise No.3: Display of 2D filters frequency responses and processing the images using these
Exercise No.4: Implementation of Arithmetic Coding for images
Exercise No.5: Basic JPEG algorithm implementation
Exercise No.6: DPCM encoding and decoding of images
Exercise No.7: Simple image watermarking algorithms using LSB substitution
Exercise No.8: Simple content based image retrieval using various distance metrics
Exercise No.9: Image segmentation algorithms using Snakes
Exercise No.10: Color images manipulations, reading and writing of color images

Text Book:
1. R.C Gonzalezand R. Woods:-Digital Image Processing, (Indian reprint: Pearsonpublication)
2. AnilK.Jain:-DigitalImageProcessing (Prentice-Hall,India)

Recommended Systems/Software Requirements:
1. Intel based desktop PC with at least 2GB RAM and 15 GB free disk space.
2. Matlab/Scilab in Windows XP or Linux Operating System.

UNIVERSITY OF ENGINEERING & MANAGEMENT, JAIPUR

Course Description

Title of Course: Grand Viva **Course Code: EC881**
L-T –P Scheme: 0P **Course Credits: 4**

Aims and Objectives

1. To compare the traditional viva examination (TVE) with OSVE (Objective Structured Viva Examination).

2. To obtain the students' opinion regarding OSVE as an assessment tool.

3. A suggestion to include OSVE as a part of university examination.

Materials and Methods

The study was carried out in November 2012, at K.J. Somaiya Medical College, in the department of Anatomy. 50 students were exposed to different stations of viva as well as OSVE. A comparison was made of the student's performance and a feedback was taken from the students regarding the same.

As the OSVE was being conducted for the first time, the students were notified in advance regarding the plan for conducting the part ending practical assessment – by both the TVE and OSVE. The OSVE was planned for 20 marks, viva voce of 20 marks.

Purpose and Format of the Viva Voce Examination

Literally, "viva voce" means by or with the living voice - i.e., by word of mouth as opposed to writing. So the viva examination is where you will give a verbal defence of your thesis.

Put simply, you should think of it as a verbal counterpart to your written thesis. Your thesis demonstrates your skill at presenting your research in writing. In the viva examination, you will demonstrate your ability to participate in academic discussion with research colleagues.

Purpose of the Exam

The purpose of the viva examination is to:

- demonstrate that the thesis is your own work
- confirm that you understand what you have written and can defend it verbally
- investigate your awareness of where your original work sits in relation to the wider research field
- establish whether the thesis is of sufficiently high standard to merit the award of the degree for which it is submitted

- allow you to clarify and develop the written thesis in response to the examiners' questions

The Examiners and Exam Chair

You will normally have two examiners:

- an internal examiner who will be a member of academic staff of the University, usually from your School/Department but not one of your supervisors
- an external examiner who will normally be a member of academic staff of another institution or occasionally a professional in another field with expertise in your area of research (candidates who are also members of University staff will normally have two external examiners in place of an internal and an external examiner)

Your supervisor should let you know who your examiners will be as it is important that you ensure you are familiar with their work and any particular approach that they may take when examining your thesis.

In some cases there may also be a Chair person for the examination. A Chair is appointed if the Graduate Dean or either of the examiners feels this is appropriate, for example where the examining team has relatively little experience of examining UK research degrees. The Chair is there to ensure the examination is conducted in line with University regulations and is not there to examine your thesis. If there is a Chair person, it will usually be a senior member of the academic staff of your School/Department.

Normally no one else is present in the exam.

Exam Venue and Arrangements

Your internal examiner is responsible for arranging your viva exam and they will contact you with the relevant details - date, time, venue, etc.

Usually the viva exam will take place in your School/Department, though occasionally another University location may be used. If you are unsure where you need to go, make sure you check this before the day of your exam.

If you returned your Notice of Intention to Submit Your Thesis three months before your submission date, your viva exam should normally take place quite soon after submission. Almost

all viva exams take place within three months of thesis submission and in many cases it is within one month.

Format of the Exam

All viva examinations are different, so it is not possible to describe exactly what will happen - but there are general points which can be made which may be helpful, and you should have the opportunity before your examination to discuss what will happen with your supervisor or to attend the University's pre-viva examination workshop.

The purpose of the viva is to establish that your work is of a sufficiently high standard to merit the award of the degree for which it is submitted. In order to be awarded a research degree, the thesis should demonstrate an original contribution to knowledge and contain work which is deemed worthy of publication.

In order to do this, examiners may:

- ask you to justify your arguments
- ask you to justify not only things which you have included in your thesis but also things which you may have left out
- ask you questions about the wider research context in which the work has been undertaken
- argue certain points with you
- expect you to discuss any developments which may flow from your work in the future

Inevitably, your thesis will have strengths and weaknesses and the examiners will want to discuss these. It is considered a positive thing, indeed an essential thing, that you can discuss both the strengths and the weaknesses. You can think of the weaknesses as an opportunity to demonstrate your skill at critical appraisal.

Remember that examiners seek to find and discuss weaknesses in all theses - you should not interpret criticism as an indication that the examination will not end successfully.

UNIVERSITY OF ENGINEERING & MANAGEMENT, JAIPUR

Course Description

Title of Course: Project Part-II **Course Code: EC882**
L-T –P Scheme: 12P **Course Credits: 12**

Project: an activity where the participants have some degree of *choice* in the outcome. The result is complete and functional, that is, it has a beginning, middle and end. Usually, it spans multiple lab periods and requires work outside scheduled lab periods. Since there are choices in implementation, *design* is inherently a component of a project. A project is inherently different from an *analysis* or *exercise*, in which the solution has a predictable form. Projects span a wide variety of possibilities: design and build, identify a system, do a forensic analysis, evaluate a product or assess some environmental situation.

Program Objective 1
Graduates shall make their way to the society with proper scientific and technical knowledge in mechanical engineering.

Program Objective 2
Graduates shall work in design and analysis of mechanical systems with strong fundamentals and methods of synthesis.

Program Objective 3
Graduates shall adapt to the rapidly changing environment in the areas of mechanical engineering and scale new heights in their profession through lifelong learning.

Program Objective 4
Graduates shall excel in career by their ability to work and communicate effectively as a team member and/or leader to complete the task with minimal resources, meeting deadlines.

Program Outcomes:

1. Ability to apply knowledge of mathematics, science and mechanical engineering fundamentals for solving problems.
2. Ability to Identify, formulate and analyze mechanical engineering problems arriving at meaningful conclusions involving mathematical inferences.
3. Ability to design and develop mechanical components and processes to meet desired needs considering public health, safety, cultural, social, and environmental aspects.
4. Ability to understand and investigate complex mechanical engineering problems experimentally.
5. Ability to apply modern engineering tools, techniques and resources to solve complex mechanical engineering activities with an understanding of the limitations.
6. Ability to understand the effect of mechanical engineering solutions on legal, cultural, social, public health and safety aspects./li>

Course Description

7. Ability to develop sustainable solutions and understand their impact on society and environment.
8. Ability to apply ethical principles to engineering practices and professional responsibilities.
9. Ability to function effectively as an individual and as a member or leader in diverse teams and in multidisciplinary settings.
10. Ability to comprehend, design documentation, write effective reports, make effective presentations to the engineering community and society at large.
11. Ability to apply knowledge of engineering and management principles to lead teams and manage projects in multidisciplinary environments.
12. Ability to engage in independent and life-long learning in the broad context of technological changes and advancements.