



Maharaja Ranjit Singh Punjab Technical University

DABWALI ROAD, BATHINDA-151001

[Established by Govt. of Punjab vide Act No. 5 of 2015, UGC Act 2(f)]

DEAN ACADEMIC AFFAIRS

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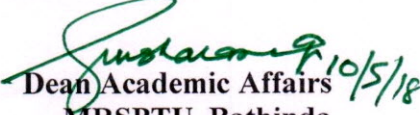
Date: 10.05.2018

NOTIFICATION

A proposal was received from Professor and Head, Department of ECE, GZSCCET, Bathinda having no. HECD: 3238 dated 16.03.2018 proposing the equivalence of two subjects MCSE1-103 and MECE1-163 named as Soft Computing.

Comments of Research Scholar's Supervisor, Dr. Shweta of ECE Deptt., GZSCCET, Bathinda, Chairman, BOS in CSE, Dr. Naresh Garg and Chairman BOS in ECE, Dr. A. K. Goel were taken and the above officers submitted their report that the contents of these two subjects are nearly the same and may be considered as equivalent.

Based upon the report of the above said officers the University declares that these two subjects i.e., MCSE1-103 and MECE1-163 named as Soft Computing are equivalent. Copy of these two syllabi is attached.


Dean Academic Affairs
MRSPTU, Bathinda

Copy to:

1. P.A. to Vice Chancellor, MRSPTU, Bathinda for information to the Vice Chancellor please
2. Registrar, MRSPTU, Bathinda
3. Dean (R & D), MRPSTU, Bathinda
4. Chairman BOS in ECE, Dr. A.K. Goel, GZSCCET, Bathinda
5. Chairman BOS in CSE, Dr. Naresh Garg, GZSCCET, Bathinda
6. Supervisor, Dr. Shweta of ECE Deptt., GZSCCET, Bathinda

**MRSPTU M.TECH. COMPUTER SCIENCE & ENGINEERING SYLLABUS 2016 BATCH
ONWARDS**

**Each Student has to Prepare Mini Research Project on Topic/ Area of their Choice and Make Presentation. The Report Should Consists of Applications of Tests and Techniques Mentioned in The Above UNITS.*

RECOMMENDED BOOKS:

1. R.I. Levin and D.S. Rubin, 'Statistics for Management', 7th Edn., Pearson Education New Delhi.
2. N.K. Malhotra, 'Marketing Research—An Applied Orientation', 4th Edn., Pearson Education New Delhi.
3. Donald Cooper, 'Business Research Methods', Tata McGraw Hill, New Delhi.
4. Sadhu Singh, 'Research Methodology in Social Sciences', Himalaya Publishers.
5. Darren George & Paul Mallery, 'SPSS for Windows Step by Step', Pearson Education New Delhi.
6. C.R. Kothari, 'Research Methodology Methods & Techniques', 2nd Edn., New Age International Publishers.

SOFT COMPUTING

MCSE1-103,
MCSE2-103,
MCSE3-103,
MCSE4-103

L T P C
3 1 0 4

Duration: 45 Hrs.

COURSE OBJECTIVES:

The OBJECTIVES of this COURSE is to teach basic neural networks, fuzzy systems, Genetic Algorithms and optimization algorithms concepts and their relations.

COURSE OUTCOMES:

CO1: Able to comprehend techniques and applications of Soft Computing in real world problems.

CO2: Able to follow fuzzy logic methodology and design fuzzy systems for various applications.

CO3: Able to design feed forward Artificial Neural Networks (ANN) and implement various methods of supervised COURSE.

CO4: Able to design feedback Artificial Neural Networks (ANN) and implement various methods of unsupervised COURSE

CO5: Able to appreciate the methodology of GA and its implementation in various applications.

UNIT-I (11 Hrs.)

Soft Computing: Introduction of soft computing, soft computing vs. hard computing, various types of soft computing techniques, applications of soft computing.

Fuzzy Logic: Fuzzy set versus crisp set, basic concepts of fuzzy sets, membership functions, basic operations on fuzzy sets and its properties. Fuzzy relations versus Crisp relation.

Fuzzy rule base system: Fuzzy propositions, formation, decomposition & aggregation of fuzzy rules, fuzzy reasoning, Fuzzy Inference Systems (FIS) – Mamdani Fuzzy Models – Sugeno Fuzzy Models – Tsukamoto Fuzzy Models, Fuzzification and Defuzzification, fuzzy decision making & Applications of fuzzy logic.

UNIT-II (12 Hrs.)

Structure and Function of a Single Neuron: Biological neuron, artificial neuron, definition of ANN and its applications. Neural Network architecture: Single layer and multilayer feed forward networks and recurrent networks. COURSE rules and equations: Perceptron, Hebb's, Delta, winner take all and out-star COURSE rules. Supervised COURSE Network:

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**MRSPTU M.TECH. COMPUTER SCIENCE & ENGINEERING SYLLABUS 2016 BATCH
ONWARDS**

Perceptron Networks, Adaptive Linear Neuron, Multiple Adaptive Linear Neuron, Back Propagation Network, Associative memory networks, Unsupervised COURSE Networks: Competitive networks, Adaptive Resonance Theory, Kohonen Self Organizing Map.

UNIT-III (11 Hrs.)

Genetic Algorithm: Fundamentals, basic concepts, working principle, encoding, fitness function, reproduction, Genetic modeling: selection operator, cross over, mutation operator, Stopping Condition and GA flow, Constraints in GA, Applications of GA, Classification of GA.

UNIT-IV (11 Hrs.)

Hybrid Soft Computing Techniques: An Introduction, Neuro-Fuzzy Hybrid Systems, Genetic Neuro-Hybrid systems, Genetic fuzzy Hybrid and fuzzy genetic hybrid systems.

RECOMMENDED BOOKS:

1. S. Rajasekaran & G.A. Vijayalakshmi Pai, 'Neural Networks, Fuzzy Logic & Genetic Algorithms, Synthesis & applications', 1st Edn., PHI Publication, **2003**.
2. S.N. Sivanandam & S.N. Deepa, 'Principles of Soft Computing', 2nd Edn., Wiley Publications, **2008**.
3. Michael Negnevitsky, 'Artificial Intelligence', 2nd Edn., Pearson Education, New Delhi, **2008**.
4. Timothy J. Ross, 'Fuzzy Logic with Engineering Applications', 3rd Edn., Wiley, **2011**.
5. Bose, 'Neural Network fundamental with Graph, Algoithm & Application', TMH, **2004**.
6. Kosko, 'Neural Network & Fuzzy System', 1st Edn., PHI Publication, **2009**.
7. Klir & Yuan, 'Fuzzy sets & Fuzzy Logic: Theory & Application', PHI, **1995**.
8. Hagen, 'Neural Network Design', 2nd Edn., Cengage COURSE, **2008**.

AGILE SOFTWARE DEVELOPMENT APPROACHES

MCSE1-156,
MCSE2-156,
MCSE4-156,
MCSE3-205

L T P C
3 1 0 4

Duration: 45 Hrs.

COURSE OBJECTIVES:

This COURSE makes student learn the fundamental principles and practices associated with each of the agile development methods. To apply the principles and practices of agile software development on a project of interest and relevance to the student.

COURSE OUTCOMES:

CO1: To learn the basics concepts of Agile software and their principles design

CO2: To explain different agile development method, project tools requirement, risk and measurements related with different development methods.

CO3: To understand the overview of Agile methods, strategies, requirements and testing.

CO4: Describe and explain agile measurement, configuration and risk management. Principles of Astern and tools.

UNIT-I (11 Hrs.)

Introduction: Basics and Fundamentals of Agile Process Methods, Values of Agile, Principles of Agile, stakeholders, Challenges.

Agile and its Significance: Agile development, Classification of methods, the agile manifesto and principles, Practices of XP, Scrum Practices, working and need of Scrum, advanced Scrum Applications, Scrum and the Organization.

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**MRSPTU M.TECH. ELECTRONICS & COMMUNICATIONS ENGG. SYLLABUS
2016 BATCH ONWARDS**

UNIT-2 (12 Hrs.)

Speech coding -sub band coding of speech - transform coding - channel vocoder - formant vocoder - cepstral vocoder -vector quantizer coder- Linear Predictive Coder. Speech synthesis - pitch extraction algorithms - gold rabiner pitch trackers - autocorrelation pitch trackers - voice/unvoiced detection - homomorphic speech processing – homomorphic systems for convolution - complex cepstrums - pitch extraction using homomorphic speech processing. Sound Mixtures and Separation - CASA, ICA & Model based separation.

UNIT-3 (11 Hrs.)

Speech Transformations - Time Scale Modification - Voice Morphing. Automatic speech recognition systems – isolated word recognition - connected word recognition -large vocabulary word recognition systems - pattern classification -DTW, HMM - speaker recognition systems - speaker verification systems - speaker identification Systems.

UNIT-4 (11 Hrs.)

Audio Processing : Non speech and Music Signals - Modelling -Differential, transform and sub-band coding of audio signals & standards - High Quality Audio coding using Psychoacoustic models - MPEG Audio coding standard. Music Production - sequence of steps in a bowed string instrument - Frequency response measurement of the bridge of a violin. Audio Data bases and applications - Content based retrieval.

Recommended Books

1. L.R. Rabiner & R.W. Schafer, 'Digital Processing of Speech Signals', Prentice Hall Inc.
2. D. O'Shaughnessy, 'Speech Communication, Human and Machine'. Addison-Wesley.
3. Thomas F. Quatieri , 'Discrete-Time Speech Signal Processing: Principles and Practice', Prentice Hall, Signal Processing Series.
4. J. Deller, J. Proakis and J. Hansen, 'Discrete-Time Processing of Speech Signals', Macmillan.
5. Ben Gold & Nelson Morgan, 'Speech and Audio Signal Processing', John Wiley & Sons, Inc.
6. F.J. Owens, 'Signal Processing of Speech', Macmillan New Electronics.
7. S. Saito & K. Nakata, 'Fundamentals of Speech Signal Processing', Academic Press, Inc.
8. P.E. Papamichalis, 'Practical Approaches to Speech Coding', Texas Instruments, Prentice Hall.
9. L.R. Rabiner & Gold, 'Theory and Applications of Digital Signal Processing', Prentice Hall of India.
10. N.S. Jayant and P. Noll, 'Digital Coding of Waveforms: Principles and Applications to Speech and Video. Signal Processing Series', Englewood Cliffs: Prentice-Hall.
11. Thomas Parsons, 'Voice and Speech Processing', McGraw Hill Series.

SOFT COMPUTING

Subject Code: MECE1-163

**L T P C
4 0 0 4**

Duration: 45 Hrs.

UNIT – I (12 Hrs.)

Soft Computing: Introduction of soft computing, soft computing vs. hard computing, various types of soft computing techniques, applications of soft computing.

Fuzzy Logic: Fuzzy set versus crisp set, basic concepts of fuzzy sets, membership functions, basic operations on fuzzy sets and its properties. Fuzzy relations versus Crisp relation,

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**MRSPTU M.TECH. ELECTRONICS & COMMUNICATIONS ENGG. SYLLABUS
2016 BATCH ONWARDS**

Fuzzy rule base system: Fuzzy propositions, formation, decomposition & aggregation of fuzzy rules, fuzzy reasoning, Fuzzy Inference Systems (FIS) – Mamdani Fuzzy Models – Sugeno Fuzzy Models – Tsukamoto Fuzzy Models, Fuzzification and Defuzzification, fuzzy decision making & Applications of fuzzy logic.

UNIT – II (13 Hrs.)

Structure and Function of a single neuron: Biological neuron, artificial neuron, definition of ANN and its applications. Neural Network architecture: Single layer and multilayer feed forward networks and recurrent networks. Course rules and equations: Perceptron, Hebb's, Delta, winner take all and out-star Course rules. Supervised Course Network: Perceptron Networks, Adaptive Linear Neuron, Multiple Adaptive Linear Neuron, Back Propagation Network, Associative memory networks, Unsupervised Course Networks: Competitive networks, Adaptive Resonance Theory, Kohlen Self Organizing Map

UNIT – III (12 Hrs.)

Genetic Algorithm: Fundamentals, basic concepts, working principle, encoding, fitness function, reproduction, Genetic modelling: selection operator, cross over, mutation operator, Stopping Condition and GA flow, Constraints in GA, Applications of GA, Classification of GA.

UNIT – IV (8 Hrs.)

Hybrid Soft Computing Techniques: An Introduction, Neuro-Fuzzy Hybrid Systems, Genetic Neuro-Hybrid systems, Genetic fuzzy Hybrid and fuzzy genetic hybrid systems

Recommended Books

1. S. Rajasekaran & G.A. Vijayalakshmi Pai, 'Neural Networks, Fuzzy Logic & Genetic Algorithms, Synthesis & Applications', PHI Publication, 2011.
2. S.N. Sivanandam & S.N. Deepa, 'Principles of Soft Computing', Wiley Publications, 2007.

Reference Books

1. Michael Negnevitsky, 'Artificial Intelligence', Pearson Education, New Delhi, 2008.
2. Timothy J. Ross, 'Fuzzy Logic with Engineering Applications', Wiley, 2010.

OPTICAL COMMUNICATION SYSTEM

Subject Code: MECE1-205

L T P C

Duration: 48 Hrs.

4 0 0 4

Course Objectives

This Course provides knowledge about various types of optical sources and detectors available at receivers. It also imparts knowledge about communication system based on optical fibre and various techniques of multiplexing. Apart from this, various networking models for optical communication taught to complete all aspects of this subject.

Course Outcomes

Students will attain various skills to develop different optical networks for single user and multiusers and can also attain the maximum benefit of this domain w.t.t. maximum data rate and available bandwidth.

UNIT I (11 Hrs.)

Nature of light and basic fibre optic communication system, principle of light transmission through a fibre, Classification of optical fibres: Single Mode and Multi-Mode Fibres, Step Index and Graded Index Fibres, Losses in Optical Fibres; Absorption, Scattering and Dispersion, Optical Windows for Fibre Optic Transmission system.