SEMESTER-II

Sr. No.	Course Code	Subject	Teaching Schedule			Hours/ Week	Examination Schedule & Percentage Distribution			Duration of Exam (Hrs.)	Credit
			L	T	P		Major Test	Minor Test	Total		
1	MTRA-201	Industrial Robotics	3	0	0	3	60	40	100	3	**3**
2	MTRA-202	Pattern recognition & Machine Learning	3	0	0	3	60	40	100	3	**3**
3	*	Program Elective-III	3	0	0	3	60	40	100	3	**3**
4	MTRA-206	Data Science	3	0	0	3	60	40	100	3	**3**
5	MTRA-207	Robotics Lab	0	0	4	4	60	40	100	3	**2**
6	MTRA-208	Machine Learning Lab	0	0	4	4	60	40	100	3	**2**
7	#MTRA-209	Mini Project	0	0	4	4	-	100	100	3	**2**
8	**	Audit Course-II	2	0	0	2	--	100	100	3	**0**
Total						**26**	**360**	**340**	**700**	**-**	**18**

***Program Elective -III**	
Course No.	**Subject**
MTRA-203	Expert System
MTRA-204	Optimization Technique
MTRA-205	Deep Learning

****Audit Course-II**	
Course No.	**Subject**
MTAD-102	Constitution of India
MTAD-104	Pedagogy Studies
MTAD-106	Stress Management by Yoga
MTAD-110	Personality Development and Soft Skills

Note 1: After the second semester exams, the students are encouraged to go to Industrial Training/Internship for at least 6-8 weeks during the summer break with a specific objective for Dissertation Part–I (MTRA-310). The industrial Training/Internship would be evaluated as the part of the Dissertation–I (with the marks distribution as 40 marks for Industrial Training/Internship and 60 marks for Dissertation Part–I).

Note 2: The course of program elective will be offered at 1/3rd or 6 numbers of students (whichever is smaller) strength of the class.

****Note 3:** Along with the credit course, a student may normally be permitted to take audit course, however for auditing a course; prior consent of the course coordinator of the course is required. These courses shall not be mentioned for any award/calculation of SGPA/CGPA in the DMC. A certificate of successful completion of the audit course will be issued by the Director/Head of institution.

#Note4: Mini project: During this course the student will be able to understand the contemporary/emerging technologies for various processes and systems. During the semester, the students are required to search/gather thematerial/information on a specific topic, comprehend it and present/discuss the same in the class. He/she will be acquainted to share knowledge effectively in oral (seminar) and written form (formulate documents) in the form of report.The student will be evaluated on the basis of viva/ seminar (40 marks) and report (60 marks).

MTRA-201	INDUSTRIAL ROBOTICS						
Lecture	**Tutorial**	**Practical**	**Credit**	**Major Test**	**Minor Test**	**Total**	**Time**
3	**0**	**0**	**3**	**60**	**40**	**100**	**3 Hrs.**
Program Objective (PO)	The objective of this course is to impart comprehensive knowledge of the industrial robot components. The course also aims at developing necessary skills required for efficient infrastructure for Robotics.						
Course Outcomes (CO)							
CO1	The students will be able to identify different components related to Robotics as per the requirement						
CO2	The students will be able to understand the sensor used in Robotics						
CO3	The students will be able to program the Robotics.						
CO4	The students will be able to undersatnd the applications of robots in industy.						

UNIT-1

Fundamentals of robotics. Introduction, construction and applications. The robot and its peripherals: Control systems and components, robot motion analysis and control, end effectors, feedback systems, encoders kinematics, homogeneous coordinates solution of the inverse kinematic problem, multiple solutions, jacobian, work envelopes. Trajectory planning, Joint Interpolated Trajectory, Link joints and their Manipulator dynamics and force control.

UNIT-2

Sensors in Robotics: Developments in sensor technology, sensory control Vision, ranging, laser, acoustic, tactile.

UNIT-3

Programming Language: Industrial robot programming languages. Mobile robots, robot avoiding system, walking devices. Robot programming environment.

UNIT-4

Robot applications: Application of robots in surgery, Manufacturing industries, space and underwater. Humanoid robots, Micro robots, Social issues and Future of robotics.

Text Books

1. K.S Fu, R.C. Gonzalez, C.S.G. Lee, Robotics, McGraw Hill, 1987.
2. Y. Koren, Robotics for Engineers, McGraw Hill, 1985.
3. J.J. Craig, Robotics, Addison-Wesley, 1986.
4. Saeed B. Niku, “Introduction to Robotics – Analysis, Systems and Application”: PHI 2006.
5. Richard D, Klafter, Thomason A Chmiel Owski, Michel Nagin “Robotics Engg-an Integrated Approach” PHI 2005.
6. R.K. Mittal & I.J. Nagrath, “Robotics & Control” TMH-2007.
7. Groover. M.P. Industrial Robotics, technology, programming and application Mc-Graw Hill 2012.
8. S. K. Saha, “Introduction to Robotics”, Tata McGraw-Hill Publishing Company Ltd. (2008).

Note for paper setter: Eight question will be set in all. Two questions from each unit. The candidate will be required to attempt four question in all and selecting one question from each unit.

MTRA-202	PATTERN RECOGNITION AND MACHINE LEARNING						
Lecture	**Tutorial**	**Practical**	**Credit**	**Major Test**	**Minor Test**	**Total**	**Time**
3	**0**	**0**	**3**	**60**	**40**	**100**	**3 Hrs.**
Program Objective (PO)	Student will understand the concepts, theory and computational algorithms needed for several real world recognition tasks such as text, speech, characters, objects etc. Simulate and understand how machine will have power to accomplish these tasks and can aim at developing several examples based learning tasks in several domains ranging from medical, economical, engineering to industrial needs.						
Course Outcomes (CO)							
CO1	Understand the basics of Pattern recognition and machine learning.						
CO2	Understand the methods used for learning approaches.						
CO3	Method and techniques for Neural network						
CO4	Implement various machine learning and Pattern recognition algorithms in a range of real-world applications.						

UNIT-1

PR overview-Feature extraction-Statistical Pattern Recognition-Supervised & Unsupervised Learning; Bayes decision Theory, Linear discriminant functions;

UNIT-2

Parametric methods, ML and MAP estimation-Bayes estimation. Non parametric methods; Parzen windows & k NN approaches.

UNIT-3

Dimensionality reduction (PCA) & Fishers linear discriminant. Linear perceptron and Neural Networks. Introduction to Deep Neural nets. Kernel methods and Support vector machine.

UNIT-4

Unsupervised learning and Clustering. K-means and Hierarchical clustering. Linear & Logistic Regression. Decision trees for classification. Ensemble/ Adaboost classifier. Expectation Maximization (EM). Applications to document analysis and recognition.

Text Books

1. Duda R O, Hart P E, and Stork D G, Pattern classification, John Wiley and Sons, 2001.
2. Christopher M B, Pattern Recognition and Machine Learning, Springer, 2006.
3. Introduction to Statistical Learning, Gareth James, Daniela Witten, Trevor Hastie, Robert Tibshirani, Springer, 2013.
4. Pattern Classification, 2nd Ed., Richard Duda, Peter Hart, David Stork, John Wiley & Sons, 2001.
5. Sergios T and Konstantinos K, Pattern Recognition, 4 th edition, Academic Press, 2008.

Note for paper setter: Eight question will be set in all. Two questions from each unit. The candidate will be required to attempt four question in all and selecting one question from each unit.

MTRA-203	EXPERT SYSTEMS						
Lecture	**Tutorial**	**Practical**	**Credit**	**Major Test**	**Minor Test**	**Total**	**Time**
4	**0**	**0**	**4**	**60**	**40**	**100**	**3 Hrs.**
Program Objective (PO)	The course gives students knowledge and skills for solving medium to hard problems from diverse expert systems application domains.						
Course Outcomes (CO)							
CO1	Define and describe expert system and its main constituents.Distinguish class of problems suitable for solving with expert systems.						
CO2	Assemble various parts of knowledge and skills in order to devise the approach to solution.						
CO3	Design and create expert system suitable for solving particular problem.						
CO4	Appraise the quality of solution and justify the employed techniques						

Unit 1

The meaning of an expert system, problem domain and knowledge domain, the advantages of an expert system, general stages in the development of an expert system, general characteristics of an expert system, history and uses of expert systems today, rule-based expert systems, procedural and nonprocedural paradigms, characteristics of artificial neural systems. -The study of logic, difference between formal logic and informal logic, meaning of knowledge, how knowledge can be represented, semantic nets, how to translate semantic nets into PROLOG, limitations of semantic nets, schemas, frames and their limitations, how to use logic and set symbols to represent knowledge, the meaning of propositional and first order predicate logic, quantifiers, imitations of propositional and predicate logic.

Unit 2

Trees, lattices, and graphs, state and problem spaces, AND-OR trees and goals, methods of inference, rules of inference, limitations of propositional logic, logic systems, resolution rule of inference, resolution systems, and deduction, shallow and causal reasoning, applying resolution to first-order predicate logic, forward and backward chaining, additional methods of reference, Meta knowledge, the Markov decision process.

Unit 3

The meaning of uncertainty and theories devised to deal with it, types of errors attributed to uncertainty, errors associate, with induction, features of classical probability, experimental and subjective probabilities, compound and conditional probabilities, hypothetical reasoning and backward induction, temporal reasoning, Markov chains, odds of belief, sufficiency and necessity, role of uncertainty in inference chains, implications of combining evidence, role of inference nets in expert systems, how probabilities are propagated.

Unit 4

Sources of uncertainty in rules, methods of dealing with uncertainty, Dempster-Shafer theory, theory of uncertainty based on fuzzylogic, commercial applications of fuzzy logic. How to select an appropriate problem, the stages in the development of an expert system, types of errors to expect in the development stages, the role of the knowledge engineer in the building of expert systems, the expected life cycle of an expert system, how to do a life cycle model.

Text and Reference Books:

1. J. Giarratano and G. Riley, "Expert Systems -- Principles and Programming". 4th Edition, PWS Publishing Company, 2004.
2. Durkin, J., Expert systems Design and Development, Macmillan, 1994 2. Elias M. Awad, Building Expert Systems, West Publishing Company 1996
3. Peter Jackson, Introduction to Expert Systems, Addison Wesley Longman, 1999.ISBN 0-20187686-8.
4. Gonzalez and D. Dankel, "The Engineering of Knowledge-Based Systems", Prentice Hall, 1994.
5. Nikolopoulos, "Expert Systems", Marcel Dekker Inc. 1997. ISBN 0 8247 9927 5

Note for paper setter: Eight question will be set in all. Two questions from each unit. The candidate will be required to attempt four question in all and selecting one question from each unit.

MTRA-204	OPTIMIZATION TECHNIQUE						
Lecture	**Tutorial**	**Practical**	**Credit**	**Major Test**	**Minor Test**	**Total**	**Time**
3	**0**	**0**	**3**	**60**	**40**	**100**	**3 Hrs.**
Program Objective (PO)	Enumerate the fundamental knowledge of Linear Programming and Dynamic Programming problems. • Learn classical optimization techniques and numerical methods of optimization. • Know the basics of different evolutionary algorithms. • Explain Integer programming techniques and apply different optimization techniques to solve various models arising from engineering areas.						
Course Outcomes (CO)							
CO1	1. Explain the fundamental knowledge of Linear Programming and Dynamic Programming problems.						
CO2	2. Use classical optimization techniques and numerical methods of optimization..						
CO3	3. Describe the basics of different evolutionary algorithms.						
CO4	4. Enumerate fundamentals of Integer programming technique and apply different techniques to solve various optimization problems arising from engineering areas						

Unit 1

Statement of the Optimization Problem, Basic Definitions, Optimality Criteria for Unconstrained Optimization, Optimality Criteria for Constrained Optimization, Engineering Application of Optimization, Overview of optimization technique, Interdisciplinary nature.

Unit 2

Formulation, Simplex method, Primal to Dual, Dual Simplex method, Sensitivity Analysis. Gomory's cutting plane method, Branch & Bound Technique.

Unit 3

Lagrangian method & Kuhn tucker method. Interpolation method (Quadratic, Cubic & Direct root method). Direct search method – Random search, Pattern search and Rosen Brock's hill climbing method.

Unit 4

Gradient descent, Newton's method, Marquardt's method, Quasi Newton method. Response Surface, the Least-Squares Methods, Two-Level Factorial Design, Central Composite Design (CCD), Sequential Nature of RSM.

Books and References:

1. S.S. Rao, "Engineering Optimization - Theory and Practice", John Wiley and Sons Inc.
2. Pierre D.A., "Optimization, Theory with Application", John Wiley & sons.
3. Pablo Pedregal, "Introduction to Optimization", Springer.
4. L.C. Jhamb, "Quantitative Techniques Vol. 1 and 2", Everest Pub. House.
5. Ranjan Ganguli, "Engineering Optimization-A modern approach", University Press.

Note for paper setter: Eight question will be set in all. Two questions from each unit. The candidate will be required to attempt four question in all and selecting one question from each unit.

MTRA-205	DEEP LEARNING						
Lecture	**Tutorial**	**Practical**	**Credit**	**Major Test**	**Minor Test**	**Total**	**Time**
3	**0**	**0**	**3**	**60**	**40**	**100**	**3 Hrs.**
Program Objective (PO)	This course aims to present the mathematical, statistical and computational challenges of building stable representations for high-dimensional data, such as images, text and data. Course delves into selected topics of Deep Learning, discussing recent models from both supervised and unsupervised learning. Special emphasis will be on convolutional architectures, invariance learning, unsupervised learning and non-convex optimization.						
Course Outcomes (CO)							
CO1	1. The fundamental principles, theory and approaches for learning with deep neural networks						
CO2	2. The main variants of deep learning (such convolutional and recurrent architectures), and their typical applications						
CO3	3. The key concepts, issues and practices when training and modeling with deep architectures as well as hands-on experience in using deep learning frameworks for this purpose						
CO4	4. How to implement basic versions of some of the core deep network algorithms (such as backpropagation) .How deep learning fits within the context of other ML approaches and what learning tasks it is considered to be suited and not well suited to perform						

Unit 1

History of Deep Learning, Deep Learning Success Stories, McCulloch Pitts Neuron, Thresholding Logic, Perceptrons, Perceptron Learning Algorithm Multilayer Perceptrons (MLPs), Representation Power of MLPs, Sigmoid Neurons, Gradient Descent, Feedforward Neural Networks, Representation Power of Feedforward Neural Networks, Backpropagation

Unit 2

Gradient Descent (GD), Momentum Based GD, Nesterov Accelerated GD, Stochastic GD, Eigenvalues and eigenvectors, Eigenvalue Decomposition, Basis Principal Component Analysis and its interpretations, Singular Value Decomposition 6 Autoencoders and relation to PCA, Regularization in autoencoders, Denoising autoencoders, Sparse autoencoders, Contractive autoencoders

Unit 3

Regularization: Bias Variance Tradeoff, L2 regularization, Early stopping, Dataset augmentation, Parameter sharing and tying, Injecting noise at input, Ensemble methods, Dropout, Greedy Layerwise Pre-training, Better activation functions, Better weight initialization methods, Batch Normalization

Unit 4

Learning Vectorial Representations of Words, Convolutional Neural Networks, LeNet, AlexNet, ZF-Net, VGGNet, GoogLeNet, ResNet, Visualizing Convolutional Neural Networks, Guided Backpropagation, Deep Dream, Deep Art, Fooling Convolutional Neural Networks.

Books and References:

1. Deep Learning by Ian Goodfellow, Yoshua Bengio, Aaron Courville and Francis Bach.
2. Neural Networks and Deep Learning By Michael Nielsen
3. Deep Learning with Python by Francois Chollet, 1st Edition
4. Hands-On Machine Learning with Scikit-Learn and TensorFlow: Concepts, Tools, and Techniques to Build Intelligent Systems by Aurélien Géron,1st Edition
5. Colab (Google

Note for paper setter: Eight question will be set in all. Two questions from each unit. The candidate will be required to attempt four question in all and selecting one question from each unit.

MTRA-206	DATA SCIENCE						
Lecture	**Tutorial**	**Practical**	**Credit**	**Major Test**	**Minor Test**	**Total**	**Time**
3	**0**	**0**	**3**	**100**	**50**	**150**	**3 Hrs.**
Program Objective (PO)	Explain how data is collected, managed and stored for data science and Understand the key concepts in data science, including their real-world applications and the toolkit used by data scientists;						
Course Outcomes (CO)							
CO1	Provide with the knowledge and expertise to become a proficient data scientist.						
CO2	Demonstrate an understanding of statistics and machine learning concepts that are vital for data science;						
CO3	Produce Python code to statistically analyze a dataset;						
CO4	Critically evaluate data visualizations based on their design and use for communicating stories from data;						

UNIT – I

Introduction to core concepts and technologies: Introduction, Terminology, data science process, data science toolkit, Types of data, Example applications.

UNIT – II

Data collection and management: Introduction, Sources of data, Data collection and APIs, Exploring and fixing data, Data storage and management, Using multiple data sources

UNIT – III

Data analysis: Introduction, Terminology and concepts, Introduction to statistics, Central tendencies and distributions, Variance, Distribution properties and arithmetic, Samples/CLT, Basic machine learning algorithms, Linear regression, SVM, Naive Bayes.

UNIT – IV

Data visualization: Introduction, Types of data visualization, Data for visualization: Data types, Data encodings, Retinal variables, Mapping variables to encodings, Visual encodings.

Reference Books:

1. Cathy O'Neil and Rachel Schutt. Doing Data Science, Straight Talk From The Frontline. O'Reilly.
2. Jure Leskovek, Anand Rajaraman and Jeffrey Ullman. Mining of Massive Datasets. v2.1, Cambridge University Press.

Note for paper setter: Eight question will be set in all. Two questions from each unit. The candidate will be required to attempt four question in all and selecting one question from each unit.

MTRA-207	Robotics Lab						
Lecture	**Tutorial**	**Practical**	**Credit**	**Practical**	**Minor Test**	**Total**	**Time**
0	**0**	**4**	**2**	**60**	**40**	**100**	**3 Hrs.**
Program Objective (PO)	**This Security in computing laboratory provide an applied understanding of the principles ofnetwork and computer security.**						
Course Outcomes (CO)							
CO1	Learn about the encryption and decryption using different algorithms.						
CO2	A hands-on experience in attack execution and the use of tools in such attacks.						
CO3	Create virtual private network to evaluate response time.						
CO4	The practical knowledge to secure computers and network including the setup of policies andsecurity assessment.						

List of practical

1. Study components of real robots and its DH parameters.
2. Forward kinematics and validate using a software (ROBO analyser or any other free software tools)
3. Use of Open source computer vision programming tools Open CV.
4. Image processing using open CV.
5. Image processing for Color Shape detection.
6. Positioning and orientation of robot arm.
7. Control experiment using available hardware or software.
8. Integartion or assorted sensors (IR, potentio meter, strain gages etc) micro controller and Robot Operating System in a robotic system.

MTRA-208	MACHINE LEARNING LAB						
Lecture	**Tutorial**	**Practical**	**Credit**	**Practical**	**Minor Test**	**Total**	**Time**
0	**0**	**4**	**2**	**60**	**40**	**100**	**3 Hrs.**
Program Objective (PO)	**Explore and prepare data**. **Develop ML models**. **Pick ML algorithms for a given task**. **Understand techniques and metrics** used to determine the quality of ML models.						
Course Outcomes (CO)							
CO1	1. This course will enable students to Make use of Data sets in implementing the machine learning algorithms						
CO2	2. Implement the machine learning concepts and algorithms in any suitable language of choice.						

List of practical

1. Implement and demonstratethe FIND-Salgorithm for finding the most specific hypothesis based on a given set of training data samples. Read the training data from a .CSV file.
2. For a given set of training data examples stored in a .CSV file, implement and demonstrate the Candidate-Elimination algorithmto output a description of the set of all hypotheses consistent with the training examples.
3. Write a program to demonstrate the working of the decision tree based ID3 algorithm. Use an appropriate data set for building the decision tree and apply this knowledge toclassify a new sample.
4. Build an Artificial Neural Network by implementing the Backpropagation algorithm and test the same using appropriate data sets.
5. Write a program to implement the naïve Bayesian classifier for a sample training data set stored as a .CSV file. Compute the accuracy of the classifier, considering few test data sets.
6. Assuming a set of documents that need to be classified, use the naïve Bayesian Classifier model to perform this task. Built-in Java classes/API can be used to write the program. Calculate the accuracy, precision, and recall for your data set.
7. Write a program to construct aBayesian network considering medical data. Use this model to demonstrate the diagnosis of heart patients using standard Heart Disease Data Set. You can use Java/Python ML library classes/API.
8. Apply EM algorithm to cluster a set of data stored in a .CSV file. Use the same data set for clustering using k-Means algorithm. Compare the results of these two algorithms and comment on the quality of clustering. You can add Java/Python ML library classes/API in the program.
9. Write a program to implement k-Nearest Neighbour algorithm to classify the iris data set. Print both correct and wrong predictions. Java/Python ML library classes can be used for this problem.
10. Implement the non-parametric Locally Weighted Regressionalgorithm in order to fit data points. Select appropriate data set for your experiment and draw graphs.

Description (If any):

1. The programs can be implemented in either JAVA or Python.
2. For Problems 1 to 6 and 10, programs are to be developed without using the built-in classes or APIs of Java/Python.
3. Data sets can be taken from standard repositories (https://archive.ics.uci.edu/ml/datasets.html) or constructed by the students.

MTAD-102	Constitution of India						
Lecture	**Tutorial**	**Practical**	**Credit**	**Major Test**	**Minor Test**	**Total**	**Time**
2	**0**	**0**	**0**	**-**	**100**	**100**	**3 Hrs.**
Program Objective (PO)	Understand the premises informing the twin themes of liberty and freedom from a civil rightsperspective and to address the growth of Indian opinion regarding modern Indian intellectuals' constitutional role and entitlement to civil and economic rights as well as the emergence of nationhood in the early years of Indian nationalism.						
Course Outcomes (CO)							
CO1	Discuss the growth of the demand for civil rights in India for the bulk of Indians before the arrival of Gandhi in Indian politics.						
CO2	Discuss the intellectual origins of the framework of argument that informed the conceptualization of social reforms leading to revolution in India.						
CO3	Discuss the circumstances surrounding the foundation of the Congress Socialist Party [CSP] under the leadership of Jawaharlal Nehru and the eventual failure of the proposal of direct elections through adult suffrage in the Indian Constitution.						
CO4	Discuss the passage of the Hindu Code Bill of 1956.						

Unit I

History of Making of the Indian Constitution: History, Drafting Committee, (Composition & Working) Philosophy of the Indian Constitution: Preamble, Salient Features

Unit 2

Contours of Constitutional Rights & Duties: Fundamental Rights , Right to Equality , Right to Freedom , Rightagainst Exploitation , Right to Freedom of Religion, Cultural and Educational Rights , Right to Constitutional Remedies , Directive Principles of State Policy , Fundamental Duties.

Organs of Governance: Parliament, Composition, Qualifications and Disqualifications, Powers and Functions,Executive , President, Governor , Council of Ministers, Judiciary, Appointment and Transfer of Judges, Qualifications. Powers and Functions

Unit 3

Local Administration: District's Administration head: Role and Importance, Municipalities: Introduction, Mayor and role of Elected Representative CEO of Municipal Corporation, Panchayati raj: Introduction, PRI: ZilaPanchayat, Elected officials and their roles, CEO ZilaPanchayat: Position and role. Block level: Organizational Hierarchy (Different departments), Village level: Role of Elected and Appointed officials, Importance of grass root democracy

Unit 4

Election Commission: Election Commission: Role and Functioning. Chief Election Commissioner and ElectionCommissioners. State Election Commission: Role and Functioning. Institute and Bodies for the welfare of SC/ST/OBC and women.

References books:

1. The Constitution of India, 1950 (Bare Act), Government Publication.
2. Dr. S. N. Busi, Dr. B. R. Ambedkar framing of Indian Constitution, 1st Edition, 2015.
3. M. P. Jain, Indian Constitution Law, 7th Edn., Lexis Nexis, 2014.
4. D.D. Basu, Introduction to the Constitution of India, Lexis Nexis, 2015.

MTAD-104	Pedagogy Studies						
Lecture	**Tutorial**	**Practical**	**Credit**	**Major Test**	**Minor Test**	**Total**	**Time**
2	**0**	**0**	**0**	**-**	**100**	**100**	**3 Hrs.**
Program Objective (PO)	Review existing evidence on the review topic to inform programme design and policy makingundertaken by the DFID, other agencies and researchers and Identify critical evidence gaps to guide the development.						
Course Outcomes (CO)							
CO1	What pedagogical practices are being used by teachers in formal and informal classrooms in developing countries?						
CO2	What is the evidence on the effectiveness of these pedagogical practices, in what conditions, and with what population of learners?						
CO3	How can teacher education (curriculum and practicum) and the school curriculum and guidance materials best support effective pedagogy?						
CO4	What is the importance of identifying research gaps?						

Unit 1

Introduction and Methodology: Aims and rationale, Policy background, Conceptual framework and terminology , Theories of learning, Curriculum, Teacher education., Conceptual framework, Research questions. Overview of methodology and Searching. Thematic overview: Pedagogical practices are being used by teachers in formaland informal classrooms in developing countries. , Curriculum, Teacher education.

Unit 2

Evidence on the effectiveness of pedagogical practices, Methodology for the in depth stage: quality assessment of included studies. How can teacher education (curriculum and practicum) and the school curriculum and guidance materials best support effective pedagogy? Theory of change. Strength and nature of the body of evidence for effective pedagogical practices. Pedagogic theory and pedagogical approaches. Teachers' attitudes and beliefs and Pedagogic strategies.

Unit 3

Professional development: alignment with classroom practices and follow-up support, Peer support from the head teacher and the community. Curriculum and assessment, Barriers to learning: limited resources and large class sizes,

Unit 4

Research gaps and future directions: Research design, Contexts , Pedagogy, Teacher education Curriculum and assessment, Dissemination and research impact.

References Books:

1. Ackers J, Hardman F (2001) Classroom interaction in Kenyan primary schools, Compare, 31 (2): 245-261.
2. Agrawal M (2004) Curricular reform in schools: The importance of evaluation, Journal of Curriculum Studies, 36 (3): 361-379.
3. Akyeampong K (2003) Teacher training in Ghana - does it count? Multi-site teacher education research project (MUSTER) country report 1. London: DFID.
4. Akyeampong K, Lussier K, Pryor J, Westbrook J (2013) Improving teaching and learning of basic maths and reading in Africa: Does teacher preparation count? International Journal Educational Development, 33 (3): 272– 282.
5. Alexander RJ (2001) Culture and pedagogy: International comparisons in primary education. Oxford and Boston: Blackwell.
6. Chavan M (2003) Read India: A mass scale, rapid, 'learning to read' campaign.

MTAD-106	Stress Management by Yoga						
Lecture	**Tutorial**	**Practical**	**Credit**	**Major Test**	**Minor Test**	**Total**	**Time**
2	**0**	**0**	**0**	**-**	**100**	**100**	**3 Hrs.**
Program Objective (PO)	To achieve overall health of body and mind and to overcome stress						
Course Outcomes (CO)							
CO1	Develop healthy mind in a healthy body thus improving social health.						
CO2	Improve efficiency						
CO3	Learn the Yog asan						
CO4	Learn the pranayama						

Unit – 1

Definitions of Eight parts of yog (Ashtanga).

Unit- 2

Yam and Niyam, Do`s and Don't's in life; Ahinsa, satya, astheya, bramhacharya and aparigraha; Shaucha,santosh, tapa, swadhyay, ishwarpranidhan.

Unit- 3

Asan and Pranayam, Various yog poses and their benefits for mind & body,

Unit- 4

Regularization of breathing techniques and its effects-Types of pranayam.

References books:

1. 'Yogic Asanas for Group Tarining-Part-I" :Janardan Swami Yogabhyasi Mandal, Nagpur
2. "Rajayoga or conquering the Internal Nature" by Swami Vivekananda, AdvaitaAshrama (Publication Department), Kolkata

MTAD-110	Personality Development and Soft Skills							
Lecture	**Tutorial**	**Practical**	**Credit**	**Major Test**	**Minor Test**	**Practical**	**Total**	**Time**
2	**0**	**0**	**0**	**--**	**100**	**-**	**100**	**3 Hrs.**
Program Objective (PO)	To become a person with stable mind, pleasing personality and determination in order to achieve the highest goal.							
Course Outcomes (CO)								
CO1	Students become aware about leadership.							
CO2	Students will learn how to improve communication skills							
CO3	Understand the team building and conflict							
CO4	Student will learn how to manage the time.							

Unit 1

Leadership Introduction to Leadership, Leadership Power, Leadership Styles, Leadership in Administration. Interpersonal: Introduction to Interpersonal Relations, Analysis Relations of different ego states, Analysis of Transactions, Analysis of Strokes, Analysis of Life position

Unit II

Communication: Introduction to Communication, Flow of Communication, Listening, Barriers of Communication, How toovercome barriers of communication. Stress Introduction to Stress, Causes of Stress, Impact Management Stress, Managing Stress

Unit III

Group Dynamics and team Building: Importance of groups in organization, Interactions in group, Group Decision Taking,Team Building, Interaction with the Team, How to build a good team? Conflict: Introduction to Conflict, Causes of Conflict, Management Managing Conflict

Unit IV

Time Management: Time as a Resource, Identify Important Time Wasters, Individual Time Management Styles,Techniques for better Time Management. Motivation: Introduction to Motivation, Relevance and types of Motivation, Motivating the subordinates, Analysis of Motivation

Reference Books:

1. E.Berne, Games People Play, Grove Press Inc., 1964; Penguin, 1968.
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