

MAULANA ABUL KALAM AZAD UNIVERSITY OF TECHNOLOGY, WB
Syllabus of M. Tech. in Information Technology with Specialization: Information Security(In-house)
(Effective for 2019-2020 Admission session)

Semester III

Course Number	Subject	L	T	P	Credits
PGIT(IS)301A/ PGIT(IS)301B/ PGIT(IS)301C	Program Elective V – A. Data Security and Access Control/ B. Web Search & Information Retrieval/ C. Blockchains and cryptocurrency	3	0	0	03
PGIT(IS)302A/ PGIT(IS)302B/ PGIT(IS)302C/ PGIT(IS)302D/ PGIT(IS)302E/ PGIT(IS)302F	Open Elective A. Business Analytics B. Industrial Safety C. Operations Research D. Cost Management of Engineering Projects E. Composite Materials F. Waste to Energy	3	0	0	03
PGIT(IS)391	Dissertation-I /Industrial Project	0	0	20	10
Total Credits: 16					

Detailed Syllabus

Course Code	PGIT(IS)301A
Course Name	Cloud Computing
Credits	3
Pre-Requisites	Networking , Distributed Computing

Total Number of Lectures: 48

COURSE OBJECTIVE
<ul style="list-style-type: none"> The student will also learn how to apply trust-based security model to real-world security problems.
<ul style="list-style-type: none"> An overview of the concepts, processes, and best practices needed to successfully secure information within Cloud infrastructures.
<ul style="list-style-type: none"> Students will learn the basic Cloud types and delivery models and develop an understanding of the risk and compliance responsibilities and Challenges for each Cloud type and service delivery model.

LECTURE WITH BREAKUP	NO. OF LECTURES
Unit 1: Introduction to Cloud Computing Online Social Networks and Applications, Cloud introduction and overview, Different clouds, Risks, Novel applications of cloud computing	4

MAULANA ABUL KALAM AZAD UNIVERSITY OF TECHNOLOGY, WB
Syllabus of M. Tech. in Information Technology with Specialization: Information Security(In-house)
(Effective for 2019-2020 Admission session)

<p>Unit 2: Cloud Computing Architecture Requirements, Introduction Cloud computing architecture, On Demand Computing Virtualization at the infrastructure level, Security in Cloud computing environments, CPU Virtualization, A discussion on Hypervisors Storage Virtualization Cloud Computing Defined, The SPI Framework for Cloud Computing, The Traditional Software Model, The Cloud Services Delivery Model</p> <p>Cloud Deployment Models Key Drivers to Adopting the Cloud, The Impact of Cloud Computing on Users, Governance in the Cloud, Barriers to Cloud Computing Adoption in the Enterprise</p>	11
<p>Unit 3: Security Issues in Cloud Computing Infrastructure Security, Infrastructure Security: The Network Level, The Host Level, The Application Level, Data Security and Storage, Aspects of Data Security, Data Security Mitigation Provider Data and Its Security</p> <p>Identity and Access Management Trust Boundaries and IAM, IAM Challenges, Relevant IAM Standards and Protocols for Cloud Services, IAM Practices in the Cloud, Cloud Authorization Management</p>	10
<p>Unit 4: Security Management in the Cloud Security Management Standards, Security Management in the Cloud, Availability Management: SaaS, PaaS, IaaS</p> <p>Privacy Issues Privacy Issues, Data Life Cycle, Key Privacy Concerns in the Cloud, Protecting Privacy, Changes to Privacy Risk Management and Compliance in Relation to Cloud Computing, Legal and Regulatory Implications, U.S. Laws and Regulations, International Laws and Regulations</p>	11
<p>Unit 5: Audit and Compliance Internal Policy Compliance, Governance, Risk, and Compliance (GRC), Regulatory/External Compliance, Cloud Security Alliance, Auditing the Cloud for Compliance, Security-as-a-Cloud</p>	8
<p>Unit 6: ADVANCED TOPICS Recent developments in hybrid cloud and cloud security.</p>	4

COURSE OUTCOMES
After completion of course, students would be able to:
<ul style="list-style-type: none"> ● Identify security aspects of each cloud model ● Develop a risk-management strategy for moving to the Cloud ● Implement a public cloud instance using a public cloud service provider ● Apply trust-based security model to different layer

References:

1. Cloud Computing Explained: Implementation Handbook for Enterprises, John Rhoton, Publication Date: November 2, 2009
2. Cloud Security and Privacy: An Enterprise Perspective on Risks and Compliance (Theory in Practice), Tim Mather, ISBN-10: 0596802765, O'Reilly Media, September 2009

MAULANA ABUL KALAM AZAD UNIVERSITY OF TECHNOLOGY, WB
Syllabus of M. Tech. in Information Technology with Specialization: Information Security(In-house)
(Effective for 2019-2020 Admission session)

Course Code	PGIT(IS)301B
Course Name	IoT and Smart Cities
Credits	3
Pre-Requisites	Wireless Communication and Networks

Total Number of Lectures:48

COURSE OBJECTIVE
<ul style="list-style-type: none"> ● Explain the basic methodologies and techniques of the arts and humanities, social sciences, business, and science and technology ● to describe the current practices and future trends about smart city; ● Capacity of critique the current practice and provide recommendations.

LECTURE WITH BREAKUP	NO. OF LECTURES
Unit 1: Introduction and Applications:smart transportation, smart cities, smart living, smart energy, smart health, and smart learning.	8
Unit 2:IoT Reference Architecture- methods to assist local governments to develop international good e-practice	9
Unit 3: Methods to redesign and redefine back and front offices in order to build smarter and transparent governments	8
Unit 4: Methods to design public mobile services aimed at efficiency, cost-saving and participation with attention for e-inclusion	8
Unit 5: Methodologies for user involvement, profiling customers and indentifying needs; test methodologies to transfer these needs in appropriate services; and test techniques to fit the right channel to the specific services and customers thereby setting a framework for a higher level of e-services in the NSR	10
Unit 6: Pilot new service channels, bluetooth services for public transport, online forms in mobile phones and wireless city services	5

COURSE OUTCOMES
On completion of the course the student should be able to
<ul style="list-style-type: none"> ● understanding the fundamental knowledge of the sustainable and smart city ● Ability to understand the technologies used for sustainable and smart cities; ● Ability to integrate and apply the learnt knowledge to conduct a case study in an organized way; Ability to present the study clearly to audiences; Demonstration of critical thinking and discovering.

References:

1. Smart City on Future Life - Scientific Planning and Construction by Xianyi Li
2. The Age of Intelligent Cities: Smart Environments and Innovation-for-all Strategies (Regions and Cities) by NicosKomninos

MAULANA ABUL KALAM AZAD UNIVERSITY OF TECHNOLOGY, WB
Syllabus of M. Tech. in Information Technology with Specialization: Information Security(In-house)
(Effective for 2019-2020 Admission session)

3. Smart Cities: Big Data, Civic Hackers, and the Quest for a New Utopia by Anthony Townsend

Course Code	PGIT(IS)301C
Course Name	Emulation and Simulation Methodologies
Credits	3
Pre-Requisites	Probability Theory, Computer Networks

Total Number of Lectures:48

COURSE OBJECTIVE
<ul style="list-style-type: none"> ● this module teaches the fundamentals of simulation and emulation methodologies providing guidance on how to design a performance evaluation campaign, ● set up a test scenario, select the appropriate models, level of granularity ● metrics for statistical correctness, and discuss the differences between simulation and emulation platforms and how to use them for accurate performance evaluation of communications.

LECTURE WITH BREAKUP	NO. OF LECTURES
Unit 1: Fundamentals of Discrete Event Simulations (DES)	8
Unit 2: Model-based representation for DES, from communication and networking, to mobility and data traffic.	8
Unit 3: Application-based Granularity Requirements: from bit-level, packet-level, to system-level evaluation, and their appropriate selection as a function of the application requirements.	8
Unit 4: Fundamentals on Random Numbers, Fundamentals on Statistical Tools for Performance Evaluation, Simulation vs. Emulations	12
Unit 5: Case study for the evaluation of communications for ITS.	8
Unit 6: Recent trends in simulation and emulation for IOT, model based and application based granularity presentation	4

COURSE OUTCOMES
On completion of the course the student should be able to
<ul style="list-style-type: none"> ● Key concepts, tools and approaches for pattern recognition on complex data sets ● Kernel methods for handling high dimensional and non-linear patterns ● State-of-the-art algorithms such as Support Vector Machines and Bayesian networks ● Theoretical concepts and the motivations behind different learning frameworks ● Be able to solve real-world machine learning tasks: from data to inference

References:

1. Jack L. Burbank, An Introduction to Network Simulator 3, Wiley

MAULANA ABUL KALAM AZAD UNIVERSITY OF TECHNOLOGY, WB
Syllabus of M. Tech. in Information Technology with Specialization: Information Security(In-house)
(Effective for 2019-2020 Admission session)

OPEN ELECTIVES
Business Analytics

Lecture: - 3 h/week

Course Code	PGIT(IS)302A
Course Name	Business Analytics

Total Number of Lectures: 48

Course objective
<ol style="list-style-type: none"> 1. Understand the role of business analytics within an organization. 2. Analyze data using statistical and data mining techniques and understand relationships between the underlying business processes of an organization. 3. To gain an understanding of how managers use business analytics to formulate and solve business problems and to support managerial decision making. 4. To become familiar with processes needed to develop, report, and analyze business data. 5. Use decision-making tools/Operations research techniques. 6. Manage business process using analytical and management tools. 7. Analyze and solve problems from different industries such as manufacturing, service, retail, software, banking and finance, sports, pharmaceutical, aerospace etc.

LECTURE WITH BREAKUP	NO. OF LECTURES
Unit1: Business analytics: Overview of Business analytics, Scope of Business analytics, Business Analytics Process, Relationship of Business Analytics Process and organisation, competitive advantages of Business Analytics. Statistical Tools: Statistical Notation, Descriptive Statistical methods, Review of probability distribution and data modelling, sampling and estimation methods overview.	9
Unit 2: Trendiness and Regression Analysis: Modelling Relationships and Trends in Data, simple Linear Regression. Important Resources, Business Analytics Personnel, Data and models for Business analytics, problem solving, Visualizing and Exploring Data, Business Analytics Technology.	8

MAULANA ABUL KALAM AZAD UNIVERSITY OF TECHNOLOGY, WB
Syllabus of M. Tech. in Information Technology with Specialization: Information Security(In-house)
(Effective for 2019-2020 Admission session)

<p>Unit 3: Organization Structures of Business analytics, Team management, Management Issues, Designing Information Policy, Outsourcing, Ensuring Data Quality, Measuring contribution of Business analytics, Managing Changes. Descriptive Analytics, predictive analytics, predicative Modelling, Predictive analytics analysis, Data Mining, Data Mining Methodologies, Prescriptive analytics and its step in the business analytics Process, Prescriptive Modelling, nonlinear Optimization.</p>	9
<p>Unit 4: Forecasting Techniques: Qualitative and Judgmental Forecasting, Statistical Forecasting Models, Forecasting Models for Stationary Time Series, Forecasting Models for Time Series with a Linear Trend, Forecasting Time Series with Seasonality, Regression Forecasting with Casual Variables, Selecting Appropriate Forecasting Models. Monte Carlo Simulation and Risk Analysis: Monte Carle Simulation Using Analytic Solver Platform, New-Product Development Model, Newsvendor Model, Overbooking Model, Cash Budget Model.</p>	10
<p>Unit 5: Decision Analysis: Formulating Decision Problems, Decision Strategies with the without Outcome Probabilities, Decision Trees, The Value of</p>	8
<p>Information, Utility and Decision Making.</p>	
<p>Unit 6: Recent Trends in : Embedded and collaborative business intelligence, Visual data recovery, Data Storytelling and Data journalism.</p>	4

COURSE OUTCOMES	
<ol style="list-style-type: none"> 1. Students will demonstrate knowledge of data analytics. 2. Students will demonstrate the ability of think critically in making decisions based on data and deep analytics. 3. Students will demonstrate the ability to use technical skills in predicative and prescriptive modeling to support business decision-making. 4. Students will demonstrate the ability to translate data into clear, actionable insights. 	

Reference:

1. Business analytics Principles, Concepts, and Applications by Marc J. Schniederjans, Dara G. Schniederjans, Christopher M. Starkey, Pearson FT Press.
2. Business Analytics by James Evans, persons Education.

MAULANA ABUL KALAM AZAD UNIVERSITY OF TECHNOLOGY, WB
Syllabus of M. Tech. in Information Technology with Specialization: Information Security(In-house)
(Effective for 2019-2020 Admission session)

OPEN ELECTIVES
Industrial Safety

CODE:

PGIT(IS)302B

Lecture: - 3 h/week

Unit-I: Industrial safety: Accident, causes, types, results and control, mechanical and electrical hazards, types, causes and preventive steps/procedure, describe salient points of factories act 1948 for health and safety, wash rooms, drinking water layouts, light, cleanliness, fire, guarding, pressure vessels, etc, Safety color codes. Fire prevention and firefighting, equipment and methods.

Unit-II: Fundamentals of maintenance engineering: Definition and aim of maintenance engineering, Primary and secondary functions and responsibility of maintenance department, Types of maintenance, Types and applications of tools used for maintenance, Maintenance cost & its relation with replacement economy, Service life of equipment.

Unit-III: Wear and Corrosion and their prevention: Wear- types, causes, effects, wear reduction methods, lubricants-types and applications, Lubrication methods, general sketch, working and applications, i. Screw down grease cup, ii. Pressure grease gun, iii. Splash lubrication, iv. Gravity lubrication, v. Wick feed lubrication vi. Side feed lubrication, vii. Ring lubrication, Definition, principle and factors affecting the corrosion. Types of corrosion, corrosion prevention methods.

Unit-IV: Fault tracing: Fault tracing-concept and importance, decision tree concept, need and applications, sequence of fault finding activities, show as decision tree, draw decision tree for problems in machine tools, hydraulic, pneumatic, automotive, thermal and electrical equipment's like, I. Any one machine tool, ii. Pump iii. Air compressor, iv. Internal combustion engine, v. Boiler, vi. Electrical motors, Types of faults in machine tools and their general causes.

Unit-V: Periodic and preventive maintenance: Periodic inspection-concept and need, degreasing, cleaning and repairing schemes, overhauling of mechanical components, overhauling of electrical motor, common troubles and remedies of electric motor, repair complexities and its use, definition, need, steps and advantages of preventive maintenance. Steps/procedure for periodic and preventive maintenance of: I. Machine tools, ii. Pumps, iii. Air compressors, iv. Diesel generating (DG) sets, Program and schedule of preventive maintenance of mechanical and electrical equipment, advantages of preventive maintenance. Repair cycle concept and importance

Reference:

1. Maintenance Engineering Handbook, Higgins & Morrow, Da Information Services.
2. Maintenance Engineering, H. P. Garg, S. Chand and Company.
3. Pump-hydraulic Compressors, Audels, Mcgrew Hill Publication.
4. Foundation Engineering Handbook, Winterkorn, Hans, Chapman & Hall London.

MAULANA ABUL KALAM AZAD UNIVERSITY OF TECHNOLOGY, WB
Syllabus of M. Tech. in Information Technology with Specialization: Information Security(In-house)
(Effective for 2019-2020 Admission session)

OPEN ELECTIVES
Operations Research

CODE:

PGIT(IS)302C

Lectures: 3 hrs/week

Course Outcomes: At the end of the course, the student should be able to

1. Students should able to apply the dynamic programming to solve problems of discreet and continuous variables.
2. Students should able to apply the concept of non-linear programming
3. Students should able to carry out sensitivity analysis
4. Student should able to model the real world problem and simulate it.

Syllabus Contents:

Unit 1:

Optimization Techniques, Model Formulation, models, General L.R Formulation, Simplex Techniques, Sensitivity Analysis, Inventory Control Models

Unit 2

Formulation of a LPP - Graphical solution revised simplex method - duality theory - dual simplex method - sensitivity analysis - parametric programming

Unit 3:

Nonlinear programming problem - Kuhn-Tucker conditions min cost flow problem - max flow problem - CPM/PERT

Unit 4

Scheduling and sequencing - single server and multiple server models - deterministic inventory models - Probabilistic inventory control models - Geometric Programming.

Unit 5

Competitive Models, Single and Multi-channel Problems, Sequencing Models, Dynamic Programming, Flow in Networks, Elementary Graph Theory, Game Theory Simulation

References:

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

MAULANA ABUL KALAM AZAD UNIVERSITY OF TECHNOLOGY, WB
Syllabus of M. Tech. in Information Technology with Specialization: Information Security(In-house)
(Effective for 2019-2020 Admission session)

Open Elective
Cost Management of Engineering Projects

CODE:

PGIT(IS)302D

Lecture: - 3 h/week

Introduction and Overview of the Strategic Cost Management Process

Cost concepts in decision-making; Relevant cost, Differential cost, Incremental cost and Opportunity cost. Objectives of a Costing System; Inventory valuation; Creation of a Database for operational control; Provision of data for Decision-Making.

Project: meaning, Different types, why to manage, cost overruns centres, various stages of project execution: conception to commissioning. Project execution as conglomeration of technical and non-technical activities. Detailed Engineering activities. Pre project execution main clearances and documents Project team: Role of each member. Importance Project site: Data required with significance. Project contracts. Types and contents. Project execution Project cost control. Bar charts and Network diagram. Project commissioning: mechanical and process

Cost Behavior and Profit Planning Marginal Costing; Distinction between Marginal Costing and Absorption Costing; Break-even Analysis, Cost-Volume-Profit Analysis. Various decision-making problems. Standard Costing and Variance Analysis. Pricing strategies: Pareto Analysis. Target costing, Life Cycle Costing. Costing of service sector. Just-in-time approach, Material Requirement Planning, Enterprise Resource Planning, Total Quality Management and Theory of constraints. Activity-Based Cost Management, Bench Marking; Balanced Score Card and Value-Chain Analysis. Budgetary Control; Flexible Budgets; Performance budgets; Zero-based budgets. Measurement of Divisional profitability pricing decisions including transfer pricing.

Quantitative techniques for cost management, Linear Programming, PERT/CPM, Transportation problems, Assignment problems, Simulation, Learning Curve Theory.

References:

2. Cost Accounting A Managerial Emphasis, Prentice Hall of India, New Delhi
3. Charles T. Horngren and George Foster, Advanced Management Accounting
4. Robert S Kaplan Anthony A. Alkinson, Management & Cost Accounting
5. Ashish K. Bhattacharya, Principles & Practices of Cost Accounting A. H. Wheeler publisher
6. N.D. Vohra, Quantitative Techniques in Management, Tata McGraw Hill Book Co. Ltd.

MAULANA ABUL KALAM AZAD UNIVERSITY OF TECHNOLOGY, WB
Syllabus of M. Tech. in Information Technology with Specialization: Information Security(In-house)
(Effective for 2019-2020 Admission session)

Open Elective
Composite Materials

CODE:

PGIT(IS)302E

Lecture: - 3 h/week

UNIT-I: INTRODUCTION: Definition – Classification and characteristics of Composite materials. Advantages and application of composites. Functional requirements of reinforcement and matrix. Effect of reinforcement (size, shape, distribution, volume fraction) on overall composite performance.

UNIT – II: REINFORCEMENTS: Preparation-layup, curing, properties and applications of glass fibers, carbon fibers, Kevlar fibers and Boron fibers. Properties and applications of whiskers, particle reinforcements. Mechanical Behavior of composites: Rule of mixtures, Inverse rule of mixtures. Isostrain and Isostress conditions.

UNIT – III: Manufacturing of Metal Matrix Composites: Casting – Solid State diffusion technique, Cladding – Hot isostatic pressing. Properties and applications. Manufacturing of Ceramic Matrix Composites: Liquid Metal Infiltration – Liquid phase sintering. Manufacturing of Carbon – Carbon composites: Knitting, Braiding, Weaving. Properties and applications.

UNIT-IV: Manufacturing of Polymer Matrix Composites: Preparation of Moulding compounds and prepregs – hand layup method – Autoclave method – Filament winding method – Compression moulding – Reaction injection moulding. Properties and applications.

UNIT – V: Strength: Laminar Failure Criteria-strength ratio, maximum stress criteria, maximum strain criteria, interacting failure criteria, hygrothermal failure. Laminate first ply failure-insight strength; Laminate strength-ply discount truncated maximum strain criterion; strength design using caplet plots; stress concentrations.

TEXT BOOKS:

1. Material Science and Technology – Vol 13 – Composites by R.W.Cahn – VCH, West Germany.
2. Materials Science and Engineering, An introduction. WD Callister, Jr., Adapted by R. Balasubramaniam, John Wiley & Sons, NY, Indian edition, 2007.

References:

1. Hand Book of Composite Materials-ed-Lubin.
2. Composite Materials – K.K.Chawla.
3. Composite Materials Science and Applications – Deborah D.L. Chung.
4. Composite Materials Design and Applications – Danial Gay, Suong V. Hoa, and Stephen W. Tasi.

MAULANA ABUL KALAM AZAD UNIVERSITY OF TECHNOLOGY, WB
Syllabus of M. Tech. in Information Technology with Specialization: Information Security(In-house)
(Effective for 2019-2020 Admission session)

Open Elective
Waste to Energy

CODE:

PGIT(IS)302F

Lecture: - 3 h/week

Unit-I: Introduction to Energy from Waste: Classification of waste as fuel – Agro based, Forest residue, Industrial waste - MSW – Conversion devices – Incinerators, gasifiers, digestors

Unit-II: Biomass Pyrolysis: Pyrolysis – Types, slow fast – Manufacture of charcoal – Methods - Yields and application – Manufacture of pyrolytic oils and gases, yields and applications.

Unit-III: Biomass Gasification: Gasifiers – Fixed bed system – Downdraft and updraft gasifiers – Fluidized bed gasifiers – Design, construction and operation – Gasifier burner arrangement for thermal heating – Gasifier engine arrangement and electrical power – Equilibrium and kinetic consideration in gasifier operation.

Unit-IV: Biomass Combustion: Biomass stoves – Improved chullahs, types, some exotic designs, Fixed bed combustors, Types, inclined grate combustors, Fluidized bed combustors, Design, construction and operation - Operation of all the above biomass combustors.

Unit-V: Biogas: Properties of biogas (Calorific value and composition) - Biogas plant technology and status - Bio energy system - Design and constructional features - Biomass resources and their classification - Biomass conversion processes - Thermo chemical conversion - Direct combustion - biomass gasification - pyrolysis and liquefaction - biochemical conversion - anaerobic digestion - Types of biogas Plants – Applications - Alcohol production from biomass - Bio diesel production - Urban waste to energy conversion - Biomass energy programme in India.

References:

1. Non Conventional Energy, Desai, Ashok V., Wiley Eastern Ltd., 1990.
2. Biogas Technology - A Practical Hand Book - Khandelwal, K. C. and Mahdi, S. S., Vol. I & II, Tata McGraw Hill Publishing Co. Ltd., 1983.
3. Food, Feed and Fuel from Biomass, Challal, D. S., IBH Publishing Co. Pvt. Ltd., 1991.
4. Biomass Conversion and Technology, C. Y. WereKo-Brobby and E. B. Hagan, John Wiley & Sons, 1996.

CODE: PGIT(IS)391 : Dissertation-I /Industrial Project