SCHOOL OF ENGINEERING

SYLLABUS

COMPUTER SCIENCE AND ENGINEERING

Class		**M.Tech.-CSE**	**L**	**T**	**P**	**C**
Semester/Year		**III/II**	**3**	**-**	**-**	**3**
Subject Name		**Mobile Applications and Services**				
Subject Code		**MCSCSE20S301**				
Paper	**English**					
	Hindi					
Max. Marks		**100**				

Course Objective:

1. Describe those aspects of mobile programming that make it unique from programming for other platforms.
2. Critique mobile applications on their design pros and cons.
3. Utilize rapid prototyping techniques to design and develop sophisticated mobile interfaces.
4. Program mobile applications for the Android operating system that use basic and advanced phone features.
5. Deploy applications to the Android marketplace for distribution.

Course Outcomes:

On completion of the course the student should be able to:

CO1. Identify the target platform and users and be able to define and sketch a mobile application.
CO2. Understand the fundamentals, frameworks, and development lifecycle of mobile application platforms including iOS, Android, and PhoneGap.
CO3. Design and develop a mobile application prototype in one of the platform (challenge project).
CO4. Competent with designing and developing mobile applications using one application development framework.
CO5. Competent with understanding enterprise scale requirements of mobile applications.

Unit	Syllabus	Periods
UNIT - I	Introduction: Introduction to Mobile Computing, Introduction to Android Development Environment, Factors in Developing Mobile Applications, Mobile Software Engineering, Frameworks and Tools, Generic UI Development Android User.	**10**

UNIT - II	More on Uis: VUIs and Mobile Apps, Text-to-Speech Techniques, Designing the Right UI, Multichannel and Multimodal Uis, Storing and Retrieving Data, Synchronization and Replication of Mobile Data, Getting the Model Right, Android Storing and Retrieving Data, Working with a Content Provider.	**10**
UNIT - III	Communications via Network and the Web: State Machine, Correct Communications Model, Android Networking and Web, Telephony Deciding Scope of an App, Wireless Connectivity and Mobile Apps, Android Telephony. Notifications and Alarms: Performance, Performance and Memory Management, Android Notifications and Alarms, Graphics, Performance and Multithreading, Graphics and UI Performance, Android Graphics.	**10**
UNIT - IV	Putting It All Together: Packaging and Deploying, Performance Best Practices, Android Field Service App, Location Mobility and Location Based Services Android. Multimedia: Mobile Agents and Peer-to-Peer Architecture, Android Multimedia. Platforms and Additional Issues: Development Process, Architecture, Design, Technology. Selection, Mobile App Development Hurdles, Testing, Security and Hacking, Active Transactions, More on Security, Hacking Android.	**15**
UNIT - V	Recent trends in Communication protocols for IOT nodes, mobile computing techniques in IOT, agents based communications in IOT.	**10**

TEXT BOOKS:

1. Mobile Computing Paperback – Illustrated, 14 December 2011 by Raj Kamal.

REFERENCE BOOKS:

1. Wei-Meng Lee, Beginning Android™ 4 Application Development, 2012 by John Wiley & Sons.

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COMPUTER SCIENCE AND ENGINEERING

Class		**M.Tech.-CSE**	**L**	**T**	**P**	**C**
Semester/Year		**III/II**	**3**	**-**	**-**	**3**
Subject Name		**Compiler for HPC**				
Subject Code		**MCSCSE20S302**				
Paper	**English**					
	Hindi					
Max. Marks		**100**				

Course Objectives:

1. Provides a solid foundation in High Performance Computing (HPC) and its role in science and engineering.
2. Study the fundamental techniques for developing HPC applications, the commonly used HPC platforms, and the methods for measuring, assessing and analysing the performance of HPC applications, and the role of administration, workload and resource management in HPC management software.
3. Introduced to the issues related to the use of HPC techniques in solving large scientific problems.

Course Outcomes:

After completion of course, students would be:

CO1. Familiar with the structure of compiler.

CO2. Parallel loops, data dependency and exception handling and debugging in compiler.

CO3. Understand the means by which to measure, assess and analyse the performance of HPC applications.

CO4. Acquainted with the fundamental programming techniques for high performance computer architectures.

CO5. Able to design, implement and benchmark parallel programs on shared-memory and distributed-memory systems.

Unit	Syllabus	Periods
UNIT - I	High Performance Systems, Structure of a Compiler, Programming Language Features, Languages for High Performance.	**10**
UNIT - II	Data Dependence: Data Dependence in Loops, Data Dependence in Conditionals, Data Dependence in Parallel Loops, Program Dependence Graph. Scalar Analysis with Factored Use-Def Chains: Constructing Factored Use- Def Chains, FUD Chains for Arrays, Induction Variables Using FUD Chains, Constant Propagation with FUD Chains, Data Dependence for Scalars. Data Dependence Analysis for Arrays.	**10**
UNIT - III	Array Region Analysis, Pointer Analysis, I/O Dependence, Procedure Calls, Inter-procedural Analysis. Loop Restructuring: Simple Transformations, Loop Fusion, Loop Fission, Loop Reversal, Loop Interchanging, Loop Skewing, Linear Loop Transformations, Strip-Mining, Loop Tiling, Other Loop Transformations, and Inter-procedural Transformations. Optimizing for Locality: Single Reference to Each Array, Multiple References General Tiling, Fission and Fusion for Locality.	**10**
UNIT - IV	Concurrency Analysis: Concurrency from Sequential Loops, Concurrency from Parallel Loops, Nested Loops, Round off Error, Exceptions and Debuggers. Vector Analysis: Vector Code, Vector Code from Sequential Loops, Vector Code from For all Loops, Nested Loops, Round off Error, Exceptions, and Debuggers, Multi-vector Computers.	**10**
UNIT - V	Message-Passing Machines: SIMD Machines, MIMD Machines, Data Layout, Parallel Code for Array Assignment, Remote Data Access, Automatic Data Layout, Multiple Array Assignments, Other Topics. Scalable Shared-Memory Machines: Global Cache Coherence, Local Cache Coherence, Latency Tolerant Machines. Recent trends in compiler design for high performance computing and message passing machines and scalable shared memory machine.	**10**

TEXT BOOKS:

1. Michael Wolfe, High-Performance Compilers for Parallel Computing, Pearson.
2. Peter Pacheco, Introduction to Parallel Programming, Morgan Kaufmann Publishers, 2011.

REFERENCE BOOKS:

1. Michael J. Quinn, Parallel programming in C with MPI and Open MP, McGraw-Hill Higher Education, 2004.
2. William Gropp, Using MPI: portable parallel programming with the message-passing interface, MIT press, 1999.

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COMPUTER SCIENCE AND ENGINEERING

Class		**M.Tech.-CSE**	**L**	**T**	**P**	**C**
Semester/Year		**III/II**	**3**	**-**	**-**	**3**
Subject Name		**Optimization Techniques**				
Subject Code		**MCSCSE20S303**				
Paper	**English**					
	Hindi					
Max. Marks		**100**				

Course Objectives:

1. To understand the theory of optimization methods and algorithms developed for solving various types of optimization problems.
2. To develop and promote research interest in applying optimization techniques in problems of Engineering and Technology.

Course Outcomes:

After completion of course, students would be:

CO1. Formulate optimization problems.

CO2. Understand and apply the concept of optimality criteria for various types of optimization Problems.

CO3. Solve various constrained and unconstrained problems in Single variable as well as Multivariable.

CO4. Apply the methods of optimization in real life situation.

CO5. To apply the mathematical results and numerical techniques of optimization theory to concrete Engineering problems.

Unit	Syllabus	Periods
UNIT - I	Engineering application of Optimization, Formulation of design problems as mathematical programming problems.	**10**
UNIT - II	General Structure of Optimization Algorithms, Constraints, The Feasible Region.	**10**

UNIT -III	Branches of Mathematical Programming: Optimization using calculus, Graphical Optimization, Linear Programming, Quadratic Programming, Integer Programming, Semi Definite Programming.	**10**
UNIT - IV	Optimization Algorithms like Genetic Optimization, Particle Swarm Optimization, Ant Colony Optimization etc.	**10**
UNIT - V	Real life Problems and their mathematical formulation as standard programming problems. Recent trends: Applications of ant colony optimization, genetics and linear and quadratic programming in real world applications.	**10**

TEXT BOOKS:

1. An Introduction to Optimization Edwin K.,P. Chong & Stanislawh .Zak.

REFERENCE BOOKS:

1. Laurence A. Wolsey (1998). Integer programming. Wiley. ISBN978-0-471-28366-9.

2. Practical Optimization Algorithms and Engineering Applications and areas Antoniou.

3. Dimitris Bertsimas; Robert Weismantel (2005). Optimization over integers. Dynamic Ideas. ISBN978-0-9759146-2-5.

4. John K. Karlof (2006). Integer programming: theory and practice. CRC Press. ISBN 978-0-8493- 1914-3.

5. H.Paul Williams (2009).Logic and Integer Programming.Springer.ISBN978-0-387-92279-9.

6. Michael Jünger; Thomas M. Liebling ; Denis Naddef ; George Nemhauser; William R. Pulley blank; Gerhard Reinelt; Giovanni Rinaldi ; Laurence A. Wolsey, eds. (2009). 50 Years of Integer Programming 1958-2008: From the Early Years to the State-of-the- Art. Springer. ISBN 978-3- 540-68274-5.

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Class		**M.Tech.-CSE**	**L**	**T**	**P**	**C**
Semester/Year		**III/II**	**3**	**-**	**-**	**3**
Subject Name		**Business Analytics**				
Subject Code		**MCSCSE20S304**				
Paper	**English**					
	Hindi					
Max. Marks		**100**				

Course objective:

1. To gain an understanding of how managers use business analytics to formulate and solve business problems and to support managerial decision making.
2. To become familiar with the processes needed to develop, report, and analyze business data.
3. To learn how to use and apply Excel and Excel add-ins to solve business problems.

Course Outcomes:

After completion of course, students would be:

CO1. Able to have knowledge of various business analysis techniques.

CO2. Understand and critically apply the concepts and methods of business analytics.

CO3. Identify, model and solve decision problems in different settings.

CO4. Interpret results/solutions and identify appropriate courses of action for a given managerial situation whether a problem or an opportunity.

CO5. Create viable solutions to decision making problems.

Unit	Syllabus	Periods
UNIT - I	Business Analysis: Overview of Business Analysis, Overview of Requirements, Role of the Business Analyst. Stakeholders: the project team, management, and the front line, Handling Stakeholder Conflicts.	**10**
UNIT - II	Life Cycles: Systems Development Life Cycles, Project Life Cycles, Product Life Cycles, Requirement Life Cycles.	**10**

UNIT - III	Forming Requirements: Overview of Requirements Attributes of Good Requirements, Types of Requirements, Requirement Sources, Gathering Requirements from Stakeholders, Common Requirements Documents.	**10**
UNIT - IV	Transforming Requirements: Stakeholder Needs Analysis, Decomposition Analysis, Additive/Subtractive Analysis, Gap Analysis, Notations (UML & BPMN), Flowcharts, Swim Lane Flowcharts, Entity-Relationship Diagrams, State-Transition Diagrams, Data Flow Diagrams, Use Case Modeling, Business Process Modeling.	**10**
UNIT - V	Finalizing Requirements: Presenting Requirements, Socializing Requirements and Gaining Acceptance, Prioritizing Requirements. Managing Requirements Assets: Change Control, Requirements Tools. Recent Trends in: Embedded and collaborative business intelligence, Visual data recovery, Data Storytelling and Data Journalism.	**10**

TEXT BOOKS:

1. Fundamentals of Business Analytics Paperback – 1 January 2011 by R.N. Prasad (Author), Seema Acharya (Author).
2. Essentials of Business Analytics Paperback – 1 April 2015 by Jeffrey D Camm (Author).

REFERENCE BOOKS:

1. Business Analysis by James Cad leetal.
2. Project Management: The Managerial Process by Erik Larson and, Clifford Gray.

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COMPUTER SCIENCE AND ENGINEERING

Class		**M.Tech.-CSE**	**L**	**T**	**P**	**C**
Semester/Year		**III/II**	**3**	**-**	**-**	**3**
Subject		**Industrial Safty**				
Paper	**English**	**MCSCSE20S305**				
	Hindi					
Max. Marks		**100**				

Course Objectives

The objective of this course is to impart knowledge on different facets and aspects of engineering systems safety, focusing on tools, techniques and methodologies needed for prevention of occurrences of unsafe operations and accidents under different industrial settings.

Course Outcomes

Upon completion of the course The students will be able to.

CO1. Equipped with concepts of engineering systems safety, dimensions of engineering systems safety, safety design.
CO2. Analysis mathematics.
CO3. Design for engineering systems safety.
CO4. Control for safety.
CO5. Integrating safety with other operational goals such as quality and reliability.

Unit	Syllabus	Periods
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 fire fighting, equipment and methods.	**10**

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.	**10**
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.	**10**
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.	**12**
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.	**14**

TEXT BOOKS:

1. Industrial Safety Management System (English, Paperback, Raj Kishore Ojha).
2. Handbook of Occupational Safety and Health 3rd Edition by S. Z. Mansdrof.

REFERENCE BOOKS:

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, Winter korn, Hans, Chapman &Hall London.

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COMPUTER SCIENCE AND ENGINEERING

Class		**M.Tech.- CSE**	**L**	**T**	**P**	**C**
Semester/Year		**III/II**	**3**	**-**	**-**	**3**
Subject Name		**Operations Research**				
Subject Code		**MCSCSE20S306**				
Paper	**English**					
	Hindi					
Max. Marks		**100**				

Course Objectives:

1. To impart knowledge in concepts and tools of Operations Research.
2. To understand mathematical models used in Operations Research.
3. To apply these techniques constructively to make effective business decisions.

Course Outcomes:

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

CO1. Students should able to apply the dynamic programming to solve problems of discreet and continuous variables.

CO2. Students should able to apply the concept of non-linear programming.

CO3. Students should able to carry out sensitivity analysis.

CO4. Student should able to model the real world problem and simulate it.

CO5. Solve Linear Programming Problems.

Unit	Syllabus	Periods
UNIT – I	Optimization Techniques, Model Formulation, models, General L.R Formulation, Simplex Techniques, Sensitivity Analysis, Inventory Control Models.	**10**
UNIT – II	Formulation of a LPP - Graphical solution revised simplex method - duality theory - dual simplex method - sensitivity analysis - parametric programming.	**10**
UNIT - III	Nonlinear programming problem - Kuhn-Tucker conditions min cost flow problem - max flow problem - CPM/PERT.	**10**

UNIT – IV	Scheduling and sequencing - single server and multiple server models - deterministic inventory models - Probabilistic inventory control models - Geometric Programming.	**10**
UNIT – V	Competitive Models, Single and Multi-channel Problems, Sequencing Models, Dynamic Programming, Flow in Networks, Elementary Graph Theory, Game Theory Simulation.	**10**

TEXT BOOKS:

1. Operations Research—Introduction to Management Science Paperback – 1 January 2019 by A Panel of Authors (Author).

2. OPERATIONS RESEARCH Paperback – 1 January 2015 by D S HIRA, P K GUPTA,(Author).

REFERENCE BOOKS:

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 India2010.

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COMPUTER SCIENCE AND ENGINEERING

Class		**M.Tech.-CSE**	**L**	**T**	**P**	**C**
Semester/Year		**III/II**	**-**	**-**	**20**	**10**
Subject Name		**Dissertation I**				
Subject Code		**MCSCSE20S307**				
Paper	**English**					
	Hindi					
Max. Marks		**250**				

Course Objective:

1. To undertake a substantial in-depth study of a specific topic in Computer Science, Software Engineering, Artificial Intelligence.

Course Outcomes:

At the end of the course, the student will be able to:

CO1. Identify Computer Science engineering problems reviewing available literature.

CO2. Identify appropriate techniques to analyse complex Computer Science systems.

CO3. Apply engineering and management principles through efficient handling of project.

Syllabus

- Dissertation-I will have mid semester presentation and end semester presentation. Mid semester presentation will include identification of the problem based on the literature review on the topic referring to latest literature available.

- End semester presentation should be done along with the report on identification of topic for the work and the methodology adopted involving scientific research, collection and analysis of data, determining solutions and must bring out individuals contribution.

- Continuous assessment of Dissertation – I and Dissertation – II at Mid Sem and End Sem will be monitored by the departmental committee.

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COMPUTER SCIENCE AND ENGINEERING

Class		**M.Tech.-CSE**	**L**	**T**	**P**	**C**
Semester/Year		**IV/II**	**-**	**-**	**32**	**16**
Subject Name		**Dissertation II**				
Subject Code		**MCSCSE20S401**				
Paper	**English**					
	Hindi					
Max. Marks		**500**				

Course Objective:

1. Extension of the work on the topic identified in Dissertation – I.

Course Outcomes:

At the end of the course, the student will be able to:

CO1. Solve complex Computer Science problems by applying appropriate techniques and tools.

CO2. Exhibit good communication skill to the engineering community and society.

CO3. Demonstrate professional ethics and work culture.

Syllabus

Dissertation – II will be extension of the work on the topic identified in Dissertation – I.

Continuous assessment should be done of the work done by adopting the methodology decided involving numerical analysis/ conduct experiments, collection and analysis of data, etc. There will be pre submission seminar at the end of academic term. After the approval the student has to submit the detail report and external examiner is called for the viva-voce to assess.