

CENTRE FOR DISTANCE AND ONLINE EDUCATION (CDOE)

THE UNIVERSITY OF BURDWAN



SELF LERANING MATERIAL CONTENTS

FOR

M.SC. IN COMPUTER SCIENCE

[TO BE SUBMITTED FOR APPROVAL OF UGC (DEB) WITH EFFECT
FROM THE SESSION OF 2022-2023]

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Advanced Algorithm Design

Paper Code-MSCS 101

Content

Course Objective:

After undergoing the course, Students will be able to understand:

1. Students should develop a sound theoretical understanding of advanced algorithms and practical problem solving skills using them.
2. Students should develop basic knowledge of a wide range of advanced algorithm design techniques including dynamic programming, linear programming, approximation algorithms, and randomized algorithms.
3. Students should develop basic advanced algorithm analysis skills for analyzing the approximation ratio of approximation algorithms and the probability of randomized algorithms.
4. Students should gain a good understanding on a wide range of advanced algorithmic problems, their relations and variants, and application to real-world problems.

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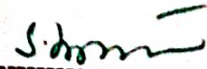
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Advanced Computer Architecture

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Paper Code-MSCS 102

Content

Course Objectives:

After undergoing the course, Students will be able to understand:

- The idea of fundamental of computer organization.
- The awareness of the students about computer and its peripherals.

Content:

1. INTRODUCTION

1

- 1.1 Basic concept and Computer evaluation
- 1.2 Operational concepts
- 1.3 Introduction to Software and Hardware Systems
- 1.4 Moore's Law
- 1.5 Amdahl's law and Little's Law
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- 6.5 Standard I/O interface
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7. PIPELINING

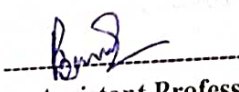
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- 7.1 Basic Concepts of Pipelining
- 7.2 pipeline scheduling
- 7.2 Hazards
- 7.3 Influence on instruction set
- 7.4 Data path and control consideration
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Advanced Software Engineering

Paper Code-MSCS 103

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Course Objectives:

After undergoing the course, Students will be able to understand:

- The course is designed to analyze the system.
- The students are able to analyze real life system to be implemented.

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1

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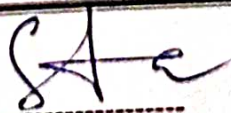
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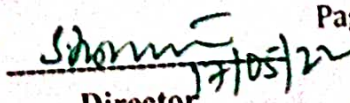
- 3.1 Software reuse
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Numerical and Statistical computing

Paper Code-MSCS 104

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Course Objectives:

After undergoing the course, Students will be able to understand:

- Obtain an intuitive and working understanding of numerical methods for the basic problems of numerical analysis.
- Gain experience in the implementation of numerical methods using a computer.
- Trace error in these methods and need to analyze and predict it.
- Provide knowledge of various significant and fundamental concepts to inculcate in the students an adequate understanding of the application of Statistical Methods.
- Demonstrate the concepts of numerical methods used for different applications.

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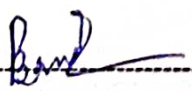
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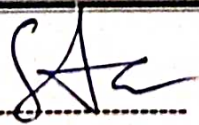
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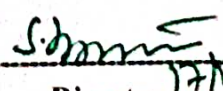
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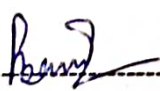

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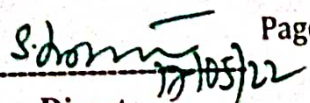

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Advanced Operating Systems

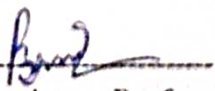
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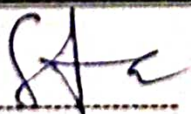
Course Objectives:

After undergoing the course, Students will be able to understand:

- General architecture of computers



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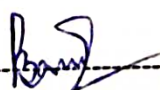
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- Understand and analyse theory and implementation of: processes, resource control (concurrency etc.), physical and virtual memory, scheduling, I/O and files
- Understand and use advanced concepts in operating systems
- Understand the high-level structure of the Linux kernel both in concept
- At the end of the course, students are expected to be proficient in details of operating systems and be sensitive to implementation and performance tuning of operating systems in preparation to entering the industry or in pursuit of graduate studies.

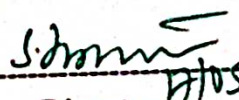
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Advanced Computer Networks

Paper Code-MSCS 202

Content

Course Objectives:

After undergoing the course, Students will be able to understand:

- Independently understand basic computer network technology.
- Understand and explain Data Communications System and its components.
- Identify the different types of network topologies and protocols.
- Enumerate the layers of the OSI model and TCP/IP. Explain the function(s) of each layer.
- Identify the different types of network devices and their functions within a network

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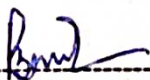
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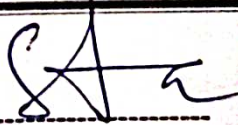
- Understand and building the skills of sub-netting and routing mechanisms.
- Familiarity with the basic protocols of computer networks, and how they can be used to assist in network design and implementation.

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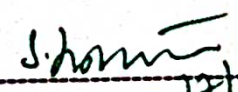

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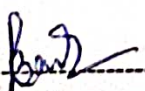
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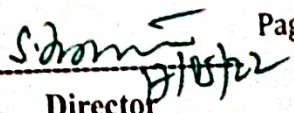

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Artificial Intelligence & Applications

Paper Code-MSCS 203

Content

Course Objectives:

After undergoing the course, Students will be able to :

- Understand the various searching techniques, constraint satisfaction problem and example problems- game playing techniques.
- Apply these techniques in applications which involve perception, reasoning and learning.
- Explain the role of agents and how it is related to environment and the way of evaluating it and how agents can act by establishing goals.
- Acquire the knowledge of real world Knowledge representation.
- Analyze and design a real world problem for implementation and understand the dynamic behavior of a system.
- Use different machine learning techniques to design AI machine and enveloping applications for real world problems.

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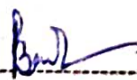
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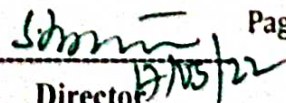


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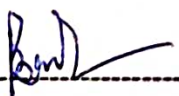
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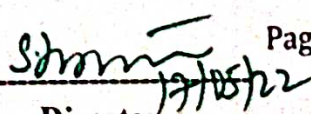
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Advanced DBMS
Paper Code-MSCS 204
Content

Course Objectives:

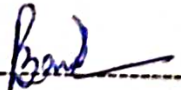
After undergoing the course, Students will be able to:

- Identify advance database concepts and database models.
- Apply and analyze various terms related to transaction management in centralized and distributed database.
- Produce data modeling and database development process for object –oriented DBMS.
- Analyze and Implement the concept of object- relational database in development of various real time software.
- Examine the issues related to multimedia and mobile database performance.

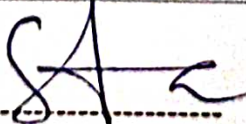
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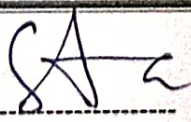

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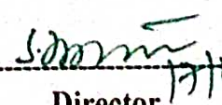
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Compiler Design
Paper Code-MSCS 301
Content

Course Objectives:

After undergoing the course, Students will be able to:


- Understand fundamentals of compiler and identify the relationships among different phases of the compiler.
- Understand the application of finite state machines, recursive descent, production rules, parsing, and language semantics.
- Analyze & implement required module, which may include front-end, back-end, and a small set of middle-end optimizations.
- Use modern tools and technologies for designing new compiler.

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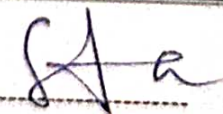
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- 1.3 problems of compiler design
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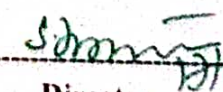

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5 Intermediate Code Generation

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Cryptography and Network Security

Paper Code: MSCS 302 B

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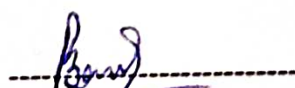
Course Objectives:

After undergoing the course, Students will be able to:

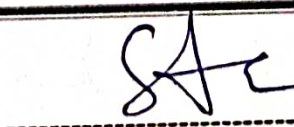
- To understand basics of Cryptography and Network Security.
- To be able to secure a message over insecure channel by various means.
- To learn about how to maintain the Confidentiality, Integrity and Availability of a data.
- To understand various protocols for network security to protect against the threats in the networks.

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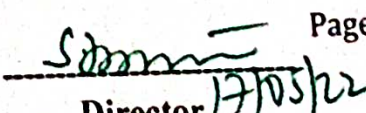

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Introduction to Programming

Paper Code: MSCS-MIE-303

Content

Course Objectives:

After undergoing the course, Students will be able to:

- Explain the basic concepts of object-oriented programming and structured programming.
- Apply simple programming constructs.
- Use stepwise refinement to solve problems.
- Develop methods.
- Develop, debug and test application programs.

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Operation Research and Optimization

Paper Code-MSCS 401A

Content

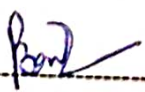
Course Objectives:

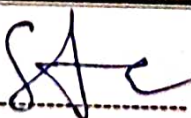
After undergoing the course, Students will be able to:

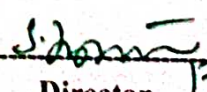
- Formulate and solve problems as networks and graphs.
- Construct linear integer programming models and discuss the solution techniques.
- Set up decision models and use some solution methods for nonlinear optimization problems.
- Propose the best strategy using decision making methods under uncertainty and game theory.
- Solve multi-level decision problems using dynamic programming method.
- Use computer software to solve decision models.

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