

29/1/19



Purbanchal University

Masters of Science in Information System Engineering
(Jestha, 2069)

| Year: I | | | Semester: I |
|--------------|----------------------------------|-----------|-----------------------------|
| Subject Code | Subject Name | Credit | Evaluation (Internal+Final) |
| MIE111 | Software Engineering | 4 | 100 (40+60) |
| MIE112 | Object Oriented System | 4 | 100 (40+60) |
| MIE113 | Communication System Engineering | 4 | 100 (40+60) |
| MIE114 | Information Security | 3 | 75 (30+45) |
| MIE115 | Research Methodology | 3 | 75 (30+45) |
| Total | | 18 | |

| Year: I | | | Semester: II |
|--------------|--------------------------------|-----------|-----------------------------|
| Subject Code | Subject Name | Credit | Evaluation (Internal+Final) |
| MIE121 | Management Information System | 4 | 100 (40+60) |
| MIE122 | Advanced Database Management | 4 | 100 (40+60) |
| MIE123 | Telecommunication Network | 4 | 100 (40+60) |
| MIE124 | Business Planning & Management | 3 | 75 (30+45) |
| MIE125 | Operation Research | 3 | 75 (30+45) |
| Total | | 18 | |

| Year: II | | | Semester: I |
|--------------|-------------------------------|-----------|-----------------------------|
| Subject Code | Subject Name | Credit | Evaluation (Internal+Final) |
| MIE211 | Distributed & Cloud Computing | 4 | 100 (40+60) |
| MIE212 | Data Mining & Warehousing | 4 | 100 (40+60) |
| | Elective-I | 4 | 100 (40+60) |
| | Elective-II | 4 | 100 (40+60) |
| Total | | 16 | |

| Year: II | | | Semester: II |
|--------------|---|--------|-----------------------------|
| Subject Code | Subject Name | Credit | Evaluation (Internal+Final) |
| | Dissertation / Thesis (Presentation & Report Submission) | 12 | 400 (160+240) |

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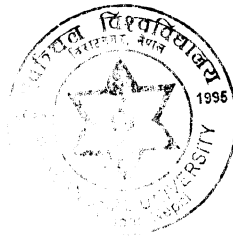
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List of Electives:

| Subject Name | Credit | Evaluation (Internal+Final) |
|---------------------------------------|--------|--------------------------------|
| E-Commerce | 4 | 100 (40+60) |
| Data Communication & Computer Network | 4 | 100 (40+60) |
| Multimedia System | 4 | 100 (40+60) |
| Geographical Information System | 4 | 100 (40+60) |
| E-Government System | 4 | 100 (40+60) |
| ICT for Development | 4 | 100 (40+60) |
| Broadband Ecosystem | 4 | 100 (40+60) |
| Cellular Network Planning | 4 | 100 (40+60) |

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|--|----------------|----------|---------------------------------|---|
| | MIE 211 | 1 | Distributed and cloud computing | 4 |
| | MIE212 | 2 | Data Mining and ware housing | 4 |
| | | 3 | Elective I | 4 |
| | | 4 | Elective II: | 4 |

Students are allowed to choose elective I and elective II from listed below

| Electives | | | |
|--------------------|----------|---|---------------|
| Course Code | | Course Title | Credit |
| MIE 213 | 1 | Broad band ecosystem | |
| MIE 214 | 2 | Cellular network planning | |
| MIE 215 | 3 | Data communication and computer network | |
| MIE 216 | 4 | E- Government System | |
| MIE 217 | 5 | Electronics commerce | |
| MIE 218 | 6 | GIS | |
| MIE 219 | 7 | Multimedia system | |
| MIE 210 | 8 | ICT for development | |

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Distributed & Cloud Computing

MIE 211

Semester: Third

Credit Hour: 4

General Objectives;

- * Visualize the concept of Cloud and Distributed Computing.
- * Conceptualize the importance of cloud computing with data centers, security and cloud applications

Specific Objectives;

Specific objectives of this course are;

- * to make the student realize the advanced topics on cloud computing and virtualized data centers.
- * to emphasize on virtual resource management, data center networking and cloud computing applications.
- * to familiarize the students with the techniques of RPC, Transaction Control and Distributed system Security.
- * to make understand the students about various cloud computing projects.

COURSE CONTENT

Unit 1: Introduction.

10 Hrs

Understanding distributed system and its goals, Hardware, Software concepts and design issues of distributed system, Concepts of cloud computing, Cloud Architecture, SAAS, PAAS, IAAS and others, Organizational Scenarios of Clouds, Types of Clouds: Private, Public & Hybrid, Comparing the various cloud architectures, Benefits and Limitations of Clouds, Challenges of Cloud Computing.

Unit 2: System Models of Distributed System

5 Hrs

Introduction, Architectural Models; Software Layers, System Architectures, Variations on client/server Model. Fundamental Model; Interaction Model, Failure Model.

Unit 3: Distributed Objects and Remote Invocation.

10 Hrs

Introduction, Communication between remote objects, Remote Procedure call, Events and notification, Java RMI case study.

Unit 4: Distributed File System.

7 Hrs

Introduction, File Service Architecture, Sun Network File system, The Andrew File System.

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Unit 5: Introduction to Cloud Technologies.

8 Hrs

Study of Hypervisors, Compare SOAP and REST, Web services: SOAP and REST, SOAP versus REST, AJAX: asynchronous 'rich' interfaces, Mashups: user interface services, Virtual machine technology, virtualization applications in enterprises, Pitfalls of virtualization, Multi-entity support, Multi-schema approach, Multi-tenance using cloud data stores, Data access control for enterprise applications.

Unit 6: Data in the Cloud.

5 Hrs

Cloud file systems: GFS and HDFS, BigTable, HBase and Dynamo, Map-Reduce and extensions: Parallel computing, The map-Reduce model, Parallel efficiency of Map-Reduce, Relational operations using Map-Reduce, Enterprise batch processing using Map-Reduce, Introduction to cloud development, Example/Application of Mapreduce, Features and comparisons among GFS, HDFS etc, Map-Reduce model.

Unit 7: Cloud Security Fundamentals.

7 Hrs

Vulnerability assessment tool for cloud, Privacy and Security in cloud, Architectural Considerations- General Issues, Trusted Cloud computing, Secure Execution, Environments and Communications, Micro-architectures; Identity Management and Access control-Identity management, Access control, Autonomic Security, Virtualization security management- virtual threats, VM Security Recommendations, VM-Specific Security techniques, Secure Execution Environments and Communications in cloud.

Unit 8: Issues in Cloud Computing.

8 Hrs

Implementing real time application over cloud platform, Issues in Intercloud, environments: QOS Issues in Cloud, Dependability, data migration, streaming in Cloud, Quality of Service (QoS) monitoring in a Cloud computing environment, 8.4 Cloud Middleware, Mobile Cloud Computing, Inter Cloud issues: A grid of clouds, Sky computing, load balancing, resource optimization, resource dynamicreconfiguration, Monitoring in Cloud.

References

1. Cloud Computing for Dummies by Judith Hurwitz, R.Bloor, M.Kanfman, F.Halper (Wiley India Edition)
2. Enterprise Cloud Computing by GautamShroff, Cambridge
3. Cloud Security by Ronald Krutz and Russell Dean Vines, Wiley-India
4. Distributed operating system, A.S. Tanenbaum, Pearson Education.
5. Distributed systems (Concepts & Design), G. Coulouris, J. Dollimore, Tim Kindberg, Pearson Education.
6. Google Apps by Scott Granneman, Pearson
7. Cloud Security & Privacy by Tim Malhar, S.Kumaraswammy, S.Latif (SPD, O'REILLY)
8. Cloud Computing : A Practical Approach, Antohy T Velte, et.al McGraw Hill,
9. Cloud Computing Bible by Barrie Sosinsky, Wiley India

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10. Stefano Ferretti et.al., "QoS-aware Clouds", 2010 IEEE 3rd International Conference on Cloud Computing

11. Cloud Computing: Principles and Paradigms by Rajkumar Buyya, James Broberg and Andrzej M. Goscinski, Wiley, 2011, ISBN: 0470887990

S. Ferretti

BM Buyya

AM

J. Broberg

A. Goscinski

Buyya

Broberg

Data Mining and Warehousing

MIE 212

Semester: Third

Credit Hour: 3

General Objectives:

This course provide the overview techniques and development on data warehousing and data mining. It focuses on providing information regarding establishment of data warehouse and Online Analytical Processing (OLAP). It introduces broad research areas for further development.

Specific Objectives:

- to make students understand the principle of data mining and warehousing,
- to orient students about implementation technique of data mining,
- to orient students about mining primitives, language and system architecture,

Unit- 1

5 Hrs.

The Evolution and brief history of Data Warehousing today's Development Environment. Principles Of Data Warehousing (Architecture And Design Techniques) : Types of Data and Their Uses, Conceptual Data Architecture, Design Techniques, introduction to the Logical Architecture.

Unit- 2

6 Hrs.

Creating the Data Asset: Business Data Warehouse Design, Populating the Data warehouse, Unlocking the Data Asset for End Users: Designing, Business Information Warehouses, Populating Business information Warehouses, User Access to Information, Information Data in Context.

Unit- 3

6 Hrs.

Implementing The Warehouse (Managing the Project and Environment): Obstacles to Implementation, Planning your Implementation, Justifying the Warehouse, Organization Implications of Data Warehousing, The data Warehouse in your Organization, Data Warehouse Management, Looking to the Future.

Unit- 4

7 Hrs.

Differences between Operational Database Systems and Data Warehouses, a multidimensional Data Model, Data warehouse and OLAP technology, multidimensional data models and different OLAP operations, OLAP Server: ROLAP, MOLAP and HOLAP. Data warehouse implementation, efficient computation of data cubes, processing of OLAP queries, indexing OLAP data.

Unit- 5

7 Hrs.

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Data Mining Primitives, Languages, and System Architectures, graphical user interfaces. Concept Description: Characterization and Comparison, Data generalization and summarization-based characterization, Analytical characterization, analysis of attribute relevance, mining class comparisons, and mining descriptive statistical measures in large databases.

Unit- 6

10 Hrs.

Mining Association Rules in Large Databases, Mining single-dimensional Boolean association rules from transactional databases, mining multilevel association rules from transaction databases, Mining multidimensional association rules from relational databases and data warehouses, From association mining to correlation analysis, Constraint-based association mining.

Unit- 7

6 Hrs.

Classification and prediction, issues, classification by decision induction, Bayesian classification, classification by back propagation, classification based on concepts from association rule mining other classification methods.

Unit- 8

6 Hrs.

Cluster Analysis Introduction : Types of Data in Cluster Analysis, A Categorization of Major Clustering Methods, Partitioning Methods, Density-Based Methods, Grid-Based Methods, Model-Based Clustering Methods, Outlier Analysis.

Unit-9

7 Hrs.

Mining Complex Types of Data: Multi-Dimensional Analysis and Descriptive Mining of Complex Data Objects, Mining Spatial databases, Mining Multimedia databases, Mining Time-Series and Sequence data, Mining Text databases, mining the World Wide Web.

References:

1. Data Mining Concepts and Techniques, Morgan Kaufmann J. Han, M Kamber Second Edition ISBN: 978-1-55860-901-3
2. Data Warehousing in the Real World – Sam Anahory and Dennis Murray, Pearson Edition Asia.

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Broadband Ecosystem
(Elective)
M.Sc. ISE
MIE 213

Semester: Third

Credit Hour: 4

General Objectives;

- To provide students with a comprehensive overview of the various components of the Broadband Ecosystem in work. Particular emphasis should be given to the case studies and cases of Nepal on every chapter.

Course Description:

- Introduction, broadband technologies, broadband policy, national broadband networks, contents and applications, business models, the way forward

Course Outline

1. Introduction to Broadband Ecosystem

Broadband service, impact of broadband service in national economy, applications, devices, current state of broadband –globally and in Nepal

2. Broadband Technologies

Broadband Access Technologies: Digital Subscriber Line (ADSL, HDSL, RADSL, VDSL, G.lite)
Cable Modem Service -Headend and regional network architecture (Cable Modem Termination System – CMTS, Hybrid Fiber Coax networks – HFC)

Optical Fiber-based Networks - Passive Optical Network (PON) architecture (Optical line termination, optical network terminals)

Fixed and Mobile WiMAX- Architecture, Standards (IEEE 802.15, 802.16), Services

Comparison of broadband access techniques

3. Broadband Policy

Need for a broadband policy-global trends in broadband policy formulation and case of Nepal, contents of a typical broadband policy

4. National Broadband Networks

Global trends in Construction of National Broadband Network-the rationale and the funding mechanism, case of Australia and Nepal

5. Contents and Applications

What is the importance of contents and applications in the sustainability of broadband service provisioning? What are the current killer applications for broadband services-typical cases of developed, developing and least developed countries, brief introduction to various contents and applications-such as e-health, m-health, e-education, entertainment, communications, e-commerce etc. as examples

6. Business Models

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What is a business model? Why business model is so important in broadband service provisioning- concept of sustainable business model. Urban business model, rural business model

7. Broadband and Economic Growth

How does broadband have impact on economic growth-study and research conclusions

8. The Way Forward

Analysis of the Global trends and lessons for Nepal

References:

1. Fixed broadband wireless system design ,Harry R. Anderson,John Wiley and Sons, 2003
2. Microwave Transmission Networks, Second Edition,HarveyLehpamer, McGraw Hill
3. Broadband Communication Systems by Cajetan M. Akujuobi and Matthew N.O. Sadiku 2007, Chapman and Hall/CRC
4. Applicable internet based materials will be used

R. K. Sharma *B. M. Acharya* *Prof. P. K. Singh* *S. K. Singh*
Dr. M. P. Singh *Dr. P. K. Singh*

Cellular Network Planning

(Elective)

M.Sc. ISE

MIE 214

Semester: Third

Credit Hour: 4

General Objectives;

- To impart students with comprehensive mechanisms required for cellular network planning.

Course Description:

- Introduction to Cellular Network Planning. Radio Propagation Effects and Coverage Planning. Multiuser Interference and Capacity Planning, Frequency and Channel Allocation, Cellular Network Planning Tools, Cellular Network Measurements.

Course Outline:

1. Introduction

- Objectives of Radio Network Planning
- The Impact of User Environment
- Cellular Network Planning Approaches
- Starting Points for the Planning Procedure: Desired Grade of Service, System Specification, Equipment Specifications, Available Frequency Band, Service Area Topography, Traffic Distribution, Existing Infrastructure
- Phases of the Planning Procedure

2. Radio Network Definition including Capacity planning

- Starting Points and Objectives
- Frequency Reuse
- Prediction of Offered Traffic
- Capacity Planning Example

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