Course Title: **System Analysis and Design**
Course No. : ICT Ed. 447
Level: Bachelor
Semester: Fourth

Nature of Course: Theoretical + Practical
Credit Hours: 3 (2T+1P)
Teaching Hours: 64 (32T+32P)

1. Course Description

The course is a blend of understanding of system analysis & design with its practical applications. This course includes understanding of various elements of system analysis and design with emphasis on the application of information technology issues as a business tool. The course covers components of system analysis and design techniques, data modeling, logical process modeling, and object oriented modeling techniques.

2. Course Objectives

Following are the general objective of this course:

- To familiarize the students with System Development Life Cycle.
- To enable student to recognize different system development models
- To enhance the skill of students in System analysis and design of user centered System requirements.
- To make the students competent in analysis, design and implementation.
- To make the students knowledgeable about the latest trends of modern system analysis and design.

3. Specific Objectives and Contents

Specific Objectives	Contents
• Explain system and its major components • Identify system attributes, properties and characteristics • Define System Development Lifecycle • Discuss steps in System Development Lifecycle • Understand the user needs • Differentiate between commercial product and contract system development	**Unit 1: System: attributes, properties and characteristics (6 Hrs)** 1.1. What is a System? 1.2. Learning to Recognize Types of Systems 1.3. Analytical Representation of a System 1.4. System Stakeholders: User and End User Roles 1.5. System Attributes 1.6. System Properties 1.7. System Characteristics 1.8. System/Product Life Cycle Concepts 1.9. Understanding the User's Problem, Opportunity, and Solution Spaces 1.10. Commercial/Consumer Product Versus Contract System Development
• Explain and understand different system development models: waterfall, spiral, iterative and incremental, evolutionary, agile development model,	**Unit 2: System Development Process Model (10 Hrs)** 2.1. Introduction to the System Development Models 2.2. Waterfall Development Strategy and Model 2.3. "V" System Development Strategy and Model

• Differentiate between different system development models	2.4. Spiral Development Strategy and Model 2.5. Iterative and Incremental Development Model 2.6. Evolutionary Development Strategy and Model 2.7. Agile Development Strategy and Model 2.8. Selection of System Versus Component Development Models
• Describe importance of system documentation • Know about data accession list (DAL) and data criteria list (DCL) • Create system documentation • Identify different issues in system documentation	**Unit 3: System Documentation Strategy (8 Hrs)** 3.1. Quality System and Engineering Data Records 3.2. System Design and Development Data 3.3. Data Accession List (DAL) and Data Criteria List (DCL) 3.4. SE and Development Documentation Sequencing 3.5. Documentation Levels of Formality 3.6. Export Control of Sensitive Data and Technology 3.7. System Documentation Issues
• Discuss importance of requirements • Know to gather requirements • Design requirement traceability path • Construct requirement statements • Develop appropriate requirement verification methods	**Unit 4: Requirement Derivation, Allocation, Flow Down and Traceability (8 Hrs)** 4.1 Introduction 4.2 Requirements Derivation Methods 4.3 Requirements Derivation and Allocation Across Entity Boundaries 4.4 Requirements Allocation 4.5 Requirements Traceability 4.6 Preparing the Requirement Statement 4.7 Selection of Requirement Verification Methods
• Discuss user centered system design • Design system incorporating Human Factors and Ergonomics • Decompose complex system into small chunks to better understand • Apply SE, HF and Ergonomics actions	**Unit 5: User Centered System Design (8 Hrs)** 5.1 Introduction to UCSD 5.2 Understanding Human Factors (HF) and Ergonomics 5.3 Situational Assessment: Areas of Concern 5.4 Complex System Development 5.5 SE, HF and Ergonomics Actions
• Demonstrate different system architecture models • Understand and make use of system architecture to design interface	**Unit 6: System Architecture Development (8 hrs)** 6.1 Introduction to System Architecture Development 6.2 Development of System Architectures 6.3 Interface Definition Methodology 6.4 Interface Design—Advanced Topics

• Design interface embedding control challenges	6.5 Interface Definition and Control Challenges and Solutions
• Discuss system testing • Design test cases • Prepare test data • Perform test procedures • Understand the test challenges and resolve	**UNIT 7: System Integration, Test, and Evaluation (SITE) (8 Hrs)** 7.1 SITE Fundamentals 7.2 Key Elements of SITE 7.3 Planning for SITE 7.4 Establishing the Test Organization 7.5 Developing Test Cases (TCs) and Acceptance Test Procedures (ATPs) 7.6 Performing SITE Tasks **7.7** Common Integration and Test Challenges and Issues
• Discuss system deployment • Perform system maintenance • Understand system reliability, maintainability and availability • Perform system disposal operations	**Unit 8: System Deployment, OM&S, Retirement, and Disposal (8 Hrs)** 8.1 System Deployment Operations 8.2 System Operation, Maintenance, and Sustainment (OM&S) 8.3 System Reliability, Maintainability, and Availability (RMA) 8.4 System Retirement (Phase-Out) Operations 8.5 System Disposal Operations

9 Instructional Techniques

The instructional techniques for this course are divided into two groups. First group consists of general instructional techniques applicable to most of the units. The second group consists of specific instructional techniques applicable to particular units.

9.1 General Instructional Techniques

Reading materials will be provided to students in each unit. Lecture preferably with the use of multi-media projector, demonstration, practical classes, discussion, and brain storming are used in all units.

4.2 Specific Instructional Techniques

Demonstration is an essential instructional technique for all units in this course during teaching-learning process. Specifically, demonstration with practical works will be specific instructional technique in this course.

10 Evaluation :

Internal Assessment	External Practical Exam/Viva	Semester Examination	Total Marks

40 Points	20 Points	40 Points	100 Points

***Note**: Students must pass separately in internal assessment, external practical exam and semester examination.*

10.1 Internal Evaluation (40 Points):

Internal evaluation will be conducted by subject teacher based on following criteria:

1) Class Attendance 5 points
2) Learning activities and class performance 5 points
3) First assignment (written assignment) 10 points
4) Second assignment (Case Study/project work with presentation) 10 points
5) Terminal Examination 10 Points

Total 40 points

10.2 Semester Examination (40 Points)

Examination Division, Dean office will conduct final examination at the end of semester.

1) Objective question (Multiple choice 10 questions x 1mark) 10 Points
2) Subjective answer questions (6 questions x 5 marks) 30 Points

Total 40 points

10.3 **External Practical Exam/Viva (20 Points):**

Examination Division, Dean Office will conduct final practical examination at the end of semester.

10.4 **Practical Exam/Viva (20 Points)**

Internal assessment (Record Book-4 points, Project work Presentation- 2, Internal Practical Test-2 Points)	Semester final examination	Total
8 Points	12 Points	20 Points

6. Recommended Books and References materials (including relevant published articles in national and international journals)

Prescribed Texts

1. Charles S. Wasson, *System Engineering Analysis, Design, and Development*, Wiley

References

1. Jefferey A. Hoffer, Joey F. George, Joseph S. Valacich, Modern Systems Analysis and Design, 7th Edition, Pearson Education
2. Jeffrey L. Whitten, Lonnie Bentley, System Analysis and Design methods, 7th Edition, Mc-Graw Hill
3. Joseph S. Valacich, Joey F. George, Jefferey A. Hoffer, Essentials of System Analysis and Design, 5th Edition, Pearson Education.
4. Gary B. Shelly, Harry J. Rosenblatt, System Analysis and Design, 9th Edition, Shelly Cashman Series
5. Alan Dennis, Barbara Haley Wixom, Roberta M. Roth System Analysis and Design, 4th Edition, Wiley Publication
6. V. Rajaraman, Analysis and Design of Information System, 2nd Edition, Prentice Hall

Course Title: Database Management System
Course No. : ICT. Ed. 446
Level: Bachelor
Semester: Fourth

Program: BICTE
Nature of course: Theoretical + Practical
Credit Hour: 3 hours (2T+1P)
Teaching Hour: 64hours (32+32)

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1. Course Description

The purpose of this course is to introduce the fundamental concepts of database management, including aspects of data models, database languages, and database design. Student will be also able to understand the current trends of database management such as big data, data analytics: data warehousing, online analytical processing and data mining.

2. General Objectives

Through this course, students shall

- become proficient at modeling databases at conceptual and logical levels of design,
- be able to develop database schemas with design principles that enforce data integrity,
- become knowledgeable in the creation, altering, and manipulation of tables and views using SQL,
- become proficient at casting queries in SQL, and
- be able to understand concepts of transaction management, concurrency control, and recovery.
- Be able to explain about big data and data analytics such as data warehousing, online analytical processing and data mining

3. Course Outlines:

Specific Objectives	Contents
• Identify data management approaches and their values. • Define differences between file systems and database management systems. • Understand benefits of database management systems. • Describe different data models and their usefulness. • Understand the concept of data abstraction and data independence.	**Unit 1: Database System Introduction(8)** 1.11. Database System Applications 1.12. Purpose of Database Systems 1.13. View of Data 1.14. Database and Application Architecture 1.15. Database Users and Administrators 1.16. History of Database Systems **Practical Work** • Create program to demonstrate differences between data access from file system and database management system
• Explain use and importance of ER model. • Use ER diagrams to design databases. • Learn to identify attributes and entity-relationship sets • Make use of generalization, specialization and aggregation concepts • Learn conversion of ER diagrams into Relational model.	**Unit 2: Database Design using ER Model (10)** 2.1. The ER Model : entity sets and relationship sets 2.2. Attributes and its types 2.3. Mapping Cardinalities 2.4. Constrains on ER Model 2.5. Extended ER Features: Aggregation, Specialization and Generalization, Constraints on Specialization/Generalization 2.6. Reducing ER diagram to Relational Schemas **Practical Works:** • Draw ER diagrams for real world scenarios • Learn to use appropriate symbols for constraints • Practice Conversion of ER model to Relational model
• Explain structure of SQL queries. • Use SELECT, FROM and WHERE clauses efficiently. • Understand concept behind join operations. • Discuss and Use aggregate functions and subqueries.	**Unit 3: Structured Query Language (SQL) (20)** 3.1 Introduction to Relational Database 3.2 Database Schema and Schema Diagram 3.3 Introduction: Basic Structure of SQL Query, SELECT, FROM and WHERE clause, Using Multiple Relations 3.4 String/Pattern Matching, Ordering the Display of Tuples, Cartesian product, Join Operations: Join Types and Join Conditions. 3.5 Set Operations and Null Values

• Apply database modification statements. • Explain and use DDL statements. • Understand concept behind views and use them. • Make use of grant and revoke statements	3.6 Nested Queries: Set membership Test, Set Comparison and Test for Empty Relations. 3.7 Aggregate Functions, Group by Clause and Having Clause 3.8 Database Modifications: Insert, Delete and Update Operations 3.9 Data Definition Language: Domain Types in SQL, Create, Alter and Drop statements 3.10 View 3.11 Authorization in SQL : grant and revoke privileges **Practical Works:** • Create relational database by using create statements • Populate tables with data by using INSERT statement • Practice basic SQL queries by using Select..from.. where • Use Cartesian products, natural join and set operations to solve queries • Use sub queries, aggregate functions and outer joins to solve queries • Practice DML statements DELETE and UPDATE • Practice DDL statements ALTER, and DROP • Demonstrate SQL authorization: grant and revoke operations
• Understand importance of integrity constraints. • List and discuss different types of integrity constraints. • Use Integrity constraints for maintaining for achieving correctness of data. • Compare and contrast between assertions and triggers	**Unit 4: Integrity Constraints (8)** 4.1 Domain Constraints: Not Null Constraints, Unique Constraints, Primary key Constraints, Check Constraints. 4.2 Referential Integrity: Using Referential Integrity, Cascading Actions 4.3 Assertions and Triggers: Creating and Deleting Assertions, Creating and Deleting Triggers, Assertions vs Triggers. **Practical Works:** • Demonstrate use of Domain constrains and referential integrity • Create assertions and triggers
• Exemplify database modification anomalies.	**Unit 5: Relational Database Design (8)** 5.1 Features of good relational designs 5.2 Keys: Super Key, Candidate Keys and Primary Keys 5.3 Functional Dependencies

• Understand and exemplify functional dependencies. • Discuss and exemplify conversion of de-normalized relations into normalized forms.	5.4 Anomalies 5.5 Decomposition using functional dependencies 5.6 Normal forms: 1NF, 2NF, 3NF and BCNF **Practical Works:** • Demonstrate Database anomalies • Design good RDBMS (anomalies free database)
• Understand the concepts of transaction and its properties • Make use of serializability • Understand the problems behind concurrent execution of transactions • Describe and exemplify lock based concurrency control technique. • Discuss need of recovery in database management systems.	**Unit 6: Transaction Management (6)** 6.1 Transaction Concept 6.2 ACID Properties 6.3 Serializability 6.4 Concurrency Control: Need of Concurrency Control, Lock-Based Protocols 6.5 Recovery: Failure Classification, Shadow paging **Practical Works:** • Demonstrate commit and rollback
• Understand the concept of big data, NoSQL, data warehousing, data mining and OLAP	**Unit 7: Big Data Analytics (4)** 7.1 Concept of Big data 7.2 Concept of NoSQL 7.3 Concept of Data Warehouse and Data Mining 7.4 Concept of Online Analytical Processing

9 Instructional Techniques

The instructional techniques for this course are divided into two groups. First group consists of general instructional techniques applicable to most of the units. The second group consists of specific instructional techniques applicable to particular units.

4.1 General Techniques

Reading materials will be provided to students in each unit. Lecture, Discussion, use of multi-media projector, brain storming are used in all units.

4.2 Specific Instructional Techniques

Demonstration is an essential instructional technique for all units in this course during teaching learning process. Specifically, demonstration with practical works will be specific instructional technique in this course. The details of suggested instructional techniques are presented below:

Unit 1: Self reading, and making study reports
Unit 2: Assignment on Creating ER diagrams and converting ER model to Relational model
Unit 3: Homework and Assignment on Laboratory works in SQL
Unit 4: Group Discussion on Integrity Constraints
Unit 5: Mini Case Study on Normalization
Unit 6: Self reading and making study reports
Unit 7: Self reading, creating and presenting study reports

5. Evaluation :

Internal Assessment	**External Practical Exam/Viva**	**Semester Examination**	**Total Marks**
40 Points	20 Points	40 Points	100 Points

***Note**: Students must pass separately in internal assessment, external practical exam and semester examination.*

5.1 Internal Evaluation (40 Points):

Internal evaluation will be conducted by subject teacher based on following criteria:

6) Class Attendance 5 points
7) Learning activities and class performance 5 points
8) First assignment (written assignment) 10 points
9) Second assignment (Case Study/project work with presentation) 10 points
10) Terminal Examination 10 Points

Total 40 points

5.2 Semester Examination (40 Points)

Examination Division, Dean office will conduct final examination at the end of semester.

3) Objective question (Multiple choice 10 questions x 1mark) 10 Points
4) Subjective answer questions (6 questions x 5 marks) 30 Points

Total	40 points

5.3 External Practical Exam/Viva (20 Points):

Examination Division, Dean Office will conduct final practical examination at the end of semester.

10 Recommended books and References materials (including relevant published articles in national and international journals)

Recommended books:

- Silberschatz, H.F. Korth, and S. Sudarshan, *Database System Concepts*, 7th Edition, McGraw Hill, 2019

References materials:

- C.J. Date, *SQL and Relational Theory: How to Write Accurate SQL Code*, 2nd Edition, O'Really Media, 2011
- C.J. Date, *An introduction to Database System*, 8th Edition, Addison Wesely, 2003

Course Title: **Numerical Analysis**

Course No.: Math. Ed. 447	Nature of course: Theoretical
Level: BICTE	Credit Hour: 3 hours
Semester: Fourth	Teaching Hour: 48 hours

1. Course Description:

This course is designed for the students of BICTE under Tribhuvan University. It helps students to fulfill their increasing desire towards numerical answers to applied problems with the help of methods and techniques of numerical analysis. Although numerical methods have always been useful, their role in the present day scientific research is of fundamental importance. It deals with numerical methods which give the solution when ordinary analytical methods fail for the solution of transcendental equations. In addition, it deals those numerical techniques which can be used for the solution of system of linear equations through matrix computations along with solution of non-linear equations through interpolation and iterative method of differentiation and integration. This course also provides a foundation for the mathematical modeling in the field of research.

2. General Objectives

- To understand errors and approximation.
- To use different methods for solving transcendental and linear simultaneous equations.
- To define different types of differences and construct their tables, and establish the relationship between them.
- To be familiar with interpolation and apply suitable interpolation formula for numerical problems
- To deal with numerical approximations of derivatives
- To approximate computation of an integral using numerical techniques

3. Specific Objectives and contents

Unit-I Errors and computation of roots	**(8 hrs)**

• To identify the types of errors • To derive general error formula • To generalize a series approximation • To solve linear equations graphically • To find solution of equations by bisection method • To discuss the method of false position • To solve equations by iteration method • To use Newton – Raphson iteration formula • To apply the Muller 's method to approximate the roots of equations	• Significant digits • Errors • General error formula • Error in a series approximation • Linear equations • Graphical solution of equations • Bisection method • The method of false position • Iteration method • Newton – Raphson method • Generalized Newton's formula for multiple roots • Muller's method
Unit –II Solution of Linear simultaneous Equations (8 hrs)	
• To identify linear-simultaneous equations. • To apply Gauss elimination method in solving simultaneous equations • To solve simultaneous equations by Gauss –Jordan method • To solve LS equations by using Jacobi's and Gauss – Seidel iteration method • To discuss and use factorization, Iterative and partition methods to solve simultaneous equations.	• Linear simultaneous equations (LSE) • Gauss elimination method • Gauss – Jordan method • Jacobi – iteration method • Gauss – Seidel iteration method • Matrix inversion method • Factorization method • Iteration method • Partition method

Unit –III	**Differences of polynomials**	**(10 hrs)**
• To discuss forward and backward difference operators • To construct difference tables • To discuss properties of the forward difference operator • To establish relationship among the operators E ,D and □ • To express a given polynomial in factorial notation • To identify the central difference operator and the mean operator • To construct the central difference table • To establish relationship between theoperators □ ,□ ,E ,□ and □		• Forward difference operator • Forward difference table • The operator E • Relation between the operators E and □ • The operator D • Backward difference table • Factorial polynomial • Central difference operator • Central difference table • Mean operator • Relationship between operators □ ,□ ,E ,□ and □
Unit –IV	**Interpolation with Equal Intervals**	**(8 hrs)**
• To derive and use Newton – Gregory forward interpolation formula • To derive and use Newton –Gregory backward interpolation formula • To apply forward and backward interpolation formulae in solving problems • To derive and use Gauss' forward and backward interpolation formula • To apply Bessel's and Stirling's formula for interpolation		• Newton –Gregory forward interpolation formula • Newton - Gregory backward interpolation formula • Error in the interpolation formula • Gauss' forward interpolation formula • Gauss' s backward interpolation formula • Bessel's formula • Stirling's formula
Unit -v	**Interpolation with Unequal Intervals**	**(4 hrs)**
• To discuss linear and quadratic interpolations • To find divided differences • To establish the relationship between divided differences and ordinary differences		• Linear interpolation • Quadratic interpolation • Divided differences • Second divided difference • Newton 's divided difference interpolation • Relation between divided differences and ordinary differences
Unit – VI	**Numerical Differentiation and integration**	**(10 hrs)**

• To derive formula for the derivative using forward and backward difference formula • To derive formula for derivative using central difference formula • To derive general quadrature formula • To apply trapezoidal rule , Simpson's one –third rule ,three-eighth rule , Bool's rule and Weddle's rule for solving numerical problems • To find errors in quadrature formula	• Numerical differentiation • Derivative using forward difference formula • Derivative using backward difference formula • Derivative using central difference formula • General quadrature formula for equidistant ordinates • Trapezoidal rule • Simpson,s One –Third rule • Simpson,s Three – Eighth rule • Bool,s rule • Weddle ,s rule • Errors in quadrature formula

4.Instructional Techniques

Units	Activity and Instructional Techniques
Unit I	• Individual and group discussion on calculating errors
Unit II	• Individual and group discussion on bisection and iteration methods • Group and individual assignments on problems of getting roots by bisection method
Unit III	• Group and individual discussion on different methods of solving linear simultaneous equations
Unit IV	• Individual and group assignments on finite differences
Unit V	• Presentation and discussion on computer programming in c++ of important methods
Unit VI	• Individual and group presentation on divided differences and ordinary differences

5. Evaluation

Internal evaluation

Internal evaluation will be conducted by course teacher based on following activities:

a.	Attendance	5 points
b.	Participation in learning activity	5 points
c.	First assessment test	10 points
d.	Second ssessment test	10 points
e.	Third ssessment test	10 points

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…..Total 40 points

NOTE: Internal evaluation and assignments may include the numerical calculation and computation by using different computer application like as Matlab, Geobebra and MS Excel also.

External Evaluation:

Faculty of Education, Examination division will conduct final examination of weight 60points at the end of semester. This 60 points is divided in final examination paper as Objective questions (10 x 1) 10 points

Short answer questions (6 x 5) 30 points

Long answer questions (2x 10) 20 points

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Total 60 points

6.Recommended and Reference Books

6.1 Recommended books

Sastry, S.S. (1990). *Introductory methods of numerical analysis* ,New Delhi :Prentice- Hall of India (Units I – VI)

Gupta S. and Sharma S.(2014).*Numerical analysis* ,New Delhi : S.K .Kataria &Sons (Units I – VI)

6.2 Reference books

Conte S.D. (1965) , *Elementary numerical analysis* Mc Graw- Hill Froberge

C.E. (1965) , *Introduction to numerical analysis* ,Adison Wesley

Jian , M.K.(1971) , *Numerical analysis for scientists and engineers* Delhi:S.B.W .Publishers

Sastry S.S. (1997) , *Engineering mathematics* , New Delhi : Prentice-Hall of India Stanton , R.G. (1967) , *Numerical methods for science and engineering* , New Delhi :Prentice-Hall of India

Course Title: **Educational Leadership** | **Program: BICTE**
Course No.: ICT. Ed. 444 | Nature of course: Theoretical
Level: Bachelor. | Credit Hour: 3 hours
Semester: Third | Teaching Hour: 48 hours

1. Course Description

The aim of the course is to prepare students for leadership roles in the field of education by providing them with the knowledge, skills, and strategies necessary to effectively manage and lead educational institutions. Students will also develop their leadership and communication skills through a variety of interactive activities, case studies, and real-world experiences. Upon completion of the course, students will be equipped with the tools and knowledge necessary to successfully lead and manage educational institutions and improve student outcomes.

2. General Objectives

After the completion of this course, the students should be able:

- To provide students with a comprehensive understanding of the principles and practices of educational leadership and management
- To develop students' skills in educational administration and management, including curriculum development, instructional leadership, and school improvement
- To improve students' leadership, communication and decision-making skills through interactive activities, case studies, and real-world experiences
- To equip students with the tools and knowledge necessary to successfully lead and manage educational institutions and improve student outcomes

3. Course Outlines:

Specific Objectives	**Contents**	
• Describe the concept of leadership management. • Justify the role of educational leadership • Debate on leaders are born or made.	**Unit I: Introduction to Educational Leaderships** 1.1 Definition of leadership and management 1.2 Leaders born or made 1.3 21st century leader V/s classical leader 1.4 Leadership for Digital transformation in Education	**6**

• Reflect leadership characteristic of some great leaders	1.5 Some great leaders a case study: Mahatma Gandhi, Nelson Mandela, Maria Montessori, Mother Teresa, Mark Zuckerberg	
• Explore the transformational leadership framework and practices • Define the nature of instructional, constructive and strategical leadership. • Compare working style of digital leadership	**Unit II: Leaderships theory and styles** 2.1 Transformational Leadership: 4I's 2.2 Instructional leadership 2.3 Constructivist leadership 2.4 Strategic leadership 2.5 Agile and Digital Leadership	**8**
• Explain basic communication methods. • Demonstrate the techniques and skills of presentation and public speaking. • Describe cross-culture communication. • Show interpersonal communication skills • Explore time management skills	**Unit III: Communication and Interpersonal Skills** 3.1 Verbal, Written and Symbolic(emoji) communication 3.2 Presentation skills and Public speaking 3.3 Cross-cultural communication 3.4 Emotional intelligence 3.5 Interpersonal communication 3.6 Time Management	**8**
• Define different decision making models. • Demonstrate root cause analysis techniques. • Describe data analysis and interpretation methods • Describe creativity and innovative idea for problem solving.	**Unit IV: Decision Making and Problem Solving** 4.1 Decision-making models 4.2 Root cause analysis 4.3 Data analysis and interpretation 4.4 Problem-solving frameworks 4.5 Creativity and innovation 4.6 Strategic thinking and risk management	**10**
• Define different motivational theories. • Explore engagement, empower and provide autonomy techniques to employee. • Build team for remote and virtual mode • Define team building strategies. • Set the coaching and mentoring process.	**Unit V: Motivation and Team Building** 5.1 Theories of Motivation 5.2 Employee engagement, empowerment and autonomy 5.3 Remote work and virtual teams 5.4 Team Building Strategies 5.5 Coaching and mentoring 5.6 Performance management	**10**

• Explore the performance management system		
• Explore change management framework for leadership. • Set process of stakeholder engagement. • Define work culture principles-based labor right guidelines • Explore the principles of sustainability.	**Unit VI: Change Management and Social Responsibility** 6.1 Change Management Framework 6.2 Communication and stakeholder engagement 6.3 Corporate social responsibility 6.4 Decent workplace, labor standards 6.5 Sustainability and Environment	**6**

4 Instructional Techniques

The instructional techniques for this course are divided into two groups. The first group consists of general instructional techniques applicable to most of the units. The second group consists of specific instructional techniques applicable to specific units.

4.1 General Instructional Techniques

- Introductory presentation on each topic of the unit bye the teacher
- Use of lecture, question answer, discussion, brainstorming and buzz sessions for the theoretical contents.

4.2 Specific Instructional Techniques

5 Evaluation

5.1 Internal Evaluation 40%

Internal evaluation will be conducted by subject teacher based on following activities:

1)	Attendance	5
2)	Class participation	5
3)	First assignment (Group work based on Unit II, III, IV)	10
4)	Second assignment (Pair work based on Unit VI and VI)	10
5)	Third assignment (Written test: objectives and subjective)	10

	Total	40

5.2 Final/Semester Evaluation 60%

Examination Division, office of the Dean, Faculty of Education will conduct final examination at the end of semester.

Objective type question (Multiple choice 10 x 1ponts)	10
Short answer questions with two OR option (6 questions x 5 points)	30
Long answer questions with one OR option (2 questions x 10 points)	20
Total	60

5. Recommended books and References materials (including relevant published articles in national and international journals)

Recommended books:

References materials:

Kouzes, J. M., & Posner, B. Z. (2017). *The leadership challenge: How to make extraordinary things happen in organizations* (Sixth edition). Leadership Challenge, A Wiley Brand.

Sinek, S. (2017). *Leaders eat last: Why some teams pull together and others don't* (Paperback edition). Portfolio/Penguin.

Covey, S. R., & Collins, J. C. (2020). *The 7 habits of highly effective people: Powerful lessons in personal change* (Revised and updated. Simon & Schuster edition). Simon & Schuster.

Kotter, J. P. (2012). *Leading change*. Harvard Business Review Press.

Self-paced Course: https://learn.saylor.org/course/resources.php?id=70

Course Title: Operating System
Nature of Course: Theoretical + Practical
Credit Hour: 3 hours (2T + 1P)
Teaching Hour: 64 hours (32 + 32)

Course No.: ICT Ed. 445
Level: Bachelor
Program: BICTE
Semester: Fourth

4. Course Description

This course is focused on how operating system (OS) manage resources to support the functioning of computer system. This course also helps the students to understand both theoretical and practical knowledge about different concepts of operating systems such as system structure of OS, process and thread management, memory management, storage management, and I/O management concepts.

5. General Objectives

Following are the general objectives of this course:

- To familiarize the basic concepts of operating systems.
- To develop both practical and theoretical concepts of process and thread concept, process synchronization and deadlock
- To make the student knowledgeable about memory management strategies, file system management and storage management.
- To be able to make distinction between available operating systems in terms of their design and working principle.

6. Course Outlines:

Specific Objectives	Contents

• To define and basic concepts of operating systems • Identify and state different types of operating systems • To explain different operations of operating systems • To define different structure of operating systems • To introduce system calls	**Unit 1: Introduction (3)** 1.1. What operating system do? 1.2. Operating Systems operations 1.3. Operating System services 1.4. Operating System Structures 1.5. System Calls **Practical Work (3)** – Write program to make use of command line arguments – Create different commands to support user operations
• To define and differentiate process and thread • To define different operations of processes • To illustrate different process states • To explain inter-process communication • To solve critical-selection problem • To demonstrate process synchronization and its details • To develop knowledge of scheduling criteria • To make use of different CPU scheduling algorithms • To illustrate different concept of deadlock • To explain different methods for handling deadlocks	**Unit 2: Process Management (12)** 2.1. Process and Thread Concepts 2.2. Operations on processes 2.3. Interprocess Communication 2.4. Process states 2.5. Process Synchronization: critical section problems and solutions 2.6. Peterson's Solution 2.7. Mutex Locks 2.8. Semaphores 2.9. Monitors 2.10. CPU Scheduling Concepts 2.11. Scheduling Criteria 2.12. Scheduling Algorithms: First come First Serve (FCFS), Shortest Job First (SJF), Shortest Remaining Time First (SRTF), Round Robin 2.13. Deadlocks: characterization, prevention, avoidance, detection and recovery **Practical Works (9)** – Demonstrate process creation and thread creation – Simulate CPU Scheduling algorithms: FCFS, SJF, SRTF, Round Robin – Simulate deadlock avoidance algorithm: Banker's Algorithm
• To understand different memory management strategies	**Unit 3: Memory Management (8)** 3.1. Main Memory Management 3.2. Swapping

• To explain the concepts of swapping • To illustrate about paging techniques and the detail structure of page table • To know about segmentation • To make distinction between paging and segmentation • To explain importance of virtual memory management • To implement page replacement algorithms	3.3. Memory allocation strategies 3.4. Paging and its types 3.5. Structure of the Page Table 3.6. Segmentation 3.7. Virtual memory management 3.8. Page replacement algorithms **Practical Works (7)** – Write program to simulate paging – Write program to simulate Page Replacement algorithms
• To identify disk structure • To make use of disk scheduling algorithms • To explain the basics and importance of RAID • To define file concepts, different file access methods, file-system structure, and file-system implementation • To explain directory and directory implementation • To demonstrate allocation methods and free space management	**Unit 4: Storage Management (9)** 4.1. Disk Structure 4.2. Disk Scheduling algorithms: FCFS, SSTF, SCAN, C-SCAN, LOOK, C-LOOK 4.3. RAID Structure 4.4. File Concept and Access Methods 4.5. Directory Structure 4.6. Directory Implementation 4.7. File System Structure and operations 4.8. Allocation Methods 4.9. Free Space Management **Practical Works (7)** – Demonstrate Directory and File Attributes – Write program to simulate disk scheduling algorithms: FCFS, SSTF, SCAN, C-SCAN, LOOK, C-LOOK
• Prepare case study summary report to understand different aspect of Linux system and Windows system	**Unit 5: Case Study (6)** 5.1. The Linux System 5.2. Windows 10

7. Instructional Techniques

The instructional techniques for this course are divided into two groups. First group consists of general instructional techniques applicable to most of the units. The second group consists of specific instructional techniques applicable to particular units.

4.1. General Techniques

Reading materials will be provided to students in each unit. Lecture, Discussion, use of multi-media projector, brain storming are used in all units.

4.2. Specific Instructional Techniques

Demonstration is an essential instructional technique for all units in this course during teaching learning process. Specifically, demonstration with practical works will be specific instructional technique in this course. The details of suggested instructional techniques are presented below:

Units	Activities
Unit 1: Introduction	• Demonstrate the working mechanism of operating systems • Monitoring of students' work by reaching each student and providing feedback for improvement • Presentation by students on at least 5 operating systems
Unit 2: Process Management	• Demonstrate process and thread concepts • To define the CPU scheduling and interprocess communication • To define process synchronization, scheduling, and deadlock • Lab work to demonstrate process creation and thread creation and simulate Processor Scheduling and deadlock detection algorithms
Unit 3: Memory Management	• Demonstrate concepts of memory, swapping, paging, and virtual memory • Lab work on page replacement algorithms
Unit 4: Storage Management	• Demonstrate disk structure, RAID structure • To illustrate file and directory concepts • Lab work to demonstrate directory and file structure, and to simulate disk scheduling algorithms and file management techniques
Unit 5: Case Study	• Presentation by students on different concepts of Linux and Widows 10 Operating Systems

6. Evaluation :

Internal Assessment	**External Practical Exam/Viva**	**Semester Examination**	**Total Marks**
40 Points	20 Points	40 Points	100 Points

***Note**: Students must pass separately in internal assessment, external practical exam and semester examination.*

6.1 Internal Evaluation (40 Points):

Internal evaluation will be conducted by subject teacher based on following criteria:

1) Class Attendance 5 points
2) Learning activities and class performance 5 points
3) First assignment (written assignment) 10 points
4) Second assignment (Case Study/project work with presentation) 10 points
5) Terminal Examination 10 Points

Total **40 Points**

6.2 Semester Examination (40 Points)

Examination Division, Dean Office will conduct final examination at the end of semester.

1) Objective question (Multiple choice 10 questions x 1mark) 10 Points
2) Subjective answer questions (6 questions x 5 marks) 30 Points

Total **40 points**

6.3 External Practical Exam/Viva (20 Points):

Examination Division, Dean Office will conduct final practical examination at the end of semester.

6. Recommended books and References materials (including relevant published articles in national and international journals)

Abraham Silberschatz, Pter Baer Galvin and Greg Gagne, Operating System Concepts, (2018). 10th Edition, John Wiley & Sons Inc

Andrew S. Tanenbaum, Herbert Bos, Modern Operating Systems, 4th Edition, Pearson

Course title: **Fundamental of Curriculum**

Course No. : Ed 442 Nature of Course: Theoretical

Level: B.Ed. Credit Hours: 3

Semester: Forth Teaching Hours: 48

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1. Course Description

This course is designed for providing students with fundamental concept of curriculum and curriculum development. The course intends to equip students with knowledge on the bases of curriculum development and its components. Further, it aims at providing students with general understanding of the process of curriculum development and study of existing school level curriculum of Nepal.

2. General Objectives

The general objectives of this course are listed below:

- To acquaint students with different meanings of curriculum.

- To make students familiar with various bases of curricular decisions.
- To enable students to figure out various components of curriculum.
- To make students familiar with the curriculum development process and existing school level curriculum of Nepal
- To equip students with skill of preparing some components of curriculum.

3. Specific Objectives and Contents

Specific Objectives	Contents
• Explain different meanings of curriculum.	**Unit 1: Introduction to Curriculum (5)** 1.1. Curriculum as subject 1.2. Curriculum as courses of study and syllabus 1.3. Curriculum as experiences 1.4. Curriculum as objectives 1.5. Curriculum as plan of learning.
• Identify bases for curricular decisions. • Relate different philosophical bases with curriculum. • Justify the need of studying society and culture for curriculum development. • Exemplify socio-cultural factors to be addressed by curriculum. • Identify various nature of knowledge. • Elucidate how nature of knowledge influences the curricular decisions. • Clarify why need, interest and maturation of child should be addressed by curriculum • Explore ways of addressing the need of children with special needs .	**Unit 2: Bases for Curricular Decision Making (17)** **2.1 Philosophical bases** 2.1.1 Philosophy and curriculum 2.1.2 Idealism and curriculum. 2.1.3 Naturalism and curriculum. 2.1.4 Pragmatism and curriculum. 2.1.5 Realism and curriculum **2.2 Society and culture** 2.2.1 Society, culture and curriculum 2.2.2 Socio-cultural factors influencing curricular decisions **2.3 Nature of knowledge** • Knowledge as contents and process. • Levels of contents • Explosion and obsolescence of knowledge. **2.4 Nature of learner** • Need, interest and maturation level • Learning needs of children with special needs.

• Explain aims, goals and objectives of curriculum. • Construct goals and objectives for various subjects. • Describe the criteria of selection and organization of content and learning experiences. • Justify the need of assessment / evaluation of student learning	**Unit III: Curricular Components (17)** 2.3 Aims, goals and objectives • Concepts and relationship • Types of objectives: general and specific • classification of objectives: cognitive, affective and psychomotor 2.4 Content: selection and organization 2.5 Teaching-learning experiences • Criteria of selecting and organizing Learning Experiences • Teacher initiated and learner initiated experiences 2.6 Evaluation /assessment of student learning
• Identify the steps of curriculum development. • Describe the process of school curriculum development in Nepal.	**Unit 4: Process of Curriculum Development (5)** 4.1 Concept of Curriculum Development. 4.2 Steps of Curriculum Development. 4.3 School level Curriculum Development Process in Nepal.
• Assess the structure,goals , learning outcomes, teaching methods and evaluation process stated in the existing school curriculum of Nepal.	**Unit 5: Existing School Level Curriculum of Nepal (5)** 5.1. Level wise goals: Pre-Primary, Basic and Secondary 5.2. Structure of curriculum of each level 5.3. Components of subject-wise curriculum: • *Introduction* • *Level wise competencies* • *Grade wise learning outcomes* • *Skills/ scope and sequence and elaboration of contents* • *Facilitation Process for learning* • *Assessment of student achievement* 5.4. Review of school curriculum of Nepal

Note: The figures in the parentheses indicate approximate teaching hours for respective units.

4. Instructional methods

Two modes of instruction, general and specific, can be applied. General mode consists of techniques applicable to most of the contents whereas, specific ones are applicable to specific contents.

4.1. General Methods

This method requires following activities:

a) Introductory presentation on each topic of the unit by teacher.
   Lecture, discussion, question-answer, argumentative sessions.

b) Presentations by students.

4.2 Specific Methods

a) Unit II: Society and culture

- The students will be involved in discussion, brainstorming on the nature of Nepalese society and culture and explore the aspects to be addressed by curriculum. Presentation of the outcomes in the classroom followed by feedback.

- Prepare an outline of some components of curriculum in subject of your interest.

b) Unit IV: Process of Curriculum Development

- The students will consult concerned agency such as CDC and find out the process of school level curriculum development.
- Presentation and discussion on pros and cons of curriculum development process in the classroom.

Unit V: Existing school level curriculum of Nepal

- Group assignment on identifying structure of school curriculum.
- The students will visit the school and observe the transaction of curriculum in classroom.

6. Evaluation

6.1 Internal Evaluation 40%

Internal evaluation will be conducted by subject teacher based on following activities:

6) Attendance	5
7) Class participation 5	
8) First assignment (Group work based on unit I, II, III & IV)	10
9) Second assignment (Pair work based on Unit V) 10	
10) Third assignment (Written test: objectives and subjective)	10
Total	40

5.2 Final/Semester Evaluation 60%

Examination Division, office of the Dean, Faculty of Education will conduct final examination at the end of semester.

Objective type question (Multiple choice 10 x 1ponts)	10
Short answer questions (6 questions x 5 points)	30
Long answer questions (2 questions x 10 points)	20

Total	60

7. Recommended Books and references

Recommended Books

Government of Nepal (2063 BS). *Primary Education Curriculum Grade 1-3 (Nepali Version)* , Sanothimi, Bhaktapur. Curriculum Development Center (UNIT V)

Government of Nepal (2065 BS). *Primary Education Curriculum Grade 3-4 (Nepali Version)* , Sanothimi, Bhaktapur. Curriculum Development Center (Unit V)

Government of Nepal. (2069 BS). *Basic Education curriculum Grade 6-8.* Sano thimi Bhaktapur. Curriculum development Center. (Unit V)

Government of Nepal (2063 BS). *National Curriculumk framework (Nepali Version)* , Sanothimi, Bhaktapur. Curriculum Development Center (UNIT IV)

Government of Nepal (2064 BS). *Local Curriculum Development Manual (Nepali Version),* Sanothimi, Bhaktapur. Curriculum Development Center (UNIT IV)

Ornstein, Allan and Hunkins, Francis P., (2004) *Curriculum: Foundations, principles and Issues*. Boston, USA, Allyn and Bacon (UNIT II).

Saylor . J. Galen and Alexander.William M. (1974*) Planning curriculum for schools.* New York, USA . Holt, Rinehart and Winston, Inc.(UNIT I)

Taba, Hilda (1962) *Curriculum Development, Theory and Practice* New York Harcourt, Brace & Inc.(UNIT II , III and IV)

Tyler. Ralph W.(1974) *Basic Principles of curriculum and Instruction.* Chicago , USA. The University of Chicago. (UNIT III)

Wheeler, D.K. (1979) *Curriculum Process*. London, Great Britain Hodder and Stougton(NIT II and IV)

References

Print, Murray. (1988) . *Curriculum Development and Design.* NSW Australia. Allen and Unwin.

Ross S. James (2008) *Groundwork of Educational Theory* New Delhi India , Surjeet Publication.

Sowell, Evelyn J. (1996). *Curriculum: An Integrative introduction*. New Jersy, Prentice Hall Inc.

Tanner, D. & Tanner, L.N. (1980) *Curriculum development, theory into practice*, 2nd edition, New York: Macmillan Publishing Co., Inc.

Zais, Robert S. (1976). *Curriculum: Principles and Foundations.* New York. USA Harper and Row, Publishers.