

Full Marks: 60  
Pass Marks: 24

Attempt any ten questions (10x6=60)

- 1) What is Software Engineering? Justify its importance.
- 2) Describe the Spiral model with its advantages.
- 3) What do you mean by risk in software development? List out the steps of risk management.
- 4) What is requirement engineering? Describe about requirement engineering process.
- 5) What is rapid prototyping technique?
- 6) Define about repository model with suitable example.
- 7) Prepare the use-case diagram for ATM System.
- 8) Define V & V model for software testing.
- 9) Compare and contrast about white box and black box testing.
- 10) What is cost estimation? How cost can be estimated using COCOMO model?
- 11) Differentiate between forward and reverse engineering.
- 12) Write short notes on:- (any two)
- i) System reengineering
  - ii) Reliability validation
  - iii) Functional vs non-functional requirements

Course Title: Compiler Design and Construction  
 Course No: CSC - 352  
 Credit Hours: 3

This course is an introductory course to compiler construction. This course covers the important basic elements of compilation and use the material effectively to design and build a working compiler. Topics include language theory, syntax-directed translation, lexical analysis, symbol tables, bottom-up LR(k) parsing, top-down LL(k) parsing, Yacc/Bison and Lex/Flex specifications, intermediate code generation, code generation, error detection, and error recovery.

#### Course Content:

##### Unit 1:

- 1.1 Introduction to compiling: Compilers, analysis of source program, compilers phases, compiler construction tools (Chapter 1)
- 1.2 A simple one pass Compiler: syntax definition, syntax directed translation, parsing, translation for simple expression, symbol table, abstract stack machine. (Chapter 2)

##### Unit 2:

- 2.1 Lexical analysis: Role of lexical analyzer, input buffering, specification and recognition of tokens, finite automata, Conversion regular expression to NFA – Thomson's Construction, NFA to DFA –subset construction, regular expression to DFA, State minimization in DFA, Flex/lex introduction. (Chapter – 3) 8hrs
- 2.2 Syntax Analysis: Role of Parser, Context Free Grammar, writing a grammar, Top-down Parsing – recursive decent parsing, non-recursive predictive parsing, error recovery mechanism, LL grammar, Bottom up parsing – handles, shift reduced parsing, LR Parsers – SLR, LALR, LR, LR/LALR Grammars, Parser Generator. (Chapter 4.1 -4.5, 4.7 & 4.9) 10hrs

##### Unit 3:

- 3.1 Syntax directed translation: Syntax directed definitions, syntax tree construction, synthesized and inherited attributes, dependency graph, S-attributed definitions, L-attributed definition, Translations schemes, Top-down and bottom-up evaluation. (Chapter 5.1 – 5.6) 5hrs
- 3.2 Type Checking: Type system, Specification simple type checker, equivalence of type expression, Type conversion. Type checking Yacc/Bison (Chapter 6.1 -6.4) 3hrs

##### Unit 4:

- 4.1: Intermediate languages, Three address code, Declarations, assignment statement, addressing array elements, Boolean expressions, case statements, procedure calls, backpatching. (Chapter 8.1 – 8.7) 4hrs
- 4.2: Code Generation and Optimization: Code generator design issues, target machine, runtime storage management, basic blocks and flow graphs, next use information, simple code generator, Peephole optimization. (Chapter 9.1 – 9.6 & 9.9) 6hrs

*On 1/1/2018  
 Mr. Bishnu Gautam  
 CSC-352  
 Compiler Design and Construction  
 Page No. 1/1*

1. Simple expression translation program using C/C++
2. Writing C program to scan and identifying token type objects
3. Writing Flex/Lex program to identify source file tokens
4. Implement simple parsing like recursive decent parsing in C/C++
5. Parser writing using parser generator.
6. Writing grammar for intermediate representation in YACC/Bison
7. Writing grammar for type conversion in YACC/Bison
8. Implement Code generation algorithm for simple abstract machine
9. A final project to show the different aspect of compiler design

**Text book:** Compilers principles, Techniques and Tools, By A.V. Aho, R. Sethi, & J. D. Ullman, 1<sup>st</sup> edition, Addison Wesley.

Note: The topics not covered in this syllabus and included in the original syllabus are requested to cover in introductory way only.

## Model Question

Course Title: Compiler Design and Construction

Course No: CSC - 352

Examination Time: 3 Hours -

(There may be 10 questions each of carrying 6 marks or 5 questions with partitions each of carrying 12 marks in total)

Attempt all questions

Q.1 Discuss the phases of compiler construction briefly.

Q.2 Discuss the role of symbol table in compiler design

Q.3 Why regular expression are used in token specification? Write the regular expression to specify the identifier like in C.

Q.4 Consider the grammar

$$\begin{aligned} E &\rightarrow TE' \\ E' &\rightarrow +TE' \mid \epsilon \\ T &\rightarrow FT' \\ T' &\rightarrow *FT' \mid \epsilon \\ F &\rightarrow (E) \mid id \end{aligned}$$

Compute the FIRST and FOLLOW for each symbol.

Q.5 Discuss with a suitable example the operation of stack implementation of shift-reduce parsing.

Q.6 Define the L-attributed definitions. How L-attributed definitions are evaluated?

Q.7 Define the process for Bottom-Up Evaluation of Inherited Attributes.

Q.8 Consider the grammar:  $E \rightarrow E + T \mid T$

$T \rightarrow \text{num} . \text{num} \mid \text{num}$

The grammar generates the expression of + to integer or real. Give a syntax-directed definition to determine the type of expression. When two integers are added, the resulting type is integer otherwise, it is real.

Q.9 Write the grammar with semantic rules that translate the C like while statement into

Q.10 How next-use information is useful in code generation? Explain steps of computing three address code representation.

Q.11 How next-use information is useful in code generation?

Q.12 How next-use information is useful in code generation?

Bachelor of Science in Computer Science and Information Technology  
Teachers Orientation Program (Detail Syllabus)  
March 27, 2011

Course Title: Web Technologies

Course no: CSC-353

Credit hours: 3

Nature of course: Theory (3 Hrs.) + Lab (3 Hrs.)

**Course Synopsis:** This course introduces the client server web technology.

**Goal:** To expose the students with client and server side web programming.

**Course Contents:**

**Unit 1: Introduction (9 Hrs.)**

Review of Web Technologies: Introduction to Networking, Internet and its Evolution, Connecting to the Internet, Client/Server Technology, Internet as a Client/Server Technology, WWW, Web Page, Web Site, URI, Web Server, Web Client, Web Browser, SMTP, POP

Review of HTML: Markup Languages, Introduction to HTML, Elements and Attributes, Different Sections of HTML Document, Comments, Common Tags for Heading, Paragraphs, Horizontal Lines, Line Breaks, Formatting, Links, Images, Tables, Lists, Forms, Using Colors, Special Characters, Head, Meta, and Div tags, Events

Review of CSS: Introduction, Syntax, Inserting CSS (External, Internal, and Inline), ID and Class Selectors, Grouping and Nesting Selectors, Pseudo Classes and Elements

Client-side Programming (Review of JavaScript): Introduction, Writing Comments, Variables, Operators, Statements, Alert, Confirm, and Prompt Boxes, Functions, Event and Error Handling, Introduction to Built-in Classes, Form Validation, Cookies

**Unit 2: Issues of Web Technology (4 Hrs.)**

Architectural issues of web layer; HTTP: Definition and Function; FTP: Definition and Function; Tier Technology: 2-Tier, 3-Tier and n-Tier

**Unit 3: The Client Tier (10 Hrs.)**

Representing content; Introduction to XML; Elements and Attributes; Rules for Writing XML; Namespaces; Schema: Simple Types and Complex Types, XSD attributes, default and fixed values, Facets, Use of Patterns, order indicators(All, Choice, Sequences), Occurrence Indicators (MaxOccurs, MinOccurs), DTD: Internal Declaration, Private External Declaration, Public External Declaration, Defining Elements and Attributes; XSL/XSLT; XPath; XQuery; SAX; DOM

**Unit 4: The Server Tier (18 Hrs.)**

Web Server Concept, Creating dynamic content, Using control flow to control dynamic content generation, Sessions and State, Error Handling, Architecting Web Application, Using tag libraries, Writing tag libraries

**Unit 5: Introduction to Advanced Server Side Issues (4 Hrs.)**

Database Connectivity, Creating an SQL statement: Select, Insert, Update, and Delete; Authentication: Anonymous Access, Authentication by IP address and Domain, Integrated Windows Authentication, Cookies; File Handling, Form Handling

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ry works

atory should cover all the topics mentioned above.

#### Reference Books

J. Crouch, ASP.NET and VB.NET Web Programming, Pearson Education Asia,

Banerjee, Internetworking Technologies, Prentice-Hall of India Limited, Fourth  
n, 2000

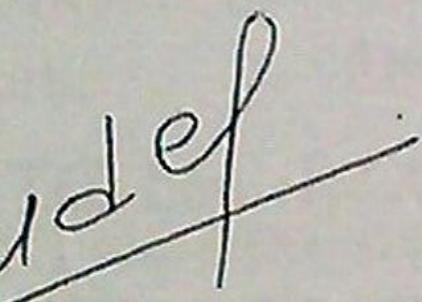
nts

Nawaraj Paudel (Subject Expert)

Nilendra Khadka Yadav (Patan Multiple Campus)

Prabin Raj Aryal (Amrit Science Campus)

Kallavi (St. Xavier College)

A handwritten signature in black ink, appearing to read "Nawaraj Paudel". It is written in a cursive style with a diagonal line through it.

National  
Prof. Dr.  
N. Paudel  
Course Title: Web Technologies  
Course no: CSC-353  
Credit hours: 3

Bachelor of Science in Computer Science and Information Technology  
Teachers Orientation Program (Model Question)

March 27, 2011

Candidates are required to answer the questions in their own word as far as practicable

Time: 3 Hrs.

Full Marks: 60

Pass Marks: 24

Answer any TWO questions from this section. Each question carries TEN marks.

1. Describe in details about the Tier Technology and its Architecture.
2. Write the structure of a XML file with example. Write an XML and DTD to describe "weather\_report" as an element and "date, location, city, state, and temperature\_range" as its attributes.
3. Make a simple Web site that takes information about the user and stores the information in a database. Use client-side script to validate the user input.

Group 'A'

- Answer any EIGHT questions from this section. Each question carries FIVE marks.
4. What is Internet? Discuss some of its services.
  5. Discuss different ways of inserting style sheets in HTML documents.
  6. Discuss the use of Cookies with suitable example.
  7. What are HTTP Protocol Methods? Explain.
  8. What is HTML DOM? Explain some DOM methods used in web technology.
  9. What is XSLT? Explain the XSL<xsl:choose> Element.
  10. What is Session? Explain its use with suitable example.
  11. What are anit-overload techniques in web Server?
  12. Discuss about Tag Libraries.
  13. Discuss file handling with suitable example.

Goal: To be f  
applica  
Unit 1. Intro  
Digital im  
Elements  
pixels

Unit 2. Two-  
Fourier t  
properties  
Unit 3. Ima  
Point of  
intensity  
specific  
spatial l  
interpol

Unit 4. Im  
Pixel c  
Unit 5. In  
Image  
recognition

Unit 6. R  
Reco

Unit 7. C  
Simi  
dete

Unit 8. C  
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Participants

1. Nawaraj Paudel (Subject Expert)
2. Sailendra Khadka Yadav (Patan Multiple Campus)
3. Hem Raj Aryal (Amrit Science Campus)
4. Pallavi (St. Xavier College)

S.N.	Name of the Export	Subject:
1.	Prof. Dr. Shashidhar Ram Joshi	1) Image Processing, 2) Embedded System Programming, 3) Automation and Robotics

**Goal:** To be familiar with processing of the images, recognition of the pattern and their applications.

4 Hrs.

#### Unit 1. Introduction to Digital Image Processing:

Digital image representation, Digital image processing: Problems and applications, Elements of visual perception, Sampling and quantization, relationships between pixels

5 Hrs.

#### Unit 2. Two-dimensional Systems:

Fourier Transform, Other image transforms and their Fourier transform and Fast Fourier Transform, Hadamard transform, Haar transform properties: Cosine transform, Sine transform

8 Hrs.

#### Unit 3. Image Enhancement and Restoration:

Point operations, contrast stretching, clipping and thresholding, digital negative, Pixel operations, histogram modeling: Equalization modification, median, filtering intensity level slicing, bit extraction, directional smoothing, averaging, spatial operations: Averaging, directional smoothing, replication and specification, Spatial operations: Average, directional smoothing, magnification by replication and spatial low pass, high pass and band pass filtering, interpolation

4 Hrs.

#### Unit 4. Image Coding and Compression:

Pixel coding: Run length, Huffman, Bit plane, Predictive and Inter-frame coding

3 Hrs.

#### Unit 5. Introduction to Pattern Recognition and Images:

Pattern Recognition, Different types of character Image, Digital Image, Pattern, Pattern Recognition, Models, Division of sample space recognition

5 Hrs.

#### Unit 6. Recognition and Classification:

Recognition classification, Feature extraction, Edge detection, problems with feature detection

6 Hrs.

#### Unit 7. Grey Level Features Edges and Lines:

Template matching, Edge detection, Line detection, Line fitting, Model fitting, Similarity and correlation, Gradient models, model detection using gradient detectors

23 of 23

**Course Synopsis:** This course introduces the real time systems

**Goal:** The main objective of this course is to address issue in scheduling, resource access control, and communication in the real time system.

#### Lesson plan

SN	Chapters	Descriptions	Time ,Hrs	Hours
	Unit 1. Introduction	Digital control-example High level controls-examples of control hierarchy, guidance and control, real time command and control	0.5 1	3
		Signal processing-radar system	0.5	
		Real time applications-issues and examples	1	
2	Unit 2. Hard versus soft real time systems	Jobs and processors, release time, deadlines and timing constraints, hard and soft timing constraints Common definitions, hard timing constraints and temporal quality of service guarantees Hard real time systems	1.5 0.5 1	4
	Unit 3. Reference model of real time systems	Processors and resources, temporal parameters of real time workload Periodic task model Precedence constraints and data dependency, other dependency	1 1 1.5	4
		Functional parameters-Laxity function/usefulness function, Concept of resource parameters, concept of scheduling hierarchy and schedules	0.5	
4	Unit 4. Approaches to real time scheduling	Clock driven approach, weighted round Robin approach, priority driven approach, dynamic versus static systems Effective release time and effective deadline, optimality of EDF & LST algorithms-theorem with proof /	1.5 2	4

		corollary ( with out proof) and example, Non optimality of EDF & LST algorithms- theorem/ corollary ( with out proof) and example	0.5	
		Challenges in validating timing constraints in priority driven systems- anomalous behavior of priority driven systems with example, offline versus online scheduling-(concepts only)	0.5	
5	Unit 5. Clock driven scheduling	Notations and assumptions, static, timer driven scheduler, general structure of cyclic schedules	2.5	5
		Concept of Cyclic executives( without algorithm),improving the average response time of aperiodic jobs- slack stealing with an example, scheduling sporadic jobs-acceptance test, EDF scheduling of accepted jobs with an example( without algorithm)	1.5	
		Practical considerations- (concepts only), algorithm for constructing static schedules-network flow graph, pros and cons of clock driven scheduling- concepts only	1	
6	Unit 6. Priority driven scheduling of periodic tasks	Static assumptions, fixed priority versus dynamic priority algorithms-Rate monolithic and deadline monolithic algorithm, well known dynamic algorithm	2	6
		Maximum schedule utilization-theorem (with out proof), example of infeasible EDF schedules, optimality of RM & DM algorithms-theorems only(without proof)	1	
		Schedulability test for fixed priority tasks with short response times-critical instants, theorem ( without proof) and example, schedulability test for fixed priority tasks with arbitrary response times-busy intervals, general scheduling test(general time demand analysis method- statements only)	1.5	
		- Sufficient schedulability conditions for RM & DM algorithms-theorem only(without proof), practical factors- concepts only	1.5	
7	Unit 7. Scheduling aperiodic	Assumptions and approaches-objectives,	3	6

fixed priority systems in [Constant utilization, total bandwidth and weighted fair queuing servers]- concepts, theorems/ corollary (with out proof) only	1		
Slack stealing in deadline driven systems-example of deadline stealer, Slack stealing in fixed priority systems- optimality criterion and design consideration with an example, [scheduling of sporadic jobs-real time performance for jobs with soft timing constraints]- basic concepts only, two level scheme for integrated scheduling- overview and terminology	2		
Assumptions on resources and their usage, effects of resources contention and resource access control,	1	5	
Nonpreemptive critical sections, basic priority inheritance protocol-definition of basic priority inheritance protocol	1		
Basic priority ceiling protocol- definition of basic priority ceiling protocol, stack based, priority ceiling(ceiling priority) protocol- motivation and definition of stack sharing priority ceiling protocol	1		
Use of priority ceiling protocol in dynamic priority systems- implementation of priority ceiling protocol in dynamic priority systems, preemption ceiling protocol-preemption levels of jobs and periodic tasks, definitions of protocols and duration of blocking(definitions only)	1		
Controlling access to multiple unit resources-priority(preemption) ceilings of multiple unit resources, controlling concurrent accesses to data objects- convex ceiling protocol(motivation and assumptions only)	1		
Model of multiprocessor and distributed systems	1.5	5	
Unit 9. Multiprocessor systems scheduling, resource access control and synchronization	1.5	3	

	on execution time requirements(simple bin packing formulation only), multiprocessor priority ceiling protocol-blocking time due to resource contention Elements of scheduling algorithms for end-end periodic tasks-interprocessor synchronization protocols(greedy synchronization protocol only), end-to-end tasks in heterogeneous systems, corollary(without proof) predictability validation of dynamic multiprocessor systems	1.5 0.5	
10	Unit 10. Real time communication	6	
	Model of real time communication Priority based service disciplines for switched networks-weighted fair queuing discipline	1 1	
	Weighted round Robin service disciplines-greedy WRR discipline	1	
	Medium access control protocol of broadcast networks-medium access protocols in CAN and IEEE 802.5 token ring	1	
	Internet and resource reservation protocols-issues in resource reservation	0.5	
	Real time protocols	1	
	Communication in multi computer systems-wormhole networks	0.5	
	Total	48	

### Text/Reference book

- Real-time systems, Jane W.S. Liu, Pearson.education Asia, 2003

### Prepared by:

Dr. Subarna Shakya –Coordinator

Mr. Hari Khadka –

Mr. Rabindra Khati –

Mr. Achyuta Nand Mishra -

Mr. Narendra Bahadur Bohara -

Mr. Mangal Regmi -

Subarna Shakya

Achyuta Nand Mishra

Course: Real Time Systems

Course No: CSC - 354

## Model Question

Marks: 80

Pass Marks: 32

### Long Answer Questions.

attempt any two questions.

1. What do you understand by Priority driven algorithms? State and prove the optimal Earliest Deadline First (EDF) Theorem.
2. What do you understand by slack stealing in dead line driven systems? Explain the operation of a slack stealer with a suitable example.
3. What is multi processor priority ceiling protocol? Describe it with the help of suitable diagrams.

### Short Answer Questions.

attempt any eight questions.

1. Define wormhole networks used for communication in multicomputer systems. Describe routing and transmission mechanism in a wormhole networks.
2. Describe the terms tracking and gating used in a radar signal processing system.
3. Differentiate between hard real time systems and soft real time systems. Give three examples of each.
4. Define temporal parameter of real time workload? Explain different types of temporal parameters of a job.
5. How does the system handle frame overruns in a clock-driven scheduling? Explain.
6. What do you understand by 'Busy Intervals' in fixed priority tasks with arbitrary response times? Explain.
7. What are the objectives and levels of two level schemes for integrated scheduling?
8. Explain 'Priority Inversion' caused by resource contention, with suitable example.
9. Describe a real-time communication model with the help of suitable diagram.
10. Write short notes on
- A. Identical versus heterogeneous processors B. Fixed priority versus dynamic priority algorithms

5/5

Credit hours: 3  
Nature of course: Theory (3 Hrs.) + Lab (3 Hrs.)

Full Marks: 60+20+20  
Pass Marks: 24+8+8

**Course Synopsis:** This course explores the concepts of developing web technology.  
**Goal:** To provide the knowledge of Net Centric Computing using Active Server Pages  
programming and .Net Framework.

#### Course Contents:

#### Unit 1. Introduction

3 Hrs.

- 1.1 Web architecture and the role of HTTP protocol
- 1.2 Static and dynamic page
- 1.3 Introduction to ASP
  - a. Benefit and Application of ASP
  - b. IIS (Features, Properties, Application)
  - c. Virtual directory properties
  - d. ASP requirements (Need for ASP)
  - e. Scripting capabilities

#### Unit 2. Intrinsic ASP Objects

6 Hrs.

- 2.1 Response object
  - a. Sending text with response and embed code in pages
  - b. Using variables
- 2.2 Request object
- 2.3 Application and Server object
- 2.4 Thread, Application variables and their uses, Limitation of application variables
- 2.5 Session object
- 2.6 The Form collection, QueryString collection
- 2.7 Cookies
  - a. The response cookies collection
  - b. The request cookies collection
- 2.8 Session and its uses

#### Unit 3. Writing Server-Side Code

8 Hrs.

- 3.1 Coding using VBScript or JScript
- 3.2 The scripting dictionary object
- 3.3 File access with ASP
- 3.4 Debugging ASP and error-handling

#### Unit 4. Using Components

- a. 4.1 Browser capabilities
- b. 4.2 Comparison between different browsers
  - a. Components, properties and methods
  - b. Working and capabilities
- c. 4.3 E-mail handling using ASP

4 Hrs.

#### Unit 5. Accessing Databases with ASP and ADO

- a. 5.1 Introduction to relational databases and SQL
- b. 5.2 Active Database Object (ADO)
  - a. Introduction to ADO
  - b. Accessing data with ADO (Insert, update, delete, and filter)
  - c. Working with Recordsets
  - d. Using Stored Procedures, Parameterized Queries
- e. 5.3 Controlling transactions in ASP

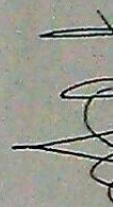
7 Hrs.

#### Unit 6. ASP Applications

- a. 6.1 ASP applications
- b. 6.2 Planning for application development
- c. 6.3 Controlling access and monitoring

3 Hrs.

#### Unit 7. Advanced ASP

- a. 7.1 Introduction to .Net framework. Compilation and execution of .Net applications
- b. 7.2 .Net language (C#)
  - Constructor, Properties, Arrays and String. Indexers, Inheritance, use of "base" keyword, Method hiding and overriding, applying polymorphism in code
  - extensibility, abstract class sealed class, interface, Delegate and Events, Partial class, Collections, Generics
- c. 7.3 Basic of ASP.net page and comparing with classical ASP
- d. 7.4 Web Forms
  - a. Structure of Asp.net Pages
  - b. Inline & Code Behind approach of Asp.Net pages
  - c. Some properties of "Page" class like IsPostBack, ViewState, Session , Request, Response etc.
  - d. Role of ViewState in Asp.net pages
- e. 7.5 Server Controls
  - a. HTML server controls
  - b. Web controls
- f. Properties & use of web controls like (Label, Button, LinkButton, ImageButton, FileUpload, Table, TextBox, CheckBox, RadioButton, Image, HyperLink, Panel, Hiddenfield, List control, ListBox, DropDownList, CheckBoxList, CheckBoxList) 

14 Hrs.  
Assist Prof. Min Bahadur Khatri, CTD(SII), IT

- d. Input Validation controls( RequiredFieldValidator, RangeValidator, CustomValidator)

#### 7.6 Data Access

- a. ADO.net fundamentals
- b. Using Connection, Command, Datasets, DataReader classes

#### Text / Reference Book:

Active Server Pages 3. a Russell Jones. BPB Publications. New Delhi. 2003.

Programming Active Server Pages. Scott Hillier and Daniel Mezick. MS Press, 1997

Programming Microsoft .NET. Jeff Prosise. MS Press. 2002

#### Laboratory works:

Students will have to complete a small project covering all the features of above course using ASP and .Net Framework.

#### Homework Assignments:

Homework assignments can be given according to the course covered throughout the semester.

#### Computer Usage:

Windows PC or workstation installed with Visual Studio .Net and IIS server and Relational DBMS in the Database server.

1

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|---|-----------|
| Introduction to E-commerce, Technology and Business, E-commerce Vs. E-Business, Related terminologies- E-markets, M-commerce, U-commerce, Components of commerce transaction, Features of ecommerce technology (Ubiquity, Richness, Universal Standard, Global Reach, Interactivity, Information Density, Customization)  | [ / Hrs]  |
| Types of E-commerce – Based on parties (B2C, B2B, C2C), Based on transaction types (Brokerage, Aggregator, Info-mediary, Community), Pure Vs. Partial E-commerce  |           |
| The EC framework (Common Business Services, Messaging and Information Processing, Multimedia Content and Network Publishing, Information Superhighway), Essential EC process architecture (Access Control and Security, Profiling and personalization, Search Management, Content Management, Catalog Management, Payment, Workflow Management, Event Notification, Collaboration and Trading), EC success factors (Selection and value, Performance & Service, Look & Feel, Advertising and incentives, personnel attention, community relationships, security & reliability), |           |
| EC Business Models (Transaction fee model, Subscription Model, Advertisement Model, Affiliate Model, Electronic tendering systems, Group Purchasing),   |           |
| Multimedia content for ecommerce, ecommerce and media convergence, Technological factors for convergence (Convergence of content, Convergence of transmission, Convergence of information access devices), The anatomy of e-commerce application (EC consumer applications, EC organization applications)   | [4 Hrs]   |
| 1.2 The Network for Electronic Commerce: Need of network, Information Super Highway (I-way), Market forces influencing the I-way, Components of I-way, Local Network access equipment (Set-Top Boxes, Digital Switches, Hubs Routers), Local Network distribution network, Public policy issues shaping on-ramps, and Global information superhighway, Internet governance, the I-way.  | [3 Hrs]   |
| 1.3 The Internet as a Network Infrastructure: Introduction, The Internet terminology, Six stages of internet Growth, NSFNET: Architecture and Components (The NSFNET backbone, Mid-Level Regional Networks, State and Campus Networks, Movement of information on the NSFNET), Internet hierarchy, IETF Working Groups.   | [23 Hrs.] |
| 2: 2.1 Ecommerce Security: (Client Server Security and Data & Transaction Security), Ecommerce Security holes, Software security holes, Security through Client-Server Network Protection Methods (Trust-based, Biometrics), Inconsistent usage holes, Password Schemes, Biometrics,  | [7 hrs]   |

B. ECO-I (R. Bista)	Trade and Check	Message new, op
B. ECO-I (R. Bista)	Case study	Case study
B. ECO-I (R. Bista)	Case study	Case study
B. ECO-I (R. Bista)	Case study	Case study
	Case study	Paynepal.
2.2	[4 hrs]	Case study
Electronic Commerce & World Wide Web: Introduction, architectural framework for electronic commerce (Applications, Brokerage Services, data or transaction management, Interface and support layers; Secure messaging, security and electronic document interchanges; Middleware and structured document interchange; and Network infrastructure and basic communication services.), WWW as an architecture, Components of web (url, http, html), Hypertext vs. Hypermedia, Technology behind the web, Security in the web (Internet Data Categories, Introduction to Secure Socket Layer (SSL), Introduction to Secure HTTP, SSL vs. S-HTTP).	<ul style="list-style-type: none"> <li>• Hamroba</li> <li>• Case study</li> <li>• Case study</li> <li>• Paynepal.</li> </ul>	
2.3	[6 Hrs]	<p>Consumer Oriented Electronic Commerce; Introduction, consumer oriented applications (Personal Finance and Home Banking Management: Basic Service, Intermediate Service, Advanced Service, Home Shopping, Home Entertainment), Desirable characteristics of an electronic marketplace</p> <p>Mercantile process models, Mercantile models from the consumer's perspective (Pre-purchase preparation, Purchase consummation, Post-purchase interaction), Mercantile Estimation and Pricing, Order Receipt and Entry, Order Generation, Cost Scheduling, Order Fulfillment and Delivery, Order Billing and Account/Payment Management, Order Post-sales Services).</p>
2.4	[6 Hrs]	<p>Electronic Payment Systems: Introduction, Why Electronic Payment Systems, Requirements for e-payments( Atomicity, Goods Atomicity, Non-repudiation), Types of electronic payment systems- digital token based electronic payment systems, cash (Digital cash), Properties of e-cash (Monetary Value, Interoperability, Retrievability, Security), e-cheques, Smart cards and electronic payment systems, Smart credit cards systems, Smart Card Readers &amp; Phones, Credit Cards, Credit Card with Encryption, Digital/Electronic Wallets</p> <p>Risks and Threat on electronic payment system (Risks from Mistake and Disputes: payment Systems (Privacy, Security, Intuitive Interface, Brokers, Database Integration, Pricing, Standards)</p>
Unit 3:	8 Hrs.	<p>Subject Expert: <i>Jagdish Bhatta</i></p> <p>Central Department Tribhuvan Unive</p> <p><i>Jagdish Bhatta</i></p>
3.1	[4 Hrs]	<p>Inter-organizational Commerce &amp; EDI Layered Architecture, Benefits of EDI, EDI application in business (International</p> <p><i>Jagdish Bhatta</i></p> <p><i>Jagdish Bhatta</i></p>

R	(2071 Batch)
08:10-08:15	
B	
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B. ECO-I (R. Bista)	8:15-8:50
B. ECO-I (R. Bista)	

trade and EDI: Role of EDI in International Trade, Financial EDI and its types; Bank Checks, Interbank EFT), EDI: legal, security, and privacy issues; Legal Status of EDI Messages, Digital Signatures and EDI, EDI and electronic commerce (traditional, old, new, open).

Firewalls, management.

3.2 Mechanisms for cryptographic electronic transaction management.

4 hrs]

Framework for electronic transaction management; and

Architecture, technology behind Secure Socket

oriented intermediate Desirable

Merchantile function, Cost on, Order management, e-

Commerce, systems, e-

Commerce, Card

Hrs]

The Corporate Digital Library: Introduction, Dimensions of electronic Commerce systems: Basic Overview of Technological Architecture for Internal Commerce digital documents (Document Imaging, Structured Documents, Hypertext Documents Active Documents), Issues behind document infrastructure (Document Documents, Documents Oriented Processes, Document Based Work Flows ), Constituencies, warehouses, Types of Data warehouses, Advantages of Data warehouses.

[4 Hrs]

Case Studies: As a part of teaching learning behavior, students are encouraged to do number of case studies to get the real idea of ecommerce systems. The case study should cover the study of current market trends of ecommerce from local Nepali Market to the global one. Here are few concepts; however the instructors are free to provide their own cases,

- Case study of current Nepali upcoming ecommerce portals; Muncha.com, Hamirobazar.com, Thamel.com
- Case study of eBay.com, Amazon.com, Dell.com
- Case study of growing payment gateways/ e-payments in Nepal; Esewa.com.np, Paynepal.com, payway.com.np
- Case study of global payment gateways; PayPal, Authorize.net, Google checkout
- Case Study of electronic payment systems like; Mondex Smart Cards, CyberCoins, Cybercash, DigiCash, Coin.net, Microsoft Digital Wallet

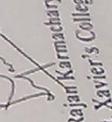
Laboratory works: Students have to develop the ecommerce system simulating the client end and merchant end. For that, students are highly encouraged to use the web development tools and techniques. However, the realization of the ecommerce portal can be done through the use of various open source packages like OSCCommerce, Magento.

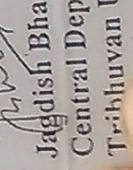
Hrs]

References:

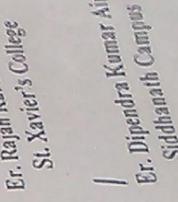
1. *Frontiers of Electronic Commerce* - Ravi Kalakota and Andrew B. Winston - Pearson
2. *E-Commerce Business, Technology, Society* – Kenneth C. Laudon, Carol G. Traver - Pearson
3. *Cryptography & Network Security: Principles and practices*, William Stallings
4. *E-Commerce: A Managerial Perspective* – P. T. Joseph – PHI
5. *E-Commerce: Implementing Global Marketing Strategies*, Bolhdan O. Szypowicz

Participants:

  
Er. Rajan Karmacharya  
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Jagdish Bhatta  
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Subject Expert:

  
Er. Dipendra Kumar Air  
St. Siddhanath Campus

Disputes:  
Engineering E-  
gatavise

# Triphuwan University

Department Of Computer Science and Information Technology

Bachelor Level Third Year/ Second Semester (B.Sc. CSC)  
Time: 3 hrs Full Marks: 60  
Pass Marks: 24

## E-commerce (Elective – CSC - 356)

### Model Question

#### SECTION "A"

##### Illustration Based Descriptive Questions:

Attempt all questions

- 3 \* 10 = 30
1. Define Electronic Commerce. Explain the anatomy of E-commerce process architecture.
  2. Explain the Mercantile Models from the merchant's perspective.
  3. How four layers of EDI ensure transmission of message and data between the trading partners in commerce transactions? Also mention the tangible benefits of EDI.

#### SECTION "B"

##### Reason Based Analytical Questions:

Attempt all questions

- 6 \* 5 = 30
1. Illustrate and explain the components of the I-Way.
  2. Given following services/products, would ecommerce or traditional commerce work best? Give brief justification to your answer.
    - a. Browsing through new books
    - b. Sale/purchase of shoes
    - c. Sale/purchase of collectibles (trading cards, plates, etc.)
  3. Explain digital token based electronic payment system with major focus on E-Cash and E-Checks.
  4. How digital document enhances business data processing? Mention the various types of digital documents.
  5. How data and message security can be enforced in ecommerce transaction?
    - a. SSL vs. S-HTTP
    - b. Types of Ecommerce based on transaction types
    - c. OTTP Steps for Online Transactions

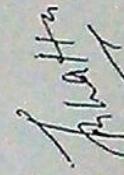
Write short notes (Any Two)

a. SSL vs. S-HTTP

b. Types of Ecommerce based on transaction types

c. OTTP Steps for Online Transactions

1  

of course: Discussion on types of software, developing process and maintaining software.

Synopsis: Discussion on types of software, developing process and maintaining software.

This course introduces concept of software development paradigm and implementing these in real world.

Contents:

Chapter No.	Description	Hours
1.1. Introduction to Software Engineering	<ul style="list-style-type: none"> <li>-Definition of software(Characteristics &amp; types)</li> <li>-Software Engineering</li> <li>-Comparing between other engineering and software engineering</li> </ul>	2 hrs.
1.2. System Engineering	<ul style="list-style-type: none"> <li>-Introduction to System</li> <li>-System properties</li> <li>-System and their environment</li> <li>-System modeling(system component)</li> </ul>	4 hrs.
1.3. Software Process	<ul style="list-style-type: none"> <li>-Introduction</li> <li>-Software process model</li> <li>-Process iteration</li> <li>-Software specification</li> <li>-Software design and implementation</li> <li>-Software validation</li> <li>-Software evolution</li> </ul>	4 hrs.
1.4. Project Management	<ul style="list-style-type: none"> <li>-Introduction</li> <li>-Management activities</li> <li>-Project planning</li> <li>-Project scheduling(WBS, intertask dependency, pert chart, CPM)</li> </ul>	3 hrs.

2	<p>2.1. Software Requirements</p> <ul style="list-style-type: none"> <li>-Introduction</li> <li>-Types of requirements(functional &amp; non-functional)</li> <li>-Requirements engineering process(Feasibility study, requirements elicitation and analysis, requirement validation, requirement management)</li> </ul>	<p>3 hrs.</p>		
	2.2. Software Prototyping	<ul style="list-style-type: none"> <li>-Introduction</li> <li>-Prototyping in the software process</li> <li>-Rapid prototyping techniques</li> <li>-User interface prototyping</li> </ul>		
	2.3. Formal Specification	<ul style="list-style-type: none"> <li>-Introduction</li> <li>-Formal specification in software process</li> <li>-Interface specification</li> <li>-Behavioral specification</li> </ul>	3 hrs.	
3	3.1. Architectural Design	<ul style="list-style-type: none"> <li>-Introduction</li> <li>-System structuring(repository, client-server, abstract with advantages &amp; disadvantages )</li> <li>-Control models</li> <li>-Modular decomposition(object oriented; class diagram, structured; Domain specific architecture</li> </ul>	3 hrs.	
	3.2. Object Oriented Design	<ul style="list-style-type: none"> <li>-Introduction</li> <li>-Features of object oriented design</li> <li>-Design model(Use case, class diagram, Sequence diagram, Activity)</li> </ul>	3 hrs.	
4	4.1. Verification & Validation	<ul style="list-style-type: none"> <li>-Introduction</li> <li>-Verification and validation planning</li> <li>-Cleanroom software development(process component)</li> </ul>	4 hrs.	
	4.2. Software Testing	<ul style="list-style-type: none"> <li>-Introduction</li> <li>-Types of testing</li> <li>-Testing approaches: white box, black box</li> <li>-Types: unit, system, integration, validation</li> <li>-Testing work benches</li> </ul>	4 hrs.	
				Assignment /

