

UNIVERSITY OF MUMBAI



**Syllabus for T.Y.B.Sc. (I.T.)
For Information Only**
Semester V and VI

**Programme: T. Y. B. Sc.
(Information Technology)**

(with effect from Academic Year 2013 – 14)

Courses and Course Codes

Semester V

Course Code	Course Title	Course Code	Course Title
USIT501	Network Security	USIT5P1	Network Security Practical
USIT502	Asp.Net With C#	USIT5P2	Asp.Net With C# Practical
USIT503	Software Testing	USIT5P3	Software Testing Practical
USIT504	Advanced Java	USIT5P4	Advanced Java Practical
USIT505	Linux Administration	USIT5P5	Linux Administration Practical

Semester VI

Course Code	Course Title	Course Code	Course Title
USIT601	Internet Technology	USIT6P1	Internet Technology Practical
USIT602	Project Management	USIT6P2	Project Management Case Studies
USIT603	Data Warehousing	USIT6P3	Data Warehousing Practical
USIT607		Project Report	
USIT608		Project Viva Voce	
Elective			
USIT604	IPR and Cyber Laws	USIT6P4	IPR and Cyber Laws Case Studies
USIT605	Digital Signal And Systems	USIT6P5	Digital Signal And Systems Practical
USIT606	Geographic Information Systems	USIT6P6	Geographic Information Systems Practical

Semester V

PROGRAMME: B. Sc (Information Technology)		Semester – V	
COURSE: NETWORK SECURITY		COURSE CODE: USIT501	
Periods per week 1 Period is 50 minutes	Lecture	5	
	Practical	3	
		Hours	Marks
Evaluation System	Theory Examination	2	60
	Theory Internal	--	40
	Practical		50

Unit I	Computer Security : Introduction, Need for security, Principles of Security, Types of Attacks Cryptography : Plain text and Cipher Text, Substitution techniques, Caesar Cipher, Mono-alphabetic Cipher, Polygram, Polyalphabetic Substitution, Playfair, Hill Cipher, Transposition techniques, Encryption and Decryption, Symmetric and Asymmetric Key Cryptography, Steganography, Key Range and Key Size, Possible Types of Attacks	10 Lectures
Unit II :	Symmetric Key Algorithms and AES: Algorithms types and modes, Overview of Symmetric key Cryptography, Data Encryption Standard (DES), International Data Encryption Algorithm (IDEA), RC4, RC5, Blowfish, Advanced Encryption Standard (AES)	10 Lectures
Unit III	Asymmetric Key Algorithms, Digital Signatures and RSA: Brief history of Asymmetric Key Cryptography, Overview of Asymmetric Key Cryptography, RSA algorithm, Symmetric and Asymmetric key cryptography together, Digital Signatures, Knapsack Algorithm, Some other algorithms (Elliptic curve cryptography, ElGamal, problems with the public key exchange)	10 Lectures
Unit IV	Digital Certificates and Public Key Infrastructure (PKI): Digital Certificates, Private Key Management, The PKIX Model, Public Key Cryptography Standards (PKCS), XML, PKI and Security, Hash functions, Key Predistribution, Blom's Scheme, Diffie-Hellman Key Predistribution, Kerberos, Diffie-Hellman Key Exchange, The Station-to-station Protocol	10 Lectures
Unit V	Network Security, Firewalls and Virtual Private Networks: Brief Introduction to TCP/IP, Firewalls, IP Security, Virtual Private Networks (VPN), Intrusion Internet Security Protocols: Basic concepts, Secure Socket Layer (SSL), Transport Layer Security (TLS), Secure Hyper Text Transfer Protocol (SHTTP), Time Stamping Protocol (TSP), Secure Electronic Transaction (SET), SSL vs SET, 3-D Secure Protocol, Electronic Money, E-mail Security, Wireless Application Protocol (WAP) Security, Security in GSM, Security in 3G	10 Lectures
Unit VI	User Authentication and Kerberos: Authentication basics, Passwords, Authentication Tokens, Certificate-based Authentication, Biometric Authentication, Kerberos, Key Distribution Center (KDC) , Security Handshake Pitfalls, Single Sign On (SSO) Approaches	10 Lectures

Books:

Cryptography and Network Security by Atul Kahate, 2nd Edition, Tata McGrawHill

(Unit I: Chapter 1,2, Unit II: Chapter 3, Unit III: Chapter 4, Unit IV: Chapter 5, Unit V: Chapter 6, Unit VI: Chapter 7)

References:

Cryptography and Network Security by William Stallings, Fifth Edition, Pearson Education.

Cryptography: Theory and Practice by *Douglas Stinson*, CRC Press, CRC Press LLC.

Course Code : **USIT5P1**

Practicals:

1. Implementing Substitution Ciphers
 - a. Caesar Cipher
 - b. Modified Caesar Cipher
 - c. Mono-Alphabetic
 - d. Poly-Alphabetic
2. Implementing Transposition Ciphers
 - a. Rail fence Techniques
 - b. Simple Columnar
 - c. Multicolumnar
 - d. Vernam Cipher
3. Implementing Diffie Helman Key Exchange Algorithm
4. Implementing DES Algorithm
5. Implementing IDEA
6. Implementing AES
7. Implementing RSA Algorithm
8. Implementing RC4, RC5
9. Implementing Blowfish

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PROGRAMME : B. Sc (Information Technology)		Semester – V	
COURSE: ASP.NET with C#		(COURSE CODE – USIT502)	
Periods per week 1 Period is 50 minutes	Lecture	5	
	Practical	3	
		Hours	Marks
Evaluation System	Theory Examination	2	60
	Theory Internal	--	40
	Practical		50

Unit-I	Review of .NET frameworks, Introduction to C#, Variables and expressions, flow controls, functions, debugging and error handling, OOPs with C#, Defining classes and class members.	10 Lectures
Unit-II	Assembly, Components of Assembly, Private and Shared Assembly, Garbage Collector, JIT compiler. Namespaces Collections, Delegates and Events. Introduction to ASP.NET 4: Microsoft.NET framework, ASP.NET lifecycle. CSS: Need of CSS, Introduction to CSS, Working with CSS with visual developer.	10 Lectures
Unit-III	ASP.NET server controls: Introduction, How to work with button controls, Textboxes, Labels, checkboxes and radio buttons, list controls and other web server controls, web.config and global.asax files. Programming ASP.NET web pages: Introduction, data types and variables, statements, organizing code, object oriented basics.	10 Lectures
Unit-IV	Validation Control: Introduction, basic validation controls, validation techniques, using advanced validation controls. State Management: Using view state, using session state, using application state, using cookie and URL encoding. Master Pages: Creating master pages, content pages, nesting master pages, accessing master page controls from a content page. Navigation: Introduction to use the site navigation, using site navigation controls.	10 Lectures
Unit-V	Databases: Introduction, using SQL data sources, GridView Control, DetailsView and FormView Controls, ListView and DataPager controls, Using object datasources. ASP.NET Security: Authentication, Authorization, Impersonation, ASP.NET provider model	10 Lectures
Unit-VI	LINQ: Operators, implementations, LINQ to objects,XML,ADO.NET, Query Syntax. ASP.NET Ajax: Introducing AJAX, Working of AJAX, Using ASP.NET AJAX server controls. JQuery: Introduction to JQuery, JQuery UI Library, Working of JQuery	10 Lectures

Books:

Beginning Visual C# 2010, K. Watson, C. Nagel, J.H Padderson, J.D. Reid, M.Skinner, Wrox (Wiley) 2010. (Unit I: Chapter 1 to 10, Unit II: Chapter 11, 13)

Murach's ASP.NET 4 Web Programming with C# 2010, 4th Edition, Anne Boehm, Joel Murach, SPD.

(Unit III: Chapter 6 Unit IV: Chapter 7,8,9,10 Unit V: Chapter 12,13,14,15,16,17,19,20 Unit VI: Chapter 21)

Beginning ASP.NET 4 in C# and VB, I. Spanjaars, Reprint 2011. (Unit II: Chapter 2 and 3 Unit III: Chapter 5 Unit VI: Chapter 14)

References:

ASP.NET 4.0 programming, J. Kanjilal, Tata McGraw-Hill.
Programming ASP.NET, D. Esposito, Microsoft Press (Dreamtech), Reprint 2011.
ASP.NET.
Visual C#.NET, Vijay Nicoel, TMH

Course Code : USIT5P2**Practical:**

1. Simple Programs with C#:

- a) Write a console application that obtains four int values from the user and displays the product. Hint: you may recall that the Convert.ToDouble() command was used to convert the input from the console to a double; the equivalent command to convert from a string to an int is Convert.ToInt32().
- b) If you have two integers stored in variables var1 and var2, what Boolean test can you perform to see if one or the other (but not both) is greater than 10?
- c) Write an application that includes the logic from Exercise 1, obtains two numbers from the user, and displays them, but rejects any input where both numbers are greater than 10 and asks for two new numbers.
- d) Write a console application that places double quotation marks around each word in a string
- e) Write an application that uses two command-line arguments to place values into a string and an integer variable, respectively. Then display these values.
- f) Write an application that receives the following information from a set of students:

Student Id:

Student Name:

Course Name:

Date of Birth:

The application should also display the information of all the students once the data is entered. Implement this using an Array of Structures.

- g) Write programs using conditional statements and loops:

- i. Generate Fibonacci series.
- ii. Generate various patterns (triangles, diamond and other patterns) with numbers.
- iii. Test for prime numbers.
- iv. Generate prime numbers.
- v. Reverse a number and find sum of digits of a number.
- vi. Test for vowels.
- vii. Use of foreach loop with arrays.

2. Object oriented programs with C#

- b) Program using classes.
- c) Program with different features of C#
 - i. Function Overloading
 - ii. Inheritance (all types)
 - iii. Constructor overloading
 - iv. Interfaces
 - v. Using Delegates and events
 - vi. Exception handling

3. Programs using different controls.

4. Programs using CSS.

5. Programs using ASP.NET Server controls.

6. Database programs with ASP.NET and ADO.NET

7. Programs using Language Integrated query.

8. Programs securing web pages.

9. Implement the exercise on AJAX.

10. Implement the exercise on JQuery.

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PROGRAMME: B. Sc (Information technology)		Semester – V	
COURSE: SOFTWARE TESTING		COURSE CODE : USIT503	
Periods per week 1 Period is 50 minutes	Lecture	5	
	Practical	3	
		Hours	Marks
Evaluation System	Theory Examination	2	60
	Theory Internal	--	40
	Practical		50

Unit-I	Fundamentals of testing: Necessity of testing , what is it, Testing principles, Fundamental test process, The psychology of testing	10 Lectures
Unit-II	Testing throughout the software life cycle: Software development models, Test levels, Test types: the targets of testing, Maintenance testing	10 Lectures
Unit-III	Static techniques: Reviews and the test process, Review process, Static analysis by tools	10 Lectures
Unit-IV	Test design techniques: Identifying test conditions and designing test cases, Categories of test design techniques, Specification-based or black-box techniques, Structure-based or white-box techniques, Experience-based techniques	10 Lectures
Unit-V	Test management: Test organization, Test plans, estimates, and strategies, Test progress monitoring and control, Configuration management, Risk and testing, Incident management	10 Lectures
Unit-VI	Tool support for testing: Types of test tool, Effective use of tools: Potential benefits and risks, Introducing a tool into an organization	10 Lectures

Book:

B1: Software Testing Foundations, 2nd Edition By Hans Schaefer, Andreas Spillner, Tilo Linz, Shroff Publishers and Distributors

(Unit I: Chapter 1,2, Unit II: Chapter 3, Unit III: Chapter 4, Unit IV: Chapter 5, Unit V: Chapter 6, Unit VI: Chapter 7)

B2: FOUNDATIONS OF SOFTWARE TESTING by Dorothy Graham, Erik van Veenendaal, Isabel Evans, Rex Black

(Unit I: Chapter 1, Unit II: Chapter 2, Unit III: Chapter 3, Unit IV: Chapter 4, Unit V: Chapter 5, Unit VI: Chapter 6)

References:

Software Testing by Yogesh Singh, Cambridge University Press

Software Testing Principles, Techniques and Tools, M.G. Limaye, TMH,

Software Testing A Craftman's Approach, Second Edition, Paul C. Jorgensen, CRC Press

Introduction to Software Testing, Paul Ammann, Jeff Offutt, Cambridge University Press.

Managing the Testing Process: Practical Tools and Techniques for Managing Hardware and Software Testing, Rex Black, Wiley.

Software Testing, Second Edition, Ron Patton, SAMS

Course Code : USIT5P3

Practicals:

1. You have got the brilliant idea of setting up a company that sells testing services to software houses. Make a strategic plan for your company, taking into account the following issues:
 - What is the testing process that will be followed in the company?
 - What is the focus of the testing services?
 - What kind of people are you going to hire as staff for the company?
 - How are you going to validate that a testing project carried out in the company has been beneficial to the customer?
 - What kind of automated tools will the company use?
2. Prepare a small project and submit SRS, design, coding and test plan.
3. The program reads an arbitrary number of temperatures (as integer numbers) within the range -60°C ... +60°C and prints their mean value. Design test cases for testing the program with the black-box strategy.
4. When getting a person's weight and height as input, the program prints the person's body weight index. The weight is given in kilograms (as a real number, for instance: 82,0) and the height in meters (as a real number, for instance: 1,86). The body weight index equals weight divided by height squared: $\text{weight} / (\text{height}^2)$. Design test cases for testing the program with the black-box strategy.
5. Let us study the following program:

```
x=0; read(y);
while (y > 100) { x=x+y; read(y); }
if (y < 200) print(x) else print(y);
```

 - a) Construct a control-flow graph for the program.
 - b) Design test cases for reaching complete branch coverage over the program. Use as few test cases as possible.
6. Design test cases for the following program with the "simple loop" strategy:

```
x=0; read(y);
while ((y > 100) && (x < 10)) { x=x+1; read(y); }
print(y);
```

 - a) Construct a data-flow graph for the program with respect to variable x .
 - b) Which execution paths have to be traversed during testing, in order to reach complete *all-definitions* coverage with respect to variable x ?
 - c) Minimize the number of paths and tests.
 - d) Which execution paths have to be traversed during testing, in order to reach complete *all-uses* coverage with respect to variable x ? Minimize the number of paths and tests.
 - e) Design test cases for reaching the (minimal) complete *all-uses* coverage with respect to variable x .
7. MANUAL TESTING for the project
 - a) Walkthrough
 - b) Whitebox Testing
 - c) Blackbox Testing
 - d) Unit Testing
 - e) Integration Testing
8. Functional Testing
 - a) Boundary value Testing
 - b) Equivalence class testing
 - c) Decision Table based testing
 - d) Cause-effect graphs
9. Regression Testing using automated testing for website.
10. AUTOMATED TESTING for websites
 - a) Load Testing
 - b) Performance Testing

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PROGRAMME: B. Sc (Information technology)		Semester – V	
COURSE: ADVANCED JAVA		COURSE CODE : USIT504	
Periods per week 1 Period is 50 minutes	Lecture	5	
	Practical	3	
		Hours	Marks
Evaluation System	Theory Examination	2	60
	Theory Internal	--	40
	Practical		50

Unit-I	<p>Event Handling: The delegation event model, Events, Event classes, Event Listener Interfaces, Using the Delegation event model, Adapter classes, inner classes</p> <p>AWT : Windows fundamentals, Working with frame windows, Control fundamentals, - Labels, Buttons, CheckBox, Radio button TextField, Understanding Layout Manager</p>	10 Lectures
Unit-II	<p>Swing: JColorChooser, JComboBox, JFileChooser, JInternalFrame, JLabel, JMenuBar, JOptionPane, JLayeredPane, JDesktopPane, JPanel, JPopupMenu, JProgressBar, JRootPane, JScrollBar, JScrollPane, JSeparator, JSlider, JSplitPane, JTabbedPane, JTable, JTableHeader, JToolBar, JToolTip, JTree, JViewport, JEditorPane, JTextPane, JTextArea, JTextField, JPasswordField, JButton, JMenuItem, JCheckBox-MenuItem, JRadioButton-MenuItem JCheckBox, JRadioButton, JMenu.</p>	10 Lectures
Unit-III	<p>Introduction to servlets: Need for dynamic content, java servlet technology, why servlets?</p> <p>Servlet API and Lifecycle: servlet API, servletConfig interface, ServletRequest and ServletResponse Interfaces, GenericServlet Class, ServletInputStream And ServletOutputStream Classes, Request Dispatcher Interface, HttpServletResponse Class, HttpServletRequest and HttpServletResponse Interfaces, HttpSession Interface, Servlet Lifecycle.</p> <p>Working with servlets: organization of a web application, creating a web application(using netbeans) , creating a servlet, compiling and building the web application</p>	10 Lectures
Unit-IV	<p>JDBC: Design of JDBC, JDBC configuration, Executing SQL statement, Query Execution, Scrollable and updatable result sets, row sets, metadata, Transaction.</p> <p>JSP: Introduction, disadvantages, JSP v/s Servlets, Lifecycle of JSP, Comments, JSP documents, JSP elements, Action elements, implicit objects, scope, characterquoting conventions, unified expression language.</p>	10 Lectures
Unit-V	<p>Java server Faces :</p> <p>Need of MVC , what is JSF?, components of JSF, JSF as an application, JSF lifecycle, JSF configuration, JSF web applications (login form, JSF pages)</p> <p>EJB: Enterprise bean architecture, Benefits of enterprise bean, types of beans, Accessing beans , packaging beans, creating web applications, creating enterprise bean, creating web client, creating JSP file, building and running web application.</p>	10 Lectures
Unit-VI	<p>HIBERNATE: Introduction, Writing the application, application development approach, creating database and tables in MySQL, creating a web application, Adding the required library files, creating a java bean class, creating hibernate configuration and mapping file, adding a mapping resource, creating JSPs.</p> <p>STRUTS: Introduction, Struts framework core components, installing and setting up struts, getting started with struts.</p>	10 Lectures

Books:

B1 Java Complete Reference, Herbert Schildt, Seventh Edition, Tata McGraw Hill.

(Unit I Chapter 20,21,22)

B2 Core Java Vol. II – Advanced Features, Cay S. Horstmans, Gary Coronell, Eight Edition, Pearson Education (Unit II: Chapter 6, Unit IV: Chapter 4 and Oracle Java Documentation on UISWing)

B3 Java EE 6 for Beginners, Sharanam Shah, Vaishali Shah, Shroff Publishers and Distributors

(Unit III: Chapter 5,6,7, Unit IV: Chapter 13,14,15,16, Unit V: Chapter 18, 1,9,24,25, Unit V:

Chapter 33,34,35,36,37,38)

References:

Java EE Project using EJB 3, JPA and struts 2 for beginners, Shah, SPD

Java Programming A practical Approach, C Xavier, McGraw Hill

Java Server Faces A practical Approach for beginners, B M Harwani, Eastern Economy Edition (PHI).

Advanced Java Technology, Savaliya, Dreamtech.

Course Code : USIT5P4

Practicals:

1. Write a java program to present a set of choices for a user to select Stationary products and display the price of Product after Selection from the list.
2. Write a java program to demonstrate typical Editable Table, describing employee details for a software company.
3. Write a java program using Split pane to demonstrate a screen divided in two parts, one part contains the names of Planets and another Displays the image of planet.
When user selects the planet name form Left screen, appropriate image of planet displayed in right screen.
4. Develop Simple Servlet Question Answer Application to demonstrate use of HttpServletResponse and HttpServletResponse interfaces.
5. Develop Servlet Application of Basic Calculator (+,-,*,/,%) using ServletInputStream and ServletOutputStream.
6. Develop a JSP Application to accept Registration Details form user and Store it into the database table.
7. Develop a JSP Application to Authenticate User Login as per the registration details.
If login success the forward user to Index Page otherwise show login failure Message.
8. Develop a web application to add items in the inventory using JSF.
9. Develop a Room Reservation System Application Using Enterprise Java Beans.
10. Develop a Hibernate application to store Feedback of Website Visitor in MySQL Database.
11. Develop a simple Struts Application to Demonstrate 3 page Website of Teaching Classes which passes values from every page to another.
12. Develop a simple Struts Application to Demonstrate E-mail Validator.

PROGRAMME : B. Sc (Information Technology)		Semester – V	
COURSE: LINUX ADMINISTRATION		(COURSE CODE – USIT505)	
Periods per week 1 Period is 50 minutes	Lecture	5	
	Practical	3	
		Hours	Marks
Evaluation System	Theory Examination	2	60
	Theory Internal	--	40
	Practical		50

Unit-I	<p>Introduction: Introduction to UNIX, Linux, GNU and Linux distributions Duties of the System Administrator, The Linux System Administrator, Installing and Configuring Servers, Installing and Configuring Application Software, Creating and Maintaining User Accounts, Backing Up and Restoring Files, Monitoring and Tuning Performance, Configuring a Secure System, Using Tools to Monitor Security Booting and shutting down: Boot loaders-GRUB, LILO, Bootstrapping, Init process, rc scripts, Enabling and disabling services. The File System: Understanding the File System Structure, Working with Linux-Supported File Systems, Memory and Virtual File Systems, Linux Disk Management, Network Configuration Files</p>	10 Lectures
Unit-II	<p>System Configuration Files: System wide Shell Configuration Scripts, System Environmental Settings, Network Configuration Files, Managing the init Scripts, Configuration Tool, Editing Your Network Configuration TCP/IP Networking: Understanding Network Classes, Setting Up a Network Interface Card (NIC), Understanding Subnetting, Working with Gateways and Routers, Configuring Dynamic Host Configuration Protocol, Configuring the Network Using the Network The Network File System: NFS Overview, Planning an NFS Installation, Configuring an NFS Server, Configuring an NFS Client, Using Automount Services, Examining NFS Security</p>	10 Lectures
Unit-III	<p>Connecting to Microsoft Networks: Installing Samba, Configuring the Samba Server, Creating Samba Users 3, Starting the Samba Server, Connecting to a Samba Client, Connecting from a Windows PC to the Samba Server Additional Network Services: Configuring a Time Server, Providing a Caching Proxy Server</p>	10 Lectures
Unit-IV	<p>Internet Services: Secure Services, SSH, scp, sftp Less Secure Services (Telnet ,FTP, sync,rsh ,rlogin,finger,talk and ntalk, Linux Machine as a Server, Configuring the xinetd Server, Comparing xinetd and Standalone, Configuring Linux Firewall Packages, Domain Name System: Understanding DNS, Understanding Types of Domain Servers, Examining Server Configuration Files, Configuring a Caching DNS Server, Configuring a Secondary Master DNS Server, Configuring a Primary Master Server, Checking Configuration</p>	10 Lectures
Unit-V	<p>Configuring Mail Services: Tracing the Email Delivery Process, Mail User Agent (MUA), Introducing SMTP, Configuring Sendmail, Using the Postfix Mail Server, Serving Email with POP3 and IMAP, Maintaining Email Security Configuring FTP Services: Introducing vsftpd, Configuring vsftpd, Advanced FTP Server Configuration, Using SFTP</p>	10 Lectures
Unit-VI	<p>Configuring a Web Server: Introducing Apache, Configuring Apache, Implementing SSI, Enabling CGI, Enabling PHP, Creating a Secure Server with SSL System Administration: Administering Users and Groups Installing and Upgrading Software Packages</p>	10 Lectures

Books:

B1: Red hat Linux Networking and System Administration, 3rd Edition by Terry Collings and Kurt Wall, Wiley Publishing

(Unit I: Chapter 1,6,7,8, Unit II: Chapter 8,11,12, Unit III: Chapter 14, 17, Unit IV: Chapter 19, 20, Unit V: Chapter 21, 22, Unit VI: Chapter 23,29,30

References:

UNIX: Concepts and techniques, S. Das, Tata McGraw-Hill,
Linux Administration: A Beginner's Guide, Fifth Edition, Wale Soyinka,
Tata McGraw-Hill
Linux: Complete Reference, 6th Edition, Richard Petersen, Tata McGraw-Hill
Beginning Linux by Neil Mathew 4th Edition

Course Code : **USIT5P5**

Practicals:

1. Installation of Red HAT/Fedora Linux operating system.
 - a. Partitioning drives
 - b. Configuring boot loader (GRUB/LILO)
 - c. Network configuration
 - d. Setting time zones
 - e. Creating password and user accounts
 - f. Shutting down
2. Software selection and installation
3. Linux system administration
 - a. Becoming super user
 - b. Temporarily changing user identity with su command
 - c. Using graphical administrative tools
 - d. Administrative commands
 - e. Administrative configuration files
4. Connecting to the internet and configuring samba
 - a. Setting up linux as a proxy server
 - b. Configuring mozilla or firefox to use as a proxy
 - c. Setting Up Samba Server
5. Setting up local area network
 - a. LAN topologies
 - b. LAN equipment
 - c. Networking with TCP/IP
 - d. Configuring TCP/IP
 - e. Adding windows computer's to user LAN
 - f. IP address classes
6. Server setup and configuration
 - a. Setting up NFS file server
 - b. The Apache web server
 - c. Setting up FTP server
7. Understanding COMPUTER SECURITY: Firewall and security configurations
 - a. LINUX security checklist
 - b. Securing linux with IP table firewalls
 - c. Configuring an IP table firewall
 - d. Securing Linux features
8. Using gcc compiler (Programming using C++).
9. Using javac compiler (Implementing Socket programs).
10. Setting up hardware devices including sound card and printers and others (USB devices etc).
11. Working with X-windows
 - a. Switching between text and graphical consoles
 - b. set up my video card, monitor and mouse for the X-server.
 - c. Install KDE, change default desktop to KDE (or Gnome)
 - d. Accessing X-window remotely.
 - e. Installing TrueType fonts from my MS Windows partition.
 - f. Display and Control a Remote Desktop using VNC.
12. Configuring Mail Server.

For Information Only

Semester VI

PROGRAMME : B. Sc (Information Technology)		Semester – VI	
COURSE: INTERNET TECHNOLOGY		COURSE CODE – USIT601	
Periods per week 1 Period is 50 minutes	Lecture	5	
	Practical	3	
		Hours	Marks
Evaluation System	Theory Examination	2	60
	Theory Internal	--	40
	Practical		50

Unit-I	Introduction: OSI Model, TCP/IP Protocol Suite, IPV 4 Addresses and Protocol and IPV6 Addresses and Protocol	10 Lectures
Unit-II	Address Resolution Protocol (ARP), Internet Control Message Protocol Version 4 (ICMPv4), Mobile IP, Unicast Routing Protocols (RIP, OSPF and BGP)	10 Lectures
Unit-III	User Datagram Protocol (UDP), Transmission Control Protocol (TCP)	10 Lectures
Unit-IV	Stream Control Transmission Protocol (SCTP), Host Configuration: DHCP, Domain Name System (DNS)	10 Lectures
Unit-V	Remote Login: TELNET and SSH, File Transfer: FTP and TFTP ; World Wide Web and HTTP,	10 Lectures
Unit-VI	Electronic Mail: SMTP, POP, IMAP and MIME, Multimedia	10 Lectures

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Books:

B1: TCP/IP Protocol Suite, Behrouz A. Forouzan, 4th Edition, Tata McGrawHill

(Unit I: Chapter 2, 5, 7, 26, 27, Unit II: Chapter 8, 9, 10, 11, Unit III: Chapter 14,15, Unit IV: Chapter 16, 18, 19, Unit V: Chapter 20, 21, 22, Unit VI: Chapter 23, 25)

References:

Internetworking with TCP/IP, Volume I, Fifth Edition, Douglas E. Comer, PHI.

Internetworking with TCP/IP, Volume II, Third Edition, Douglas E. Comer, D.L. Stevens, PHI

TCP/IP Illustrated, Eastern Economy Edition, N.P. Gopalan, B.Siva Selvan, PHI

Course Code : **USIT6P1**

Practicals:

1. IPv4 Addressing and Subnetting
 - a. Given an IP address and network mask, determine other information about the IP address such as:
 - Network address
 - Network broadcast address
 - Total number of host bits
 - Number of hosts
 - b. Given an IP address, network mask, and subnetwork mask, determine other information about the IP address such as:
 - The subnet address of this subnet
 - The broadcast address of this subnet
 - The range of host addresses for this subnet
 - The maximum number of subnets for this subnet mask
 - The number of hosts for each subnet
 - The number of subnet bits
 - The number of this subnet
2. Use of ping and tracert / traceroute and arp utilities.
3. Configure IP static routing.
4. Configure IP routing using RIP.
5. Configuring OSPF.
6. Configuring UDP and TCP
7. Run different STCP commands.
8. Configure DHCP and DNS.
9. Configure FTP and HTTP. Run Telnet and SSH.
10. Configure SMTP, POP3, IMAP and NNTP.

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PROGRAMME : B. Sc (Information Technology)		Semester – VI	
COURSE: PROJECT MANAGEMENT		COURSE CODE – USIT602	
Periods per week 1 Period is 50 minutes	Lecture	5	
	Case Study	3	
		Hours	Marks
Evaluation System	Theory Examination	2	60
	Theory Internal	--	40
	Case Study		50

Unit-I	Conventional Software Management: The waterfall model, conventional software Management performance. Evolution of Software Economics: Software Economics, pragmatic software cost estimation. Improving Software Economics: Reducing Software product size, improving software processes, improving team effectiveness, improving automation, Achieving required quality, peer inspections.	10 Lectures
Unit-II	The old way and the new: The principles of conventional software Engineering, principles of modern software management, transitioning to an iterative process. Life cycle phases: Engineering and production stages, inception, Elaboration, construction, transition phases. Artifacts of the process: The artifact sets, Management artifacts, Engineering artifacts, programmatic artifacts. Model based software architectures: A Management perspective and technical perspective.	10 Lectures
Unit-III	Work Flows of the process: Software process workflows, Iteration workflows. Checkpoints of the process: Major milestones, Minor Milestones, Periodic status assessments. Iterative Process Planning: Work breakdown structures, planning guidelines, cost and schedule estimating, Iteration planning process, Pragmatic planning.	10 Lectures
Unit-IV	Project Organizations and Responsibilities: Line-of-Business Organizations, Project Organizations, evolution of Organizations. Process Automation: Automation Building blocks, The Project Environment.	10 Lectures
Unit-V	Project Control and Process instrumentation: The seven core Metrics, Management indicators, quality indicators, life cycle expectations, pragmatic Software Metrics, Metrics automation. Tailoring the Process: Process discriminants.	10 Lectures
Unit-VI	Future Software Project Management: Modern Project Profiles, Next generation Software economics, modern process transitions.	10 Lectures

Books:

B1: Software Project Management by Walker Royce: Pearson Education, 2005.

(Unit I: Chapter 1,2,3, Unit II: Chapter 4,5,6,7, Unit III: Chapter 8,9,10 Unit IV: Chapter 11,12, Unit V: Chapter 13,14, Unit VI: Chapter 15,16,17)

Course Code : **USIT6P2**

Case Study:

At least 8 case studies should be presented on various topics covering the entire syllabus.

For Information Only

PROGRAMME : B. Sc (Information Technology)		Semester – VI	
COURSE: DATA WAREHOUSING		COURSE CODE – USIT603	
Periods per week 1 Period is 50 minutes	Lecture	5	
	Practical	3	
		Hours	Marks
Evaluation System	Theory Examination	2	60
	Theory Internal	--	40
	Practical		50

Unit-I	<p>Introduction to Data Warehousing: Introduction, Necessity, Framework of the datawarehouse, options, developing datawarehouses, end points.</p> <p>Data Warehousing Design Consideration and Dimensional Modeling: Defining Dimensional Model, Granularity of Facts, Additivity of Facts, Functional dependency of the Data, Helper Tables, Implementation many-to-many relationships between fact and dimensional modelling.</p>	10 Lectures
Unit-II	<p>An Introduction to Oracle Warehouse Builder: Installation of the database and OWB, About hardware and operating systems, Installing Oracle database software, Configuring the listener, Creating the database, Installing the OWB standalone software, OWB components and architecture, Configuring the repository and workspaces.</p> <p>Defining and Importing Source Data Structures: An overview of Warehouse Builder Design Center, Importing/defining source metadata, Creating a project, Creating a module, Creating an Oracle Database module, Creating a SQL Server database module, Importing source metadata from a database, Defining source metadata manually with the Data Object Editor, Importing source metadata from files.</p>	10 Lectures
Unit-III	<p>Designing the Target Structure: Data warehouse design, Dimensional design, Cube and dimensions, Implementation of a dimensional model in a database, Relational implementation (star schema), Multidimensional implementation (OLAP), Designing the ACME data warehouse, Identifying the dimensions, Designing the cube, Data warehouse design in OWB, Creating a target user and module, Create a target user, Create a target module, OWB design objects.</p> <p>Creating the Target Structure in OWB: Creating dimensions in OWB, The Time dimension, Creating a Time dimension with the Time Dimension Wizard, The Product dimension, Product Attributes (attribute type), Product Levels, Product Hierarchy (highest to lowest), Creating the Product dimension with the New Dimension Wizard, The Store dimension, Store Attributes (attribute type), data type and size, and (Identifier), Store Levels, Store Hierarchy (highest to lowest), Creating the Store dimension with the New Dimension Wizard, Creating a cube in OWB, Creating a cube with the wizard, Using the Data Object Editor</p>	10 Lectures
Unit-IV	<p>Extract, Transform, and Load Basics: ETL, Manual ETL processes, Staging, To stage or not to stage, Configuration of a staging area, Mappings and operators in OWB, The canvas layout, OWB operators, Source and target operators, Data flow operators, Pre/post-processing operators.</p> <p>Designing and building an ETL mapping: Designing our staging area, Designing the staging area contents, Building the staging area table with the Data Object Editor, Designing our mapping, Review of the Mapping Editor, Creating a mapping.</p>	10 Lectures

Unit-V	<p>ETL: Transformations and Other Operators: STORE mapping, Adding source and target operators, Adding Transformation Operators, Using a Key Lookup operator, Creating an external table, Creating and loading a lookup table, Retrieving the key to use for a Lookup Operator, Adding a Key Lookup operator, PRODUCT mapping, SALES cube mapping, Dimension attributes in the cube, Measures and other attributes in the cube, Mapping values to cube attributes, Mapping measures' values to a cube, Mapping PRODUCT and STORE dimension values to the cube, Mapping DATE_DIM values to the cube, Features and benefits of OWB.</p> <p>Validating, Generating, Deploying, and Executing Objects: Validating, Validating in the Design Center, Validating from the editors, Validating in the Data Object Editor, Validating in the Mapping, Editor, Generating, Generating in the Design Center, Generating from the editors, Generating in the Data Object Editor, Generating in the Mapping Editor, Deploying, The Control Center Service, Deploying in the Design Center and Data Object Editor, The Control Center Manager, The Control Center Manager window overview, Deploying in the Control Center ,Manager, Executing, Deploying and executing remaining objects, Deployment Order, Execution order.</p>	10 Lectures
Unit-VI	<p>Extra Features: Additional editing features, Metadata change management, Recycle Bin, Cut, copy, and paste, Snapshots, Metadata Loader (MDL) exports and imports, Synchronizing objects, Changes to tables, Changes to dimensional objects and auto-binding, Warehouse Builder online resources.</p> <p>Datawarehousing and OLAP: Defining OLAP, The Value of Multidimensional data, OLAP terminologies, Multidimensional architectures, Multidimensional views of relational data, Physical Multidimensional databases, Data Explosion, Integrated relational OLAP, Data sparsity and data explosion.</p>	10 Lectures

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Book:

Data Warehousing by Soumendhra Mohanty, Tata McGrawHill

(Unit I: Chapter 1, 2 Unit VI: 14).

Oracle Warehouse Builder 11g, Getting Started by Bob Griesemer, PACKT Publishing, SPD.

(Unit II: Chapter 1,3 Unit III: Chapter 3,4 Unit IV: Chapter 5,6 Unit V: Chapter 7,8 Unit VI: Chapter 9)

References:

DW2.0 The architecture for Next Generation of Datawarehousing by W.H. Inmon, Derek Strauss, Genia Neushloss, ELSEVIER.

Data Warehousing Fundamentals by Paulraj Ponnian, John Wiley.

Building the data warehouse by, W.H.Inmon, third Edition, John Wiley.

The Data Warehouse Lifecycle toolkit by Ralph Kimball, John Wiley.

Course Code : USIT6P3

Practicals:

1. Importing the source data structures in Oracle.
2. Design the target data structure using Oracle
3. Create the target structure in OWB (Oracle Web Builder)
4. Designed and build the ETL mapping
5. Perform the ETL process and transform it to data marts.
6. Create the cube and process it in OWB.
7. Generate the different types of reports in using Oracle.
8. Perform the deployment of Warehouse
9. Create the Pivot table and Pivot chart using some existing data or create the new data.
10. Import the cube in access and create Pivot table and chart.

PROGRAMME : B. Sc (Information Technology)		Semester – VI	
COURSE: IPR and CYBER LAWS		COURSE CODE – USIT604	
Periods per week 1 Period is 50 minutes	Lecture	5	
	Case Study	3	
		Hours	Marks
Evaluation System	Theory Examination	2	60
	Theory Internal	--	40
	Case Study		50

Unit-I	Intellectual Property: Introduction, Protection of Intellectual Property Copyright, Related Rights, Patents, Industrial Designs, Trademark, Unfair Competition	10 Lectures
Unit-II	Information Technology Related Intellectual Property Rights Computer Software and Intellectual Property-Objective, Copyright Protection, Reproducing, Defences, Patent Protection. Database and Data Protection-Objective, Need for Protection, UK Data Protection Act, 1998, US Safe Harbor Principle, Enforcement. Protection of Semi-conductor Chips-Objectives Justification of protection, Criteria, Subject-matter of Protection, WIPO Treaty, TRIPs, SCPA. Domain Name Protection-Objectives, domain name and Intellectual Property, Registration of domain names, disputes under Intellectual Property Rights, Jurisdictional Issues, and International Perspective.	10 Lectures
Unit-III	Patents (Ownership and Enforcement of Intellectual Property) Patents-Objectives, Rights, Assignments, Defences in case of Infringement Copyright-Objectives, Rights, Transfer of Copyright, work of employment Infringement, Defences for infringement Trademarks- Objectives, Rights, Protection of good will, Infringement, Passing off, Defences Designs-Objectives, Rights, Assignments, Infringements, Defences of Design Infringement	10 Lectures
Unit-IV	Enforcement of Intellectual Property Rights - Civil Remedies, Criminal Remedies, Border Security measures. Practical Aspects of Licencing – Benefits, Determinative factors, important clauses, licensing clauses.	10 Lectures
Unit-V	Cyber Law: Basic Concepts of Technology and Law : Understanding the Technology of Internet, Scope of Cyber Laws, Cyber Jurisprudence Law of Digital Contracts : The Essence of Digital Contracts, The System of Digital Signatures, The Role and Function of Certifying Authorities, The Science of Cryptography Intellectual Property Issues in Cyber Space: Domain Names and Related issues, Copyright in the Digital Media, Patents in the Cyber World. Rights of Netizens and E-Governance : Privacy and Freedom Issues in the Cyber World, E-Governance, Cyber Crimes and Cyber Laws	10 Lectures
Unit-VI	Information Technology Act 2000 : Information Technology Act-2000-1 (Sec 1 to 13), Information Technology Act-2000-2 (Sec 14 to 42 and Certifying authority Rules), Information Technology Act-2000-3 (Sec 43 to 45 and Sec 65 to 78), Information Technology Act-2000-4(Sec 46 to Sec 64 and CRAT Rules), Information Technology Act-2000-5 (Sec 79 to 90), Information Technology Act-2000-6 (Sec 91-94) Amendments in 2008.	10 Lectures

Books:

B1: http://www.dcmsme.gov.in/emerge/website_material_on_IPR.pdf (Unit I)

B2: Cyber Law Simplified by Vivek Sood, Tata McGrawHill (Unit V: Chapter 7)

B3: Guide to Cyber Laws by Rodney Ryder, Wadhwa Publications, Nagpur.
(Unit II: Chapter 4, 5, Unit V: Chapter 1, 4)

B4: Licensing Art & Design by Caryn R. Leland, Allworth Press (Unit IV)

B5: Patents, Trademarks, Copyright, Industrial Designs and Geographical Indications by Dr. B. L. Wadhwa
(Unit I, II, III, IV)

B6: www.cyberlawtimes.com/itact2008.pdf (Unit VI)

Course Code : **USIT6P4**

Case Studies:

At least 8 case studies should be presented on various topics covering the entire syllabus.

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PROGRAMME : B. Sc (Information Technology)		Semester – VI	
COURSE: DIGITAL SIGNALS AND SYSTEMS		COURSE CODE – USIT605	
Periods per week 1 Period is 50 minutes	Lecture	5	
	Practical	3	
		Hours	Marks
Evaluation System	Theory Examination	2	60
	Theory Internal	--	40
	Practical		50

Unit-I	<p>Classification of Signals & systems: Introduction, Continuous Time and discrete time signals, classification of signals, simple manipulations of discrete time signals, amplitude and phase spectra, classification of systems, analog to digital conversion of signals</p> <p>Fourier Analysis of Periodic and Aperiodic Continuous Time Signals & Systems: Introduction, trigonometric Fourier series, Complex or exponential form of Fourier series, Parsevals identity for Fourier series, Power spectrum of a periodic function. Fourier transform and its properties, Fourier transforms of some important signals, Fourier transforms of power and energy signals</p>	10 Lectures
Unit-II	<p>Applications of Laplace Transform to System Analysis Introduction, definition, region of convergence (ROC) LT of some important functions, Initial and final value theorems, convolution integral, Table of Laplace transforms, partial fraction expansions, network transfer function. S-plane Poles and zeros. LT of periodic functions. Application of LT in analysing networks.</p>	10 Lectures
Unit-III	<p>Z Transform: Introduction, definition of z-transform, properties of z-transform, evaluation of inverse z-transform.</p>	10 Lectures
Unit-IV	<p>Linear Time Invariant Systems: Introduction, properties of DSP system, Discrete convolution, solution of linear constant coefficient difference equation. Frequency domain representation of discrete time signals and systems. Difference equation and its relationship with system function, impulse response and frequency response</p>	10 Lectures
Unit-V	<p>Discrete and Fast Fourier Transforms: Introduction, discrete Fourier series, Discrete time Fourier transform (DTFT), Fast Fourier transform (FFT), Computing an inverse DFT by doing direct DFT, Composite radix FFT, Fast (Sectioned) convolution, Correlation.</p>	10 Lectures
Unit-VI	<p>Finite Impulse Response (FIR) Filters Introduction, magnitude response and phase response of digital filters, frequency response of linear phase FIR filters, Design techniques of FIR filters, design of optimal linear phase FIR filters.</p> <p>Infinite Impulse Response (IIR) Filters: Introduction, IIR filter design by approximation of derivatives, IIR filter design by impulse invariant method, IIR filter design by the bilinear transformation, Butterworth filters, Chebyshev filters, Elliptic filters, frequency transformation.</p>	10 Lectures

Books:

B1: Digital Signal Processing by S. Salivahanan, C. Gnanapriya Second Edition, TataMcGrawHill
(Unit I: Chapter 1,2, Unit II: Chapter 3, Unit III: Chapter 4, Unit IV: Chapter 5, Unit V: Chapter 6, Unit VI: Chapter 7, 8)

References:

Digital Signal Processing by Sanjit K. Mitra, Third Edition, Tata McGrawHill
Signals and Systems by Alan V. Oppenheim and Alan S. Willsky with S. Hamid Nawab, Second Edition, PHI (EEE)
Signals and Systems by A. Anand Kumar, EEE, PHI.

Course Code : **USIT6P5**

Practicals:

1. Write a Scilab program to study and implement Discrete Time Signals and systems.
 - a. Unit Step Sequence
 - b. Unit Ramp Sequence
 - c. Exponential Sequence
 - d. Exponential Increasing Sequence
 - e. Exponential Decreasing Sequence
 - f. Even Signals
 - g. Odd Signals
2. Write a Scilab program to implement Z-Transforms.
 - a. Z-transform of Finite duration signals
 - b. Time shifting property of Z transform
3. Write a Scilab program to demonstrate convolution property.
4. Write a Scilab program to demonstrate correlation property.
5. Write a Scilab program to implement Frequency Response of First order Difference Equation.
6. Write Scilab program to
 - a. Determine N-Point DFT.
 - b. Find DFT and IDFT of the given sequence.
7. Write a Scilab program to implement circular convolution using DFT
8. Write Scilab program to perform linear filtering (linear convolution using DFT).
9. Write Scilab program to implement/Design of FIR Filter using Frequency Sampling Technique.
10. Write Scilab program to implement low pass, high pass and band pass filters.

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PROGRAMME : B. Sc (Information Technology)		Semester – VI	
COURSE: GEOGRAPHIC INFORMATION SYSTEMS		COURSE CODE – USIT606	
Periods per week 1 Period is 50 minutes	Lecture	5	
	Practical	3	
		Hours	Marks
Evaluation System	Theory Examination	2	60
	Theory Internal	--	40
	Practical		50

Unit-I	Spatial Data Concepts: Introduction to GIS, Geographically referenced data, Geographic, projected and planer coordinate system, Map projections, Plane coordinate systems, Vector data model, Raster data model	10 Lectures
Unit-II	Data Input and Geometric transformation: Existing GIS data, Metadata, Conversion of existing data, Creating new data, Geometric transformation, RMS error and its interpretation, Resampling of pixel values.	10 Lectures
Unit-III	Attribute data input and data display : Attribute data in GIS, Relational model, Data entry, Manipulation of fields and attribute data, cartographic symbolization, types of maps, typography, map design, map production	10 Lectures
Unit-IV	Data exploration: Exploration, attribute data query, spatial data query, raster data query, geographic visualization	10 Lectures
Unit-V	Vector data analysis: Introduction, buffering, map overlay, Distance measurement and map manipulation. Raster data analysis: Data analysis environment, local operations, neighbourhood operations, zonal operation, Distance measurement operations.	10 Lectures
Unit-VI	Spatial Interpolation: Ehermens, Global methods, Local methods, Kriging, Comparisons of different methods	10 Lectures

Books:

B1: Introduction to Geographic Information Systems by Kang-tsung Chang, 5th Edition, Tata McGrawHill.

(Unit I: Chapter 1,2,3,4, Unit II: Chapter 5,6, Unit III: Chapter 4, Unit IV: Chapter 5, Unit V: Chapter 6, Unit VI: Chapter 7, 8)

References:

Concepts and Techniques in Geographic Information Systems by Chor Pang Lo and Albert K. W. Yeung
<http://www.ncgia.ucsb.edu/giscc/>

Course Code : USIT6P6

Practicals:

1. Implement data in import and generation coordinate system basics.
2. Generate data (points, line, polygons) and topology.
3. Geo-referencing and image registration
4. Implement 3D layers (DEM, Contours, TIN, 3D models)
5. Querying GIS data
6. Distance and decisions analysis (spatial, geo-statistics, network, hydrology, topology, 3D analysis, extract overlay)
7. 3D visualizations
8. Cartography

PROGRAMME : B. Sc (Information Technology)		Semester – VI	
COURSE: PROJECT REPORT		COURSE CODE – USIT607	
Periods per week 1 Period is 50 minutes	Lecture	5	
	Practical	3	
		Hours	Marks
Evaluation System	Project Report (External)	--	60
	Project Report (Internal)	--	40

PROGRAMME : B. Sc (Information Technology)		Semester – VI	
COURSE: PROJECT VIVA VOCE		COURSE CODE – USIT608	
Periods per week 1 Period is 50 minutes	Lecture	--	
	Practical	--	
		Hours	Marks
Evaluation System	Viva Voce (External)	--	60
	Viva Voce (Internal)	--	40

The project should be undertaken preferably individually or by the group of maximum 4 students who will jointly work and implement the project. The candidate/group will select a project with the approval of the Guide (staff member) and submit the name of the project with a synopsis of the proposed work of not more than 02 to 08 pages within one month of the starting of the semester. The candidate/ group is expected to complete detailed system design, analysis, data flow design, procurement of hardware and/or software, implementation of a few modules of the proposed work during the semester VI as a part of the term work submission in the form of a joint report.

Candidate/group will submit the completed project work to the department at the end of semester VI as mentioned below.

1. The workable project.
2. The project report in the bound journal complete in all respect with the following : -
 - a. Problem specifications.
 - b. System definition – requirement analysis.
 - c. System design – dataflow diagrams, database design
 - d. System implementation – algorithm, code documentation
 - e. Test results and test report.
 - f. In case of object oriented approach – appropriate process be followed.

The project report should contain a full and coherent account of your work. Although there will be an opportunity to present the work verbally, and demonstrate the software, the major part of the assessment will be based on the written material in the project report. One can expect help and feedback from the project guide, but ultimately it's the candidates own responsibility. The suggestive structure of a project report should be guided by your guide in selecting the most appropriate format for your project.

The oral examination will be conducted by an internal and external examiner as appointed by the University.