The students who have **pre-registered** for **Networking Course Project** are required to submit your project proposal. The titles proposed by the supervisors are listed below. Students can submit a proposal by choosing any of the titles listed or submit proposal for a topic on their own.

**Last Date of Proposal Submission → Wednesday, 26/11/2014**

The template of **Project Proposal** is also attached.

**LIST OF COURSE PROJECT TITLES**

1. **VoIP Design and Implementation using Real IP Phones (7950) and Gateway (2811 Router)**

   **Objectives:**
   - Plan and design VoIP in an Enterprise Network
   - Use a VoIP Enterprise Model in implementing voice network
   - Prototype and simulate the design using Packet Tracer (ver 6.1)
   - Implement segment of the Enterprise network to test VoIP operation using real devices
   - Configure DHCP for Call Manager Express
   - Configure a real IP Phone (7950)
   - Install and implement software phones using Cisco IP Communicator (CIPC)

   **Outcomes:**
   - Identify the requirements, both hardware and software, in VoIP implementation
   - Hands-on skills on IP Phone and soft-phones installation and configuration
   - DHCP functionality over Call Manager Express
   - Capability to test the network design in a simulated environment.

   **Tools:**
   - Packet tracer v6.1
   - CISCO IP Communicator Software installer
   - IP Phones (at least 2 7950 series)
   - Router 2800 Series (IOS image: enterprise)
   - Switch 2600 Series
   - Laptop or PCs (at least 2)
   - Cables
   -
2. **QoS: Basic Implementation and Analysis**

**Objectives:**

- Implement QoS in an Enterprise network
- Design a QoS Policy
- Identify the QoS Model to be used in implementing the policy
- Evaluate at least 4 QoS policies and its configurations
- Test the operation of QoS policy in a simulated environment using Packet tracer v6.1

**Outcomes:**

- Choose appropriate QoS Model framework
- Plan, design and Configure QoS policy
- Understand and comprehend different types of QoS policy
- Configure and implement QoS in a network using Packet Tracer

**Tools:**

- Packet Tracer 6.01
- Samples of QoS Solutions

3. **Routing & Switching / WAN Design**

**Objectives:**

- Network Topology (Physical & Logical).
- LAN/WAN Integration.
- Cabling Installation (CAT6, CAT5, CAT5E, Multimode and Single mode Fiber).
- Enable efficient routing.
- Internal/External Corporate Network Security, Firewall.
- Client Integration.
- Wireless Device Integration.

**Outcomes:**

- Understand & work with physical & logical topology.
- Understand & work with designing & configuration of Local Area Network / Wide Area Network.
- Understand & work with different switching & routing protocols.
- Students are able to configure & monitor Network security.
- Able to understand & work with wireless devices and protocols.

**Tools:**

- Packet Tracer

4. **Server Administration**

**Objectives:**

- Management and Maintenance of a Windows Server Environment
- Planning the Placement of Domain Controllers
- Designing and Deploying Active Directory and Security Services
- Deploying Network Services
- Management of Users, Groups, and Computers in a networked environment
- Implementation, Management, Planning, and Troubleshooting Group & User Policy
- Management of Disaster Recovery
- Management of different servers (DNS, DHCP & IIS)

Outcomes:

- Understand Client & Server Environment
- Understand & Configure Domain Controller
- Able to Deploying Network Services
- Able to manage Users & Groups in domain environment
- Able to manage Disaster & Recovery procedures
- Able to configure different servers

Tools:

- Three Computers OR Virtual Machine
- Windows 7 for Clients & Windows 2003 for Server

5. **Designing and implementing Active directory (AD):**

Objectives:

- Plan and design an Active Directory for an enterprise
- Tap the AD in a real network infrastructure
- Active directory business continuity

Outcomes:

- Identify the requirements, both hardware and software, in AD implementation
- IP planning
- Installing the administration tool
- Configure DNS suffix and NetBIOS
- Installing and configuring + specifying an IP address of the DNS
- Installing the active directory and checking the appropriation of installation
- User management
- Server management
- Trouble shooting AD

Tools:

- Server and Pcs
- Switch 2600 Series
- Cables

6. **Designing and implementing MS Exchange Server**

Objectives:

- Plan and design an Active Directory for an enterprise
- Tap the Exchange Server in a real network infrastructure
- Exchange Server business continuity
- Trouble shooting Exchange Server

**Outcomes:**

- Identify the requirements, both hardware and software, in Trouble shooting implementation
- IP planning

**Tools:**

- Server and Pcs
- Switch 2600 Series
- Cables

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### 7. Network Design for some organization (business/educational/office)

To design and configure a network for an organization using Enterprise network architecture. Organization can have multiple departments, where all users in the department receives appropriate IP address. Also vlans can be created for different departments. An organization has two or more remote offices and one main office. Any WAN technology can be used to connect remote offices with the main branch. Server farm can be maintained by configuring different servers like DHCP, email server, file server, web server etc. can be configured. Teleworkers module can also be implemented.

**Objectives:**

- Learn project management skills.
- Design a network for a real organization using enterprise network architecture model.
- Apply various networking technologies to design the network based on the requirement of the organization. (LAN/WAN)
- Basic Configuration of various types of servers.
- Configure Basic security features like port security, ACL etc...
- Simulate the designed network.

**Outcomes:**

- Able to design a network as per the requirement of real organization.
- Able to use various data gathering tools for collecting the information needed to design the network.
- Analyze the collected information properly so that the designed network will be able to meet the requirement of the organization.
- Able to select and implement appropriate networking technology based on the objectives.
- Able to configure & simulate various networking devices.

**Tools:**

- Packet Tracer 6.1
- Real devices like router, switches, PC’s and cables for demonstrating the designed
network using smaller topology.

8. **Performance Evaluation of routing protocols in wired network:**

There are various routing protocols in a wired network like RIP, EIGRP & OSPF etc. Every routing protocol has its own criteria of calculating the routes & forwarding the packets along that route. Therefore a comparative performance study can be done by considering some performance metrics like throughput, Packet Delivery Fraction, Packet Loss, Routing Overhead etc. For this Comparative study some network scenarios (from small to large networks) can be considered with different routing protocols & analysis can be done to observe which routing protocol performs better in terms of performance metrics under different networking conditions.

**Objectives:**

- Design & Configure a network.
- Thorough study of implementation of routing protocols like RIP, EIGRP & OSPF etc. on the designed network.
- Knowledge of performance metrics related to the network as described above.
- Analytical study of performance of various routing protocols under varying network conditions.

**Outcomes:**

- Enable students to select appropriate routing protocols depending upon network requirement.
- Measure the performance metrics for various routing protocols under varying network environments.
- Analyze the performance metrics to compare the performance of routing protocols.

**Tools:**

- Packet Tracer 6.1
- Basic Graph developing tools like MS-Excel, X-Graph etc.

9. **Comparative Study of Mobile Ad hoc Network (MANET) Routing Protocols:**

Routing in MANET is an important task due to highly dynamic environment. Several routing protocols exist for mobile ad hoc networks like DSDV, DSR, and AODV etc. Overview of these protocols can be given by presenting their characteristics, functionality, benefits and limitations and then makes their comparative analysis so to analyze their performance.

**Objectives:**

- Learn research based study involving mobile ad hoc networks.
- Study Routing protocols of mobile Ad hoc networks
- Understanding basic architecture of mobile node or mobile host in ad hoc networks.
- Analyze the requirement and limitations of MANETs
- Simulate the MANET using some networking simulator like ns-2.
- Performance comparison of ad hoc network routing protocols under different traffic models.
Outcomes:
- Learn new simulations software.
- Able to simulate mobile ad hoc network within the given network traffic models and scenarios.
- Able to understand the working of routing protocols of MANET.
- Perform result Analysis using some graphical tools or analytical tools.
- Able to derive the conclusion based on the result analysis.

Tools:
- NS-2.35
- MATLAB
- AWK SCRIPTS
- X-Graph.

10. Routing & Switching / WAN Design

Objectives:
- Creating Network Topology (Physical & Logical).
- Integrating LAN/WAN concepts.
- Efficient Switching & Routing
- Developing a secured network.
- Working with key WAN technology concepts

Outcomes:
- Ability to understand physical & logical topology.
- Ability to design & configure a LAN Network.
- Ability to configure & apply WAN technologies.
- Understand & work with different switching & routing techniques.
- Understanding security threats & implementing methods to avoid them.
- Configure, verify and troubleshoot different routing protocols.

Tools:
- Packet Tracer 6
- Real Devices

11. Server Administration

Objectives:
- Management and Maintenance of a different servers (DHCP, E-mail, Web)
- Implementation, Management, Planning, and Troubleshooting
- Disaster Recovery Measures

Outcomes:
- Understand Client & Server Environment
- Ability to configure different servers
- Ability to manage Disaster & Recovery
Tools:
- Packet Tracer 6
- Real Devices

12. Routing & Switching / WAN Design - Cisco Enterprise Architecture

The Cisco Enterprise Architecture consists of modules representing focused views that target each place in the network. Each module has a distinct network infrastructure with services and network applications that extend across the modules. Minimum 2 servers will be available in the data center out of which one must be a DHCP server.

Objectives:
- To configure & troubleshoot an Enterprise Campus Architecture
- To configure & troubleshoot an Enterprise Branch Architecture
- To configure & troubleshoot an Enterprise Data Center Architecture
- To configure & troubleshoot an Enterprise Teleworker Architecture
- To configure & troubleshoot an WAN Technology

Outcomes:
- Identify the requirements of the enterprise.
- Ability to configure & troubleshoot different modules of the enterprise.
- Understanding & implementation of servers

Tools:
- Packet Tracer

13. VOIP

Objectives:
- provide the functionality required to set up, manage, and tear down calls and connections;
- be scalable to support a very large number of registered endpoints (in the order of billions worldwide), and a very large number of simultaneous calls (in the order of millions worldwide);
- support network management features for policy control, accounting, billing, etc;
- provide a mechanism to communicate and set up the Quality of Service requested by the end points;
- be extensible to help with adding new features easily;
- support interoperability among different vendors’ implementations, among different versions of the signaling protocol, and with different signaling protocols.

Outcomes:
- Identify hardware and software requirements in VoIP implementation
- Project wide VoIP Calculations
- Traffic Analysis

Tools:
14. **QoS: Basic Implementation and Analysis**

**Objectives:**
- Implement QoS for an Organization
- Designing a QoS Policy
- Identify the QoS Model to be used in implementing the policy
- Evaluating QoS policies and its configurations
- Testing: QoS policy in a simulated environment using Packet tracer v6.1

**Outcomes:**
- Choose appropriate QoS Model framework
- Plan, design and Configure QoS policy
- Understanding of different types of QoS policy
- Configure and implement QoS in a network using Packet Tracer

**Tools:**
- Packet Tracer 6.01
- Samples of QoS Solutions

15. **WAN Design**

**Objectives:**
- Analytic Cost Modeling of various WAN technologies
- Design WAN topology
- Development of a planning program to evaluate the optimum cost for the network
- Analyzing program outputs to provide suggestions & solutions

**Outcomes:**
- Identifying hardware and software requirements
- Cost benefit Analysis for WAN models
- WAN planning software
- Capability to test the network design in a simulated environment

**Tools:**
- Packet Tracer v6.1

16. **Project Title: Network Traffic Analyzer**

**Objectives:**

The objectives of the project are
- Find computer that is generating most of the traffic.
- Identify the open ports/services provided by each computer.
- To monitor most frequently accessed external website?
- Identify the network protocols used.
- Generate a traffic matrix.
**Outcomes:**

At the end of the project, the students will be able to
- design and implement a network traffic analyzer application.
- monitor the network and periodically provide some statistics on the network traffic.

**Tools**

- ntop
- Ethereal
- nmap

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**17. Project Title: MPLS Layer 3 VPN**

**Objectives:**

The objectives of the project are
- Configure MPLS LDP in the Service Provider network.
- Configure VRF in the Provider Edge (PE) routers.
- Configure BGP VPNv4 peering between Routers.
- Configure Peering between PE routers to customer routers.

**Outcomes:**

At the end of the project, the students will be able to
- Design and implement a MPLS Layer 3 VPN.
- Understand MPLS network requirement from service provider and customer perspective
- How to share routes between different VRFs inside an MPLS network.

**Tools:**

- GNS3.

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**18. App development in Android.**

**Objectives:**

- The Student will learn the concept of Java for programming handheld devices. The student will appreciate the programming in IDE. The student will get knowledge of different aspects like Database connectivity etc.

**Outcomes:**

- The Students can able to learn how to work with the apps which he/she will be using commonly in the cell phone. It gives him/her the knowledge of Java programming language and how exactly the code will be developed in IDE before putting it in the cell phone.

**Tools:**

Objectives:
- The student will be aware of the secured mechanisms used to access the Home Security.
  The student can modify the existing one and introduce some algorithms where the efficiency can be increased.

Outcomes:
- It sends message to all members of house if illegal access to house is been made. It uses programming language like Objective C++ or Java to work on this application.

Tools:
- J2SE, Objective C++, Eclipse, Android tool kit.

20. Analysis on Credit Card Fraud Detection Methods

Objectives:
- The proposed system overcomes the above mentioned issue in an efficient way. Using genetic algorithm the fraud is detected and the false alert is minimized and it produces an optimized result. The fraud is detected based on the customers behavior. A new classification problem which has a variable misclassification cost is introduced.

Outcomes:
- The Traditional detection method mainly depends on database system and the education of customers, which usually are delayed, inaccurate and not in-time. After that methods based on discriminate analysis and regression analysis are widely used which can detect fraud by credit rate for cardholders and credit card transaction.

Tools:
- C# .Net or J2SE.

21. VLAN network design with restricted internet access

Objectives
- To design a network for a software development organization based on VLAN with Cisco routers and switches.

Outcomes
- Different VLANS for each department.
  All the departments on different IP networks.
- The trainee department without internet access browsing, and all other communication over the internet.
- The users in all the departments to have inter access communication with each other.
- Cisco based routers and switches are used.
  Client set up for TCP/IP adapter configurations.
22. **LAN Network design with redundancy**

**Objectives:**
- To set up a LAN network for an organization with redundancy.

**Outcomes:**
- LAN IP network with internet connection.
- Upgraded network with dual intermediate routers.
- Appropriate IP address and internet packet forwarding on the routers.
- High availability of access to the internet.

**Tools:**
- Cisco routers
- Cisco switches
- Internet router
- PC (As per requirement)
- Network cables
- Packet tracer (if above configurations are not available)
23. **LAN Design for an Organization**

**Objectives:**
- To design a LAN for an organization that has three floors with different departments inter-accessibility.

**Outcomes:**
- All five departments (HR, IT, Finance, Management, Trainee) to have inter-accessibility.
- Each department to have a separate VLAN.
- Different subnets for different VLANS.

**Tools:**
- Hardware – Cisco router (Capable of inter VLAN routing) and Switch which supports VLAN, PC’s (for demonstration)
- Software – Packet Tracer can be used if the above equipment is not available

24. **DMZ Network design with VLAN**

**Objectives:**
- To design a DMZ network for an organization using VLAN.

**Outcomes:**
- Organization with a web server which is publicly accessible over the internet.
- A DMZ setup with a Cisco IOS firewall router using VLAN’s on the interface
- VLANS to segregate between the web server and LAN network.

**Tools:**
- Cisco IOS firewall router
- Cisco switch
- Computers

25. **Data Network Traffic Analysis**

**Objectives:**
- Examine the types of data travelling on the network.
- Establish the importance of network traffic analysis.
- To examine the packets and define priority of the traffic over the network.
- Experience the use of different network traffic analysis tools.
- To establish a reason for a developing a new traffic management / analysis tool.

**Outcomes:**
- To be able to identify and differentiate between different network traffic types.
- To classify different tools for network traffic analysis based on their use.
- To be able to draw a comparison between different types of available off-the-shelf network traffic analyzers.
- To be able to suggest a new network analyzer, for the future development by delivering:
  - Recommendations about the features of a new network traffic analyzer shall be having.
  - Identifying the use of network traffic analyzer is different networked environments
  - Suggesting best practices for network analysis.

**Tools:**
- Different Network analyzer that could be downloaded from the web (Free Ware)
- A small network (10-15 PC’s) having internet connectivity and administrative privileges.

### 26. Wireless Network Planning and Design Challenges in Airports

**Objectives:**
- Providing a complete Wireless Network Design for an Airport.
- MAC Address filtering.
- Implementation of Wireless Distribution System.
- Allocation of channels and cell separation techniques.
- Classifying the traffic from different domains.
- Implementing Wireless IP Cameras for surveillance.

**Outcomes:**
- To understand the planning and design techniques in a wireless network.
- Shall be able to identify the correct IEEE-802.11x to be used in the Airport.
- Should be able to allow and deny certain users form accessing the network resources.
- Suggesting the design for surveillance control rooms using Wireless IP Cameras.
- Shall be able to provide a secured and separate WLAN for IP Cameras.

**Tools:**
- Access Points
- Wireless IP Cameras
- Network Simulation Applications such as “GNS 3 or Packet Tracer”
- Cell Size Planning Tools

### 27. Remote access VPN Network design behind NAT router Using Packet Tracer

**Project scope and description**
- In this project, a network has to be designed for remote access VPN. A windows XP VPN server is to be setup behind a Cisco NAT router.
- The NAT router has a public IP address received dynamically by the ISP, which is also required to be used by the LAN users for internet. The remote users should be able to connect to the public IP address of the router, and establish connectivity with the VPN server. After connection is established, the remote user should be able to access systems on the LAN. LAN and VPN network should be segregated using appropriate VLAN’s

**Tools:**
- Packet Tracer

### 28. Practical ad hoc network implementation Using NS-2

**Aim:**
- Create a functioning ad-hoc network using the equipment available in the labs

**Goal:**
- Is to examine performance characteristics when different IEEE 802.11 standards are used
**Environment:**
- specialized networking labs

**Test Method:**
- develop scenarios and actual network setups using the network equipment available to the students and measure performance

### 29. Network design proposal for airport Using Packet Tracer

**Project Description**
- The project is to design a proposal for setting up a network in an airport. The airport has three departments.
  1. Airport authority
  2. Flight service providers

- The airport authority maintains a server which handles the flight management controls. The flight service providers should have access only to the specific server in the airport authority network and not to any other systems. The guest users should have wireless access to a high speed internet connection, which should be shared among all the users in all the departments.
- The wireless access should be using a common password. The guest users should not have access to the other two departments. The users should obtain IP addresses automatically. The airport authority has 20 users, the flight service providers have 40 users and the maximum numbers of guests are estimated to be 100.
## 1. PROJECT PROPOSAL (TITLE PAGE)

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Comments (if any):

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### Approved By

Proposal Review Panel

1. __________________

2. __________________

Comments (if any):
2. PROJECT PROPOSAL (OUTLINE)

{Title of the Project}

1. Problem Definition
   {State the definition of the problem that your project will be solving}

2. Project Objectives
   {State the objectives of your project.}

3. Project Description

3.1 General Framework
   {Any graphical representation of the proposed system}
   AND
   {A clear and concise description of the Project}

3.2 Module Description
   {A brief description of the modules in your project E.g. Administrator Module, User Module, etc}

4. Project Requirements

4.1 Functional Requirements
   {Functional requirements capture and specify specific intended behaviour of the system being developed. It should contain descriptions about what the system should do.}

4.2 Hardware Requirements

4.3 Software Requirements
   {Indicate the software version number used. For e.g. Visual Studio 2012, WAMP Server 12.1}

5. Project Relevance
   {Specify the importance/value of your proposed project to an organization/society}

6. Organization Details {only if applicable}
   {If the proposed project is a real-time, specify the details of the organization for which the project is proposed}

7. References