Enterprise Networking Project

NovaShield Financial Services Ltd. is a US-owned banking and insurance company expanding into Africa, with its first branch in Nairobi, Kenya, operating from a three-story building, and has engaged final-year university students to design and implement its enterprise network based on the company's requirements below

First Floor			
No.	Departments	No. of PC	No. of Printers
1	Management	5	1
2	Research	5	1
3	Human resource	5	1

Second Floor			
No.	Departments	No. of PC	No. of Printers
1	Marketing	5	1
2	Logistics	5	1
3	Finance	5	1

Third Floor				
No.	Departments	No. of PC	No. of Printers	No of Servers
1	Administration	2	1	
2	ICT	2	1	
3	Server Room	2 Admin PCs		3 (DHCP, HTTP and Email)

Requirements:

1. Use a software modeling tool to visualize the network topology (consider requirement 3)
    - Software Modelling Tools: MS Visio, Visual Paradigm, or Draw.io for modeling network design.
2. Use any of the following network simulation software to implement the above topology:
    - Simulation software: Cisco Packet tracer or GNS3 for design and implementation.
    - There should be one router on each floor. The router should be connecting switches on that floor.
    - Use OSPF as the routing protocol to advertise routes.
    - Each department is required to have a wireless network for the users.
    - Host devices in the network are required to obtain IPv4 addresses automatically.
    - Devices in all the departments are required to communicate with each other.
    - All devices in the network are expected to obtain an IP address dynamically from the dedicated DHCP servers located at the server room.
    - Create HTTP, and E-mail servers

3. Use hierarchical network design with redundancy included:
4. Having core, distribution, and access layers.
5. Configure the basic configuration of the devices:
    - Hostnames
    - Line Console and VTY passwords
    - Banner messages
    - Disable domain IP lookup
6. Each department should be in a different VLAN
    - Create VLANs in every department
    - VLANs you will use in your case, including VLAN1 also e.g. 10, 20, 30… etc. Each VLAN should be a different subnetwork.
7. Planning of IP Addresses:
    - You have been given **192.168.10.0** as the base address for this network.
    - Do subnetting based on the number of hosts in every department as provided above.
    - **Identify subnet mask, useable IP address range, and broadcast address for each subnet.**
8. End Device Configurations:
    - Configure all the end devices in the network with the appropriate IP address based on the calculations above.
9. Configure port-security:
    - Use sticky command to obtain MAC Address.
    - Violation mode of the shutdown.
10. Test Communication:
    - Do devices in the same VLAN communicate?
    - Do the devices in different VLANs communicate?
11. Document the project design and implementation