

COMMON POOL OF GENERIC ELECTIVES (GE) COURSES OFFERED BY THE DEPARTMENT

GENERIC ELECTIVE : Standardization and Quality Control (INGE6A)

CREDIT DISTRIBUTION, ELIGIBILITY AND PRE-REQUISITES OF THE COURSE

Course title & Code	Credits	Credit distribution of the course			Eligibility criteria	Pre-requisite of the course (if any)
		Lecture	Tutorial	Practical/ Practice		
Standardization and Quality Control (INGE6A)	4	3	-	1	Class XII passed with Mathematics/ Applied Mathematics + Biology/ Computer Science/ Informatics Practices	Probability and Statistics

Learning Objectives

The Learning Objectives of this course are as follows:

- To introduce the basic concepts of Total Quality Management.
- To enable the student on how to apply various Statistical Process Control (SPC) techniques to ensure the quality level of products.
- To understand the significance of Control Charts and Acceptance sampling in modern quality control systems.
- To make students learn the national and international quality assurance standards.

Course Learning Outcome

The Learning Outcomes of this course are as follows:

- Apply the principles and techniques of Total Quality Management in improving quality practices within an industrial or service organization

- Use statistical process control (SPC) techniques such as pareto charts, control charts and cause-effect diagrams recognized throughout industries to ensure the quality level of products
- Understand the role of Acceptance Sampling (AS) in modern quality control systems
- Develop an understanding of national and international quality assurance standards such as ISO 9000 and 14001

SYLLABUS OF GE

Unit-1 (11 hours)

Quality Concepts: Meaning of Quality, Dimensions of Quality, Quality Approaches- Deming's Approach, Juran's Approach, Difference between Inspection, Quality Control and Quality Assurance, Evaluation of Quality control, Quality Improvement Techniques-Quality Circles, Kaizen, Six Sigma.

Unit-2 (12 hours)

Quality Control: Graphical and Tabular representation of data, Measures of Central Tendency, Measures of Dispersion, Random Variables, Chance and assignable causes of variation, Quality Control Tools-Histogram, Pareto Chart, Cause-Effect Diagram, Control Charts. Control Chart for variables (X-bar & R), Control limits, Warning Limits, Process Capability, Sample Size and Sampling Frequency, Sensitizing rules for Control Charts, Control Chart for Attributes (p, np, c).

Unit-3 (11 hours)

Acceptance Sampling: Advantages and Disadvantages of Sampling, Types of Sampling, Lot formation, Principle of acceptance sampling, OC curve, Producer's and consumer's risk, Acceptable Quality Level, Lot Tolerance Percentage Defective, Sampling plans: single, double, Average outgoing Quality, AOQL.

Unit-4 (11 hours)

ISO 9001-2000 & 14000 Series of Standards: History and Evolution of ISO 9000 Series, Importance and overview of ISO 9000- 1998 Series standards, structure of ISO 9000-2000 Series standards, clauses of ISO 9000 series standards and their interpretation and implementation, quality system documentation and audit. Environmental management concepts, and requirement of ISO 14001, benefits of environmental management Systems.

Practical component: (30 hours)

Use latest statistical software package like SPSS to conduct experiments based on:

1. Descriptive statistics
2. Histogram
3. Pareto Chart
4. Control charts for variables
5. Control charts for attributes
5. OC curve
6. AOQ curve

Essential/recommended readings

1. D. C. Montgomery, Introduction to Statistical Quality Control, John Wiley and sons, 6th edition, 2008.
2. Subburaj Ramasamy, Total Quality management, Tata McGraw Hill, 2 nd Edition, 2012
3. E. L. Grant & R.S. Leavenworth-Statistical Quality Control, 7th Edition, 2000.
4. Kaoru Ishikawa-Guide to Quality Control, Asian Productivity Organization, Series, 1986

Suggestive readings

1. M. S. Mahajan, Statistical Quality Control, 1st Edition, Dhanpat Rai Publishing Co Pvt Ltd (2016).
2. Ranjit Kumar, Research Methodology, A step by step guide for beginners, SAGE Publications (2015)
3. Prabhat Pandey, Meenu Mishra Pandey, Research Methodology: Tools and Techniques, Bridge Center (2015)
4. S.P Gupta, Statistical Methods, 46th edition, Sultan Chand & Sons (2021)

Note: Examination scheme and mode shall be as prescribed by the Examination Branch, University of Delhi, from time to time.

GENERAL ELECTIVE COURSE : Wireless Networks (INGE6B)

CREDIT DISTRIBUTION, ELIGIBILITY AND PRE-REQUISITES OF THE COURSE

Course title & Code	Credits	Credit distribution of the course			Eligibility criteria	Pre-requisite of the course (if any)
		Lecture	Tutorial	Practical/ Practice		
Wireless Networks (INGE6B)	04	03	-	01	Class XII passed with Mathematics/Applied Mathematics/ + Computer Science/Informatics	Mathematics in class XII and digital communication

Learning Objectives

The Learning Objectives of this course are as follows:

- To understand the concept about Wireless networks, protocol stack and standards
- To understand and analyze the network layer solutions for Wireless networks
- To study about fundamentals of 3G Services, its protocols and applications
- To have in depth knowledge on internetworking of WLAN
- To learn about evolution of 4G and 5G Networks, its architecture and applications

Learning outcomes

The Learning Outcomes of this course are as follows:

- Conversant with the latest 3G/4G networks and its architecture
- Design and implement wireless network environment for any application using latest wireless protocols and standards
- Ability to select the suitable network depending on the availability and requirement
- Implement different type of applications for smartphones and mobile devices with latest network strategies

SYLLABUS OF GE

UNIT – 1

(12 hours)

WIRELESS LAN

Introduction-WLAN technologies: Infrared, UHF narrowband, spread spectrum -IEEE 802.11: System architecture, protocol architecture, physical layer, MAC layer, 802.11b, 802.11a – Hiper LAN, BRAN (Broadband Radio Access Networks), HiperLAN2 Bluetooth: Architecture, Radio Layer, Baseband layer, Link manager Protocol, security IEEE 802.16-WIMAX: Physical layer, MAC, Spectrum allocation for WIMAX.

UNIT – 2

(11 hours)

MOBILE NETWORK LAYER

Introduction - Mobile IP: IP packet delivery, Agent discovery, tunneling and encapsulation, IPV6- Network layer in the internet- Mobile IP session initiation protocol - mobile ad-hoc network: Routing, Destination Sequenced distance vector, Dynamic source routing

UNIT – 3

(11 hours)

MOBILE TRANSPORT LAYER

TCP enhancements for wireless protocols - Traditional TCP: Congestion control, fast retransmit/fast recovery, Implications of mobility - Classical TCP improvements: Indirect TCP, Snooping TCP, Mobile TCP, Time out freezing, Selective retransmission, Transaction oriented TCP - TCP over 3G wireless networks.

UNIT – 4

(11 hours)

4G NETWORKS

Introduction – 4G vision – 4G features and challenges - Applications of 4G – 4G Technologies: Multicarrier Modulation, Smart antenna techniques, OFDM-MIMO systems, Adaptive Modulation and coding with time slot scheduler, Cognitive Radio.

5G NETWORKS

Introduction – 5G vision – 5G features and challenges - Applications of 5G – 5G Technologies

Practical component:

(30 hours)

1. Program in NS 3 to connect WIFI TO BUS(CSMA)
2. Program in NS 3 to create WIFI SIMPLE INFRASTRUCTURE MODE
3. Program in NS 3 to create WIFI SIMPLE ADHOC MODE
4. Program in NS 3 to connect WIFI TO WIRED BRIDGING
5. Program in NS 3 to create WIFI TO LTE(4G) CONNECTION
6. Program in NS3 for CREATING A SIMPLE WIFI ADHOC GRID
7. Introduction to GSM Architecture

Essential/recommended readings

1. Wireless Communication and Networks, Second Edition, Williant Stallings.

2. Erik Dahlman, Stefan Parkvall, Johan Skold and Per Beming, "3G Evolution HSPA and LTE for Mobile Broadband", Second Edition, Academic Press, 2008.
3. Anurag Kumar, D.Manjunath, Joy kuri, "Wireless Networking", First Edition, Elsevier 2011.
4. Simon Haykin, Michael Moher, David Koilpillai, "Modern Wireless Communications", First Edition, Pearson Education 2013

Suggestive readings

1. Jochen Schiller, "Mobile Communications", Second Edition, Pearson Education 2012.
2. Vijay Garg, "Wireless Communications and networking", First Edition, Elsevier 2007.

Note: Examination scheme and mode shall be as prescribed by the Examination Branch, University of Delhi, from time to time.



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