R. V. CENTRE FOR COGNITIVE TECHNOLOGIES

DETAILED SCHEDULE, LESSON PLAN & ASSIGNMENT QUESTIONS

2nd YEAR 1st CONTACT PROGRAMME - BATCH -2

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COURSES

(Click on the Course Name)

MASTER SCHEDULE FOR SECOND YEAR MS- FIRST CONTACT PROGRAM						
Date/Time		**09:00 - 11:00**	**11:00-11:30**	**11:30-01:30**	**01:30-02:00**	**02:00-04:00**
21-06-2010	**Mon**	*Paper - 6*	**Tea Break**	*Paper - 7*	**Lunch Break**	*Discussion*
22-06-2010	**Tue**	*Paper - 6*		*Paper - 7*		*Discussion*
23-06-2010	**Wed**	*Paper - 6*		*Paper - 7*		*Discussion*
24-06-2010	**Thu**	*Paper - 6*		*Paper - 7*		*LAB*
25-06-2010	**Fri**	*Paper - 6*		*Paper - 7*		*LAB*
26-06-2010	**Sat**	*Discussion*		*Discussion*		
27-06-2010	**Sun**	**Holiday**				

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ASIC DESIGN

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PAPER-6
Subject: VLSI TECHNOLOGY & SYSTEM ON CHIP (ADEC21)

Texts books(TB):

1. C.Y.Chang & S M SZE(Ed), ULSi Technology, MC Graw HillInc,1996
2. S K Gandhi, VLSI Fabrication Principles, John Wiley Inc., New York 1983
3. Design: System-on-Chip Design (3rd Edition) by Wayne Wolf From ASICs to SOCs: A Practical Approach by Farzad Nekoogar ,Faranak Nekoogar
4. Bhasker, J., Verilog HDL Synthesis – A Practical Primer, Star Galaxy Publishing, Allentown PA, 1998

Hour	Date	Time	Chapter	Main Topics As per syllabus	Contents
1	21-06-2010	11:30-01:30	1	Environment for VLSI technology	Clean room and safety requirements wafer cleaning processes and wet chemical etching techniques.
2	22-06-2010	11:30-01:30	2	Impurity incorporation	Solid state diffusion modeling and technology; ion implantation modeling, Technology and damage annealing, characterization of impurity profiles.
3	23-06-2010	11:30-01:30	3	Oxidization	Kinetics of sio2 growth both for thick, thin and ultra thin films, oxidization technologies in VLSI.
4	24-06-2010	11:30-01:30	6	Soc design introduction	Methodologies and design flows for front-end and back-end designs
5	25-06-2010	11:30-01:30	7	Guidelines for Design	Tips and guidelines for front-end and back-end designs, Modern physical design techniques.

Faculty In charge: **Prof. Poornima. M.** **Prof. Namita Palecha**
E-Mail : poorni_m@rediffmail.com namita_bapna@yahoo.co.in

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PAPER 7 (ELECTIVE- III)
Subject : NANOELECTRONICS (ADEC232)

Texts books(TB):

1. *V. Mitin, V. Kochelap, M. Stroscio, "Quantum Heterostructures. Microelectronics and Optoelectronics", Cambridge University Press, 1999. ISBN 0-521-63635-3*
2. *Weisbuch, B. Vinter, "Quantum Semiconductor Structures", Academic Press, 1991.*
3. *S.M. Sze, "High-Speed Semiconductor Devices", Wiley, 1990.*
4. *Gerald, Bastard, "Wave Mechanics Applied to Semiconductor Heterostructures", Halsted Press, 1988.*
5. *Ia Ipatova and V. Mitin, "Introduction to Solid State Electronics". Addison-Wesley, 1996. ISBN 0-201-47962-1*

Hour	Date	Time	Chapter	Main Topics As per syllabus	Contents
1	21-06-2010	09:00-11:00	1	Introduction:	Trends in microelectronics and nanoelectronics.
2	22-06-2010	09:00-11:00	2	Theoretical Basis of Nanoelectronics:	Problem formulation and theoretical approach, Basic concepts of quantum physics. Waves and particles, Time and length scales. Quantum and classical regimes of transport, Schrödinger equation. Normalization, averages. Separation of variables. Variational method. Perturbation theory, Spin and statistics, Quantum transport. Landauer formula, Boltzmann equation; Self-consistent approach to kinetics. Drift-diffusion, hydrodynamics.
3	23-06-2010	09:00-11:00	3	Electrons in Quantum Structures:	Energy spectra of some semiconductor materials; mismatch. (Matched and mismatched structures, strained and (pseudomorphic structures); Single-heterojunction devices. Selective doping. (MOS structures, single heterostructures); Basic equations and quantitative results for a single heterostructure (simple analytical estimates, numerical analysis of selectively-doped single heterostructure, control of charge transfer); Modulation-doped quantum structures (quantum wells, n-i-p structures, delta doping).
4	24-06-2010	09:00-11:00	4	Abbreviated Discussion of Lattice Vibrations in Quantum Structures:	Vibrations of atomic linear chains. (Monoatomic and diatomic chains, acoustic and optical modes, density of vibrational modes); Normal coordinates. Three dimensional case. (DOS); Phonons; Lattice vibrations in quantum structures. (Acoustic and optical modes, importance of phonons in quantum structures).
5	25-06-2010	09:00-11:00	5	Abbreviated Discussion of Electron Scattering in Quantum Structures:	Elastic scattering in two-dimensional electron systems; Screening of a two-dimensional electron gas; Scattering by interface roughnesses, defects and impurities; Scattering of electrons by acoustic phonons in quantum wells and wires; Scattering of electrons by optical phonons in quantum wells and wires.

Faculty In charge: **Prof. Ramvankatesh**
E-Mail : ramavenkates@gmail.com

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PAPER-7 (ELECTIVE-III)
Subject: VLSI AND DSP – DRIVEN COMPUTER SYSTEM

Texts books(TB):

1. *MANAGING POWER ELECTRONICS:VLSl and DSP-Driven Computer System, Dr. Nazzareno Rossetti*

Hour	Date	Time	Chapter	Main Topics As per syllabus	Contents
1	21-06-2010	09:00-11:00	1	Power Management Technologies	Integrated Circuits Power Technology: Processing and Packaging, Diodes and Bipolar Transistors, Metal - Oxide-Semiconductor (MOS) Transistors, DMOS transistor, CMOS Transistors, Passive Components, A Monolithic Process Example, Packaging
2	22-06-2010	09:00-11:00	2	Discrete Power Technology	Discrete Power Technology: Processing and Packaging, From Wall to Board, Power MOSFET Technology Basics, Package Technologies, Ongoing Trends
3	23-06-2010	09:00-11:00	3	Circuits (Part I Analog Circuits)	Transistors: NPN, PNP, Trans-conductance, Transistor as Transfer- Resistor, Transistor Equations, MOS versus Bipolar Transistors, Elementary Circuits: Current Mirror, Current Sources, Differential Input Stage, Differential to Single Input Stage, Buffer
4	24-06-2010	09:00-11:00	4	Circuits (Part II Analog Circuits)	Operational Amplifier (Opamp): Inverting and Non-Inverting Inputs, Rail to Rail Output Operation, CMOS Opamp, Opamp Symbol and Configurations, DC Open Loop Gain, AC Open Loop Gain
5	25-06-2010	09:00-11:00	4	Circuits (Part II Analog Circuits)	Voltage Reference: Positive TC of ΔVBE, Negative TC of ΔVBE, Build a ΔVBE, Building a Voltage Reference, Fractional Band-Gap Voltage Reference. Voltage Regulator, Linear versus Switching, Switching Regulators, Buck Converters, Switching Regulator Power Train

Faculty In charge: **Prof. Hariprasad.**
E-Mail : **harivat2002@yahoo.co.in**

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SECOND YEAR FIRST ASSIGNMENT QUESTIONS

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PAPER-6
VLSI TECHNOLOGY & SYSTEM ON CHIP
ASSIGNMENT QUESTIONS-I

1. With the help of a flow diagram explain the basics of the wafer processing in a micro fabrication unit.
2. Give a detail explanation of the Czochralski method of crystal growth.
3. List out and explain different cleanroom practices.
4. With neat block diagrams, explain the working of ion implantation system.
5. List out and explain the difference between diffusion and ion implantation.
6. What are the different stopping methods in ion implantation?
7. Give a note on the oxide thickness. If silicon oxide layer of thickness x is grown by thermal oxidation, what is the thickness of silicon being consumed? Molecular weight of silicon is 28.9 g/mol, density of silicon is 2.88 g/cm^3, corresponding values of sio_2 are 60.08 g/mol, and 2.21 g/cm^3.
8. Why boundary scan are done at RTL level.
9. Explain the importance of clock distribution in SOC design.
10. Write down guidelines for memory design?
11. Discuss the various safety requirements in a cleanroom
12. What is etching? Give and explain its advantages.
13. What are the different mechanisms of movement in diffusion? Explain with neat diagrams.
14. Give the brief characterization of impurity profiles.
15. Explain about the damages caused due to ion implantation.
16. Explain the concept of wet and dry oxide growth on silicon.
17. Explain the kinetics of SiO_2 oxidation process.
18. Give a model for thermal oxidation of silicon indicating the concentration of species and explain.
19. Discuss three types of routing in SOC design.
20. Write a short on physical design for larger than two million gates.

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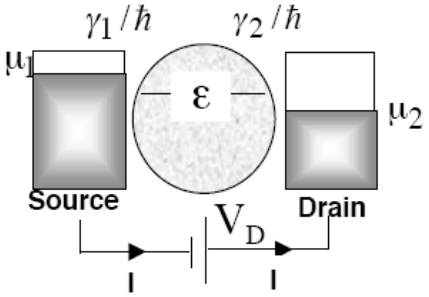
PAPER-7(ELECTIVE III)
NANOELECTRONICS
ASSIGNMENT QUESTIONS-1

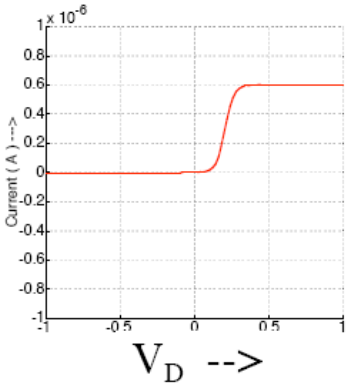
Problem 1: We have seen in class that the current-voltage (I-V) characteristics of nanoscale device can be calculated from

$$I = \frac{2q}{\hbar}\int dE\, D(E-U)\frac{\gamma_1\gamma_2}{\gamma_1+\gamma_2}[f_1(E)-f_2(E)]$$

Where $U = U_L + U_0(N-N_0)$, where the Laplace potential is given by a fraction α of the drain potential (there is no gate in this structure):

$U_L = -q\,\alpha V_D$, α being a constant between 0 and 1. For a device having one energy level ε located above the equilibrium electrochemical potential μ isomeone has calculated the current versus voltage shown below:





Assume negligible charging energy: $U0 = 0$

and equal escape rates: $\gamma_1/\hbar = \gamma_2/\hbar$.

(1) Estimate $\gamma_1/\hbar$ (same as $\gamma_2/\hbar$). Please be sure to mention units.
(2) What did the person doing the calculation assume for the constant ε ?

Problem 2: We have seen in class that free electrons in the absence of any external potential are described by (in one dimension)

$$i\hbar\frac{\partial\psi}{\partial t} = -\frac{\hbar^2}{2m}\frac{\partial^2\psi}{\partial x^2} \qquad (1)$$

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whose solutions can be written in the form

$$\psi(x,t) = \underbrace{A}_{constant}\; e^{+i\,kx}\; e^{-i\,Et/\hbar} \qquad (2)$$

with E and k related by the dispersion relation:

$$E = \hbar^2 k^2 / 2m \qquad (3)$$

We have also seen that if the electrons are confined in a box of length L, the energy levels become discrete with the lowest energy given by

$$E_1 = \hbar^2 \pi^2 / 2mL^2 \qquad (4)$$

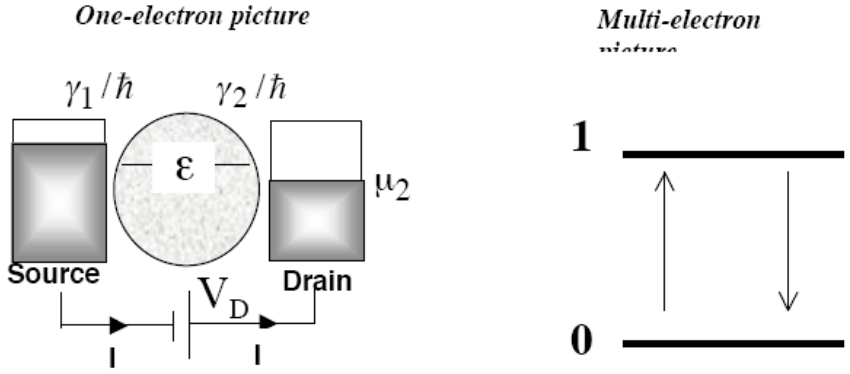
(3) Can you suggest a suitable differential equation to replace (1) if you wanted the dispersion relation to look like

$$E = (\hbar^2 k^2 / 2m) + \alpha k^4 \qquad (3')$$

(α being a constant) instead of (3) ?

(4) If a system of electrons with a dispersion relation given by (3') were confined in a box of length L, how would the expression for the lowest energy given in be modified?

Problem 3: We wish to calculate the current, I through a single discrete energy level ε and the average number of electrons, N using the ***multielectron*** picture where we have two levels '0' and '1' corresponding to the one-electron level being empty or full respectively.



Your answers to all questions below should be in terms of the Fermi functions in the two contacts and the couplings γ_1 and γ_2 for the two contacts.
(5) Equate the rate of transition from '0' to '1'and that from '1' to '0' to obtain an expression relating the probabilities P0 and P1.
(6) From your result in (a), find an expression for the average number of electrons, N
(7) Obtain an expression for the current I from the rates of transition from '1' to '0' and from '0' to '1'.

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Problem 4: Electrons in a semiconductor obey a modified Schrodinger equation which in one dimension has the form

$$i\hbar\frac{\partial\psi}{\partial t} = -\frac{\hbar^2}{2m}\frac{\partial^2\psi}{\partial x^2} + \alpha\frac{\partial^4\psi}{\partial x^4}$$

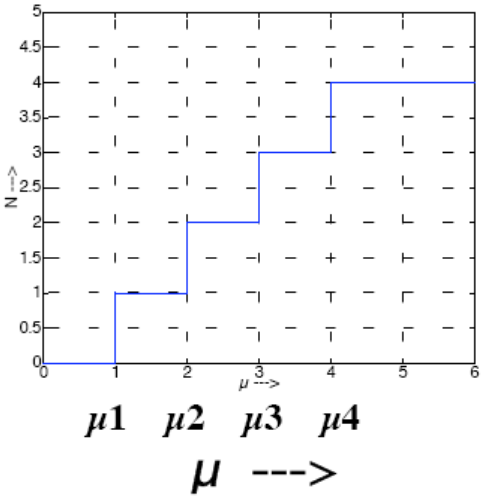
(8) where α and m are constants. Assume a solution of the form (ψ0 being a constant)

$$\psi(x,t) = \psi_0\, e^{ikx}\, e^{-iEt/\hbar}$$

to find the dispersion relation E (k).

Problem 3: A channel has four degenerate energy levels all having the same energy ε = 0 eV with an interaction energy that can be written as Uee =U_0N(N -1) /2, where U_0 = 0.1 eV. The figure below shows the change in the equilibrium number of electrons, N inside the channel as the electrochemical potential μ is changed.

(9) What are the values of μ at which the transitions in N take place (labeled μ1, μ2, μ3 and μ4 in the figure) ?



Problem 5 : Consider a (2x2) matrix of the form A =

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$$A = \begin{bmatrix} \cos\theta & \sin\theta\, e^{-i\varphi} \\ \sin\theta\, e^{+i\varphi} & -\cos\theta \end{bmatrix}$$

(10) What are its eigenvalues? What are the corresponding eigenvectors ?

Problem 6 : Consider an infinitely long linear 1-D lattice (lattice constant: a) with one sorbital per atom (assumed orthogonal) and having a site energy of E0, so that the Hamiltonian looks like

$$H = \begin{bmatrix} \varepsilon & te^{i\varphi} & 0 & 0 & \cdots \\ te^{-i\varphi} & \varepsilon & te^{i\varphi} & 0 & \cdots \\ 0 & te^{-i\varphi} & \varepsilon & te^{i\varphi} & \cdots \\ \cdots & \cdots & \cdots & & \end{bmatrix}$$

(11) Impose periodic boundary conditions and assume a solution of the form $f_n = f_0\, e^{ik\,na}$ to find the dispersion relation E(k).

Problem 7: The E(kx,ky) relation for a two-dimensional solid is written in the form E = E0 - 2V (cos kxa + cosk ya + 2a cosk xa cos kya)

(12) where a is a dimensionless number. How would you choose the nearest neighbor and next nearest neighbor overlap matrix elements in a square lattice of side 'a' so as to correspond to this dispersion relation ?
(13) Explain briefly about linear electron transport with boltzmann equation and diffusion
(14) Explain about High field transfer in quantum structure using neat diagram
(15) Write short notes on properties of quantum structure selective and modulation level doping system
(16) Write short notes Quantum Wires and quantum dotes
(17) Write short notes on super lattice structure with neat block diagram.
(18) What is perturbation theory and spin statics in Quantum theory Explain Briefly.
(19) Briefly Waves and Particle in Quantum Structure
(20) Derive Landauer formula and boltzmann equation.

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PAPER-7 (ELECTIVE-III)
VLSI AND DSP – DRIVEN COMPUTER SYSTEM
ASSIGNMENT QUESTIONS-1

1. Discuss about the construction details used in a modern Bipolar-CMOS-DMOS(BCD) integrated circuit process for NPN and PNP transistors with a neat sketch.
2. Explain how amplification is done in a 3-terminal device with a neat sketch.
3. Write the difference between MOS and DMOS transistors.
4. Discuss briefly about discrete power technology.
5. What are the types of Power MOSFET Technology? Explain them briefly.
6. Explain Planar Power MOSFET Technology with a neat sketch.
7. Explain Power Trench MOSFET Technology with a neat sketch.
8. List the characteristics between MOS transistors and Bi-polar Transistors.
9. Discuss about the PNP and NPN Transistors with reference to their DC models.
10. Drive the trans-conductance and transistor equations.
11. List the different elementary circuits built using transistors.
12. Built current source circuits using PNP and NPN transistors. Explain its working.
13. With a neat diagram, explain the working of differential input stage.
14. When do buffer circuits are needed?
15. What are the basic blocks used in designing an op-amp? Explain them with a neat diagram(using BJTs).
16. Draw the CMOS op-amp schematic and built inverting, non-inverting and buffer circuits using op-amp symbol.
17. Drive the expression for DC and AC open loop gains
18. Built a voltage reference circuit and discuss its operation along with the supporting diagrams built in it.
19. Why do need a voltage regulator circuit? Explain the various types in brief.
20. Discuss about the Linear regulator circuit along with the supporting circuit diagrams.
21. Discuss about the Switched mode voltage along with the supporting circuit diagrams.

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MOBILE COMMUNICATION & INTERNET TECHNOLOGIES

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PAPER-6 [MCEC 21]
Subject: COMMUNICATION PROTOCOLS OVER WIRELESS NETWORKS

Texts books(TB):

2. *James F. Kurose and Keith W Ross: Computer Networking A top down approach: Pearson Education.*
3. *Andrew .S Teneaunbaum: Computer Networks: Pearson Education*
4. *Dimitri bertsekas and Robert Gallager: Data Networks : Pearson Education International Edition*

Hours	Date	Time	Chapter	Main Topics As per syllabus	Contents
1	21-06-2010	09:00 - 11:00	1	Introduction to Internet	Internet in Education, Next generation internet
2	22-06-2010	09:00 - 11:00	2	Computer Networks	Circuits, Multiplexing, General network Topologies, OSI Model.
3	23-06-2010	09:00 - 11:00	3	TDM and Narrowband ISDN	Circuit Switching,Private line network,TDM,N-ISDN
4	24-06-2010	09:00 - 11:00	4	Connection Oriented Protocols	X.25 and frame relay- Packet Switching, Frame relay , User plane , Control Plane.
5	25-06-2010	09:00 - 11:00	5	Connectionless Protocols	IP and SMDS, TCP IP ,LANs , Bridging and routing, Routing concepts and protocols
6	26-06-2010	09:00 - 11:00	6	Discussion	

Faculty In charge: Prof. A.S. Pradeep
E-Mail : pradeepas17@gmail.com

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PAPER-7 (ELECTIVE-III)
Subject: CRYPTOGRAPHY AND NETWORK SECURITY

Texts books(TB):

1. *Cryptography and Network Security (Third Edition) by William Stallings*
2. *Network Security: Private Communication in a Public World (Second Edition) by Charlie Kaufman, Radia Perlman, Mike Speciner*
3. *Cryptography and Network Security, by Atul Kahate*
4. *Fundamentals of Network Security, by Eric Maiwald*
5. *Cryptography Demystified by John Hershey*

Hour	Date	Time	Chapter	1.Main Topics As per syllabus	Contents
1	21-06-2010	09:00 - 11:00	1	Symmetric Ciphers	Overview: Services, Mechanisms and Attacks, The OSI Security Architecture, A Model of Network Security, Classical Encryption Techniques.
2	22-06-2010	09:00 - 11:00	2	Block Cipher and the Data Encryption Standard	Simplified DES, Block Cipher Principles, The Data Encryption Standard, The Strength of DES, Differential and Linear Cryptanalysis.
3	23-06-2010	09:00 - 11:00	3	Complementary Symmetric Ciphers	Triple DES, Blowfish, Confidentiality Using Conventional Encryption, Key Distribution, Random number Generation.
4	24-06-2010	09:00 - 11:00	4	Public – Key Encryption	Prime Numbers, Fermant's and Euler's Theorem, Testing for Primality, Public-Key Cryptography and RSA principles, Key Management, Diffie Hellman key Exchange.
5	25-06-2010	09:00 - 11:00	5	Digital Signatures and Authentication Protocols	Number Theory, Message Authentication, Message Authentication Codes, MD5 Message Digest Algorithm, Digital Signatures and Authentication Protocols
6	26-06-2010	09:00 - 11:00			***Discussion***

Faculty In charge: Dr A.G.Ananth
E-Mail : antisro@yahoo.com

Prof. M B Kamakshi.
E-Mail : kamakshimb@rediffmail.com

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PAPER-7 (ELECTIVE-III)
Subject: NETWORK MANAGEMENT

Text books (TB):

1) Network Management, L.Mani Sumbramanian

Hour	Date	Time	Chapter	Main Topics As per syllabus	Contents
1	21-06-10	09:00 - 11:00	1	Introduction	Analogy of telephone network management, Data(computer) and telecommunication networks, Distributed Computing environments, TCP/IP based networks: The Internet and Intranets, Communications Protocols and standards, Protocol layers and services, The importance of topology, Some common network problems, Goals, organization and functions, Goal of Network Management, Network Provisioning, Network operations and the NOC, Network Installation and Maintenance
2	22-06-10	09:00 - 11:00	2	Basic Foundations: Standards, Models, and Language	Introduction, Network Management Standards, Network Management Architecture, Organizational Model, Information model, Management Information Tree (MIT), Managed Object Perspective, Communication Model, Abstract Syntax Notation One: Terminology, symbols and conventions, Objects and Data Types: Structure & Tag, Object Names, An example of ASN.1 from ISO 8824, TLV Encoding structure, Macros, Functional Model
3	23-06-10	09:00 - 11:00	4,5	SNMPv1 Network Management: Organization and Information Models Communication and Functional Model	Managed Network, History of SNMP Management, Internet Organization and Standards, Organizations, Internet Documents, The SNMP Model, The Organization Model SNMP Communication Model, The SNMP Architecture, The Administrative Model, SNMP Protocol Specifications, SNMP Operations, The SNMP MIB Group, Functional Model
4	24-06-10	09:00 - 11:00	4	SNMPv1 Network Management: Organization and Information Models	System Overview, Information model, Introduction, The structure of Management Information, Managed Objects, Management information base.

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5	**25-06-10**	**11.30-1.30**	**3**	**Broadband Network Management: ATM Networks**	**Broadband Networks and Services, ATM Technology, Virtual Path-Virtual Circuit, ATM Packet Size, Integrated Service, WAN/SONET, ATM LAN Emulation, Virtual LAN, ATM Network Management, The ATM Network Reference Model, The Integrated Local Management Interface, The ATM Management Information Base, The Role of SNMP and ILMI in ATM Management, MI Interface: Management of ATM Network Element, M3 Interface: Customer Network Management of Public Networks, M4 Interface: Public Network Management , Management of LAN Emulation: ATM Digital Exchange Interface Management**

Faculty In charge: Prof. Poonam Ghuli
E Mail : pghuli@yahoo.com

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SECOND YEAR FIRST ASSIGNMENT QUESTIONS

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PAPER-6

COMMUNICATION PROCOLS OVER WIRELESS NETWORKS [MCEC 21]

ASSIGNMENT -I

1. Clearly bring out the differences between LAN, WAN and MAN. Give examples.
2. Distinguish between Connection oriented and Connectionless services.
3. List and explain the different design issues for the layer-2
4. Explain the following with respect to transport layer
   - i) Addressing
   - ii) Connection establishment
   - iii) Connection release
   - iv) Flow control and buffering
5. Write a Note on X.25
6. Explain different issues related to Network layer Design
7. What is computer network? Explain the concept of internet working.
8. Explain the B-ISDN reference Model
9. Explain the data transmission process in the OSI reference model
10. Explain the use of following devices in networking.
    - i) Repeater
    - ii) Bridge
    - iii) Router
    - iv) Gateway
    - v)
11. What is **little's** theorem?
12. A packet arrives at a transmission line every **K** seconds with the first packet arriving at time **0**. All packets have equal length and require **αK** Seconds for transmission where **α<1**. The processing and propagation delay per packet is **P** seconds. Calculate the number of packets in the system?

13. Customers arrive at a fast food restaurant at a rate of **100 per hour** and take **30 sec** to be served.
    - -How much time do they spend in restaurant?
    - -How much time waiting in line?
    - -How many customers in the restaurant?
    - -What is the server utilization?
14. Explain the **M/M/1** queue system and derive the average waiting time in queue.

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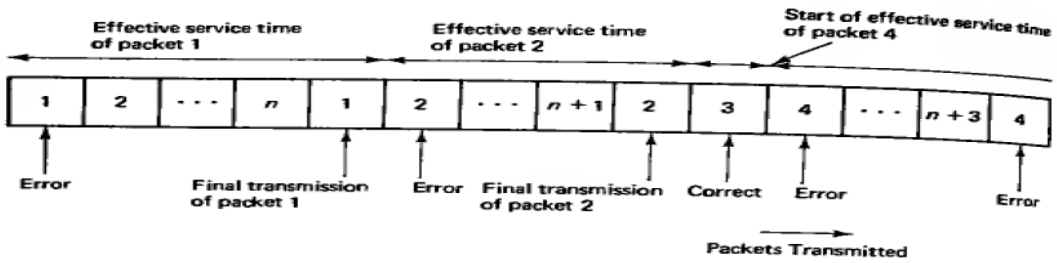
15. Persons arrive at a taxi stand with room for **W** taxis according to a Poisson process with rate **λ.** A person boards a taxi upon arrival if one is available and otherwise waits in a line. Taxis arrive at the stand according to a Poisson process with rate **μ.** An arriving taxi that finds the stand full departs immediately; otherwise, it picks up a customer if at least one is waiting, or else joins the queue of waiting taxis. Use an **M/M//1** queue formulation to obtain the steady state distributions of the persons queue. What is the steady state probability distribution of taxi queue size when **W=5** and **λ** and **μ** are equal to **1** and **2** per minute, respectively?
16. Derive the average number of customers in **M/M/m: m-server case**?
17. A printer is attached to the LAN of the department. The printing jobs are assumed to arrive with a Poissonian intensity **λ** and the actual printing times are assumed to obey the distribution **Exp (μ).**The capacity of the printer has become insufficient with regard to the increased load. In order to improve the printing service, there are three alternatives:
    1. Replace the old printer by a new one twice as fast, i.e. with service rate **2μ**.
    2. Add another similar printer (service rate **μ)** and divide the users in two groups of equal size directing the works in each group to their own printer. The arrival rate of jobs to each printer is **λ/2**.
    3. The same as alternative 2, but now there is a common printer queue where all jobs are taken and the job at the head of the queue is sent to whichever Printer becomes free first.
18. Write the **P-K formula** and prove it .

19. Consider a **go back n ARQ** system and assume that packets are transmitted in frames that are one time unit long, and there is a maximum wait for an acknowledgment of n-1 frames before a packet is retransmitted and consider only the errors in the transmitted packets and that a packet is rejected at the receiver with probability **p** independently of other packets. Then what is the total waiting delay of the system? (Consider packets arrive at the transmitter according to Poisson process with rate **λ**).



20. Explain the single user and multi user system of **M/G/1** system?
21. Explain the pre-emptive and non pre-emptive priority for **M/G/1** system?

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PAPER-7 (ELECTIVE-III)
CRYPTOGRAPHY
ASSIGNMENT –I

1. With the aid of a functional schematic, explain the general model of network security system.
2. Breifly explain the various security services defined in X.800.
3. Discuss how manoalphabetic ciphers are better than Caesar ciphers.
4. Write a Play-fair matrix with the keyword "walking". Use it to encipher the message given below:
   "SUPPORT NEEDED URGENTLY" If needed use "Q" as the dummy character.
5. Encrypt the following message using hill cipher technique.

   $$\text{Key} = \begin{bmatrix} 7 & 8 \\ 19 & 3 \end{bmatrix}$$

   Plaintext = FRIDAY
6. In the transposition cipher, the key is 213, and the message is written in 3 columns with the last row stopped with X for completion. Find the ciphertext for the message.
   "MEET ME AT VTU IN BELGAUM"
7. With a diagram, explain the Fiestel Encryption and Decryption algorithm.
8. With the help of a block diagram, explain the overall structure of the simplified DES. Explain the role of each block in the above structure with suitable analysis.
9. What is the difference between differential and linear cryptanalysis ? Explain.
10. What is meant by Pseudorandom number ? Explain about ANSI X 9.17 PRNG.
11. With an algorithm explain Blum Blum shub generator.
12. What are the characteristics of BLOWFISH ? Discuss the encryption and decryption used in blowfish block cipher.
13. What is meet – in – the – middle attack ? Explain with reference to double DES.
14. State and explain Fermant's Theorem.
15. State and prove Euler's Theorem.
16. Discuss the various Requirements and Applications of Public Key Cryptosystems.
17. Perform Encryption and Decryption using the RSA algorithm of
    P = 7, q = 11, e = 17, M = 8
18. Draw the state diagram and explain the act of "Exchange of Public-Key Certificates" between two parties A and B with the help of certificate authority.
19. Develop a scheme for message authentication and digital signature using a hash function.
20. What is meant by a digital signature ? What are the requirements ? Distinguish between direct digital signature and arbitrated digital signature.

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PAPER – 7 (ELECTIVE-III)
NETWORK MANAGEMENT
ASSIGNMENT - 1

1. Explain in brief Data and Telecommunication Network.
2. Explain in brief OSI Communication Architecture.
3. Define Network management. What are the goals of Network management?
4. Define Network management. What are the goals of Network management?
5. Write an ASN.1 module that defines dayaOfWeek as a SEQUENCE type with each day of week(day1,day2,…) as the type VisibleString. Write the ASN.1 description a)for te structure and b)for the value.
6. Write an ASN.1 module that defines daysOfWeek as an Enumerated data type, with values from 0 to 6.
7. a) Describe a list and an ordered list in ASN.1 syntax.
   b) Identify the difference between them
   c) Using examples, differentiate between list construction and repetitive construction.

8. What is the difference between MDB (Management database) and MIB (Management information
9. Explain TLV encoding structure.
10. Explain how a virtual circuit configuration works with the help of a diagram.
11. What are the 5 main concepts that comprise ATM technology?
12. Explain layered architecture of a LAN Emulation with a neat block diagram.
13. Explain LUNI Interface with a diagram.
14. Explain M2 interface: Management of private networks.
15. Explain 2-tier and 3-tier Organization model.
16. Explain with block diagram SMNP ASN.1 Data types.
17. Explain how an NMS behaving as manager and agent.
18. What is the difference between Get-Next-request operation and Get-Next-request operation with indices?
19. Explain in brief Functional Model.
20. Explain the structure of a SNMP encapsulated message with a neat diagram.

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INFORMATION TECHNOLOGY

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PAPER-6
Subject: DATABASE MANAGEMENT SYSTEMS AND COMPUTER NETWORKS

Text books (TB):

1. **Elmasri and Navathe**: *Fundamentals of Database Systems* (Fourth Edition), Pearson Education, 2003
2. **Silberschatz, Korth and Sudharshan:** *Data base System Concepts,* Fourth Edition, Mc-GrawHill, 2002
3. ***Computer Networks*** *(Fourth Edition) by Andrew S Tanenbaum*
4. ***Communication Networks - Fundamental Concepts and Key architectures****(Second Edition)by Alberto Leon - Garcia*

Hour	Date	Time	Chapter	Main Topics As per syllabus	Contents
1	21-06-10	09:00 - 11:00	6	Introduction to Computer Networks	Uses of Computer Networks , Network Hardware, Design issues for the layers, Connection-oriented and Connection-less services, Service primitives, Example networks
2	22-06-10	09:00 - 11:00	7	Network Layer	Network Layer design issues, Routing Algorithms : the optimality principle, Shortest path routing, flooding, Congestion Control : load shedding, jitter control, Quality of Service, The IP Protocol
3	23-06-10	09:00 - 11:00	7 1	Network Layer Introduction to Database Systems	Internet Control Protocols, Mobile IP, IPv6 Managing Data; A Historical Perspective; File Systems versus a DBMS; Advantages of a DBMS; Describing and storing Data in a DBMS; Queries in a DBMS; Transaction Management; Structure of a DBMS; People Who work with Database.
4	24-06-10	09:00 - 11:00	2	Entity-Relationship Model	Using High-Level Conceptual Data Models for Database Design; An Example Database Application; Entity Types, Entity Sets, Attributes and Keys; Relationship types, Relationship Sets, Roles and Structural Constraints; Weak Entity Types; Refining the ER Design for the COMPANY Database; ER Diagrams, Naming Conventions and Design Issues.
5	25-06-10	09:00 - 11:00	3	Relational Model and Relational Algebra	Relational Model Concepts; Relational Model Constraints and Relational Database Schemas; Update Operations and Dealing with Constraint Violations; Unary Relational Operations:

Faculty In charge: Prof. Deepamala. N
E Mail : deepamala_n@hotmail.com

Prof. Hemavathy R
E Mail : hemavathy_rk@yahoo.com

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PAPER 7 (ELECTIVE – III)
Subject: CLIENT SERVER COMPUTING (ITC 231)

Text books (TB):

1) *Patrick Smith and Steve Guengerich, Client/Server computing, 2nd edition, Prentice Hall*
2) *Robert Orfali, Dan Harkey, Jeri Edwards, The Essenhtial Client/Server Survival Guide, 2nd edition, Galgotia Publications.*

Hour	Date	Time	Chapter	Main Topic As per syllabus	Contents
1	21-06-10	11.30-1.30	1&2	Introduction and Architecture	Client/Server computing advantages of client/server computing, advantages of client server Data access architecture –Two-tiered client/server, stored procedure, Three-tiered architecture
2	22-06-10	11.30-1.30	3	Role of the Client and Client service	Remote Procedure call, print Services, Remote services, utility Services, Message Services, Network services, Application services
3	23-06-10	11.30-1.30	4	Database services	DDE, Object Linking and Embedding, CORBA Architecture, Client tools-Non GUI,GUI, OOUI.
4	24-06-10	11.30-1.30	5	Remote Procedure calls	The RPC model, Transparency of RPC, Implementing RPC mechanism, Communication Protocols for RPCs, Client-Server binding, Exception Handling, Security, Case studies :SUN RPC
5	25-06-10	11.30-1.30	6	Server functionality	Request processing, file services, database services, Communication services, Secur Services, Network operating system, Platforms, Server Operating system.

Faculty In charge: Prof. Sharvani G S
E Mail : sharvanim@yahoo.com

Prof. Anala. M. R
E Mail : Anala_m_r@yahoo.co.in

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PAPER-7 (ELECTIVE – III)
Subject: MOBILE COMPUTING (ITCS232)

Text books (TB):

1) *Mobile communications ,Pearson Education , Jochen Schiller*

Hour	Date	Time	Chapter	Main Topics As per syllabus	Contents
1	21-06-10	11.30-01.30	1	Introduction	Vehicles, emergencies, business, a short history of wireless communication. A simplified reference model
2	22-06-10	11.30-01.30	2	Wireless Transmission	Wireless transmission, Frequencies for radio transmission, signals, multiplexing, spread spectrum, cellular systems
3	23-06-10	11.30-01.30	3	Medium Access control	Hidden and Exposed terminals, SDMA, FDMA, TDMA, Classical Aloha, reservation TDMA Comparison of S/T/F/CDMA ,
4	24-06-10	11.30-01.30	4	Telecommunications system	GSM, system architecture, protocols, Telecommunications system, DECT,System architecture, protocol architecture, TETRA, UMTS, IMT-2000, UMTS architecture, UTRAN , Handover, Satellite systems and broadcast systems,
5	25-06-10	11.30-01.30	5	Satellite systems and broadcast systems	GEO, LEO, MEO, routing, DAB, DVB, DVB for convergence of broadcasting,

Faculty In charge: Prof. Vinay Hegde
E Mail : hegdevinay4u@gmail.com

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SECOND YEAR FIRST ASSIGNMENT QUESTIONS

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PAPER-6
Database management systems and Computer Networks
ASSIGNMENT - I

1. Define database system. What are the major disadvantages of conventional file system over DBMS?
2. How many levels are there in data abstraction? Name each of them.
3. Define the following: DDL , DML, SDL , DBA.
4. List the characteristics of database and explain. Write the advantages of database.

5. Define the following terms.
    a) Entity
    b) Attribute, attribute value
    c) Relationship instance
    d) Composite, multivalued, derived and derived attribute
    e) Key attribute
    f) Value set
6. Explain briefly high-level conceptual data model for database design. With a neat diagram Illustrate the main phases of database design.
7. Design an ER diagram to describe the BANKING DATABASE(min of 5 entities).
8. What is a relation? Define the following terms
    a. Relational schema
    b. Relational instance
    c. N-tuples
    d. degree of a relation
    e. Relational database state
9. Define the following constraints
    a. Key
    b. Entity integrity
    c. Referential integrity
    d. Foreign key
    e. Semantic integrity
    f. Transition and state
10. What is constraint violation? Which all the constraints violated on an update operation.(insert, delete and modify) with examples.

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PAPER-7 (ELECTIVE III)
MOBILE COMPUTING
ASSIGNMENT - I

1) Check out strategies of different network operators while migrating towards 3rd Generation system. Why is a single common system is not in sight?
2) Explain Simplified reference model used to structure communication sytems?
3) What are the main problems of signal propagation? Why do radio waves not always follow a straight line?
4) Draw the constellation diagram of a 16 QAM with the 12 phases, and 3 amplitude levels.
5) What is narrow band interference? What is the solution to avoid narrow band interference?
6) Why , typically , is digital modulation is not enough for radio transmission? What are general goals for digital modulation? What are typical schemes?
7) What is the main physical reason for the failure of many MAC schemes known from wired networks?
8) What are the advantages of a fixed TDM pattern compared to random , demand driven TDM?
9) Why a new infrastructure is needed for GPRS? , not for HSCSD? Which components are new?
10) How is synchronization achieved in GSM? Who is responsible for synchronization?
11) Why and when are different signaling channels needed? What are the differences?
12) How is localization , location, roaming, update done in GSM is reflected in databases?
13) What characteristics do the different satellite orbits have? What are their pro-s and Cons?
14) 2G and 3G systems can transfer data, compare this approach with DAB /DVB . List reasons for and against the use of DAB/DVB.
15) How could location bases services and broadcast system work together.
16) With a focus on Security , what are the problems of WLAN ? What level of security can WLAN provide?
17)Compare IEEE 802.11, Hiperlan 2 , blue tooth (all three networks) regarding to their ad-hoc capabilities
18) How do IEEE 802.11 , Hiperlan2 and Bluetooth solve the hidden terminal problem?
19) In what solutions, can collisions occur in all three networks?Distinguish between collisions on physical and MAC layer.
20) What are advantages and problem of forwarding mechanism in blue tooth networks regarding security, power saving and network stabiliy

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PAPER-7
CLIENT SERVER COMPUTING
ASSIGNMENT-2

1) Define Client/Server computing
2) List the advantages of client/server computing
3) Write a short note on enhanced data sharing
4) Data Interchangeability and Interoperability
5) List the Characteristics of a client
6) List the Characteristics of a server
7) With a block diagram explain three basic building blocks of client/server.
8) Explain how the building –block arrangements are used in four situations;
9) Explain Two-tier data access Architecture with a neat block diagram
10) What are Features of TWO-TIER?
11) Explain Three-Tier Data Access Architecture
12) Compare are contrast both types of architecture (Two Tier and Three-tier).
13) What is the role of a client in client/server computing?
14) List of Client Services. Remote Procedure call (RPC)
15) What are GUI clients?
16) What are Object Oriented User Interface (OOUI) Clients?
17) What are NON GUI clients? Explain Non-GUI clients sub-categories.
18) Explain in brief Network Management Services-Alerts
19) Explain the Security mechanism in RPCs
20) List and explain the steps in Client – Server binding

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