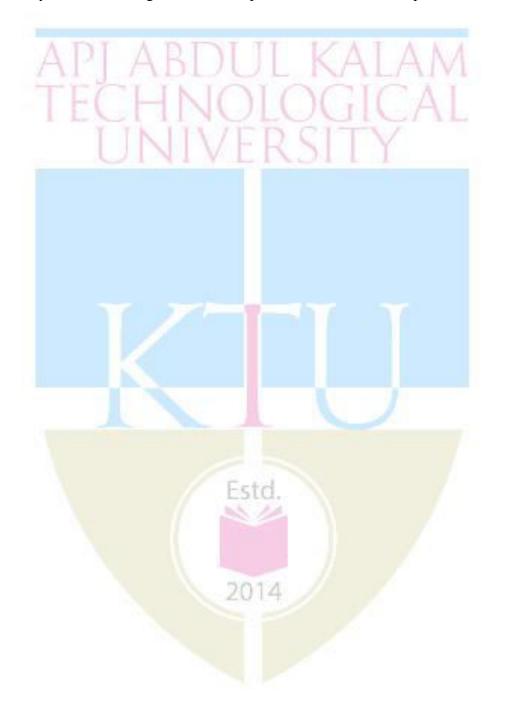
COUR COD	YEAR INTRODU					
	CODECOURSE NAMEL-T-P-CIEC402NANOELECTRONICS3-0-0-3					
	site: EC203 Solid State Devices, EC304 VLSI	5-0-0-5	2010	J		
	bjectives:					
	introduce the concepts of nanoelectronics.					
Syllabus		A T A A				
optoelectr Schroding properties carbon na to charact X-Ray D wells, m Nanostrue devices, p Expected • Th	on to nanotechnology, Mesoscopic physics, onics, characteristic lengths in mesoscopic system ger's Equation, wave function, Low dimensional of two dimensional semiconductor nanostructures no tube, grapheme, Introduction to methods of fabr erization of nanostructures, Principle of operation of ffraction analysis, MOSFET structures, Quantum ultiple quantum wells, The concept of super stures under Electric field, Transport of charge rinciple of NEMS outcome: the students will be able to understand basic concern no technology.	s, Quantum m structures Qu Quantum wire ication of nance of Scanning Tur wells, modula lattices, Tran in magnetic	echanical co antum well es and quantu o-layers, Intro nnelling Mic tion doped of sport of ch field, Nanoe	herence, s, Basic um dots, oduction roscope, quantum large in electonic		
Μ						
Referenc						
1. Cl 2. G 3. K 4. M 20 5. Po	hattopadhyay, Banerjee, Introduction to Nanoscience corge W. Hanson, Fundamentals of Nanoelectronics Goser, P. Glosekotter, J. Dienstuhl, Nanoelectronic urty, Shankar, Text book of Nanoscience and Nano 12. pole, Introduction to Nanotechnology, John Wiley, 2 priyo Dutta, Quantum Transport- Atom to transisto	s, Pearson Educ cs and nanosyst technology, Ur 2006.	cation, 2009. tems, Springe iversities Pre	er 2004.		
	Course Plan					
Module	Course contents		Hours	End Sem. Exam Marks		
	Introduction to nanotechnology, Impacts, conventional microelectronics, Trends in micr optoelectronics					
I	Mesoscopic physics, trends in microelectronics an characteristic lengths in mesoscopic systems, Qua coherence	intum mechani	cal 2	15%		
	Classification of Nano structures, Low dimen Quantum wells, wires and dots, Density dimensionality		res and 1			

Basic properties of two dimensional semiconductor nanostructures, square quantum wells of finite depth, parabolic and triangular quantum wells, Quantum wires and quantum dots, carbon nano tube, graphene 1 Quantum wires and quantum dots, carbon nano tube, graphene 1 Introduction to methods of fabrication of nano-layers, different approaches, physical vapour deposition, chemical vapour deposition 2 II Dioxide- dry and wet oxidation methods. 1 Fabrication of nano particle- grinding with iron balls, laser ablation, reduction methods, sol gel, self assembly, precipitation of quantum dots. 2 III First INTERNAL EXAM 1 III Principle of operation of Scanning Tunnelling Microscope, Atomic Force Microscope, Scanning Electron microscope, Specimen interaction. Transmission Electron Microscope 2 X-Ray Diffraction analysis, PL & UV Spectroscopy, Particle size analyser. 2 IV Quantum wells, modulation doped quantum wells, multiple quantum wells, modulation doped quantum wells, multiple quantum wells, modulation doped quantum wells, multiple quantum wells, modulation toped quantum wells, multiple fransport of charge in Nanostructures under Electric field - parallel transport, hot electrons, perpendicular transport. 2 V Quantum transport in nanostructures, Coulomb blockade 2 20 Transport of charge in Nanostructures under Electric field - parallel transport, hot electrons, perpendicular transport. 2 2<
Introduction to methods of fabrication of nano-layers, different approaches, physical vapour deposition, chemical vapour deposition 2 II Introduction to methods of fabrication, chemical vapour deposition 2 15 III Dioxide- dry and wet oxidation methods. 2 15 Fabrication of nano particle- grinding with iron balls, laser ablation, reduction methods, sol gel, self assembly, precipitation of quantum dots. 2 15 FIRST INTERNAL EXAM Introduction to characterization of nanostructures, tools used for of nano materials characterization, microscope-optical, electron, and electron microscope. 2 15 III Principle of operation of Scanning Tunnelling Microscope, Atomic Force Microscope, Scanning Electron microscope, Specimen interaction. Transmission Electron Microscope 2 15 IV Quantum wells, modulation doped quantum wells, multiple quantum wells, modulation doped quantum wells, multiple quantum wells, modulation doped quantum wells, multiple quantum wells 15 V Transport of charge in Nanostructures under Electric field - parallel transport, hot electrons, perpendicular transport. 2 20 V Quantum transport in nanostructures, Coulomb blockade 2 20 V Quantum transport of charge in magnetic field - Effect of magnetic field on a crystal. Aharonov-Bohm effect, the Shubnikov-de Hass effect, the 3 quantum Hall effect.
approaches, physical vapour deposition, chemical vapour deposition2IIMolecular Beam Epitaxy, Ion Implantation, Formation of Silicon Dioxide- dry and wet oxidation methods.215Fabrication of nano particle- grinding with iron balls, laser ablation, reduction methods, sol gel, self assembly, precipitation of quantum dots.215Introduction of characterization of nanostructures, tools used for of nano materials characterization, microscope-optical, electron, and electron microscope.215IIIPrinciple of operation of Scanning Tunnelling Microscope, Atomic Force Microscope, Scanning Electron Microscope A-Ray Diffraction analysis, PL & UV Spectroscopy, Particle size analyser.215IVQuantum wells, modulation doped quantum wells, multiple quantum wells215The concept of super lattices Kronig - Penney model of super lattice.215VQuantum transport in nanostructures, Coulomb blockade220Transport of charge in Manostructures, Coulomb blockade220Itanistors1215Resonant tunnel effect, RTD, RTT, Hot electron transistors220Coulomb blockade effect and single electron transistor, CNT220
IIMolecular Beam Epitaxy, Ion Implantation, Formation of Silicon Dioxide- dry and wet oxidation methods.215Fabrication of nano particle- grinding with iron balls, laser ablation, reduction methods, sol gel, self assembly, precipitation of quantum dots.215FIRST INTERNAL EXAMIntroduction to characterization of nanostructures, tools used for of nano materials characterization, microscope-optical, electron, and electron microscope.15IIIPrinciple of operation of Scanning Tunnelling Microscope, Atomic Force Microscope, Scanning Electron Microscope N-Ray Diffraction analysis, PL & UV Spectroscopy, Particle size analyser.15Two dimensional electronic system, two dimensional behaviour, MOSFET structures, Heterojunctions2IVQuantum wells, modulation doped quantum wells, multiple quantum wells2Transport of charge in Nanostructures under Electric field - parallel ransport, hot electrons, perpendicular transport.2VQuantum transport in nanostructures, Coulomb blockade Transport of charge in magnetic field - Effect of magnetic field on a crystal. Aharonov-Bohm effect, the Shubnikov-de Hass effect, the quantum Hall effect.2Nanoelectonic devices- MODFETS, heterojunction bipolar transistors1Resonant tunnel effect, RTD, RTT, Hot electron transistor, CNT 22
Fabrication of nano particle- grinding with iron balls, laser ablation, reduction methods, sol gel, self assembly, precipitation of quantum dots. 2 FIRST INTERNAL EXAM Introduction to characterization of nanostructures, tools used for of nano materials characterization, microscope-optical, electron, and 2 electron microscope. 2 Principle of operation of Scanning Tunnelling Microscope, Atomic Force Microscope, Scanning Electron microscope, Specimen interaction. Transmission Electron Microscope 2 X-Ray Diffraction analysis, PL & UV Spectroscopy, Particle size analyser. 2 Ivo dimensional electronic system, two dimensional behaviour, MOSFET structures, Heterojunctions 2 Ivo quantum wells, modulation doped quantum wells, multiple quantum wells 2 The concept of super lattices Kronig - Penney model of super lattice. 2 V Quantum transport in nanostructures, Coulomb blockade 2 Ivansport of charge in Manostructures, Coulomb blockade 2 Ivansport of charge in magnetic field - Effect of magnetic field on a crystal. Aharonov-Bohm effect, the Shubnikov-de Hass effect, the 3 quantum Hall effect. 3 Nanoelectonic devices- MODFETS, heterojunction bipolar transistors 1 Resonant tunnel effect, RTD, RTT, Hot electron transistor, CNT 2
Introduction to characterization of nanostructures, tools used for of nano materials characterization, microscope-optical, electron, and electron microscope. 2 III Principle of operation of Scanning Tunnelling Microscope, Atomic Force Microscope, Scanning Electron microscope, Specimen interaction. Transmission Electron Microscope 2 X-Ray Diffraction analysis, PL & UV Spectroscopy, Particle size analyser. 2 IV Two dimensional electronic system, two dimensional behaviour, MOSFET structures, Heterojunctions 2 Quantum wells, modulation doped quantum wells, multiple quantum wells 1 The concept of super lattices Kronig - Penney model of super lattice. 2 V Quantum transport in nanostructures, Coulomb blockade 2 Transport of charge in Manostructures, Coulomb blockade 2 Transport of charge in manostructures, Coulomb blockade 2 V Quantum transport in nanostructures, Coulomb blockade 2 Transport of charge in magnetic field - Effect of magnetic field on a crystal. Aharonov-Bohm effect, the Shubnikov-de Hass effect, the 3 3 Nanoelectonic devices- MODFETS, heterojunction bipolar transistors 1 Resonant tunnel effect, RTD, RTT, Hot electron transistor, CNT 2
IIInano materials characterization, microscope-optical, electron, and electron microscope.2IIIPrinciple of operation of Scanning Tunnelling Microscope, Atomic Force Microscope, Scanning Electron microscope, Specimen interaction. Transmission Electron Microscope215IIIX-Ray Diffraction analysis, PL & UV Spectroscopy, Particle size analyser.21IVTwo dimensional electronic system, two dimensional behaviour, MOSFET structures, Heterojunctions215IVQuantum wells, modulation doped quantum wells, multiple quantum wells215The concept of super lattices Kronig - Penney model of super lattice.220IIITransport of charge in Nanostructures under Electric field - parallel transport, hot electrons, perpendicular transport.220IIIResonant tunnel effect, RTD, RTT, Hot electron transistors220IIIResonant tunnel effect and single electron transistor, CNT220
III Force Microscope, Scanning Electron microscope, Specimen interaction. Transmission Electron Microscope 2 15 X-Ray Diffraction analysis, PL & UV Spectroscopy, Particle size analyser. 2 2 IV Two dimensional electronic system, two dimensional behaviour, MOSFET structures, Heterojunctions 2 15 IV Quantum wells, modulation doped quantum wells, multiple quantum wells 2 15 The concept of super lattices Kronig - Penney model of super lattice. 2 2 V Quantum transport of charge in Nanostructures under Electric field - parallel transport, hot electrons, perpendicular transport. 2 2 V Quantum transport in nanostructures, Coulomb blockade 2 2 Inasport of charge in magnetic field - Effect of magnetic field on a crystal. Aharonov-Bohm effect, the Shubnikov-de Hass effect, the 3 quantum Hall effect. 3 20 Nanoelectonic devices- MODFETS, heterojunction bipolar transistors 1 2 20 Resonant tunnel effect, RTD, RTT, Hot electron transistors 2 2 20
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IVMOSFET structures, Heterojunctions2Quantum wells, modulation doped quantum wells, multiple quantum wells215The concept of super lattices Kronig - Penney model of super lattice.215Ittice.22VTransport of charge in Nanostructures under Electric field - parallel transport, hot electrons, perpendicular transport.220VQuantum transport in nanostructures, Coulomb blockade220Transport of charge in magnetic field - Effect of magnetic field on a crystal. Aharonov-Bohm effect, the Shubnikov-de Hass effect, the quantum Hall effect.320Nanoelectonic devices- MODFETS, heterojunction bipolar transistors1220Coulomb blockade effect and single electron transistor, CNT220
IVquantum wells215The concept of super lattices Kronig - Penney model of super lattice.22VTransport of charge in Nanostructures under Electric field - parallel transport, hot electrons, perpendicular transport.22VQuantum transport in nanostructures, Coulomb blockade220Transport of charge in magnetic field - Effect of magnetic field on a crystal. Aharonov-Bohm effect, the Shubnikov-de Hass effect, the quantum Hall effect.320Nanoelectonic devices- MODFETS, heterojunction bipolar transistors1220Resonant tunnel effect, RTD, RTT, Hot electron transistors220
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crystal. Aharonov-Bohm effect, the Shubnikov-de Hass effect, the quantum Hall effect. 3 Nanoelectonic devices- MODFETS, heterojunction bipolar transistors 1 Resonant tunnel effect, RTD, RTT, Hot electron transistors 2 Coulomb blockade effect and single electron transistor, CNT 2
transistors1Resonant tunnel effect, RTD, RTT, Hot electron transistors2Coulomb blockade effect and single electron transistor, CNT2
Coulomb blockade effect and single electron transistor, CNT 2
VI transistors 20
Heterostructure semiconductor laser 1
Quantum well laser, quantum dot LED, quantum dot laser2
Quantum well optical modulator, quantum well sub band photo detectors, principle of NEMS.2
END SEMESTER EXAM

Question Paper Pattern

The question paper shall consist of three parts. Part A covers modules I and II, Part B covers modules III and IV, and Part C covers modules V and VI. Each part has three questions uniformly covering the two modules and each question can have maximum four subdivisions. In each part, any two questions are to be answered. Mark patterns are as per the syllabus with 70% for theory and 30% for logical/numerical problems, derivation and proof.



COURS CODE	E I COURSE NAME	C-T-P-	YEAR (INTRODU(
EC404	CC404 ADVANCED COMMUNICATION SYSTEMS 3-0-0-3		2016			
Prerequis	ite: EC302 Digital Communication, EC403 Microwave & Ra	adar Engi	neering			
Course o	ojectives:					
• To im	part the basic concepts of various communication system.					
Syllabus:						
Satellite c Introducti technolog	Microwave Radio Communications, Diversity, protection switching arrangements, Digital T Satellite communication systems, Satellite sub systems, Evolution of mobile radio communication Introduction to Modern Wireless Communication Systems, wireless networks, Over view of WIMA technologies, Cellular concept, Wireless propagation mechanism, Introduction to Multiple Acce GSM system architecture, Introduction to new data services					
Expected	outcome:					
	udents will be able to understand the basics and technology of	fadvance	d communicat	tion		
systen Text Boo						
 He Fr Si Th 	 Dennis Roody, Satellite communication, 4/e, McGraw Hill, 2006. Herve Benoit, Digital Television Satellite, Cable, Terrestrial, IPTV, Mobile TV in the DVB Framework, 3/e, Focal Press, Elsevier, 2008 Simon Haykin, Michael Mohar, Modern wireless communication, Pearson Education, 2008 Theodore S. Rappaport: Wireless communication principles and practice,2/e, Pearson Education, 1990 					
Reference	ices:					
2. M 3. Na 4. Si 5. To	 Mishra, Wireless communications and Networks, McGraw Hill, 2/e, 2013. Nathan, Wireless communications, PHI, 2012. Singal, Wireless communications, Mc Graw Hill, 2010. Tomasi, Advanced Electronic Communication Systems, 6/e, Pearson, 2015. W.C.Y.Lee, Mobile Cellular Telecommunication, McGraw Hill, 2010. 					
	Course Plan					
Module	Course content (42hrs)		Hours	End Sem. Exam Marks		
	Microwave Radio Communications : Introduction, Advantage Disadvantages, Analog vs digital microwave, frequency vs ar modulation		1			
Ι	Frequency modulated microwave radio system, FM microwave repeaters	ve radio	1	15%		
	Diversity, protection switching arrangements, FM micro stations, microwave repeater station, line of sight path charac	teristics	2			
п	Digital TV: Digitized Video, Source coding of Digiti Compression of Frames, DCT based (JPED), Compression Pictures (MPEG). Basic blocks of MPEG2 and MPE4,Di Broadcasting (DVB)	of Movi igital Vid	ng 4	15%		
	Modulation: QAM (DVB-S, DVB-C), OFDM for Terrestrial (DVB –T). Reception of Digital TV Signals (Cable, S					

Satellite systems- GEO systems, non-GEO communication systems, Satellite Applications- Global Positioning System, Very Small Aperture Terminal system, Direct to Home Satellite Systems 3 INV Evolution of mobile radio communications, paging systems, Cordless 2 2 Introduction to Modem Wireless Communication Systems, Second generation cellular networks, third generation wireless networks, fourth generation wireless technologies 1 154 Wireless in local loop, wireless local area networks, Blue tooth and Personal Area networks, Over view of WIMAX Technologies, architecture, spectrum allocation 2 2 VI Cellular concept, hand off strategies, Interference and system capacity: Cell splitting, Sectoring, Repeaters, and Microcells. Cellular System Design Fundamentals: Frequency Reuse, channel assignment strategies, handoff Strategies, Interference and system capacity. 3 204 Wireless propagation mechanism, free space propagation model, ground reflection model, knife edge diffraction model, path loss prediction in hilly terrain, introduction to fading and diversity techniques, Introduction to MIMO system 3 2 VI Introduction to new data services like High Speed Circuit Switched Data (HSCSD), General Packet Radio Service (GPRS), Digital Enhanced Cordless Telecommunication Systems (UWB), Push To Talk (PTT) technology, Mobile IP 204		terrestrial). Digital TV over IP, Digital terrestrial TV for mobile			
Satellite Communication systems, introduction, Kepler's laws, orbits, orbital perturbations 2 Satellite sub systems, Antennas, Transponders, earth station technology, Link calculation, 2 157 Satellite systems, GEO systems, non-GEO communication systems, Satellite System, Direct to Home Satellite Systems 3 157 III Satellite systems, OEO systems, non-GEO communication systems, Satellite Applications- Global Positioning System, Very Small Aperture Terminal system, Direct to Home Satellite Systems 2 157 Introduction to Modern Wireless Communication Systems, Second generation wireless technologies 2 156 Wireless in local loop, wireless local area networks, Blue tooth and Personal Area networks, Over view of WIMAX Technologies, architecture, spectrum allocation 2 156 V Cellular concept, hand off strategies, Interference and system capacity: Cell splitting, Sectoring, Repeaters, and Microcells. 3 206 V tracking and grade off service, improving coverage and capacity 3 2 206 Wireless propagation mechanism, free space propagation model, ground reflection model, knife edge diffraction model, path loss prediction in hilly terrain, introduction to fading and diversity techniques, Introduction to MilMO system 2 206 VI GSM system architecture, radio link aspects, network aspects 2 2		Display Technologies: basic working of Plasma, LCD and LED Displays	2		
orbital effects, orbital perturbations 2 Satellite sub systems, Antennas, Transponders, earth station technology, Link calculation, 2 Satellite systems, GEO systems, non-GEO communication systems, Satellite Applications. Global Positioning System, Very Small Aperture 3 Evolution of mobile radio communications, paging systems, Cordless telephone systems, comparison of various wireless systems 2 IV Evolution of Modern Wireless Communication Systems, Second generation cellular networks, third generation wireless networks, fourth generation wireless technologies 2 Wireless in local loop, wireless local area networks, Blue tooth and Personal Area networks, Over view of WIMAX Technologies, architecture, spectrum allocation 2 V Cellular concept, hand off strategies, Interference and system capacity: Cell splitting, Sectoring, Repeaters, and Microcells. 3 Cellular System Design Fundamentals: Frequency Reuse, channel assignment strategies, handoff strategies, Interference and system capacity Wireless propagation mechanism, free space propagation model, ground reflection model, knife edge diffraction model, path loss prediction in hilly terrain, introduction to fading and diversity techniques, Introduction to MIMO system 2 VI Introduction to Multiple Access, FDMA, TDMA, Spread Spectrum multiple Access, space division multiple access, CDMA, OFDM 2 Vireless Standards, 1 2 VI GSM system architecture, radio link aspects, network aspects <td></td> <td></td> <td></td> <td></td>					
III Link calculation, 2 154 Satellite systems- GEO systems, non-GEO communication systems, Satellite Applications- Global Positioning System, Very Small Aperture 3 3 Terminal system, Direct to Home Satellite Systems 3 2 154 IV Evolution of mobile radio communications, paging systems, Cordless telephone systems, comparison of various wireless systems 2 1 IV Evolution to Modern Wireless Communication Systems, Second generation wireless technologies 1 1 154 Wireless in local loop, wireless local area networks, Blue tooth and Personal Area networks, Over view of WIMAX Technologies, architecture, spectrum allocation 2 154 V Cellular concept, hand off strategies, Interference and system capacity: Cell splitting, Sectoring, Repeaters, and Microcells. 3 204 V tracking and grade off service, improving coverage and capacity 204 204 Wireless propagation mechanism, free space propagation model, ground reflection model, knife edge diffraction model, path loss prediction to MIMO system 2 204 VI Introduction to Multiple Access, FDMA, TDMA, Spread Spectrum multiple Access, space division multiple access, CDMA, OFDM 2 204 Wireless theoremultications, Difference between wireless and fixed telephone networks, development of wireless networks, fixed netwo		orbital effects, orbital perturbations	2		
Satellite Applications- Global Positioning System, Very Small Aperture 3 Terminal system, Direct to Home Satellite Systems 2 Evolution of mobile radio communications, paging systems, Cordless 2 Introduction to Modern Wireless Communication Systems, Second generation cellular networks, third generation wireless networks, fourth generation wireless technologies 1 159 Wireless in local loop, wireless local area networks, Blue tooth and Personal Area networks, Over view of WIMAX Technologies, architecture, spectrum allocation 2 2 VI Cellular concept, hand off strategies, Interference and system capacity: Cell splitting, Sectoring, Repeaters, and Microcells. 3 209 VI Tracking and grade off service, improving coverage and capacity 3 209 Wireless propagation mechanism, free space propagation model, ground reflection model, knife edge diffraction model, path loss prediction in hilly terrain, introduction to fading and diversity techniques, Introduction to MIMO system 2 VI Mireless Networking, Difference between wireless and fixed telephone networks, development of wireless networks, fixed network transmission hierarchy, traffic routing in wireless networks, wireless data services, Wireless transmission hierarchy, traffic routing in wireless networks, wireless data services, Wireless transmission hierarchy, traffic routing in wireless networks, pligital Enhanced Cordless Telecommunications (DECT), Enhanced Data Rate for Global Evolution (EDCE), Ultra wideband systems (UWB), Push To Talk (PTT) technolog	III	· · · · · · · · · · · · · · · · · · ·	2 15%		
Itelephone systems, comparison of various wireless systems2Introduction to Modern Wireless Communication Systems, Second generation cellular networks, third generation wireless networks, fourth generation wireless technologies1159Wireless in local loop, wireless local area networks, Blue tooth and Personal Area networks, Over view of WIMAX Technologies, architecture, spectrum allocation2159Cellular concept, hand off strategies, Interference and system capacity: Cell splitting, Sectoring, Repeaters, and Microcells. Cellular System Design Fundamentals: Frequency Reuse, channel assignment strategies, handoff Strategies, Interference and system capacity tracking and grade off service, improving coverage and capacity209Wireless propagation mechanism, free space propagation model, ground reflection model, knife edge diffraction model, path loss prediction in hilly terrain, introduction to fading and diversity techniques, Introduction to MIMO system2ViGSM system architecture, radio link aspects, network aspects Urieless standards, GSM system architecture, radio link aspects, network aspects Introduction to new data services (BPRS), Digital Enhanced Cordless Telecommunications (DECT), Enhanced Data Rate for Gilobal Evolution (EDGE), Ultra wideband systems (UWB), Push To Talk (PTT) technology, Mobile IP2		Satellite Applications- Global Positioning System, Very Small Aperture	3		
IV generation cellular networks, third generation wireless networks, fourth generation wireless technologies 1 159 Wireless in local loop, wireless local area networks, Blue tooth and Personal Area networks, Over view of WIMAX Technologies, architecture, spectrum allocation 2 2 V SECOND INTERNAL EXAM 2 2 V Cellular concept, hand off strategies, Interference and system capacity: Cell splitting, Sectoring, Repeaters, and Microcells. Cellular System Design Fundamentals: Frequency Reuse, channel assignment strategies, handoff Strategies, Interference and system capacity. 3 209 V tracking and grade off service, improving coverage and capacity 3 209 Wireless propagation mechanism, free space propagation model, ground reflection model, knife edge diffraction model, path loss prediction in hilly terrain, introduction to fading and diversity techniques, Introduction to MIIMO system 2 Introduction to Multiple Access, FDMA, TDMA, Spread Spectrum multiple Access, space division multiple access, CDMA, OFDM 2 209 VI GSM system architecture, radio link aspects, network aspects 1 1 1 Introduction to new data services like High Speed Circuit Switched Data (HSCSD), General Packet Radio Service (GPRS), Digital Enhanced Cordless Telecommunications (DECT), Enhanced Data Rate for Global Evolution (EDGE), Ultra wideband systems (UWB), Push To Talk (PTT) technology, Mobile IP 209			2		
Personal Area networks, Over view of WIMAX Technologies, architecture, spectrum allocation 2 SECOND INTERNAL EXAM 2 Cellular concept, hand off strategies, Interference and system capacity: Cell splitting, Sectoring, Repeaters, and Microcells. 3 Cellular System Design Fundamentals: Frequency Reuse, channel assignment strategies, handoff Strategies, Interference and system capacity, tracking and grade off service, improving coverage and capacity 3 V Wireless propagation mechanism, free space propagation model, ground reflection model, knife edge diffraction model, path loss prediction in hilly terrain, introduction to fading and diversity techniques, Introduction to MIMO system 3 Introduction to Multiple Access, FDMA, TDMA, Spread Spectrum multiple Access, space division multiple access, CDMA, OFDM 2 VI GSM system architecture, radio link aspects, network stansmission hierarchy, traffic routing in wireless networks, fixed network transmission hierarchy, traffic routing in wireless networks, wireless data services, Wireless standards, 2 GSM system architecture, radio link aspects, network aspects 1 Introduction to new data services like High Speed Circuit Switched Data (HSCSD), General Packet Radio Service (GPRS), Digital Enhanced Cordless Telecommunications (DECT) , Enhanced Data Rate for Global Evolution (EDGE), Ultra wideband systems (UWB), Push To Talk (PTT) technology, Mobile IP 5	IV	generation cellular networks, third generation wireless networks, fourth	1	15%	
VICellular concept, hand off strategies, Interference and system capacity: Cell splitting, Sectoring, Repeaters, and Microcells. Cellular System Design Fundamentals: Frequency Reuse, channel assignment strategies, handoff Strategies, Interference and system capacity, 		Wireless in local loop, wireless local area networks, Blue tooth and Personal Area networks, Over view of WIMAX Technologies, architecture,			
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VInetworks, development of wireless networks, fixed network transmission hierarchy, traffic routing in wireless networks, wireless data services, Wireless standards,2VIGSM system architecture, radio link aspects, network aspects1Introduction to new data services like High Speed Circuit Switched Data (HSCSD), General Packet Radio Service (GPRS), Digital Enhanced 			2	20.01	
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(HSCSD), General Packet Radio Service (GPRS), Digital Enhanced Cordless Telecommunications (DECT), Enhanced Data Rate for Global 5 Evolution (EDGE), Ultra wideband systems (UWB), Push To Talk (PTT) technology, Mobile IP		GSM system architecture, radio link aspects, network aspects	1	20%	
END SEMESTED EVAN		(HSCSD), General Packet Radio Service (GPRS), Digital Enhanced Cordless Telecommunications (DECT), Enhanced Data Rate for Global Evolution (EDGE), Ultra wideband systems (UWB), Push To Talk (PTT)	5		
EIND SEINESTER EAANI		END SEMESTER EXAM			

Question Paper Pattern

The question paper shall consist of three parts. Part A covers modules I and II, Part B covers modules III and IV, and Part C covers modules V and VI. Each part has three questions uniformly covering the two modules and each question can have maximum four subdivisions. In each part, any two questions are to be answered. Mark patterns are as per the syllabus with 60% for theory and 40% for logical/numerical problems, derivation and proof.

Course code	Course N	ame	Credits	Year of Introduction
**492	PROJE	СТ	6	2016
	Pre	erequisite : Nil		
Course Object	tives			
• To appl	y engineering knowledge in	practical problem	solving	
• To foste	er innovation in design of pro	oducts, processes o	or systems	
• To deve	elop creative thinking in find	ing viable solutior	ns to engineering pro	oblems
Course Plan	API ABD	K	ALAM	
In depth study	of the topic assigned in the	light of the prelim	ninary report prepar	ed in the sevent
semester			IL AL	
	alization of the approach to			
	ailed action plan for conduct sis/Modelling/Simulation/Defined action/Defined action/Defined action/Defined action/Defined action actio			
	ent of product/process, testi	0	0 1	
	per for Conference presentati			
	ort in the standard format fo			
	resentation and viva voce by			
Expected out			6	1
The students w				
iii.	Think innovatively on the dev		nents, products, proce	esses or
	technologies in the engineerin	-	574	
iv.	Apply knowledge gained in se	olving real life engir	neering problems	
Evaluation	100			
Maximum M	arks : 100			
(i) Two progr	ess assessments	20% by the fac	culty supervisor(s)	
(ii) Final proje	ect report	30% by the ass	essment board	
(iii) Project pr	resentation and viva voce	50% by the ass	sessment board	
				-
	three evaluations are mandat	ory for course con	npletion and for awa	arding the final
grade.		Estd.		
		5/4		
		2014		