OUTCOMES:
Upon completion of the course, the student will be able to
- Identify the limitations of ILP and the need for multicore architectures.
- Discuss the issues related to multiprocessing and suggest solutions.
- Point out the salient features of different multicore architectures and how they exploit parallelism.
- Point out the various optimizations that can be performed to improve the memory hierarchy design.
- Point out the salient features of vector, GPU and domain specific architectures.

REFERENCES:
1. John L. Hennessey and David A. Patterson, "Computer Architecture – A Quantitative Approach", Morgan Kaufmann / Elsevier, 5th edition, 2012.
2. Darryl Gove, "Multicore Application Programming: For Windows, Linux, and Oracle Solaris", Pearson, 2011.
3. David B. Kirk, Wen-mei W. Hwu, "Programming Massively Parallel Processors", Morgan Kauffman, 2010.
4. Wen–mei W.Hwu,"GPU Computing Gems", Morgan Kaufmann / Elsevier, 2011.

CO	PO						PSO		
	1	2	3	4	5	6	1	2	3
1.	√			√		√	√	√	√
2.	√		√	√		√		√	√
3.	√			√			√	√	√
4.	√			√			√	√	√
5.	√			√		√	√	√	

CP5153 **NETWORKING TECHNOLOGIES** **L T P C**
3 0 0 3

OBJECTIVES:
- To learn about integrated and differentiated services architectures.
- To understand the working of wireless network protocols.
- To study the developments in cellular networks.
- To get familiarized with next generation networks.
- To know the concepts behind software defined networks.

UNIT I   NETWORK ARCHITECTURE AND QoS   9
Overview of TCP/IP Network Architecture – Integrated Services Architecture – Approach – Components – Services – Queuing Discipline – FQ – PS – BRFQ – GPS – WFQ – Random Early Detection – Differentiated Services.

UNIT II   WIRELESS NETWORKS   9
IEEE 802.16 and WiMAX – Security – Advanced 802.16 Functionalities – Mobile WiMAX – 802.16e – Network Infrastructure – WLAN – Configuration – Management Operation – Security – IEEE 802.11e and WMM – QoS – Comparison of WLAN and UMTS – Bluetooth – LiFi – Protocol Stack – Security – Profiles

UNIT III   CELLULAR NETWORKS   9
GSM – Mobility Management and call control – GPRS – Network Elements – Radio Resource Management – Mobility Management and Session Management – Small Screen Web Browsing over GPRS and EDGE – MMS over GPRS – UMTS – Channel Structure on the Air Interface – UTRAN –Core and Radio Network Mobility Management – UMTS Security

UNIT IV   4G NETWORKS   9
LTE – Network Architecture and Interfaces – FDD Air Interface and Radio Networks –Scheduling – Mobility Management and Power Optimization – LTE Security Architecture – Interconnection with UMTS and GSM – LTE Advanced (3GPPP Release 10) – 4G Networks and Composite Radio Environment – Protocol Boosters – Hybrid 4G Wireless Networks Protocols – Green Wireless Networks – Physical Layer and Multiple Access – Channel Modelling for 4G – Introduction to 5G& XG networks.

UNIT V   SOFTWARE DEFINED NETWORKS   9
Introduction – Centralized and Distributed Control and Data Planes – Open Flow – SDN Controllers – General Concepts – VLANs – NVGRE – Open Flow – Network Overlays – Types – Virtualization – Data Plane – I/O – Design of SDN Framework

TOTAL : 45 PERIODS

OUTCOMES:
Upon completion of the course, the student will be able to
- Identify the different features of integrated and differentiated services.
- Demonstrate various protocols of wireless networks.
- Analyze the use of next generation networks.
- Provide solutions using SDN.
- Design protocols for cellular networks.

REFERENCES:
1. William Stallings, "High Speed Networks and Internets: Performance and Quality of Service", Prentice Hall, Second Edition, 2002.
2. Martin Sauter, "From GSM to LTE, An Introduction to Mobile Networks and Mobile Broadband", Wiley, 2014.
3. Savo G Glisic, "Advanced Wireless Networks – 4G Technologies", John Wiley & Sons, 2007.
4. Jonathan Rodriguez, "Fundamentals of 5G Mobile Networks", Wiley, 2015.
5. Martin Sauter, "Beyond 3G – Bringing Networks, Terminals and the Web Together: LTE,
6. WiMAX, IMS, 4G Devices and the Mobile Web 2.0", Wiley, 2009.
7. Naveen Chilamkurti, SheraliZeadally, HakimaChaouchi, "Next-Generation Wireless Technologies", Springer, 2013.
8. Erik Dahlman, Stefan Parkvall, Johan Skold, "4G: LTE/LTE-Advanced for Mobile Broadband", Academic Press, 2013.

CO	PO						PSO		
	1	2	3	4	5	6	1	2	3
1.	√		√	√		√	√	√	√
2.	√		√	√		√	√	√	√
3.	√		√	√		√	√	√	√
4.	√		√	√		√	√	√	√
5.	√		√	√		√	√	√	√

RM5151	RESEARCH METHODOLOGY AND IPR	LT P C
		2 0 0 2

OBJECTIVES:
To impart knowledge and skills required for research and IPR:
- Problem formulation, analysis and solutions.
- Technical paper writing / presentation without violating professional ethics
- Patent drafting and filing patents.

UNIT I RESEARCH PROBLEM FORMULATION 6
Meaning of research problem- Sources of research problem, criteria characteristics of a good research problem, errors in selecting a research problem, scope and objectives of research problem. Approaches of investigation of solutions for research problem, data collection, analysis, interpretation, necessary instrumentations

UNIT II LITERATURE REVIEW 6
Effective literature studies approaches, analysis, plagiarism, and research ethics.

UNIT III TECHNICALWRITING /PRESENTATION 6
Effective technical writing, how to write report, paper, developing a research proposal, format of research proposal, a presentation and assessment by a review committee.

UNIT IV INTRODUCTION TO INTELLECTUAL PROPERTY RIGHTS (IPR) 6
Nature of Intellectual Property: Patents, Designs, Trade and Copyright. Process of Patenting and Development: technological research, innovation, patenting, development. International Scenario: International cooperation on Intellectual Property. Procedure for grants of patents, Patenting under PCT.

UNIT V INTELLECTUAL PROPERTY RIGHTS (IPR) 6
Patent Rights: Scope of Patent Rights. Licensing and transfer of technology. Patent information and databases. Geographical Indications. New Developments in IPR: Administration of Patent System, IPR of Biological Systems, Computer Software etc.
Traditional knowledge Case Studies, IPR and IITs.

TOTAL: 30 HOURS