NEW HORIZON
COLLEGE OF ENGINEERING

Autonomous College Permanently Affiliated to VTU, Approved by AICTE & UGC
Accredited by NAAC with 'A' Grade.

Department of Computer Science and Engineering

Academic Year 2016-17

M.Tech in Computer Network Engineering

Third and Fourth Semesters
Scheme and Syllabus

NEW HORIZON COLLEGE OF ENGINEERING

M.TECH COMPUTER NETWORK ENGINEERING

CREDIT SCHEME FOR THIRD SEMESTER

THIRD SEMESTER-M.TECH COMPUTER SCIENCE AND ENGINEERING												
S.No	**Course code**	**course**	**BOS**	**Credit distribution**				**Overall credits**	**Contact Hours**	**Marks**		
				L	**P**	**T**	**S**			**CIE**	**SEE**	**TOTAL**
1	16SCN31x	Specialization Elective-3	CSE	4	0	0	1	5	4	50	50	100
2	16SCN32	Internship	CSE	0	2	0	0	2	-	50	50	100
3	16SCN33	Seminar	CSE	0	0	0	2	2	-	50	50	100
4	16SCN34	Project Phase-1	CSE	0	16	0	7	16	-	50	50	100
Total								25	4	200	200	400

Specialization Elective-3	
Course code	**course**
16SCN311	Internet Of Things
16SCN312	Network Management
16SCN313	Optical Networks
16SCN314	Ethical Hacking

INTERNET OF THINGS

Course Code : 16SCN31/16SCS31 | **Credits : 05**
L:P:T:S : 4:0:0:1 | **CIE Marks : 50**
Exam Hours : 03 | **SEE Marks : 100**

Course Outcomes: At the end of the Course, the Student will be able to:

CO1	Interpret on various IoT protocols, design and their standardization challenges
CO2	Develop a networked programming using python libraries
CO3	Design a portable IoT using Arduino/equivalent boards and relevant protocols
CO4	Develop a web services to access/control IoT devices
CO5	Deploy an IoT application and connect to the cloud
CO6	Analyze specifications in real time scenarios

Mapping of Course Outcomes to Program Outcomes:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	-	-	-	-	-	2	3	3	3	3	3	3
CO2	-	-	-	-	-	2	3	3	3	3	3	3
CO3	-	-	-	-	-	2	3	3	3	3	3	3
CO4	-	-	-	-	-	2	3	3	3	3	3	3
CO5	-	-	-	-	-	2	3	3	3	3	3	3
CO6	-	-	-	-	-	2	3	3	3	3	3	3

SYLLABUS			
Module no	**Module Contents**	**Hrs**	**COs**
1	**FUNDAMENTALS OF IOT** Introduction-Characteristics-Physical design - Protocols – Logical design – Enabling technologies – IoT Levels – Domain Specific IoTs – IoT vs M2M(Machine-to-Machine).	9	CO1, CO2
2	**IOT DESIGN METHODOLOGY**IoT systems management – IoT Design Methodology – Specifications Integration and Application	9	CO3

	Development using Python-Networked programming using python libraries		
3	**BUILDING IOT WITH RASPBERRY PI** Physical device – Raspberry Pi Interfaces – Programming – Application Programming Interface(APIs)/ Packages – Web services- Amazon web services	9	CO4,CO5, CO6
4	**BUILDING IOT WITH GALILEO/ARDUINO** Intel Galileo Gen2 with Arduino- Interfaces - Arduino IDE – Programming - APIs and Hacks	9	CO4,CO5, CO6
5	**CASE STUDIES and ADVANCED TOPICS** Various Real time applications of IoT(smart transportation, smart cities, smart living, smart energy, smart health, and smart learning)- Connecting IoT to cloud – Cloud Storage for Iot – Data Analytics for IoT – Software & Management Tools for IoT	9	CO4,CO5, CO6

Text Books / Reference books:

1. ArshdeepBahga, Vijay Madisetti, “Internet of Things – A hands-on approach”, Universities Press, 2015.

2. Manoel Carlos Ramon, “Intel® Galileo and Intel® Galileo Gen 2: API Features and Arduino Projects for Linux Programmers”, Apress, 2014.

3. Marco Schwartz, “Internet of Things with the Arduino Yun”, Packt Publishing, 2014.

4.Jan Holler, VlasiosTsiatsis, Catherine Mulligan, Stefan Avesand, Stamatis Karnouskos, David Boyle, “From Machine-to-Machine to the Internet of Things: Introduction to a New Age of Intelligence”, 1st Edition, Academic Press, 2014.

5. Francis daCosta, “Rethinking the Internet of Things: A Scalable Approach to Connecting Everything”, 1st Edition, Apress Publications, 2013

Assessment Pattern

CIE- Continuous Internal Evaluation (50 Marks)

Bloom’s Category	Tests	Assignments	Quizzes	Self Study
Marks (out of 50)	20	10	10	10
Remember	5	-	-	-
Understand	5	-	-	-
Apply	5	-	5	-
Analyze	5	5	-	-
Evaluate	-	-	5	5
Create	-	5	-	5

SEE- Semester End Examination (50 Marks)

Bloom's Category	Tests
Remember	0
Understand	10
Apply	10
Analyze	10
Evaluate	5
Create	5

NEW HORIZON COLLEGE OF ENGINEERING

M.TECH COMPUTER NETWORK ENGINEERING

CREDIT SCHEME FOR FOURTH SEMESTER

FOURTH SEMESTER-COMPUTER NETWORK ENGINEERING												
S.No	**Course code**	**course**	**BOS**	**Credit distribution**				**Overall credits**	**Contact Hours**	**Marks**		
				L	**P**	**T**	**S**			**CIE**	**SEE**	**TOTAL**
1	16SCN41x	Specialization Elective-4	CSE	4	0	0	1	5	4	50	50	100
2	16SCN42	Internship	CSE	0	3	0	0	3	-	50	50	100
3	16SCN43	Seminar	CSE	0	0	0	2	2	-	50	50	100
4	16SCN44	Project Phase-2	CSE	0	16	0	0	16	-	50	50	100
Total								25	4	200	200	400

Specialization Elective-4	
Course code	**course**
16SCN411	Mobile and Pervasive Comp
16SCN412	Network Routing Algorithms
16SCN413	Advanced Mobile Networks
16SCN414	WSN

WIRELESS SENSOR NETWORKS

Course Code : 16SCN414 **Credits : 05**
L:P:T:S : 4:0:0:1 **CIE Marks : 50**
Exam Hours : 03 **SEE Marks : 50**

Course Outcomes: At the end of the Course, the Student will be able to:

CO1	Architect sensor networks for various application setups.
CO2	Explore the design space and conduct trade-off analysis between performance and resources.
CO3	Devise appropriate data dissemination protocols and model links cost.
CO4	Determine suitable medium access protocols and radio hardware.
CO5	Prototype sensor networks using commercial components.
CO6	Design energy efficient wireless sensor network architecture.

Mapping of Course Outcomes to Program Outcomes:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	1	1	1	1					1	1	1	2
CO2	1	1	2	2	2	1	1	1	1	1	1	2
CO3	1	1	1	2	2	1	1	1	1	1	1	2
CO4	1	1	2	2	3	1	1	1	2	1	1	2
CO5	1	2	2	3	3	2	2	2	3	3	3	2
CO6	1	1	1	2	3	2	2	1	2	3	3	2

SYLLABUS			
Sl. No.	**Contents of Module**	**Hrs**	**COs**
1	**INTRODUCTION TO WIRELESS SENSOR NETWORKS:** Overview of Wireless Sensor Networks, Network Characteristics, Network Applications, Network Design Objectives Network, Design Challenges, Technological Background, MEMS Technology, Wireless Communication Technology, Hardware and Software Platforms, Wireless Sensor Network Standards. **NETWORK ARCHITECTURES AND PROTOCOL STACK:** Introduction, Network Architectures for Wireless Sensor Networks, Classifications of Wireless Sensor Networks Protocol Stack for Wireless Sensor Networks. **MEDIUM ACCESS CONTROL:** Introduction, Fundamental MAC Protocols, MAC Design for Wireless Sensor Networks, MAC Protocols for Wireless Sensor Networks.	**9**	**CO1 & CO6**
2	**ROUTING AND DATA DISSEMINATION:** Introduction, Fundamentals and Challenges, Taxonomy of Routing and Data Dissemination Protocols, Overview of Routing and Data Dissemination Protocols. **BROADCASTING, MULTICASTING, AND GEOCASTING:** Introduction, Concepts and Major Challenges, Broadcasting Mechanisms, Multicasting Mechanisms, Geocasting Mechanisms. **NODE CLUSTERING:** Introduction, Node Clustering Algorithms, Node	**9**	**CO2 & CO6**

	Clustering Algorithms for Wireless Sensor Networks.		
3	**QUERY PROCESSING AND DATA AGGREGATION:** Introduction, Query Processing in Wireless Sensor Networks, Data Aggregation in Wireless Sensor Networks. **NODE LOCALIZATION:** Introduction, Concepts and Challenges of Node Localization Technologies, Ranging Techniques for Wireless Sensor Networks, Wireless Localization Algorithms, Wireless Sensor Node Localization. **TIME SYNCHRONIZATION:** Introduction, Need for Synchronization in Wireless Sensor Networks, Requirements of Synchronization in Wireless Sensor Networks, Synchronization Protocols for Wireless Sensor Networks.	**9**	**CO3 &CO6**
4	**ENERGY EFFICIENCY AND POWER CONTROL:** Introduction, Need for Energy Efficiency and Power Control in Wireless Sensor Networks, Passive Power Conservation Mechanisms, Active Power Conservation Mechanisms. TRANSPORT **PROTOCOLS AND QUALITY OF SERVICE:** Introduction, Traditional Transport Protocols, Transport Protocol Design for Wireless Sensor Networks, Transport Protocols for Wireless Sensor Networks. **NETWORK SECURITY AND ATTACK DEFENSE:** Introduction, Confidentiality, Integrity, Authenticity, Nonrepudiation, Freshness, Availability, Intrusion Detection, Key Management.	**9**	**CO4 & CO6**
5	**SENSOR NETWORK STANDARDS:** Introduction, IEEE 802.15.4 Standard, ZigBee Standard. **FUTURE TRENDS IN WIRELESS SENSOR NETWORKS:** Introduction, Wireless Multimedia Sensor Networks, Wireless Sensor and Actor Networks, Sensor Network Applications in Challenging Environments, Cross-Layer Design for Wireless Sensor Networks.	**9**	**CO5 & CO6**

TEXT BOOKS:

1. Zheng & Jamalipour: Wireless Sensor Networks: A Networking Perspective, Wiley India, 2014.

REFERENCE BOOKS:

1. KAZEM SOHRABY, DANIEL MINOLI, TAIEB ZNATI, "Wireless Sensor Networks: Technology, Protocols and Applications:, WILEY , Second Edition (Indian) , 2014.

2. Ian F. Akyildiz, Mehmet Can Vuran "Wireless Sensor Networks", Wiley 2010

3. Feng Zhao & Leonidas J. Guibas, "Wireless Sensor Networks- An Information Processing Approach", Elsevier, 2007.