Template for Courses

1. Title: Mobile Networks

2. Credit Structure (L-T-P-Cr): 3 0 2 ?

3. Course Code: 5XX

4. Program/Semester: MTech/III

5. Category: Elective

6. Prerequisites: Basic understanding of networking fundamentals

7. Foundation for: Advancement in networking technology

8. Abstract Content:

This course will focus on current research issues in Mobile networks including techniques, cellular system design, mesh networking and relevant standards (802.11s, WiMAX) and their applications e.g. VANET, ad hoc networking/MANET, Mobile Network protocols, Cognitive radio networks, cross layer design and security in mobile networks. Lectures will be based on required reading from textbook complemented by conference, magazine and journal articles. Each student will be required to present a paper on one of the course topics to the class. The course grade will be based on class participation, paper surveys, analysis based on the required and supplemental reading and assignments.

9. Suggested Text/s:

Text Books: TBD

Reference Books: TBD

10. The format of the Detailed Course content is as follows:

<table>
<thead>
<tr>
<th>Unit</th>
<th>Topic names and relevant Contents</th>
<th>No. of lectures</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Multiuser Wireless System: Broadcast channels, MAC channels, Bandwidth Sharing (FD, TD, CD, SD, Hybrid), Multiuser Detection, Random access, Scheduling Techniques, Multiuser Channel capacity</td>
<td>4</td>
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<tr>
<td>2</td>
<td>Cellular systems: Overview, Design consideration, LTE/3G standards, Cellular system Capacity, MIMO in cellular, Multiuser Detection in Cellular, Adaptive resource allocation in cellular, Power control, Adaptive OFDM and CDMA</td>
<td>4</td>
</tr>
<tr>
<td>3</td>
<td>Mesh Networks: Introduction to WMN, Advance MAC protocols, Routing, Cross layer communication and issues, Standards 802.11s and 802.16 (WiMAX),</td>
<td>5</td>
</tr>
</tbody>
</table>
Advanced Topics e.g. Topology Management, Heterogeneous Mesh networks, Vehicular Mesh networks, Millitary Mesh Network

| 4 | Ad hoc networks: Overview of Ad hoc networks, Ad hoc network design issues – Link layer design, channel access and frequency reuse, Reliability, Routing, resource allocation, Capacity of Ad hoc Networks | 5 |

5 | Mobile Network Protocols: Mobile IP, routing optimization, P-MIP, Network Enhanced Mobility and their applications in Aviation and Space industry | 4 |


8 | Security in Mobile Networks | 1 |

9 | Paper Presentation by Students |  |

11. The outcomes and objectives should give on the one hand the skills and competencies acquired by the student as well as the value of the course towards latest industry/research/academic objectives.

Proposed course definitely fulfills the above objectives as course work will also focus on advancement in wireless systems and networks, including latest industry perspective in this field, which can improve competencies and depth in this area. Moreover students will receive exposure to research done in this area while referring the international magazine or Journal papers.