# DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING
## NATIONAL INSTITUTE OF TECHNOLOGY, TIRUCHIRAPPALLI

| COURSE PLAN PART - I | | | |
|---|---|---|---|
| **Course Title** | AD HOC WIRELESS NETWORKS | | |
| **Course Code** | ECPE30 | **No.of Credits** | 03 |
| **Course Code of Pre-requisite subject(s)** | ECPE29 NETWORKS AND PROTOCOLS | | |
| **Session** | **JULY** | **Section (if Applicable)** | - |
| **Name of Faculty** | Dr.B.Malarkodi | **Department** | ECE |
| **Email** | malark@nitt.edu | **Telephone No.** | 9894768765 |
| **Name Course Coordinator(s) (if, applicable)** | - | ' | |
| **Email** | - | **Telephone No.** | - |
| **Course Type** | ☐ Core course | ☑ Elective course | |

### Syllabus (approved in BoS)

- Cellular and ad hoc wireless networks, Applications of ad hoc wireless networks. Issues in ad hoc wireless networks-medium access scheme, routing, transport layer protocols, security and energy management. Ad hoc wireless internet.
- Design goals of a MAC protocol, Contention based protocols; Contention based protocols with reservation mechanisms and scheduling mechanisms, MAC protocols using directional antennas.
- Table driven routing protocols, On demand routing protocols, hybrid routing protocols, Hierarchical routing protocols, Power aware routing protocols, Tree based and mesh based multicast routing protocols
- Network security requirements-Issues and challenges, network security attacks, key management, secure routing protocols
- Energy management schemes-Battery management, transmission power management, system power management schemes. Quality of service solutions in ad hoc wireless networks.

### COURSE OBJECTIVES

The main objective of this course is to impart the students a thorough exposure to the wireless adhoc network technology and to analyse the design issues, challenges and the protocols implemented at various layers for optimizing the network performance.

## COURSE OUTCOMES (CO)

| | Course Outcomes | Aligned Programme Outcomes (PO) |
|---|---|---|
| 1. | Compare the differences between cellular and ad hoc networks and to analyse the challenges at various layers of network and services | 1 |
| 2. | Summarize the protocols used at the MAC layer and scheduling mechanisms | 5 |
| 3. | Compare and analyse the types of routing protocols used for unicast and multicast routing | 5 |
| 4. | Examine the network security solution and routing mechanism | 9, 10 |
| 5. | Evaluate the energy management schemes and quality of service solution in ad hoc networks | 9, 10 |

## COURSE PLAN PART - II

### COURSE OVERVIEW

The aim of this course is to analyze the layered protocol architecture of wireless adhoc network challenges, protocols and their services

### COURSE TEACHING AND LEARNING ACTIVITIES

| S.No. | Week | Topic | Mode of Delivery |
|---|---|---|---|
| 1. | 1 | Introduction on wireless ad hoc Networks, Cellular and ad hoc networks, applications | Chalk and Talk, PPT |
| 2. | 2 | Issues in ad hoc networks, medium access scheme, routing, transport layer protocols, QOS provisioning, ad hoc wireless internet | Chalk and Talk, PPT |
| 3. | 3 | MAC protocols for ad hoc networks-issues in designing a protocol, Design goals, Classification | Chalk and Talk, PPT |
| 4. | 4,5 | Contention based protocols, contention based protocols with reservation based mechanisms, contention based protocols with scheduling mechanisms | Chalk and Talk, PPT |
| 5 | 6 | MAC protocols using directional antennas, Multichannel MAC protocol, Power control MAC protocol for ad hoc networks | Chalk and Talk, PPT |

| 6. | 7,8 | Routing protocols for ad hoc networks-design issues,Classification of routing protocols, Table driven routing protocols, On demand routing protocols | Chalk and Talk, PPT |
| 7. | 9,10 | Hybrid routing protocols,Routing protocols with efficient flooding mechanisms,hierarchical routing, Power aware routing protocols. | Chalk and Talk, PPT |
| 8. | 11,12,13 | Multicast routing, Security in ad hoc networks-Requirements,challenges and issues, network security attacks, Key management,Secure routing,security aware AODV protocol. | Chalk and Talk, PPT |
| 9. | 14,15 | QOS in ad hoc networks, MAC layer and network layer solutions, need for energy management,battery management, transmission power management, system power management schemes | Chalk and Talk, PPT |

## COURSE ASSESSMENT METHODS

| S.No. | Mode of Assessment | Week/Date | Duration | % Weightage |
|---|---|---|---|---|
| 1. | Assessment I Descriptive Type Examination (2 ½ Units) | Schedule as per the Class Committee Meeting | 60 Minutes | 20 |
| 2. | Assessment II Descriptive Type Examination (2 ½ Units) | Schedule as per the Class Committee Meeting | 60 minutes | 20 |
| 3. | Assessment III Seminar / Mini Projects/Assignment | ------- | | 10 |
| CPA | Compensation Assessment | Before End Semester | 60 Minutes | 20 |
| 4. | Assessment IV (End Semester) Descriptive Type Examination (Unit 1,2,3,4 & 5) | | 180 Minutes | 50 |

## COURSE EXIT SURVEY (mention the ways in which the feedback about the course is assessed and indicate the attainment also)

1. Direct feedback from the students by having face-to-face meeting individually and as the class as a whole.
2. Feedback from the students during the class committee meetings

| COURSE POLICY (including plagiarism, academic honesty, attendance, etc.) |
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**MODE OF CORRESPONDENCE**

1. All the students are advised to come to the class regularly. All the correspondence (schedule of classes/ schedule of assignment/ course material/ any other information regarding this course) will be intimated in the class only.

**ATTENDANCE**

1. Attendance will be taken by the faculty. 100 % is a mandatory. However, the relaxation upto 25% will be given for leave on medical, and other essential requirements followed in the institute. Every student should maintain minimum 75% physical attendance in these contact hours along with assessment criteria to attend the end semester examination.

2. Any student, who fails to maintain 75% attendance need to appear for the compensation assessment (CPA). Student who scores more than 60 % marks in the CPA along with assessment criteria will be eligible for attending the end semester examination.

3. Those students who have attendance lag and also missed any of the continuous assessments (CAs) can appear for CPA to get eligibility for writing the end semester examination as quoted in Pt. 2. Their scores in the CPA WILL NOT be taken into account for computing marks for CA.

4. Students not having 75% minimum attendance along with compensation at the end of the semester will have to REDO the course.

**ASSESSMENT**

1. Attending all the assessments (Assessments 1-4) are MANDATORY for every students.

**COMPENSATION ASSESSMENT**

1. If any student is not able to attend Assessment-1 (1st Cycle Test) / Assessment-2 (2nd Cycle Test) due to medical or genuine reason, student is permitted to attend the Compensation Assessment with 20% weightage of 100 (20 marks).

2. In any case, retest will not be considered as an improvement test.
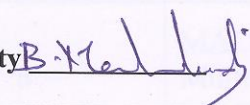
**PLAGIARISM, ACADEMIC HONESTY**

1. Copying in any form during assessments is considered as academic dishonesty and will attract suitable penalty.

| ADDITIONAL INFORMATION |
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1. The faculty is available for consultation at times as per the intimation given by the faculty.

2. Queries (if required) to the course teacher shall only be emailed to the Email ID specified by the teacher (malark@nitt.edu)

3. Queries may also be emailed to the Class-Committee Chairperson at bhaskar@nitt.edu

| FOR APPROVAL |
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Course Faculty B. Mel___    CC-Chairperson M-BM___    HOD ___