

DEPARTMENT OF ECE

NATIONAL INSTITUTE OF TECHNOLOGY, TIRUCHIRAPPALLI

| COURSE PLAN – PART I | | | |
|---|---|--|------------|
| Name of the programme and specialization | B.Tech ELECTRONICS AND COMMUNICATION ENGINEERING | | |
| Course Title | WIRELESS COMMUNICATION | | |
| Course Code | ECPC27 | No. of Credits | 03 |
| Course Code of Pre-requisite subject(s) | - | | |
| Session | July 2019 | Section (if, applicable) | B |
| Name of Faculty | Dr. V. Sudha | Department | ECE |
| Email | vsudha@nitt.edu | Telephone No. | 9443608785 |
| Name of Course Coordinator(s) (if, applicable) | | | |
| E-mail | | Telephone No. | |
| Course Type | <input checked="" type="checkbox"/> Core course | <input type="checkbox"/> Elective course | |
| Syllabus (approved in BoS) | | | |
| Introduction to Wireless Communication. Cellular concept. System design fundamentals. Coverage and Capacity improvement in Cellular system. Technical Challenges. | | | |
| Mobile Radio Propagation; Reflection, Diffraction, Fading. Multipath propagation. Statistical characterization of multipath fading. Diversity Techniques. | | | |
| Path loss prediction over hilly terrain. Practical link budget design using Path loss models. Design parameters at base station. Antenna location, spacing, heights and configurations. | | | |
| Multiple access techniques; FDMA, TDMA and CDMA. Spread spectrum. Power control. WCDMA. CDMA network design. OFDM and MC-CDMA. | | | |
| GSM. 3G, 4G (LTE), NFC systems, WLAN technology. WLL. HiperLAN. Ad hoc networks. Bluetooth. | | | |
| Text Books: | | | |
| 1. T.S. Rappaport, Wireless Communication Principles (2/e), Pearson, 2002. 2. A.F. Molisch, Wireless Communications, Wiley, 2005. | | | |
| Reference Books: | | | |
| 1. P. MuthuChidambaram Nathan, Wireless Communications, PHI, 2008. | | | |
| 2. W.C.Y. Lee, Mobile Communication Engineering. (2/e), McGraw-Hill, 1998. | | | |
| 3. A. Goldsmith, Wireless Communications, Cambridge University Press, 2005. 4. S.G. Glisic, Adaptive CDMA, Wiley, 2003. | | | |

| COURSE OBJECTIVES | |
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| To get an understanding of mobile radio communication principles, types and to study the recent trends adopted in cellular and wireless systems and standards. | |
| COURSE OUTCOMES (CO) | |
| Course Outcomes | Aligned Programme Outcomes (PO) |
| The students will be able to | |
| 1. Apply the knowledge of basic communication systems and its principles | 1,2,3,4,6,12 |
| 2. Describe the cellular concept and analyze capacity improvement Techniques. | 1,2,3,4,6 |
| 3. Mathematically analyze mobile radio propagation mechanisms | 1,4 |
| 4. Summarize diversity reception techniques. | 3,6 |
| 5. Design Base Station (BS) parameters and analyze the antenna configurations | 3,4,6 |
| 6. Analyze and examine the multiple access techniques and its applications | 1,3,4 |
| 7. Assess the latest wireless technologies | 3,4,6 |

| COURSE PLAN – PART II | | | |
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| COURSE OVERVIEW | | | |
| This course deals with the basics of wireless communication and its system fundamentals, capacity improvement techniques (both flat and hilly terrain), multipath propagation effects. Also deals with diversity reception techniques, link budget analysis, various multiple access schemes and latest wireless network technologies. | | | |
| COURSE TEACHING AND LEARNING ACTIVITIES | | | |
| S.No. | Week/Contact Hours | Topic | Mode of Delivery |
| 1 | Week 1 (3 Contact Hours) | Introduction to Wireless Communication. Cellular concept. | Lecture C&T/ PPT or any suitable mode |
| 2 | Week 2 (3 Contact Hours) | System design fundamentals. | |
| 3 | Week 3 (3 Contact Hours) | Coverage and Capacity improvement in Cellular system. Technical Challenges. | |
| 4 | Week 4 (3 Contact Hours) | Mobile Radio Propagation mechanisms, two ray ground reflection model. | |
| ASSESSMENT I - 20 Marks | | | Written |
| 5 | Week 5 (3 Contact Hours) | Knife edge diffraction model, Multipath propagation, Fading and its types. | Lecture C&T/ PPT or any suitable mode |
| 6 | Week 6 (3 Contact Hours) | Statistical characterization of multipath fading, diversity Techniques. | |

| 7 | Week 7 (3 Contact Hours) | Path loss prediction over hilly terrain Practical link budget design using Path loss models | | |
|---|------------------------------|--|-------------|--|
| 8 | Week 8 (3 Contact Hours) | Indoor and outdoor propagation models. | | |
| 9 | Week 9 (3 Contact Hours) | Design parameters at base station. Antenna location, spacing, heights and configurations | | |
| ASSESSMENT II - 20 Marks | | | | Written |
| 10 | Week 10 (3 Contact Hours) | Multiple access techniques; FDMA, TDMA and CDMA | | Lecture C&T/ PPT or any suitable mode |
| 11 | Week 11 (3 Contact Hours) | Spread spectrum. Power control. WCDMA. CDMA network design OFDM and MC-CDMA | | |
| ASSESSMENT III- 10 Marks | | | | Assignment Test / Seminar/Quiz |
| 12 | Week 12 (3 Contact Hours) | GSM, 3G, 4G (LTE) | | PPT |
| 13 | Week 13 (3 Contact Hours) | NFC systems, WLAN technology, WLL. Hiper LAN. Ad hoc networks. Bluetooth. | | PPT |
| 14 | Week 14 (3 Contact Hours) | CPA - 20 Marks | | Written |
| 15 | Week 15 (3 Contact Hours) | END ASSESSMENT – 50 Marks | | Written |
| COURSE ASSESSMENT METHODS (shall range from 4 to 6) | | | | |
| S.No. | Mode of Assessment | Week/Date | Duration | % Weightage |
| 1 | Assessment I | 4 th Week | 60 Minutes | 20 |
| 2 | Assessment II | 9 th Week | 60 Minutes | 20 |
| 3 | Assessment III | 11 th Week | | 10 |
| 4 | Compensation Assessment* | 14 th Week | 60 Minutes | 20 |
| 5 | Final Assessment * | 15 th Week | 180 Minutes | 50 |
| *mandatory; refer to guidelines on page 4 | | | | |
| COURSE EXIT SURVEY (mention the ways in which the feedback about the course shall be assessed) | | | | |
| Feedback from the students during class committee meetings and MIS. | | | | |

COURSE POLICY (preferred mode of correspondence with students, compensation assessment policy to be specified)

MODE OF CORRESPONDENCE (email/ phone etc)

All the students are advised to check their NITT WEBMAIL/group mail/ class representative regularly. All the correspondence (schedule of classes/ schedule of assessment/ course material/ any other information regarding this course) will be intimated in class only.

ATTENDANCE

- **At least 75% attendance in each course is mandatory.**
- **A maximum of 10% shall be allowed under On Duty (OD) category.**
- **Students with less than 65% of attendance shall be prevented from writing the final assessment and shall be awarded 'V' grade.**

ASSESSMENT POLICY

1. Attending all the assessments are MANDATORY for every student.
2. If any student is not able to attend any of the continuous assessments due to genuine reason, student is permitted to attend the **compensation assessment (CPA)** with 20% weightage.
3. Please refer institute B.Tech Regulations/ guidelines for grading policy.

ACADEMIC DISHONESTY & PLAGIARISM

- Possessing a mobile phone, carrying bits of paper, talking to other students, copying from others during an assessment will be treated as punishable dishonesty.
- Zero mark to be awarded for the offenders. For copying from another student, both students get the same penalty of zero mark.
- The departmental disciplinary committee including the course faculty member, PAC chairperson and the HoD, as members shall verify the facts of the malpractice and award the punishment if the student is found guilty. The report shall be submitted to the Academic office.

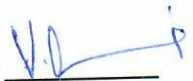
The above policy against academic dishonesty shall be applicable for all the programme.

ADDITIONAL INFORMATION

Queries may also be emailed to the course teacher directly at vsudha@nitt.edu

FOR APPROVAL

Course Faculty


(DR. V. SUDHA)

CC-Chairperson



HOD

