# Maharashtra State Board of Technical Education, Mumbai TEACHING PLAN (TP)

**D-1**

## Academic Year: 2020-21

**Date:** 15/06/2020

**Institute Name &Code:Late Annasheb(NIT’S)**, Nashik (1479)

**Programme and Code**: Electronics and Telecommunication (EJ) **Course Index:** 504

**Course Name**: : **Mobile and Wireless Communication Course Abbr-Code**: MWC-22533

**Semester**: Vth **Scheme**: ‘I’ **Allocated Hrs:** 64 **Name of Faculty**: Mr.G.R.Kshrisagar

# Class: TYEJ

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## Course Objectives:

* 1. Troubleshoot mobile handsets.
  2. Assess cellular systems capacity.
  3. Assess performance of standards of different cellular mobile systems.
  4. Select relevant wireless technology suitable for variousapplications.
  5. Test the performance of various wireless protocols.

## Course Outcomes (COs) and Unit Outcomes: Theory & Practical

By learning course **Mobile and Wireless Communication** (MWC-22533), Third Year students will be able to:

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| **CO No.** | **UO** | **Course Outcomes (COs) / Unit Outcomes (UOs)** |
| **CO504.1** |  | **Wireless Network** |
|  | 1a | Explain the features of the givcn mobile radio standards |
| 1b | Describe with relevant sketch the working of the specified application of the mobile |
| 1c | Explain with relevant sketch the working principle of the given mobile handset unit |
| 1d | Describe with relevant sketch the working of the given fixed wireless network systcm. |
| 1e | Describe step-by-step trouble shooting piocedure for the given section of mobile phone |
| **CO504.2** |  | **Fundamentals of cellular system** |
|  | 2a | Explain the given terms, with respect to Cellular systems. |
| 2b | Apply the principle of frequency reuse for the given coverage area. |
| 2c | Choose the handoff mechanism for the given situation with justification |
| 2d | Explain the effect ofthe given interference on cellular system performance |
| 2e | Select the relevant method to improve coverage and system capacity of the given system  with justification . |
| **CO504.3** |  | **Digital cellular mobile standard** |
|  | 3a | Describe with relevant sketch the architecture of the given 3G cellular standard. |
| 3b | Describe with relevant sketch the layered architecture of the given ss7 protocol |
| 3c | Explain the features of the services and performance of the given type of signaling  system |
| 3d | Describe call processing stages in the given cellular standard. |
| **CO504.4** |  | **Advance Wireless Standards** |
|  | 4a | Explain compatibility requirements of the given wireless standard |
| 4b | Explain features of the given next generation wireless standard. |
| 4c | Describe with relevant sketch the functions of the given section of UMTS network architecture |
| 4d | Compare features of two given next generation mobile communication standard. |

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| **CO504.5** |  | **Wireless Network Technologies** |
|  | 5a | Explain the procedure to develop personal area network for the given number of’ devices using Bluetooth. |
| 5b | Describe with relevant sketch given IEEE protocol standard for wireless communication  network |
| 5c | Classify RFID tags on the basis of the given type |
| 5d | Compare the performance of given wireless network |

* Teaching Plan:

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| **Unit No.**  **(Allotted Hrs.)** | **Object ives**. | **Title/Topic Details and Course Outcome (CO)** | **Plan (From – To & No. of Lectures** |  | | |
| **Actual Execution (From-To & No. of Lectures)** | **Teaching Method/ Media/ Tools** | **Remark** |
|  |  |  |  |  |  |  |
| 10 | CO  504.1 | 1.1Wireless network |  |  |  |  |
|  |  | 1.2 Mobile Radio standards-AMPS, N- AMPS, IS -95,GSM, UMTS, CDMA  2000 |  |  |  |  |
|  |  | 1.3 Mobile wireless systems :Cordless Telephone system Paging system and  Cellular telephone system |  |  |  |  |
|  |  | 1.4 Fixed wireless networks :Wireless Local Loop (WLL) &Local Multipoint  Distribution System (LMDS) |  |  |  |  |
|  |  | 1.5 Mobile Phone Unit : Block diagram  , working, Features, Block diagram and working of transmitter, Receiver, Frequency Synthesizer, Control unit and Logic Unit of Mobile phone |  |  |  |  |
| 12 | CO 504.2 | 2.1Cell, cluster, reuse factor, minimum reuse distance, mobile station, base station,Traffic channel (Forward and Reverse) , Control channel (Forward and Reverse),Frequency reuse, channel  assignment strategies |  |  |  |  |
|  |  | 2.2 Handoff strategies: concept of handoff, Types of Handoffs: Hard, soft, Queued, delayed, MAHO ( Mobile Assisted Handoff ) , Proper and  improper Handoff, Umbrella cell approach |  |  |  |  |
|  |  | 2.3 Interference and system capacity: Co-Channel interference, Adjacent  Channel Interference, Channel Planning for wireless systems |  |  |  |  |
|  |  | 2.4 Improving Coverage and capacity in cellular systems: Cell splitting, sectoring, Microcell Zone concept  ,Repeaters for range extension |  |  |  |  |
| 12 | CO 504.3 | 3.1 Global System for Mobile Communication (GSM):Features and services, GSM architecture, GSM radio aspects, Security aspects, GSM Protocol Model part(NSP) ,Message transfer Part (MTP), Signalling Correction Control  part (SCCP), |  |  |  |  |
|  |  | 3.2 GSM signal Processing :Functions  of various blocks |  |  |  |  |

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|  |  | 3.3 Mobile terminated call and mobile originated call sequence |  |  |  |  |
|  |  | 3.4 Interim Standard-95(IS-95)CDMA 1: Features, Service Aspects, Architecture, Network reference Model, Radio aspects & Security aspects Stages of Call processing in IS-95 Signalling System No.7 (SS7):Network services  Services and performance of SS7 |  |  |  |  |
| 18 | CO 504.4 | 4.1 Need for 3G and 4G technology requirements |  |  |  |  |
|  |  | 4.2 IMT-2000 global standards:Vision, Compatibility, service and spectrum |  |  |  |  |
|  |  | 4.3 UMTS standard: Features,architecture, UMTS Air-  interface specification, security procedure |  |  |  |  |
|  |  | 4.4 CDMA 2000 : Features and  advanced versions, advantages over GSM |  |  |  |  |
|  |  | 4.5 Next generation wireless systems: Features of 4G & 4G LTE, VoLTE, 4.5 G, 5G |  |  |  |  |
| 12 | CO 504.5 | 5.1Bluetooth technology:Architecture, Features ,IEEE 802.15.1 Protocol specifications, personal area network |  |  |  |  |
|  |  | 5.2 WLAN technology: IEEE 802.11 WLAN system architecture, radio  spectrum |  |  |  |  |
|  |  | 5.3 WMAN /Wi-max/ :IEEE 802.16 WMAN and IEEE 802.16a Wimax, specifications |  |  |  |  |
|  |  | 5.4 Mobile Ad-hoc networks (MANETs): MANET topologies, applications. |  |  |  |  |

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**\*BS: Additional topic conducted considering beyond syllabus coverage.**

Contents of Beyond Syllabus (Additional Topic) imparted for the attainment of the COs/POs & fulfill the Course gap.

### Chapter wise CO Mapping:

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|  | **CO504.1** | **CO504.2** | **CO504.3** | **CO504.4** | **CO504.5** |
| **Chapter 1** |  |  |  |  |  |
| **Chapter 2** |  |  |  |  |  |
| **Chapter 3** |  |  |  |  |  |
| **Chapter 4** |  |  |  |  |  |
| **Chapter 5** |  |  |  |  |  |

* **Direct Assessment Criteria:**
  + **Rules for Theory Assessment:**
    1. Weekly Test may be conducted in class. Student can’t access any study material during test.
    2. An Open Book Test may be conducted in class. Student can access any material but no discussion with any one is allowed during test.
    3. Total weightage of Theory Marks to the Course is 100. From 100 Marks 70 Marks are allotted to MSBTE TH Examination and 30 Marks are allotted to Theory Progressive Assessment (PA).
    4. Under the theory PA; out of 30 Marks, 10 marks of theory PA are for micro-project assessment to facilitate integration of COs and the remaining 20 marks is the average of 2 test taken during the semester
    5. MSBTE Theory Examination of 70 marks will be conducted by MSBTE at the end of semester. The schedule of MSBTE Examinations will be announced by MSBTE on the website [www.msbte.com.](http://www.msbte.com/)

### Rules for Practical assessment:

* + - 1. Progressive Assessment (P.A.) of each experiment will be done out of 25 marks on the basis of Use of appropriate tool to solve the problem, Quality of output achieved, Answer to sample questions and Submit report in time
      2. Final term work of 25 marks is calculated based on Progressive Assessment for each experiment
      3. Term Work Marks = ((Total Marks Obtained in P.A.) / (25 x Total Number of Experiments)) \*25
      4. A comprehensive Final Practical End Semester examination (of 25 Marks) will be conducted by MSBTE at the end of semester. Examiner for this examination will be appointed by MSBTE. The schedule of MSBTE Practical Examination will be display on Notice board prior to examination

### References:

|  |  |  |  |
| --- | --- | --- | --- |
| **Sr. No** | **Author** | **Title** | **Publisher** |
| 01 | Lec, C“. Y. William | Mobile Cellular Telecommunications System | Mcgraw Hill Education, New Delhi, 2017  ISBN-13: 978-0070635999 |
| 02 | rappaport | Wireless communication- Principles and practice | Pearson publication New Delhi, 2005  ISBN: 978-81 -317-3186-4 |
| 03 | Lin Yi-flan | Wireless and mobile  network Architecture | lohn Wiley& sons, New 1 i.2001 ISBN : 978-81 -  265- l56i |

Mr. G.R. Kshirsagar Prof. S.K. Khaire

### (Name & signature of staff) (Name & signature of HOD)