**Dr. Mahalingam College of Engineering and Technology, Pollachi – 642003**

(An Autonomous Institution affiliated to Anna University)

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| **Programme:** | | | **B.E Electronics and Communication Engineering** | | | |
| **Course Code &Title:** | | | **19ECCN1701 / RF and Microwave Engineering** | | | |
| **Year/Section:** | **IV/A & B** | **Semester:** | | **VII** | **Academic Year:** | **2023-2024** |
| **TQA No: 1** | | | | | | |

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| **Instructions to the students** |
| 1. Students are instructed to select the TQA questions from Part –A,B,C & D as per the following criteria and do the same: Criteria 1 (written assignment) (or) Criteria 2 (seminar) (or) Criteria 3 (practical)   Criteria 1: Number of Part A questions in one CO : 2 (2\*2=4 Marks)  Number of Part B question from same CO : 1 (1\*16=16 Marks)  Total : 20 Marks  **(or)**  Criteria 2: One seminar Topic from Part C : 20 Marks  **(or)**  Criteria 3: One Simulation question : 20 Marks  (Total 20 marks obtained from either Criteria 1 or 2 or 3 is scaled down to 10 Marks as TQA-1 marks) |

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| **CO No.** | **Statement** | **Blooms Level** |
| **1** | Analyze the given High Frequency networks using S parameters | **Analyze** |
| **2** | Classify the Microwave Passive Components based on its operating principle | **Apply** |
| **3** | Analyze the characteristics of Microwave Solid State devices with its Application | **Analyze** |

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| **Part - C - Seminar Topics** | |
| **S. No** | **Seminar Topic** |
|  | Chip less RFID Tags |
|  | Microstrip Resonators |
|  | Microwave Power transmission |
|  | RF/Microwave Active & Passive Circuits |
|  | Antennas for Wireless Cellular Applications |
|  | Smart Antennas |
|  | Industrial Applications of Microwaves |
|  | Biomedical Applications of Microwaves |
|  | 4G and 5G standards |
|  | Application of RF and Microwaves in defense communication |
|  | Radio Frequency Light sources |
|  | Antenna Measurement Techniques |
|  | RF Front-end circuit design |
|  | RF/Microwave Equalizers |
|  | Microwave Remote Sensing and its Recent advancements |
|  | Challenges and design issues in RF and Microwave Engineering |
|  | Microwave Filters and its applications |
|  | Multi user MIMO systems |
|  | Ultra Wideband (UWB) Antennas |
|  | UWB Technologies and Channel Models |
|  | Smart Antennas for Software Defined Radio (SDR) |
|  | Radio Frequency Implementation Issues in SDR |
|  | EMC/EMI in RF |
|  | Multi rate Signal Processing in SDR |
|  | MIMO systems |
|  | Application of MIMO in LTE |
|  | Beam forming Techniques |
|  | Optimization of Microwave components in communication |
|  | Performance Enhancement techniques in MIMO communication system |
|  | Sub 6-GHz Communication and Applications |
|  | Tera Hertz Communication |
|  | Millimeter wave Communication |
|  | UWB Applications and Regulations |
|  | Massive MIMO system |

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| **Part – D - Simulation Experiments** | |  | **CO No.** | **Blooms Level** |
| **S. No** | **Name of the Experiment** |  |
|  | Design and Simulation of Half wavelength and Quarter wavelength transmission line using ADS tool |  | 1 | Analyze |
|  | Analyze and Investigate the performance of radio frequency filter circuits using ADS |  | 1 | Analyze |
|  | Design and Simulation of Microstrip Patch Antenna at 2.4GHz using CST Microwave Studio |  | 1 | Analyze |
|  | Design and Simulation of Branch line hybrid coupler using ADS |  | 2 | Apply |
|  | Design of Wilkinson power divider using ADS |  | 2 | Apply |
|  | Design and Simulation of Microwave Phase shifter using ADS |  | 2 | Apply |
|  | Investigate the performance of Microwave Transistors |  | 3 | Analyze |
|  | Investigate the performance of MMIC |  | 3 | Analyze |

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| **Text Book(s):** |
| 1. Liao, S.Y., “Microwave Devices & Circuits”, Prentice Hall of India, 2006. 2. Ludwig, R and Bretshko, P., “RF Circuit Design”, Pearson Education, Inc., 2006. |
| **Reference Books:**   1. Collin, R. E., “Foundation of Microwave Engineering, 2nd edition, McGraw Hill, 2001. 2. Annapurna Das and Das, S. K., “Microwave Engineering”, Tata McGraw Hill Inc., 2004. 3. Radmanesh, M. M., “RF & Microwave Electronics Illustrated”, Pearson Education, 2007. 4. Pozar, D. M., “Microwave Engineering”, John Wiley & sons, Inc., 2006. 5. Henry W.Ott.,” Electromagnetic Compatibility Engineering”, John Wiley and Sons Inc.,2009 |

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| **Name of the Faculty** | **Signature** |
| Ms. S. Thilagavathi |  |
| Ms.C.Gokila |  |