******E.G.S Pillay Engineering College**

**An ISO 9001-2008 Certified Institution**

**Approved by AICTE - New Delhi, Affiliated by Anna University – Chennai**

**Nagapattinam – 611002**

**Department of Electronics and Communication Engineering**

Academic Year 2015-2016 - Even Semester

**COURSE PLAN**

**COURSE CODE : EC6801 COURSE NAME :** **WIRELESS COMMUNICATION**

**SEMESTER : VIII SEM. ECE – A&B SECTIONS ACADEMIC YEAR : 2015-2016**

**COURSE DURATION : JANUARY – MAY 2017 CLASS ROOM : SJB104**

**FACULTY DETAILS : M. NUTHAL SRINIVASAN, AP/ECE(nuthal@egspec.org)**

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| **PURPOSE** | To educate information about High Speed networks. |
| **PREREQUISITE** | CS1302: Computer networks |
| **INSTRUCTIONAL OBJECTIVES** | 1. Provide an outline of ATM and Frame relay. 2. Educate the students with an up-to-date survey of developments in High Speed Networks. 3. Impart the students on techniques involved to support real-time traffic and congestion control. 4. Train the students on different levels of quality of service (Q.S) to different applications. |
| **COURSE OUTCOME(COs)** | After completion of this course, students can able to   1. Identify the ATM and Frame relay. 2. Describe the traffic management system. 3. List the flow control and congestion control. 4. Define the integrated and differentiated service in telecommunication networks. 5. Examine the supporting Protocols and networks. |

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| Course designed by | | **Anna University, Chennai, Regulation 2008** | | | |
| 1 | Category | GENERAL  (G) | BASIC SCIENCES  (B) | **ENGINEERING SCIENCES**  **AND TECHNICAL ART**  **(E)** | PROFESSIONAL  SUBJECTS  (P) |
|  |  | **x** |  |
| 2 | Broad area | Electronics | **Communication & Networking** | Embedded Systems & Signal Processing | General |
|  | **x** |  |  |
| 3 | Course co-coordinator | | | **Mr. M. Nuthal Srinivasan** | |

**Direct assessment details**

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| **Name of assessment** | **Internal Marks** | **Topics** | **Duration** |
| Unit Test | 20 | Unit I | 2 periods |
| Daily Test 1 | Unit II | 1 period |
| Daily Test 2 | Unit III | 1 period |
| Daily Test 3 | Unit IV | 1 period |
| Cycle Test -1 | II & III Units | 3 Hrs |
| Cycle Test -2 | IV & V Units | 3 Hrs |
| Model Exam | Entire Syllabus | 3 Hrs |
| Assignments |  | Entire Syllabus |  |
| Innovative Assignment | Content Beyond Syllabus |  |
|  |  |  |  |
| Total | 20 |  |  |

**DETAILED LESSON PLAN**

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| **UNIT I : HIGH SPEED NETWORKS**   |  |  |  | | --- | --- | --- | | **LECTURE** | **TUTORIAL** | **PRACTICAL** | | **9 Hrs.** | **0 Hr** | **0 Hr** |   Frame relay networks – Asynchronous transfer mode –High speed LANs -Fiber channel – Wireless LANs | | | | | | | |
| **Session No** | **Topics to be covered** | **Instruction Delivery** | | | **Testing Method** | **Instructional objective** | **Course Outcome** |
| **Method** | **Teaching Aids** | **Level** |
| **1** | Frame relay networks | Lecture with discussion | PPT & Videos | Understand | Tests, Assignments | 1. Provide an outline of ATM and Frame relay. | CO1.Identify the ATM and Frame relay |
| **2** | ATM Protocol architecture and logical connections |
| 3 | ATM cells |
| 4 | ATM service categories |
| 5 | ATM adaptation layer |
| 6 | High speed LANs |
| 7 | Gigabit Ethernet and Fast Ethernet |
| 8 | Fiber channel |
| 9 | Wireless LANs |
| **CUMULATIVE HOURS = LECTURE - 9, TUTORIAL – 0** | | | | | | | |

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| **UNIT II: CONGESTION AND TRAFFIC MANAGEMENT**   |  |  |  | | --- | --- | --- | | **LECTURE** | **TUTORIAL** | **PRACTICAL** | | **9 Hrs.** | **0 Hr.** | **0 Hr.** |   Queuing analysis – Queuing models – Single server queues – Effects of congestion –Congestion control – Traffic management – Congestion control in packet switching networks – Frame relay congestion control | | | | | | | |
| **Session No** | **Topics to be covered** | **Instruction Delivery** | | | **Testing Method** | **Instructional objective** | **Course Outcome** |
| **Method** | **Teaching Aids** | **Level** |
| **1** | Queuing analysis | 1.Lecture with discussion  2.Case Studies | PPT & Videos | Understand | Tests,  Assignments | 1. Educate the students with an up-to-date survey of developments in High Speed Networks. | CO2.Describe the traffic management system. |
| **2** | Queuing models |
| **3** | Single server queues |
| **4** | Multi server queues |
| **5** | Effects of congestion |
| **6** | Congestion control |
| **7** | Traffic management |
| **8** | Frame relay congestion control |
| **CUMULATIVE HOURS = LECTURE - 18, TUTORIAL – 0** | | | | | | | |
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| **UNIT III: TCP AND ATM CONGESTION CONTROL**   |  |  |  | | --- | --- | --- | | **LECTURE** | **TUTORIAL** | **PRACTICAL** | | **9 Hrs.** | **0 Hr.** | **0 Hr.** |   TCP flow control – TCP congestion control – Retransmission – Timer management –Exponential RTO back off – KARN’s algorithm – Window management – Performance of TCP over ATM – Traffic and congestion control in ATM – Requirements – Attributes– Traffic management frame work – traffic control – ABR traffic management – ABR rate control – RM cell formats – ABR capacity allocation – GFR traffic management. | | | | | | | |
| **Session No** | **Topics to be covered** | **Instruction Delivery** | | | **Testing Method** | **Instructional objective** | **Course Outcome** |
| **Method** | **Teaching Aids** | **Level** |
| **1** | TCP Flow control | Lecture with discussion | PPT & Videos | Understand | Tests,  Assignments | 3.Impart the students on techniques involved to support real-time traffic and congestion control. | CO3.List the flow control and congestion control |
| **2** | TCP congestion control |
| **3** | Retransmission timer management |
| **4** | Window management |
| **5** | Performance of TCP over ATM |
| **6** | Requirements for ATM traffic and congestion control |
| **7** | Attributes |
| 8 | Traffic management frame work |
| 9 | Traffic control |  |  |  |  |  |  |
| 10 | ABR rate control, ABR capacity allocation |  |  |  |  |  |  |
| 11 | GFR Traffic management |  |  |  |  |  |  |
| **CUMULATIVE HOURS = LECTURE - 27, TUTORIAL – 0** | | | | | | | |

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| **UNIT IV: INTEGRATED AND DIFFERENTIATED SERVICES**   |  |  |  | | --- | --- | --- | | **LECTURE** | **TUTORIAL** | **PRACTICAL** | | **9 Hrs.** | **0 Hr.** | **0 Hr.** |   Integrated services architecture – Approach, components, services – Queuing discipline, FQ – PS – BRFQ – GPS – WFQ – Random early detection, differentiated services. | | | | | | | |
| **Session No** | **Topics to be covered** | **Instruction Delivery** | | | **Testing Method** | **Instructional objective** | **Course Outcome** |
| **Method** | **Teaching Aids** | **Level** |
| **1** | Integrated services architecture | Lecture with discussion | PPT & Videos | Understand | Tests,  Assignments | 1. Train the students on different levels of quality of service (Q.S) to different applications. | CO4.Define the integrated and differentiated service in telecommunication networks. |
| **2** | ISA components/architecture |
| **3** | Fair queuing/processor sharing |
| 4 | Bit round fair queuing/GPS |
| 5 | Weighted fair queuing |
| **6** | Random early detection |
| **7** | Differentiated services |
| 8 | Differentiated services |
| **CUMULATIVE HOURS = LECTURE - 36, TUTORIAL – 0** | | | | | | | |

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| **UNIT V: PROTOCOLS FOR QOS SUPPORT**   |  |  |  | | --- | --- | --- | | **LECTURE** | **TUTORIAL** | **PRACTICAL** | | **9 Hrs.** | **0 Hr.** | **0 Hr.** |   RSVP – Goals and characteristics – data flow – RSVP operations – Protocol mechanisms– Multi protocol label switching – Operations – Label stacking – Protocol details – RTP –Protocol architecture – Data transfer protocol – RTCP. | | | | | | | |
| **Session No** | **Topics to be covered** | **Instruction Delivery** | | | **Testing Method** | **Instructional objective** | **Course Outcome** |
| **Method** | **Teaching Aids** | **Level** |
| **1** | Resource reservation protocol | Lecture with discussion | PPT & Videos | Understand | Tests,  Assignments | 1. Train the students on different levels of quality of service (Q.S) to different applications. | CO5.Examine the supporting protocols in high speed networks. |
| **2** | RSVP operation |
| **3** | Protocol mechanism |
| 4 | Multiprotocol label switching |
| 5 | Label stacking |
| **6** | Real time transport protocol |
| **7** | Data transfer protocol |
| 8 | RTP control protocol |
| **CUMULATIVE HOURS = LECTURE - 45, TUTORIAL – 0** | | | | | | | |

**Text / Reference Books**

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| **Sl. No.** | **Title of the Book** | **Author(s)** | **Publisher** |
| **TEXT BOOKS** | | | |
| T1 | High Performance Communication Networks | William Stallings | Second Edition, Pearson Education, 2002 |
| **REFERENCES** | | | |
| R1 | High Performance Communication Networks | Warland, Parvin Varaiya | Second Edition, Jean Harcourt Asia Pvt Ltd, 2001 |
| R2 | MPLS and VPN Architecture | Irvan Pepelnjk, Jim Guichard, Jeff Apcar | Cisco Press, Volume 1 and 2,2003 |
| R3 | ATM Technology for broad band telecommunication networks | Abhijit S. Pandya, Ercan Sea | Oxford University Press, 2009 |
| **REFERENCE WEBSITES** | | | |
| 1 | <http://nptel.iitm.ac.in/courses/Webcourse-contents> | | |
| 3 | http:// [www.cse.iitd.ernet.in](http://www.cse.iitd.ernet.in) | | |
| 4 | <http://www.books.google> | | |

**GAP ANALYSIS:**

To satisfy the

1. CO 4 (Define the integrated and differentiated service in telecommunication networks.)

I Plan to give **innovative assignments**

**CONTENT BEYOND SYLLUBI:** Assignments forthe following topics:

1. Review of different country Networks.
2. Review of different Multinational Company.
3. Emerging Technology in High Speed Networks.

**COURSE INCHARGE**

**Programme Name: B.E. Electronics and Communication Engineering**

**PROGRAM EDUCATION OBJECTIVES:**

1. Graduates will have the ability of successful technical or professional careers in the electronics and communication engineering and its relative disciplines
2. Graduate will exhibit technical skills to meet the day to day challenges with social consciousness.
3. Graduate will possess lifelong learning ability and teamwork capability

**PROGRAM OUTCOME:**

1. Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization for the solution of complex engineering problems.
2. Problem analysis: Identify, formulate, research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
3. Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for public health and safety, and cultural, societal, and environmental considerations.
4. Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
5. Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools, including prediction and modelling to complex engineering activities, with an understanding of the limitations.
6. The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal, and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
7. Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
8. Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
9. Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
10. Communication: Communicate effectively on complex engineering activities with the engineering community and with t h e society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
11. Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one’s own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
12. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

**PSO – Program Specific Outcome:**

1. Examine the emerging areas in the field of communication/networking and signal processing
2. Apply the principles of semiconductor devices, Digital systems, Microprocessors in the field of consumer electronics, medical, defense and spacecraft electronic industry
3. Design and analyze subsystems and /or modules as a team for a variety of comparisons and recent applications in Electronics and Communications.
4. Adapt recent developments in the electronics and communication engineering areas along with state of the art Software tools.

**Mapping Table 1: COs of CS2060: High Speed Networks Vs POs**

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| Course Outcomes (COs) | CO  level | Program Outcomes (POs) | | | | | | | | | | | |
| PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
| PO level |  | K3 | K4 | K5 | K5 | K6/k5/k4 |  |  |  |  |  |  |  |
| CO1 | K2 | 2 | - | - | - |  |  |  |  |  |  |  |  |
| CO2 | K2 | 2 | - | - | - |  |  |  |  |  |  |  |  |
| CO3 | K2 | 2 | - | - | - |  |  |  |  |  |  |  |  |
| CO4 | K2 | 2 | - | - | - |  |  |  |  |  |  |  |  |
| CO5 | K2 | 3 | 2 | - | - |  |  |  |  |  |  |  |  |

**Mapping Table 2: COs of CS2060: High Speed Networks Vs PSOs**

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| Course Outcomes (COs) | CO level | Program Specific Outcomes (PSOs) | | | |
| PSO1 | PSO2 | PSO3 | PSO4 |
| PO level |  | K4 | K3 | K4 | K2 |
| CO1 | K2 | 1 | - | - | 3 |
| CO2 | K2 | 1 | - | - | 3 |
| CO3 | K1 | 1 | - | - | 3 |
| CO4 | K2 | 1 | - | - | 3 |
| CO5 | K2 | 2 | - | - | 3 |

**Note: Adequate Support by the COs to POs and PSO\s: 3- High 2- Medium 1- Low**

**K1-Remembering, K2-Understanding, K3-Applying, K4-Analysing, K5-Evaluating, K6-Creating**