

**CENTRAL UNIVERSITY OF KARNATAKA  
KALABURAGI  
SCHOOL OF ENGINEERING**



CENTRAL UNIVERSITY OF KARNATAKA

**COURSE STRUCTURE AND SYLLABUS [Draft\*]**

**For**

**B.Tech. Fourth Year - 2020 & 2021 Batches**

**(Common to both ELECTRONICS & COMMUNICATION  
ENGINEERING AND ELECTRICAL ENGINEERING)**

**Learning Outcomes-based Curriculum Framework**

**(Effective from the academic year 2020 –21)**

Department of Electronics & Communications Engineering  
and Electrical Engineering.  
School of Engineering  
Central University of Karnataka  
Kalaburagi-585367

**SCHOOL OF ENGINEERING**  
**PROPOSED COURSE STRUCTURE [Draft\*] - FOURTH YEAR B. TECH**  
**ELECTRONICS & COMMUNICATION ENGINEERING-2020 & 2021 Batches**

| <b>VII SEMESTER</b>   |             |                                     |                    |          |                       |           |                     |            |                  |             |           |
|---|-------------|-------------------------------------|--------------------|----------|-----------------------|-----------|---------------------|------------|------------------|-------------|-----------|
| Course code   | Course Type | Course Title                        | Teaching Hrs./Week |          |                       |           | Examination         |            |                  |             | Credits   |
|   |             |                                     | Theory<br>Lecture  | Tutorial | Practical/<br>Drawing | Total     | Duration in<br>Hrs. | IA Marks   | End Sem<br>Marks | Total Marks |           |
|   |             |                                     | L                  | T        | P                     |           |                     |            |                  |             |           |
| UECTCC7001  | CC          | Wireless Communication Engg.        | 3                  | 1        | -                     | 4         | 2.5                 | 30         | 45               | 75          | 3         |
| UECTCC7002  | CC          | Adv. Microcontrollers & RTOS        | 3                  | 1        | -                     | 4         | 2.5                 | 30         | 45               | 75          | 3         |
| UECTCC7003  | CC          | Automation and Robotics             | 3                  | 1        | -                     | 4         | 2.5                 | 30         | 45               | 75          | 3         |
| UECTCC7004  | CC          | Optical and Satellite Communication | 3                  | 1        | -                     | 4         | 2.5                 | 30         | 45               | 75          | 3         |
| UECPCC7005  | CC          | Automation and Robotics Lab         | -                  | -        | 3                     | 3         | 3                   | 20         | 30               | 50          | 2         |
| UECPCC7006  | CC          | Adv. Microcontrollers & RTOS Lab    | -                  | -        | 3                     | 3         | 3                   | 20         | 30               | 50          | 2         |
| UECDSC7007  | DS          | NPTEL-DSE                           | -                  | -        | -                     | -         | -                   | -          | 75               | 75          | 3         |
| UECRCC7008  | CC          | Major Project Phase-I               | -                  | -        | 5                     | 5         | 3                   | 50         | 75               | 125         | 5         |
| <b>Total</b>  |             |                                     | <b>15</b>          | <b>5</b> | <b>9</b>              | <b>25</b> | <b>19</b>           | <b>210</b> | <b>390</b>       | <b>600</b>  | <b>21</b> |
| <p><b>Note:</b> 1. CC-Core Course, DS-Discipline specific Elective, AE-Ability Enhancement course and GE-Generic Elective courses<br/>                 2. English Enhancement is a mandatory non-credit course. This course shall not be considered for vertical progression, but completion of the courses shall be mandatory for the award of degree.</p> |             |                                     |                    |          |                       |           |                     |            |                  |             |           |



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### SCHOOL OF ENGINEERING

#### PROPOSED COURSE STRUCTURE [Draft\*] - FOURTH YEAR B. TECH

#### ELECTRONICS & COMMUNICATION ENGINEERING -2020 & 2021 Batches

#### VIII SEMESTER

| Course code  | Course Type | Course Title           | Teaching Hrs./Week |          |                       |       | Examination      |          |               | Credits |             |
|--------------|-------------|------------------------|--------------------|----------|-----------------------|-------|------------------|----------|---------------|---------|-------------|
|              |             |                        | Theory Lecture     | Tutorial | Practical/<br>Drawing | Total | Duration in Hrs. | IA Marks | End Sem Marks |         | Total Marks |
|              |             |                        | L                  | T        | P                     |       |                  |          |               |         |             |
| UECRCC8001   | CC          | Major Project Phase-II | -                  | -        | 5                     | 5     | 3                | 180      | 270           | 450     | 18          |
| <b>Total</b> |             |                        | -                  | -        | 5                     | 5     | 3                | 180      | 270           | 450     | 18          |

**Note:** 1. CC-Core Course, DS-Discipline specific Elective, AE-Ability Enhancement course and GE-Generic Elective courses  
2. Environmental Science is a mandatory non-credit course. This course shall not be considered for vertical progression, but completion of the courses shall be mandatory for the award of degree.

\* To be approved by BOS

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## Wireless Communication Engineering

|                                    |                   |                              |       |
|------------------------------------|-------------------|------------------------------|-------|
| <b>Semester</b>                    | : 7 <sup>th</sup> | <b>Internal Assessment</b>   | : 30  |
| <b>Course Code</b>                 | : UECTCC7001      | <b>End Sem. Exam</b>         | : 45  |
| <b>Teaching Hours/Week (L:T:P)</b> | : 3:1:0           | <b>Exam Duration (Hours)</b> | : 2.5 |
| <b>Credits : 03</b>                |                   |                              |       |

### PREREQUISITES

Basics concepts of: Analog Communication, Digital Communication, and Signal and Systems.

### COURSE OUTCOMES

After completing this Course, the students should be able to:

- CO1. Understand the basic concepts of basic Cellular System and characteristic the wireless channel.
- CO2. Understand the basics of propagation of radio signals
- CO3. Understanding of the basic principles behind radio resource management techniques such as power control, channel allocation, frequency reuse, and handoffs.
- CO4. Gain insights into various mobile radio propagation models and how the diversity can be exploited to improve performance.
- CO5. Gain knowledge and awareness of the technologies for how to effectively share spectrum through multiple access techniques i.e. TDMA, CDMA, FDMA etc.

### UNIT-I

**Introduction and Motivation to:** Wireless communication, Why wireless communication?, Challenges, Types: Feasible for long range, and feasible for short range; A simplified wireless communication representation: Current wireless system, Cellular system, Wireless local area network, Satellite systems, Paging system, Wide-area paging system, Personal area networks, **Emerging Wireless System:** Ad-hoc wireless networks, Sensor networks, Distributed control networks, Ultra wideband system. **Introduction to Modern Wireless Communication:** Basic concept of multiple access, Frequency division multiple access (FDMA), Time division multiple access (TDMA), Code division multiple access (CDMA), **Evolution of Cellular Networks:** 1G, 2G, 3G, 4G and 5G.

**RBT Levels: L1, L2, L3.**

### UNIT-II

**Introduction to Cellular System:** Basic concept of cellular system, Forward and reverse channels, Anatomy of a cellular call, Frequency reuse, Cell shape: Circular, Traingular, Square, Hexagonal; Geometry of hexagons, Cochannel cell locations, Cell capacity and reuse, Traffic theory, Hand off strategies, **Inteference:** Cochannel, and adjacent channel, **Improving coverage and system capacity:** Power control for interference reduction, Cell splitting, Sectoring, Micro Cell zone, Use of repeaters. **Introduction to Radio Propagation:** Propagation basics, Antenna basics, Basics of radio propagation and mechanism, Radio propagation models: Small scale- and Large scale- propagation models, Outdoor- and Indoor- propagation models.

**RBT Levels: L1, L2, L3,L4.**



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### UNIT-III

**Fundamental Concept of:** Multipath and fading, Doppler shift, Delay spread, Intersymbol interference (ISI), The multipath channel: Impulse response of multipath channel, and Discrete time impulse response; Power delay profile, bandwidth and Received power, Wideband- and narrowband signals, **Small Scale Multipath Measurements:** Channel sounding techniques, Direct RF pulse system, and Frequency domain channel sounding; **Introduction to Ultra Wideband Communication:** Motivation for channel modeling, Channel model parameters, Channel measurements campaign, **Time dispersion parameters:** Mean excess delay, RMS delay spread, Minimum excess delay; Coherence bandwidth and coherence time, **Types of Fading:** Frequency flat fading and frequency selective fading, Slow fading and Fast fading, Rayleigh fading, and Rician fading, Rayleigh- and Rician- distribution,

**RBT Levels: L1, L2, L3, L4.**

### UNIT-IV

**Fundamentals of Equalization,** Equalization Techniques: Linear and nonlinear equalization, Adaptive equalization, **Introduction to Diversity,** Why do we need diversity?, Diversity techniques, **Coding Techniques for Mobile Communication:** Linear block code, Galois field, Cyclic codes, Fire codes, BCH- and RS- Codes, Convolutional codes, Trellis codes, Viterbi decoding, Trellis coded modulation, **Introduction to Wireless Networks:** Networking basics, Network components: Hubs, Switches, Routers, Access points, Limitation of wireless networking, **Introduction to GSM for 2G:** GSM architecture, GSM networking, Multiple access for GSM, Disadvantages, **Introduction to CDMA for 3G:** How CDMA works?, Key operation in CDMA, Multi-user CDMA, Advantages, **Introduction to MIMO and OFDM for 4G, Introduction to massive MIMO, Millimeter wave, NOMA for 5G.**

**RBT Levels: L1, L2, L3, L4.**

### TEXT BOOKS

1. T.S. Rappoport, "Wireless Communications" 2<sup>nd</sup> Edition, Pearson Education, 2002.
2. Andrea Goldsmith, "Wireless Communications", Cambridge University Press, 2005.
3. W.C.Y Lee, "Mobile Cellular Telecommunications" 2<sup>nd</sup> Edition, McGraw Hill, 1995.
4. Tse, David, and Pramod Viswanath, "Fundamentals of Wireless Communication", Cambridge, UK: Cambridge University Press, 2005.

### REFERENCE BOOKS

1. J. Schiller, "Mobile Communication" 2/e, Pearson Education, 2012.
2. S. Sekhar Das, and Ramjee Prasad, "Evolution of Air Interface Towards 5G: Radio Access Technology and Performance Analysis", River publisher, June 2018.

### ONLINE RESOURCES

1. <https://nptel.ac.in/courses/117102062>
2. <https://nptel.ac.in/courses/117104115>



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### COURSE ASSESSMENT

#### A. Internal Assessment (Weightage 30 Marks)

- Two internal assessments will be conducted with each one of 20 marks weightage.
- Remaining 10 marks will be given for Assignments/Quiz/Seminar/Class performance etc. based on the decision of subject incharge.
- If only Quizes (MCQ type) are preferred then minimum of two are to be conducted and necessary proof has to be maintained.
- If only assignments are considered then Four Assignments are to be given with one each from respective units.
- In case of seminar, student must give 20 minutes presentation and ppt file has to be submitted to the subject incharge & department.

#### B. End Sem Examination (Weightage 45 Marks)

- One full question carries 9 Marks. Full question may be divided further into sub questions.
- There will be one full questions from each unit and a total of SIX FULL QUESTIONS.
- Student has to answer FIVE FULL QUESTIONS from full question that are mandatory.

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## ADVANCED MICROCONTROLLERS AND REAL TIME OPERATING SYSTEMS

|                                    |                     |                              |          |            |
|------------------------------------|---------------------|------------------------------|----------|------------|
| <b>Semester</b>                    | <b>: VII</b>        | <b>Internal Assessment</b>   | <b>:</b> | <b>30</b>  |
| <b>Course Code</b>                 | <b>: UECTCC7002</b> | <b>End Sem. Exam</b>         | <b>:</b> | <b>45</b>  |
| <b>Teaching Hours/Week (L:T:P)</b> | <b>: 3:1:0</b>      | <b>Exam Duration (Hours)</b> | <b>:</b> | <b>2.5</b> |
| <b>Credits : 03</b>                |                     |                              |          |            |

### PREREQUISITES

Digital electronics, Basic computer operations and number system

### COURSE OUTCOMES

After completing this Course, the students should be able to:

- CO1. Develop a clear understanding of ARM processor and assembly language.
- CO2. Describe the architecture and functional block of ARM Cortex M3.
- CO3. Describe the architecture details of STM32 and MSP430 microcontroller.
- CO4. Develop an application using STM32 for the given specification.
- CO5. Develop an application using RTOS for the given specification..

### UNIT-I

**ARM Microcontroller:** Introduction, Architecture of ARM Cortex M3, Various Units in the architecture, Debugging support, General Purpose and Special Registers. Thumb-2 technology

**RBT Levels: L1, L2, L3.**

### UNIT-II

**STM32:** Introduction and features of STM32 ARM cortex family. STM32 Architecture and , Memory organization/map. STM32 IO Interfacing and GPIO Programming.

**RBT Levels: L1, L2, L3, L4.**

### UNIT-III

**MSP430:** Introduction and Architecture of MSP430. Addressing Modes and Instruction Set. IO Interfacing and GPIO Programming

**RBT Levels: L1, L2, L3, L4.**

### UNIT-IV

**RTOS:** Introduction and features of RTOS.

**ARTE:** Introduction, Features, Architecture and Programming.

**VxWorks:** Introduction, Features, Architecture and Programming.

**MicroC/OS-II:** Introduction, Features, Architecture and Programming.

**Application development using RTOS:**

**RBT Levels: L1, L2 L3, L4.**



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### TEXT BOOKS

1. Joseph Yiu, "The Definitive Guide to the ARM Cortex-M3", Elsevier Science, 2011.
2. Vincent Mahout, "Assembly Language Programming ARM Cortex-M3", Wiley, 2012.
3. Majid Pakdel, "Advanced Programming with STM32 Microcontrollers", Elektor Verlag, 2020.
4. Warren Gay, "Beginning STM32: Developing with FreeRTOS, Libopenm3 and GCC", 2020.
5. Deepali A. Godse, Atul P. Godse, "Microcontrollers", UNICORN Publishing Group, 2020.
6. "Tornado and VxWorks: What's Not in the Manual", C. Wehner, 2004.
7. J. J Labrosse, "MicroC/OS-II: The Real-Time Kernel", Newnes, 2002.
8. Jane W. S. Liu, "Real-time systems", Prentice Hall, 2000.

### ONLINE RESOURCES

1. <https://www.acsce.edu.in/acsce/wp-content/uploads/2019/03/ece-notes.pdf>
2. <https://www.iare.ac.in/sites/default/files/MPDSP%20LECTURE%20NOTES.pdf>
3. <https://developer.arm.com/documentation/dai0179/latest/cortex-m3-embedded-software-development>
4. [https://www.st.com/content/st\\_com/en/support/learning/stm32-education.html](https://www.st.com/content/st_com/en/support/learning/stm32-education.html)

### COURSE ASSESSMENT

#### A. Internal Assessment (Weightage 30 Marks)

- Two internal assessments will be conducted with each one of 15 marks weightage
- Remaining 15 marks will be given for Assignments/Quiz/Seminar etc. based on the decision of subject incharge.
- If only Quizzes (MCQ type) are preferred then minimum of two are to be conducted.
- If only assignments are considered then 4 assignments to be given from each unit.
- In case of seminar, student must give 10+5 minutes presentation and ppt file has to be submitted to the subject incharge & department.

#### B. End Sem Examination (Weightage 45 Marks)

- Question Paper will have two parts: Part A and Part B.
- Part A will have short answer questions (total of 15 marks).
- In Part A, all questions are compulsory and covers all the units.
- Part B will have long answer questions (total of 30 marks).
- In Part B option will be given, however questions will be from each unit.



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## AUTOMATION AND ROBOTICS

|                                    |                     |                              |              |
|------------------------------------|---------------------|------------------------------|--------------|
| <b>Semester</b>                    | <b>: VII</b>        | <b>Internal Assessment</b>   | <b>: 30</b>  |
| <b>Course Code</b>                 | <b>: UECTCC7003</b> | <b>End Sem. Exam</b>         | <b>: 45</b>  |
| <b>Teaching Hours/Week (L:T:P)</b> | <b>: 0:0:3</b>      | <b>Exam Duration (Hours)</b> | <b>: 3.0</b> |
| <b>Credits : 03</b>                |                     |                              |              |

### PREREQUISITE(S)

Control Engineering, Microprocessor and Microcontrollers.

### COURSE OUTCOMES

After completing this Course, the students should be able to:

CO1. Understand Automation and their needs.

CO2. Understand the apply the to automated lines how functions in industry.

CO3. Understand the industrial robots.

CO4. Apply the knowledge of robot programing in their work.

#### UNIT-I

**Introduction to automation:** Basic elements of an automated system, advanced automation functions, levels of automation, process industries versus discrete manufacturing industries, continuous versus discrete control, computer process control. Hardware components for automation and process control, sensors, actuators, analog to digital converters, digital to analog converters, input/output devices for discrete data

**RBT Levels: L1, L2.**

#### UNIT-II

**Automated production lines:** Fundamentals of automated production lines, application of automated production lines, analysis of transfer lines, automated assembly systems, fundamentals of automated assembly systems, quantitative analysis of assembly systems, automatic identification methods, barcode technology, radio frequency identification, other AIDC technologies.

**RBT Levels: L1, L2, L3.**

#### UNIT-III


**Industrial Robotics:** Robotic configuration, robot anatomy and related attributes, robot control systems, end effectors, sensors in robotics, industrial robot applications, robot accuracy and repeatability, different types of robotics, various generations of robots, degrees of freedom – Asimov's laws of robotics dynamic stabilization of robots.

**RBT Levels: L1, L2, L3.**

#### UNIT-IV

**Robot programming:** Introduction, levels of robot programming, requirements of robot programming language, problems pertaining to robot programming languages, offline programming systems, central issues in OLP systems, automating subtasks in OLP systems, simple programs on robot applications

**RBT Levels: L1, L2, L3.**

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### TEXT BOOKS

1. Automation, Production systems, and computer integrated manufacturing-MikellP.Groover 3rd edition, Pearson 2009
2. Industrial Robotics-Groover, Weiss, Nagel, McGraw Hill International, 2nd edition, 2012

### REFERENCE BOOKS

1. Robotics for Engineers –YoramKoren, McGraw Hill International, 1st edition, 1985.
2. Robotic Engineering - An Integrated approach, Klafter, Chmielewski and Negin, PHI, 1st edition, 2009.
3. An Introduction to Automated Process Planning Systems- Tiess Chiu Chang & Richard A. Wysk

### ONLINE RESOURCES

1. <https://nptel.ac.in/courses/112101098>
2. [https://onlinecourses.nptel.ac.in/noc21\\_me32/preview](https://onlinecourses.nptel.ac.in/noc21_me32/preview)

### COURSE ASSESSMENT

#### A. Continuous Assessment (Weightage 30 Marks)

- Two continuous assessments will be conducted with each one of 10 marks weightage.
- **Remaining 10 marks** will be given for two/four assignments.

#### B. End Sem Examination (Weightage 40 Marks)

- There will be a total of FIVE FULL questions. Student has to answer any four.
- One full question carries 15 Marks. Full question may be divided further into sub questions.



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## OPTICAL & SATELLITE COMMUNICATION

|                             |              |                       |       |
|-----------------------------|--------------|-----------------------|-------|
| Semester                    | : VII        | Internal Assessment   | : 30  |
| Course Code                 | : UECTCC7004 | End Sem. Exam         | : 45  |
| Teaching Hours/Week (L:T:P) | : 3:1:0      | Exam Duration (Hours) | : 2.5 |
| Credits : 03                |              |                       |       |

### PREREQUISITES

Basic knowledge on digital/analog communication, transmission medium, signal loss.

### COURSE OUTCOMES

After completing this Course, the students should be able to:

- CO1: Explain the generic optical communication system.
- CO2: Identify the types of fiber used in optical communication.
- CO3: Illustrate how the information travels through the communication channel.
- CO4: Explain the dynamics of the satellite.
- CO5: Examine how analog and digital technologies are used for satellite communication networks.

### UNIT-I

**Introduction to optical communication:** The general system, advantages, different communication windows, and different generations, Transmission Characteristics of optical fibers: Ray Theory Transmission- Acceptance angle, NA, Skew rays, Wave transmission, step index fiber, graded index fiber.

### UNIT-II

**Single and multimode fiber characteristics:** Attenuation in fibers: material absorption, Linear scattering losses, Non-linear scattering losses, fiber bend loss, Dispersion Characteristics, Optical switches, amplifiers and detectors.

### UNIT-III


**Elements of orbital mechanics:** Equations of motion, Tracking and orbit determination, Orbital correction/control, Satellite launch systems, Multistage rocket launchers and their performance.

### UNIT-IV

**Elements of communication satellite design:** Spacecraft subsystems, Reliability considerations, Spacecraft integration, Multiple access techniques, FDMA, TDMA, CDMA, Random access techniques. Satellite on-board processing, Satellite broadcasting, GPS.

### TEXT BOOKS

1. G. P. Agarwal, Optical Fiber Communication System, John Wiley & Sons, New York, 2010.
2. Le Nguyen Binh, Advanced Digital Optical Communications, CRC Press, 2015.
3. D. Roddy, "Satellite Communication (4/e)", McGraw-Hill, 2009.
4. T. Pratt & C. W. Bostain, "Satellite Communication", Wiley 2000.

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### REFERENCE BOOKS

1. M. M. K. Liu, “Principles and Applications of Optical Communications”, Tata McGraw Hill, 2010.
2. A. Selvarajan, S. Kar and T. Srinivas, “Optical Fiber Communication Principles and Systems”, Tata McGraw Hill, 2002.
3. A. K. Maini, V. Agrawal, “Satellite Communications”, Wiley India Pvt Ltd, 1999.
4. B. R. Elbert, „The Satellite Communication Applications“ Hand Book, Artech House Boston London, 1997.

### ONLINE RESOURCES

1. <https://nptel.ac.in/courses/108106167>
2. <https://nptel.ac.in/courses/117105131/>


### COURSE ASSESSMENT

#### A. Continuous Assessment (Weightage 30 Marks)

- Two continuous assessments will be conducted with each one of 10 marks weightage
- **Remaining 10 marks** will be given for Assignments (Four Assignments will be given with one each from respective units).

#### B. End Sem Examination (Weightage 45 Marks)

- One full question carries 10/11 Marks. Full question may be divided further into sub questions.
- There will be two full questions from each unit and a total of EIGHT FULL QUESTIONS.
- Student has to answer FOUR FULL QUESTIONS one from each unit i.e., Answering one full question from each unit is mandatory. (Note: Course teacher may change the pattern as applicable)

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## AUTOMATION AND ROBOTICS LAB

|                                    |                    |                              |          |            |
|------------------------------------|--------------------|------------------------------|----------|------------|
| <b>Semester</b>                    | <b>: VII</b>       | <b>Internal Assessment</b>   | <b>:</b> | <b>20</b>  |
| <b>Course Code</b>                 | <b>: UECPC7005</b> | <b>End Sem. Exam</b>         | <b>:</b> | <b>30</b>  |
| <b>Teaching Hours/Week (L:T:P)</b> | <b>: 0:0:3</b>     | <b>Exam Duration (Hours)</b> | <b>:</b> | <b>3.0</b> |
| <b>Credits : 02</b>                |                    |                              |          |            |

### PREREQUISITES

Exposure to Automation and Robotics course.

### COURSE OUTCOMES

After completing this Course, the students should be able to:

- CO1. Understanding Automation & Robotics
- CO2. Apply basics of Automation & Robotics for Programming.
- CO3. Apply the simulation procedure to understand moments configuration.

### LIST OF EXPERIMENTS

1. Automation Introduction Of Programming (Two Experiments ) **RBT Level: L1 To L4**
2. Assignment On Introduction To Robot Configuration (Two Experiments ). **RBT Level L1 To L6**
3. Programming Exercises For Robots. (Three Experiments ) **RBT Level: L1 To L4**
4. Exercise On Robotic Simulation Software. (Three Experiments ) **RBT Level: L1 To L4**

### TEXT BOOKS

1. W. Bolton, —Programmable logic controllers, Elsevier Ltd, 2015.
2. Frank D Petruzella, —Programmable logic controllers, McGraw-Hill, 5 th Ed, 2016.

### REFERENCE BOOKS


1. R M Murray, Z. Li and SS Sastry, —A Mathematical Introduction to Robotic Manipulation, CRC Press, 1994.
2. J J Craig, —Introduction to Robotics: Mechanics and Control, Prentice Hall, 4th Ed, 2018.

### COURSE ASSESSMENT

#### A. Continuous Assessment (Weightage 20 Marks)

- Two continuous assessments will be conducted with each one of 10 marks weightage

#### B. End Sem Examination (Weightage 30 Marks)

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## ADVANCED MICROCONTROLLERS AND REAL TIME OPERATING SYSTEMS LAB

|                                    |                    |                               |             |
|------------------------------------|--------------------|-------------------------------|-------------|
| <b>Semester</b>                    | <b>: VII</b>       | <b>Internal Assessment</b>    | <b>: 20</b> |
| <b>Course Code</b>                 | <b>: UECPC7006</b> | <b>End Sem. Exam</b>          | <b>: 30</b> |
| <b>Teaching Hours/Week (L:T:P)</b> | <b>: 0:0:3</b>     | <b>Exam Duration (Hourse)</b> | <b>: 03</b> |
| <b>Credits : 02</b>                |                    |                               |             |

### PREREQUISITES

Microprocessor / Microcontroller and Operating Systems theoretical concepts

### COURSE OUTCOMES

On the completion of this laboratory course, the students will be able to:

- CO1. Impliment assembly language programs for 8085 and 8051.
- CO2. Interfacing and testing various interface various IO devices with 8051.
- CO3. Interfacing and testing various interface various IO devices with Atmega328P.
- CO4. Interfacing and testing various interface various IO devices with Arduino platform

### STM32-ARM programming: RBT Levels: L1, L2, L3, L4.


1. Basic arithmetic and Logical operations
2. Various addressing modes
3. Data movements programs
4. Code conversion (decimal, binary, octal and hex).
5. Interfacing IO devices (Switches, LEDs)

### MSP430-ARM programming: RBT Levels: L1, L2, L3, L4.

1. Basic arithmetic and Logical operations
2. Code conversion, decimal arithmetic and Matrix operations.
3. Interfacing IO devices (Switches, LEDs)

### RTOS Programming: RBT Levels: L1, L2, L3, L4.

1. Task creation,
2. Task Scheduling.
3. Interprocess Communication
4. Scheduling Algorithms

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### TEXT BOOKS

1. Joseph Yiu, "The Definitive Guide to the ARM Cortex-M3", Elsevier Science, 2011.
2. Vincent Mahout, "Assembly Language Programming ARM Cortex-M3", Wiley, 2012.
3. Majid Pakdel, "Advanced Programming with STM32 Microcontrollers", Elektor Verlag, 2020.
4. Warren Gay, "Beginning STM32: Developing with FreeRTOS, Libopenm3 and GCC", 2020.
5. Deepali A. Godse, Atul P. Godse, "Microcontrollers", UNICORN Publishing Group, 2020.
6. "Tornado and VxWorks: What's Not in the Manual", C. Wehner, 2004.
7. J. J Labrosse, "MicroC/OS-II: The Real-Time Kernel", Newnes, 2002.
8. Jane W. S. Liu, "Real-time systems", Prentice Hall, 2000.

### ONLINE RESOURCES

1. <https://www.acsce.edu.in/acsce/wp-content/uploads/2019/03/ece-notes.pdf>
2. <https://www.iare.ac.in/sites/default/files/MPDSP%20LECTURE%20NOTES.pdf>
3. <https://developer.arm.com/documentation/dai0179/latest/cortex-m3-embedded-software-development>
4. [https://www.st.com/content/st\\_com/en/support/learning/stm32-education.html](https://www.st.com/content/st_com/en/support/learning/stm32-education.html)


### COURSE ASSESSMENT

#### A. Internal Assessment (Weightage 20 Marks)

- One internal assessments will be conducted for 10 marks weightage
- Remaining 10 marks will be given for Assignments/Mini Project.

#### B. End Sem Examination (Weightage 30 Marks)

- All laboratory experiments are to be included for practical examination.
- Students are allowed to pick one experiment from the lot.
- Strictly follow the instructions as printed on the cover page of answer script for breakup of marks.
- Change of experiment is allowed only once and 15% Marks allotted to the procedure part be made zero.

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## NPTEL-DESCIPLINE SPECIFIC ELECTIVE

|                                    |                   |                              |      |
|------------------------------------|-------------------|------------------------------|------|
| <b>Semester</b>                    | : 7 <sup>th</sup> | <b>Internal Assessment</b>   | : -- |
| <b>Course Code</b>                 | : UECDS7007       | <b>End Sem. Exam</b>         | : -- |
| <b>Teaching Hours/Week (L:T:P)</b> | : --              | <b>Exam Duration (Hours)</b> | : -- |
| <b>Credits : 02</b>                |                   |                              |      |

### INSTRUCTIONS TO STUDENTS

The student is expected choose an NPTEL/SWAYAM course of 02 credits. It must be noted that the chosen course must not have repeated in earlier/current/future semesters of 8 semesters B. Tech. (ECE) program. The chosen course must be relevant to ECE department and the number of credits must be atleast 2. All norms of CUK/COE section with respect to NPTEL course are applicable.



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## MAJOR PROJECT-PHASE-I

|                                    |                     |                              |             |
|------------------------------------|---------------------|------------------------------|-------------|
| <b>Semester</b>                    | <b>: VII</b>        | <b>Internal Assessment</b>   | <b>: 50</b> |
| <b>Course Code</b>                 | <b>: UECRCC7008</b> | <b>End Sem. Exam</b>         | <b>: 75</b> |
| <b>Teaching Hours/Week (L:T:P)</b> | <b>: 0:0:5</b>      | <b>Exam Duration (Hours)</b> | <b>: 03</b> |
| <b>Credits : 05</b>                |                     |                              |             |

### PREREQUISITES

Working knowledge of Electronics and Communication areas including Computer Science.

### COURSE OUTCOMES


After the completion of mini project, students should be able to:

- CO1. Construct working models and explore field independently.
- CO2. Develop practical exposure and upgrade to the present industrial standards.
- CO3. Devise system integration skills
- CO4. Demonstrate documentation skills
- CO5. Develop Project management skills
- CO6. Develop problem solving skills

### GUIDELINES

There shall be an UG major-project to be chosen in consultation with the department faculties of their specialization. Students will register for the project at the time of commencement of VII semester. The UG major-project shall be submitted in a report form and presented before the committee in the VII semester. The following points need be considered for UG Major Project Phase-I

1. Student has to select a project either of their own interest or in consultation with faculty members of the department.
2. Students are advised to carry out project independently, however depending on the complexity of the proposed idea, they can do in group consisting of not more than three, with appropriate permission from HoD / Dean and department guide.
3. If student has his/her own idea for an individual Project, it is the student's responsibility to find a faculty member who both approves of the proposed programme of work and is willing to be the supervisor.
4. It is the responsibility of the student to report the progress of the work regularly to the concerned supervisor. A proper documentation has to be maintained in this regard.
5. In this phase student is expected to complete the literature review and should define the problem statement to implement the project in the subsequent semester. Evidence of part of the implementation of the project work is an added advantage for grading.
6. A report of atleast 30 pages (pinted on double side) must be submitted before the commencement of 7<sup>th</sup> semester end semester examinations (ESE).

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### REPORT FORMAT

Following points may be noted regarding the format of a report:

- A4 size, 1.5 inches margin on left side and 1 inch margin on remaining three sides.
- Times New Roman fonts:
  - Title of the Project: 24, Bold
  - Main/Chapter Header (1, 2, etc..): 16, Bold
  - Sub title: 14, Bold
  - Running Text: 12, Regular
  - Lines Spacing: 1.5 Lines
  - Paragraph Beginning: Opt. (No Space)
  - Paragraph Spacing: 6pt.
  - Figure Caption (Below Figure, Center Justified): 10, Regular Times New Roman
  - Table Caption (Above Table, Center Justified): 10, Regular Times New Roman
  - References must be placed at the end of Report
  - References must be cited in square brackets [1][2], [3-5], [6-9, 11, 14] etc.
- Report must be tested against Plagiarism and percentage of duplication must be less than 10% (As suggested by UGC)


### COURSE ASSESSMENT

#### A. Continuous Assessment (Weightage 50 Marks)

- Continues assement from internal guide.
- Project assessment will be carriedout twice in a semester usually after 5<sup>th</sup> and 10<sup>th</sup> weeks of the ongoing semester.

#### B. End Sem Examination (Weightage 75 Marks)

- The evaluation shall be based on the report submitted and a viva-voce exam for 75 marks
- There shall be a committee comprising of the head of the department, project supervisor and an department faculty members.

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## MAJOR PROJECT-PHASE-II

|                                    |                     |                                |          |            |
|------------------------------------|---------------------|--------------------------------|----------|------------|
| <b>Semester</b>                    | <b>: VIII</b>       | <b>Internal Assessment</b>     | <b>:</b> | <b>180</b> |
| <b>Course Code</b>                 | <b>: UECRCC8001</b> | <b>End Sem. Exam</b>           | <b>:</b> | <b>270</b> |
| <b>Teaching Hours/Week (L:T:P)</b> | <b>: 0:0:5</b>      | <b>Exam Duration (Minutes)</b> | <b>:</b> | <b>180</b> |
| <b>Credits : 18</b>                |                     |                                |          |            |

### PREREQUISITES

Thorough working knowledge of Electronics and Communication areas including Computer Science.

### COURSE OUTCOMES

After the completion of mini project, students should be able to:

- CO1. Construct working models and explore field independently.
- CO2. Develop practical exposure and upgrade to the present industrial standards.
- CO3. Devise system integration skills
- CO4. Demonstrate documentation skills
- CO5. Develop Project management skills
- CO6. Develop problem solving skills

### GUIDELINES


There shall be an UG major-project, in collaboration with an Industry / department faculties / Educational institute of national repute of their specialization. The following points need be followed for UG Major Project Phase-II

1. Students will have to continue the project chosen in the 7<sup>th</sup> semester for its implementation. Those who would like to go for external project with industry/an educational institute of national importance may continue the existing project or may choose different one as per the suggestion of external supervisor.
2. The UG major-project shall be submitted in a report form and presented before the committee in VIII semester.
3. In case students would like to work with other institute or industry, they have to inform the HoD /Dean and take appropriate permission.
4. In this phase student is expected to complete the project implementation and should keep the working model ready at the time of final internal deminstartion/external examination.
5. Evidence of paper publication either in referred conferences/journals is an added advantage for grading.

### REPORT FORMAT

Following points may be noted regarding the format of a report:

- A4 size, 1.5 inches margin on left side and 1 inch margin on remaining three sides.
- Times New Roman fonts:  
-Title of the Project: 24, Bold

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- Main/Chapter Header (1, 2, etc.): 16, Bold
- Sub title: 14, Bold
- Running Text: 12, Regular
- Lines Spacing: 1.5 Lines
- Paragraph Beginning: 0pt (No Space)
- Paragraph Spacing: 6pt
- Figure Caption (Below Figure, Center Justified): 10, Regular Times New Roman
- Table Caption (Above Table, Center Justified): 10, Regular Times New Roman
- References must be placed at the end of Report
- References must be cited in square brackets [1][2], [3-5], [6-9, 11, 14] etc.
- Report must be tested against Plagiarism and percentage of duplication must be less than 10% (As suggested by UGC)

### COURSE ASSESSMENT

#### A. Continuous Assessment (Weightage 160 Marks)

- Continues assement from internal guide.
- Project assessment will be carriedout twice in a semester usually after 5<sup>th</sup> and 10<sup>th</sup> weeks of the ongoing semester.

#### B. End Sem Examination (Weightage 240 Marks)

- The evaluation shall be based on the report submitted and a viva-voce exam for 240 marks
- There shall be a committee comprising of the head of the department, project supervisor and an department faculty members.