# SYLLABUS

# DR VISHWANATH KARAD

# MIT - WORLD PEACE UNIVERSITY

## FACULTY OF ENGINEERING AND TECHNOLOGYINTEGRATED B. TECH.

## (ELECTRONICS AND COMMUNICATION ENGINEERING)

# BATCH 2021 – 2027 AND ONWARDS

Prof. Dr. R.S.Kale
Associate Dean

# PROGRAMME STRUCTURE

***Preamble***:

Electronics and Communication Industry is increasingly finding applications in all sectors of the economy and thus is accepted as a key enabler in development of our country. To this aspect, there is also a need to ensure availability of trained human resources for this sector in order to sustain growth and to achieve the target set for this sector. To meet the challenge of ensuring excellence in engineeringeducation, the issue of quality needs to be addressed and taken forward in a systematic manner.

The Department of Electronics and Communication Engineering aims to provide quality education to youngsters so that they can contribute to the development of the nation. Promoting Industry involvementin student projects, internships, are the prime objectives of the department. With new technological advancements emerging every day, the course of Electronics & Communication Engineering is quite lucrative given the huge demand for competent and skilled engineers in telecom industry. Electronics and Communication Engineering is a study of various principles and practical aspects related to designing of various telecommunications equipment. The Department not only aims to make our students technically sound and knowledgeable but also to nurture their wisdom and make them better and responsible human beings.

**Prof. A.A. Bakare**
Programme Head,
ECE

**Dr. R.S. Kale**
Associate Dean,
School of Polytechnic andSkill Development

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## ***Vision and Mission of the Programme***

### VISION

To establish the Electronics and Communication Engineering department as a centre to impartknowledge, skills and continual learning in contemporary streams.

### MISSION

- To encourage and provide requisite facilities to our students and faculty to be at par with the latesttrends in the field of Electronics and Communication engineering.
- To equip students with sound technical knowledge to pursue further under graduate education andimpart entrepreneurial skills for being better professionals.

## ***Programme Educational Objectives***

The Electronics and Communication Engineering Graduate will:

PEO1: Provide socially responsible, environment friendly solutions to Electronics and communicationengineering related broad-based problems adapting professional ethics.

PEO2: Adapt state-of-the-art Electronics and Communication engineering broad-based technologies towork in multi-disciplinary work environments

PEO3: Solve broad-based problems individually and as a team member communicating effectively inthe world of work.

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## ***Programme Outcomes (POs)***

Electronics and Communication Engineering Graduates will be able to:

**PO1 Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

**PO2 Problem analysis:** Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, andengineering sciences.

**PO3 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 the public health and safety, and the cultural, societal, and environmental considerations.

**PO4 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 toprovide valid conclusions.

**PO5 Modern tool usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

**PO6 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.

**PO7 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.

**PO8 Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of theengineering practice.

**PO9 Individual and team work:** Function effectively as an individual, and as a member or leader in diverseteams, and in multidisciplinary settings.

**PO10 Communication:** Communicate effectively on complex engineering activities with the engineering community and with 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.

**PO11 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 manageprojects and in multidisciplinary environments.

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**PO12 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.

## ***Programme Specific Outcomes (PSOs)***

Electronics and Communication Engineering Graduates will be able to:

**PSO1** Diploma engineer will be able to apply fundamentals of electronics in various domains of analog anddigital systems.

**PSO2** Perceive various functional elements of different types of communication systems and apply the samefor societal and environmental needs

**PSO3** Use EDA tools to develop simple Electronics and Communication engineering and related circuits

## **Programme Structure*:***

**(a) Programme duration** : Six Years

**(b) System followed** : Trimester

**(c) Credits System:**

The outcome based education, trimester based credit and grading system is introduced to ensure quality of engineering education. Trimester based credit and grading system enables a much- required shift in focus from teacher centric to learner-centric education since the workload estimatedis based on the investment of time in learning and not in teaching. It also focuses on continuous evaluation which will enhance the quality of education.

(i) Per term or per year : Credits are given per trimester
(ii) Total in the programme : 125 Credits (For First Three Years)

**(d) Credits for activities other than academics:**

In the curriculum, some credits are given to other activities such as Industry internship/projects/MOOC.

**(e) Internship:**

The program has rural immersion module as a part of social internship in the first year of study. The student would also have to undergo two full trimester Internship in Industry along with their project work during the final year. These internships have credits and mandatory for all the students.

**(f) Assessment Criteria:**

There will be continuous as well as end trimester assessment of a student's performance and grades will be awarded by the Subject Teacher. Various assessment tools such as tests, quizzes, assignments, project, group activities, presentations, etc would be used

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to evaluate the performanceof the students.

**(g) <u>Branches or Specialisations:</u> NA**

**(h) Mandatory Attendance to appear for examination:**

As per the Examination Ordinance, 2020 of MIT-WPU, the student should have minimum 75% attendance in a trimester considering all concessions such as attendance concession given for sport, sickleave etc. to appear for external examination for that trimester.

***(j)*** **Medium of Instruction & Examination:** *English*

As per Section 14(a), Academic Ordinance: 2018 of MIT-WPU, in all the Academic Programs, themedium of instruction and examination shall be English.

**(k) Eligibility criteria for admission to the programme:**

10th with 60% in SSC course of state of Maharashtra or equivalent board. Reservations as perAICTE rules published from time to time.

**Eligibility criteria for Integrated B.Tech.(Lateral Entry):**

Lateral entry as per prevailing rules of DTE and Government of Maharashtra**.**

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## Int.B. Tech Courses in Electronics and Communication Engineering

**A. Definition of Credit**:

| | |
|---|---|
| 1 Credit (Theory/Tutorial) | 15 Hrs |
| 1 Credit (Laboratory/Project or similar activity) | 30 Hrs |

**B. Credits:**

Total number of credits for Three-year Int. B.Tech. Electronic and Communication EngineeringProgramme would be 125. (For First Three Years)

**C. Structure of Credits for Undergraduate Int.B.Tech. Electronics and CommunicationEngineering:**

| S. No. | Category | Suggested Breakup of Credits (Total 125) (For First Three Years) |
|---|---|---|
| 1 | Humanities and Social Sciences and Peace Programmes including Management courses | 08 |
| 2 | Basic Science courses | 18 |
| 3 | Engineering Science courses including workshop, drawing, Basics of electrical/mechanical/computer etc. | 20 |
| 4 | Professional core courses | 50 |
| 5 | Professional Elective courses relevant to chosen specialization/branch | 09 |
| 6 | Open subjects–Electives from other technical and/or emerging subjects | 02 |
| 7 | Project work, seminar and internship in industry or elsewhere | 18 |
| | **Total** | **125** |

***D. Course Code and Definition:***

| *Course code* | *Definitions* |
|---|---|
| L | Lecture |
| T | Tutorial |

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| | |
|---|---|
| ES | Engineering Science Courses |
| WPC | Humanities and Social Sciences and Peace Programs includingManagement courses |
| MEE | Mechanical Engineering Courses |
| ECE | Electronics and Communication |
| EEE | Electrical Engineering |
| CHE | Chemical Engineering |
| CET | Computer Science and Engineering |
| POE | Polymer Engineering |
| CVE | Civil Engineering |
| PEL | Petroleum Engineering |

## E. Grading Scheme:

According to Para 12.1 of Academic Ordinances 2017, University shall use trimester /semester / annual as per need of a program. The credit based system provides flexibility in designing curriculumand assigning credits based on the course content and hours of teaching. The choice based credit system provides a 'cafeteria' type approach in which the students can take courses of their choice, learn at their own pace, undergo additional courses and acquire more than the required credits, and adopt an interdisciplinary approach to learning. The University shall follow a 10-point grading system with the following letter grades as given below:

| Marks Out of 100 | Grade | Grade Point |
|---|---|---|
| 80-100 | O: Outstanding | 10 |
| 70-79 | A+: Excellent | 9 |
| 60-69 | A: Very Good | 8 |
| 55-59 | B+: Good | 7 |
| 50-54 | B: Above Average | 6 |
| 45-49 | C: Average | 5 |
| 40-44 | Pass | 4 |
| 0-39 | Fail | 0 |
| Ab | Absent | NA |

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# *Integrated B. Tech. Electronics &Communication Engineering* (First Year)
# (Batch 2021-2027)
# Trimester-I

| Sr. No. | Course Code | Name of Course | Type | Weekly Workload, Hrs | | | Credits | | Assessment, Marks | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Theory | Tutorial | Lab | Theory | Lab | CCA* | LCA* | End Term Test | Total |
| 1 | | Basic Mathematics | BS | 30 | 20 | 0 | 2 | 1 | 50 | 50 | 50 | 150 |
| 2 | | Workshop Practices | ES | 0 | 0 | 30 | 0 | 1 | 0 | 50 | 0 | 50 |
| 3 | | Basic Chemistry | BS | 30 | 0 | 30 | 2 | 1 | 50 | 50 | 50 | 150 |
| 4 | | Fundamentals of Computer System | ES | 30 | 0 | 30 | 2 | 1 | 50 | 50 | 50 | 150 |
| 5 | | Engineering Graphics | ES | 30 | 0 | 30 | 2 | 1 | 50 | 50 | 50 | 150 |
| 6 | | World Famous Philosophers,Saga/Sants and Great Kings | HSS | 30 | 0 | 0 | 2 | 0 | 70 | 0 | 30 | 100 |
| 7 | | Yoga for Winning Personality | WP | - | - | -- | - | - | - | - | - | - |
| | | **Total** | | **150** | **20** | **120** | **10** | **5** | **270** | **250** | **230** | **750** |

**Type: (Refer Para 11 of Academic Ord. 2017)**

****Assessment Marks are valid only if Attendance criteria are met**

**Trimester Teaching Hours: 290**

**Total Credits: First Year Integ. *B. Tech* Trimester I: 15**

* CCA: Class Continuous Assessment
* LCA: Laboratory Continuous Assessment

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# *Integrated B. Tech. Electronics &Communication Engineering* (First Year)
# (Batch 2021-2027)
# Trimester-II

| Sr. No. | Course Code | Name of Course | Type | Weekly Workload, Hrs | | | Credits | | Assessment, Marks | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Theory | Tutorial | Lab | Theory | Lab | CCA* | LCA* | End Term Test | Total |
| 1 | | Basic Physics | BS | 30 | 0 | 30 | 2 | 1 | 50 | 50 | 50 | 150 |
| 2 | | Communication Skill | HSS | 30 | 0 | 00 | 2 | 0 | 50 | 0 | 50 | 100 |
| 3 | | Basics of Electrical & Electronics Engineering | ES | 30 | 0 | 30 | 2 | 1 | 50 | 50 | 50 | 150 |
| 4 | | Soldering & Debugging Techniques | PC | 0 | 0 | 60 | 0 | 2 | 0 | 100 | 0 | 100 |
| 5 | | Basics of Mechanical Engineering | ES | 30 | 0 | 30 | 2 | 1 | 50 | 50 | 50 | 150 |
| 6 | | Biology for Engineers | BS | 30 | 0 | 0 | 2 | 0 | 50 | 0 | 50 | 100 |
| 7 | | Yoga for Winning Personality | WP | - | - | - | - | - | - | - | - | - |
| | | **Total** | | **150** | **0** | **150** | **10** | **5** | **250** | **250** | **250** | **750** |

****Assessment Marks are valid only if Attendance criteria are met**

**Trimester Teaching Hours: 300**

**Total Credits: First Year Integ. *B. Tech* Trimester II: 15**

* CCA: Class Continuous Assessment
* LCA: Laboratory Continuous Assessment

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# *Integrated B. Tech. Electronics & Communication Engineering* (First Year)
# (Batch 2021-2027)
# Trimester-III

| Sr. No. | Course Code | Name of Course | Type | Weekly Workload, Hrs | | | Credits | | Assessment, Marks | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Theory | Tutorial | Lab | Theory | Lab | CCA* | LCA* | End Term Test | Total |
| 1 | | Electronics Simulation Tool (Proteus) | PC | 0 | 0 | 60 | 0 | 2 | 0 | 100 | 0 | 100 |
| 2 | | Applied Science | BS | 30 | 0 | 30 | 2 | 1 | 50 | 50 | 50 | 150 |
| 3 | | Electric Circuits & Networks | PC | 15 | 0 | 0 | 1 | 0 | 25 | 0 | 25 | 50 |
| 4 | | Electronic Devices and Circuits | PC | 30 | 0 | 30 | 2 | 1 | 50 | 50 | 50 | 150 |
| 5 | | Basics of Civil Engineering | ES | 30 | 0 | 30 | 2 | 1 | 50 | 50 | 50 | 150 |
| 6 | | Engineering Mechanics | ES | 30 | 0 | 30 | 2 | 1 | 50 | 50 | 50 | 150 |
| 7 | | Yoga for Winning Personality | WP | - | - | - | - | - | - | - | - | - |
| | | **Total** | | **135** | **0** | **180** | **9** | **6** | **225** | **300** | **225** | **750** |

****Assessment Marks are valid only if Attendance criteria are met**

**Trimester Teaching Hours: 315**

**Total Credits: First Year Integ. *B. Tech* Trimester III: 15**

* CCA: Class Continuous Assessment
* LCA: Laboratory Continuous Assessment

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# *Integrated B. Tech. Electronics &Communication Engineering* (First Year)
# (Batch 2021-2027)
# Trimester-IV

| Sr. No. | Course Code | Name of Course | Type | Weekly Workload, Hrs | | | Credits | | Assessment, Marks | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Theory | Tutorial | Lab | Theory | Lab | CCA* | LCA* | End Term Test | Total |
| 1 | | Engineering Mathematics I | BS | 30 | 0 | 0 | 2 | 0 | 50 | 0 | 50 | 100 |
| 2 | | Applied Electronics | PC | 30 | 0 | 30 | 2 | 1 | 50 | 50 | 50 | 150 |
| 3 | | Material Science | PC | 30 | 0 | 0 | 2 | 0 | 50 | 0 | 50 | 100 |
| 4 | | Basics of Digital Techniques | PC | 30 | 0 | 30 | 2 | 1 | 50 | 50 | 50 | 150 |
| 5 | | Electronic Measurements & Instruments | PC | 30 | 0 | 30 | 2 | 1 | 50 | 50 | 50 | 150 |
| 6 | | Simulation Software-1 (Matlab &Labview) | PC | 0 | 0 | 60 | 0 | 2 | 0 | 100 | 0 | 100 |
| | | **Total** | | **150** | **0** | **150** | **10** | **5** | **250** | **250** | **250** | **750** |

****Assessment Marks are valid only if Attendance criteria are met**

**Trimester Teaching Hours: 300**

**Total Credits: First Year Integ. *B. Tech* Trimester IV: 15**

***** CCA: Class Continuous Assessment

***** LCA: Laboratory Continuous Assessment

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# *Integrated B. Tech. Electronics & Communication Engineering* (First Year)
# (Batch 2021-2027)
# Trimester-V

| Sr. No. | Course Code | Name of Course | Type | Weekly Workload, Hrs | | | Credits | | Assessment, Marks | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Theory | Tutorial | Lab | Theory | Lab | CCA* | LCA* | End Term Test | Total |
| 1 | | Linear Integrated Circuits | PC | 30 | 0 | 30 | 2 | 1 | 50 | 50 | 50 | 150 |
| 2 | | Control Systems | PC | 30 | 0 | 30 | 2 | 1 | 50 | 50 | 50 | 150 |
| 3 | | C Programming | PC | 0 | 0 | 60 | 0 | 2 | 0 | 100 | 0 | 100 |
| 4 | | Digital Communication | PC | 30 | 0 | 30 | 2 | 1 | 50 | 50 | 50 | 150 |
| 5 | | EDP | HSS | 30 | 0 | 0 | 2 | 0 | 50 | 0 | 50 | 100 |
| 6 | | Peace 2 | HSS | 30 | 0 | 0 | 2 | 0 | 70 | 0 | 30 | 100 |
| 7 | | Basics of Power Electronics | PC | 30 | 0 | 30 | 2 | 1 | 50 | 50 | 50 | 150 |
| | | **Total** | | **180** | **0** | **180** | **12** | **6** | **320** | **300** | **280** | **900** |

****Assessment Marks are valid only if Attendance criteria are met**

**Trimester Teaching Hours: 360**

**Total Credits: First Year Integ. *B. Tech* Trimester V: 18**

* CCA: Class Continuous Assessment
* LCA: Laboratory Continuous Assessment

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# *Integrated B. Tech. Electronics & Communication Engineering* (First Year)
# (Batch 2021-2027)
# Trimester-VI

| Sr. No. | Course Code | Name of Course | Type | Weekly Workload, Hrs | | | Credits | | Assessment, Marks | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Theory | Tutorial | Lab | Theory | Lab | CCA* | LCA* | End Term Test | Total |
| 1 | | Microcontroller | PC | 30 | 0 | 30 | 2 | 1 | 50 | 50 | 50 | 150 |
| 2 | | C++ | PC | 0 | 0 | 60 | 0 | 2 | 0 | 100 | 0 | 100 |
| 3 | | Mobile & Wireless Communication | PC | 30 | 0 | 30 | 2 | 1 | 50 | 50 | 50 | 150 |
| 4 | | **Elective-1**<br>1. Industrial Automation<br>2. Microwave and Satellite Communication | PE | 30 | 0 | 30 | 2 | 1 | 50 | 50 | 50 | 150 |
| 5 | | Simulation Software-02 (Python) | PC | 0 | 0 | 60 | 0 | 2 | 0 | 100 | 0 | 100 |
| 6 | | **Elective-2**<br>A. Mechatronics<br>B. Fiber Optic Communication | PE | 30 | 0 | 30 | 2 | 1 | 50 | 50 | 50 | 150 |
| | | **Total** | | **120** | **0** | **240** | **8** | **8** | **200** | **400** | **200** | **800** |

****Assessment Marks are valid only if Attendance criteria are met**

**Trimester Teaching Hours: 360**

**Total Credits: First Year Integ. *B. Tech* Trimester VI: 16**

* CCA: Class Continuous Assessment
* LCA: Laboratory Continuous Assessment

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# *Integrated B. Tech. Electronics & Communication Engineering* (First Year)
# (Batch 2021-2027)
# Trimester-VII

| Sr. No. | Course Code | Name of Course | Type | Weekly Workload, Hrs | | | Credits | | Assessment, Marks | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Theory | Tutorial | Lab | Theory | Lab | CCA* | LCA* | End Term Test | Total |
| 1 | | Internship | SI | 0 | 0 | 180 | 0 | 6 | 0 | 300 | 0 | 300 |
| 2 | | One subject online mode | MOOC | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 100 |
| | | **Total** | | **0** | **0** | **180** | **2** | **6** | **0** | **300** | **0** | **400** |

**Type: (Refer Para 11 of Academic Ord. 2017)**

****Assessment Marks are valid only if Attendance criteria are met**

**Trimester Teaching Hours: 180**

**Total Credits: First Year Integ. *B. Tech* Trimester VII: 8**

* CCA: Class Continuous Assessment
* LCA: Laboratory Continuous Assessment

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# *Integrated B. Tech. Electronics & Communication Engineering* (First Year)
# (Batch 2021-2027)
# Trimester-VIII

| Sr. No. | Course Code | Name of Course | Type | Weekly Workload, Hrs | | | Credits | | Assessment, Marks | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Theory | Tutorial | Lab | Theory | Lab | CCA* | LCA* | End Term Test | Total |
| 1 | | Internship | SI | 0 | 0 | 180 | 0 | 6 | 0 | 300 | 0 | 300 |
| 2 | | Capstone Project-Stage-1 Seminar | PR | 0 | 0 | 60 | 0 | 2 | 0 | 100 | 0 | 100 |
| | | **Total** | | **0** | **0** | **180** | **0** | **8** | **0** | **400** | **0** | **400** |

**Type: (Refer Para 11 of Academic Ord. 2017)**

****Assessment Marks are valid only if Attendance criteria are met**

**Trimester Teaching Hours: 240**

**Total Credits: First Year Integ. *B. Tech* Trimester VIII: 8**

* CCA: Class Continuous Assessment

* LCA: Laboratory Continuous Assessment

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# *Integrated B. Tech. Electronics & Communication Engineering* (First Year)
# (Batch 2021-2027)
# Trimester-IX

| Sr. No. | Course Code | Name of Course | Type | Weekly Workload, Hrs | | | Credits | | Assessment, Marks | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Theory | Tutorial | Lab | Theory | Lab | CCA* | LCA* | End Term Test | Total |
| 1 | | **Elective 3-**<br>1 Internet of Things<br>2. Robotics | PE | 30 | 0 | 30 | 2 | 1 | 50 | 50 | 50 | 150 |
| 2 | | Data Communication &Networking | PC | 30 | 0 | 30 | 2 | 1 | 50 | 50 | 50 | 150 |
| 3 | | Engineering Maths II | BS | 30 | 0 | 0 | 2 | 0 | 50 | 0 | 50 | 100 |
| 4 | | Open Elective | OE | 30 | 0 | 0 | 2 | 0 | 50 | 0 | 50 | 100 |
| 5 | | Embedded Systems | PC | 30 | 0 | 30 | 2 | 1 | 50 | 50 | 50 | 150 |
| 6 | | Capstone Project Stage 02 | PR | 0 | 0 | 60 | 0 | 2 | 0 | 100 | 0 | 100 |
| | | **Total** | | **150** | **0** | **150** | **10** | **5** | **250** | **250** | **250** | **750** |

**Type: (Refer Para 11 of Academic Ord. 2017)**

****Assessment Marks are valid only if Attendance criteria are met**

**Trimester Teaching Hours: 300**

**Total Credits: First Year Integ. *B. Tech* Trimester XI: 15**

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