RAISONI GROUP
a vision beyond

# G. H. Raisoni College of Engineering and Management , Wagholi , Pune

(Autonomous Institute Affiliated to Savitribai Phule Pune University)

PUNE

## Department of Electronics & Telecommunication

## Academic Year 2017-18

## Under Graduate

## Course Book

# SY B.Tech (E&TC)

## Semester- III/IV

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## Semester- III/IV


**Ms. Rupali B. Patil**

**Dept. Autonomy Coordinator**

**Dr. Vaibhav Hendre**

**HOD(E&TC)**

# INDEX

# About Department

- NBA Accredited UG level Electronics and Telecommunication Program.
- Involvement of Experts from IITs, NITs and Reputed Industries in designing of curriculum.
- Choice of electives
- Remedial Teaching at Multi levels with pre-requisites
- Sponsorship for presenting papers, filing patents
- Research Mentorship and Industry Internship
- Recognition of Research Center under Savitribai Phule Pune University (Ph.D Program)
- Department Industry Advisory Board (DIAB)
- Industry Supported Labs.
- MOUs with Industries.

# INSTITUTE VISION AND MISSION

## VISION:-

To achieve excellent standards of quality education by keeping pace with rapidly changing technologies. To create technical manpower of global standards with capabilities of accepting new challenges.

## MISSION:-

Our efforts will be dedicated to impart quality and value based education to raise satisfaction level of all stake-holders. Our strength will be directed to create competent engineers. Our endeavor will be to provide all support to promote research and development activities.

# DEPARTMENT VISION AND MISSION

## VISION:-

To create globally competent and acceptable technical manpower in the ever-changing domain of Electronics & Telecommunication with attributes of self and lifelong learning, thereby transforming challenges into contributions to rapidly changing technologies.

## MISSION:-

M1: To impart quality and value based education to the learners by strengthening teaching learning process from innovative curriculum to its rigorous implementation.

M2: To create competent professionals with a feature of life long contributors to technology and mankind.

M3: To engage faculty and students into relevant and outcome oriented R&D activities.

# Programme Educational Objectives (PEOs)

A graduate in E&TC will be able to demonstrate:

**PEO1:** Ability to grasp, comprehend and apply the knowledge acquired from basic sciences, mathematics, program specific core and elective courses to solve real life technical problems.

**PEO2:** As a self and lifelong learner, ability to deliver and contribute applications, products, services dealing with usage of modern software tools and hardware platforms.

**PEO3:** Ability to work as cohesive team members to exhibit professional ethics, human values and social awareness in their career.

**PEO4:** Competencies, excellence in higher education and employability in diversified areas of Electronics and Telecommunication Engineering.

# PROGRAM SPECIFIC OBJECTIVES(PSOs)

At the end of the programme students will be able to demonstrate:

**PSO1:** An in-depth understanding of fundamental and application oriented courses in communication systems, signal processing, embedded systems and electronic devices.

**PSO2:** A rigorous hands-on skills of modeling and simulation by using broad range of

programming languages and open source platform.

**PSO3:** Behavior as a responsible team member contributing to development of prototype, application, product as a part of his/her mini and main project in the field of Electronics and communication systems.

# PROGRAM OUTCOMES(POs)

Engineering Graduates will be able to:

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

**2. Problem analysis**: Identify, formulate, review 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 the public health and safety, and the 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 modeling 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 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.

# G. H. Raisoni College of Engineering and Management, Pune

(Autonomous Institute Affiliated to Savitribai Phule Pune University)

**Board of Studies members of Electronics and Telecommunication Engineering**

| SN | Name | Designation | Designation in BOS | E-mail ID | Mobile No |
|---|---|---|---|---|---|
| 01 | Dr. Vaibhav Hendre | Professor & Head (E&TC) | Chairman | vaibhav.hendre@raisoni.net | 9921580670 |
| 02 | Dr. Preeti Bajaj | Director, GHRCE, Nagpur | Special Invitee | principal.ghrce@raisoni.net | 9822220369 |
| 03 | Dr.Jaywant Sankpal | Director | Permanent Invitee | director_ghrcemp@raisoni.net | 9604787185 |
| 04 | Dr.R.S. Bichkar | Professor (E &TC) and Dean (R&D) | Faculty Representative (Specialized faculty in Genetic Algorithm, Image Processing) | rajankumar.bichkar@raisoni.net | 9657724108 |
| 05 | Mr P.N. Matte | Assistant Professor E&TC & Dean Academics | Faculty Representative (Specialized Faculty in VLSI Design Embedded System Design) | pravin.matte@raisoni.net | 9922944973 |
| 06 | Ms. Meeta Bakuli | Assistant Professor UG-E&TC | Faculty Representative (Specialized Faculty in communication) | meeta.bakuli@raisoni.net | 9960206474 |
| 07 | Dr. M.S. Sutaone | Professor (E&TC) college of Engineering Pune | Subject Expert (Specialized Faculty in VLSI Design, Signal & Image Processing) | mssutaone@gmail.com | 9923560608 |
| 08 | Dr. V.M. Gadre | Professor IIT, Bombay | Subject Expert (Specialized Faculty in Digital Signal Processing) | vmgadre@ee.iitb.ac.in | 9819007426 |

| SN | Name | Designation | Designation in BOS | E-mail ID | Mobile No |
|---|---|---|---|---|---|
| 09 | Dr. A.N. Rajgopalan | Professor IIT, Madras | Subject Expert to be nominated by Vice- Chancellor | raju@ee.iitm.ac.in | 044-22574433 |
| 10 | Mr. Sanjay Mishra | Vice-President, Cotmac Electronics Pvt. Ltd, Pune | Industry Expert-1 | sanjay.mishra @cotmac.com | 9890180604 |
| 11 | Mr. Prasanna Rode | Principal, Architect, Capgemini, Pune | Industry Expert-2 | prasanna.rode @capgemini.com | 9833289394 |
| 12 | Mr. Anuj Sharma | Engineer (R&D),KPIT Cummins Info System Ltd.,Pune | Alumni Member | asharma614 @yahoo.com | 8149002994 |
| 13 | Mr. S K Waghmare | Assistant Professor , Dean-FY | Co-opted Member (Specialization Faculty in VLSI & RFM EMS) | surendra.waghmare @raisoni.net | 9881240358 |
| 14 | Dr.Milind Khanapurkar | Professor & Head E&TC GHRCE Nagpur | Co-opted Member | milind.khanapurkar @raisoni.net | 9922411221 |
| 15 | Ms. Rupali B. Patil | Assistant Professor UG-E&TC | Co-opted Member(Communication Engg.) | rupalib.patil @raisoni.net | 9922411320 |
| 16 | Mr. Pranav Chippallkatti | Assistant Professor PG-E&TC | Co-opted Member | pranav.chippalkatti @raisoni.net | 9730468538 |
| 17 | Mr. Ashutosh Satpute | UG-Student | Student member-UG | ashutoshsatpute30 @gmail.com | 9552049697 |
| 18 | Mr.Anish Polke | PG-Student | Student member-PG | anishpolke@gmail.com | 8446292080 |

# Department of Electronics and Telecommunication Engineering

# S.Y BTech

# Course Code Details

| S. N. | Code | Course Name | Sem | Scheme | Subject | Elective | Offer |
|---|---|---|---|---|---|---|---|
| 1 | BEML201 | Engineering Mathematics –III | III | UG Electronics & Telecommunication 2017-18 (AUTONOMOUS) | Theory | NO | YES |
| 2 | BECL201 | Electronic Devices & Circuits | III | UG Electronics & Telecommunication 2017-18 (AUTONOMOUS) | Theory | NO | YES |
| 3 | BECP201 | Electronic Devices & Circuits | III | UG Electronics & Telecommunication 2017-18 (AUTONOMOUS) | Practical | NO | YES |
| 4 | BECL202 | Power Electronics | III | UG Electronics & Telecommunication 2017-18 (AUTONOMOUS) | Theory | NO | YES |
| 5 | BECP202 | Power Electronics | III | UG Electronics & Telecommunication 2017-18 (AUTONOMOUS) | Practical | NO | YES |
| 6 | BCOL201 | Data Structures | III | UG Electronics & Telecommunication 2017-18 (AUTONOMOUS) | Theory | NO | YES |
| 7 | BCOP201 | Data Structures | III | UG Electronics & Telecommunication 2017-18 (AUTONOMOUS) | Practical | NO | YES |
| 8 | BECL203 | Network Theory | III | UG Electronics & Telecommunication 2017-18 (AUTONOMOUS) | Theory | NO | YES |
| 9 | BECGP202/ BECGP203 | GENERAL PROFICIENCY: -II :Foreign Language/ GENERAL PROFICIENCY-III: Hobby classes | III/ IV | UG Electronics & Telecommunication 2017-18 (AUTONOMOUS) | Theory | NO | YES |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 10 | BECL204 | Digital System Design | IV | UG Electronics & Telecommunication 2017-18(AUTONOMOUS) | Theory | NO | YES |
| 11 | BECP204 | Digital System Design | IV | UG Electronics & Telecommunication 2017-18(AUTONOMOUS) | Practical | NO | YES |
| 12 | BECL205 | Field Theory | IV | UG Electronics & Telecommunication 2017-18(AUTONOMOUS) | Theory | NO | YES |
| 13 | BECL206 | Analog Systems &Design | IV | UG Electronics &Telecommunication 2017-18(AUTONOMOUS) | Theory | NO | YES |
| 14 | BECP206 | Analog Systems & Design | IV | UG Electronics & Telecommunication 2017-18(AUTONOMOUS) | Practical | NO | YES |
| 15 | BECL207 | Communication Electronics | IV | UG Electronics & Telecommunication 2017-18(AUTONOMOUS) | Theory | NO | YES |
| 16 | BECP207 | Communication Electronics | IV | UG Electronics & Telecommunication 2017-18(AUTONOMOUS) | Practical | NO | YES |
| 17 | BCOL203 | Computer Architecture& Organization | IV | UG Electronics & Telecommunication 2017-18(AUTONOMOUS) | Theory | NO | YES |
| 18 | BECP208 | Modelling& Simulation | IV | UG Electronics & Telecommunication 2017-18(AUTONOMOUS) | Practical | NO | YES |

# B.Tech. Electronics and Telecommunication

## Course Structure

| Scheme for S.Y. B.Tech. | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SEMESTER-III | | | | | | | | | | | | | | |
| **Subject Code** | **Name of the Course** | **Teaching Scheme** | | | | **Credits** | **Evaluation Scheme** | | | | | | **Duration of Paper/ Practical (Hrs.)** |
| | | | | | | | **Theory** | | | **Practical** | | **Total** | |
| | | **Th** | **Tu** | **Pr** | **Total** | | **TAE (20)** | **CAE (20)** | **ESE (60)** | **Cont. Ass.** | **Ext.** | | |
| BEML201 | Engineering Mathematics –III | 3 | 1 | - | 4 | 4 | 20 | 20 | 60 | - | - | 100 | 3 |
| BECL201 | Electronic Devices & Circuits | 3 | 1 | - | 4 | 4 | 20 | 20 | 60 | - | - | 100 | 3 |
| BECP 201 | Electronic Devices & Circuits | - | - | 2 | 2 | 1 | - | - | - | 25 | 25 | 50 | 3 |
| BECL203 | Network Theory | 3 | 1 | - | 4 | 4 | 20 | 20 | 60 | - | - | 100 | 3 |
| BECL202/ BECL207 | Power Electronics / Communication Electronics | 3 | 1 | - | 4 | 4 | 20 | 20 | 60 | - | - | 100 | 3 |
| BECP202 / BECP207 | Power Electronics / Communication Electronics | - | - | 2 | 2 | 1 | - | - | - | 25 | - | 25 | - |
| BCOL201 / BCOL203 | Data Structures / Computer Architecture & Organization | 3 | 1 | - | 4 | 4 | 20 | 20 | 60 | - | - | 100 | 3 |
| | | 3 | - | - | 3 | 3 | 20 | 20 | 60 | - | - | 100 | 3 |
| BCOP201 | Data Structures | - | - | 4 | 4 | 2 | - | - | - | 25 | 25 | 50 | - |
| BECGP202 / BECGP203 | GENERAL PROFICIENCY:-II :Foreign Language / GENERAL PROFICIENCY-III: Hobby classes | 1 | - | 2 | 3 | Audit Course | - | - | - | G | - | - | - |
| | **Total** | 16 | 5/4 | 10 | 31/ 26 | 24/ 21 | 100 | 100 | 300 | 75/ 50 | 50/25 | 625/575 | |

# B.Tech. Electronics and Telecommunication

## Course Structure

## Group A

| Scheme for S.Y. B.Tech. | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SEMESTER-III | | | | | | | | | | | | | | |
| **Subject Code** | **Name of the Course** | **Teaching Scheme** | | | | **Credits** | **Evaluation Scheme** | | | | | | | **Duration of Paper/ Practical (Hrs.)** |
| | | | | | | | **Theory** | | | **Practical** | | **Total** | | |
| | | **Th** | **Tu** | **Pr** | **Total** | | **TAE (20)** | **CAE (20)** | **ESE (60)** | **Cont. Ass.** | **Ext.** | | | |
| BEML201 | Engineering Mathematics –III | 3 | 1 | - | 4 | 4 | 20 | 20 | 60 | - | - | 100 | 3 | |
| BECL201 | Electronic Devices & Circuits | 3 | 1 | - | 4 | 4 | 20 | 20 | 60 | - | - | 100 | 3 | |
| BECP 201 | Electronic Devices & Circuits | - | - | 2 | 2 | 1 | - | - | - | 25 | 25 | 50 | 3 | |
| BECL203 | Network Theory | 3 | 1 | - | 4 | 4 | 20 | 20 | 60 | - | - | 100 | 3 | |
| BECL202 | Power Electronics | 3 | 1 | - | 4 | 4 | 20 | 20 | 60 | - | - | 100 | 3 | |
| BECP202 | Power Electronics | - | - | 2 | 2 | 1 | - | - | - | 25 | - | 25 | - | |
| BCOL201 | Data Structures | 3 | 1 | - | 4 | 4 | 20 | 20 | 60 | - | - | 100 | 3 | |
| BCOP201 | Data Structures | - | - | 4 | 4 | 2 | - | - | - | 25 | 25 | 50 | - | |
| BECGP202 | GENERAL PROFICIENCY:-II :Foreign Language | 1 | - | 2 | 3 | Audit Course | - | - | - | G | - | - | - | |
| | **Total** | 16 | 5 | 10 | 31 | 24 | 100 | 100 | 300 | 75 | 50 | 625 | | |

# Group B

| Scheme for S.Y. B.Tech. | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SEMESTER-III | | | | | | | | | | | | | | |
| **Subject Code** | **Name of the Course** | **Teaching Scheme** | | | | **Credits** | **Evaluation Scheme** | | | | | | | **Duration of Paper / Practical (Hrs.)** |
| | | | | | | | **Theory** | | | **Practical** | | **Total** | | |
| | | **Th** | **Tu** | **Pr** | **Total** | | **TAE (20)** | **CAE (20)** | **ESE (60)** | **Cont. Ass.** | **Ext.** | | | |
| BEML201 | Engineering Mathematics –III | 3 | 1 | - | 4 | 4 | 20 | 20 | 60 | - | - | 100 | 3 | |
| BECL201 | Electronic Devices & Circuits | 3 | 1 | - | 4 | 4 | 20 | 20 | 60 | - | - | 100 | 3 | |
| BECP201 | Electronic Devices & Circuits | - | - | 2 | 2 | 1 | - | - | - | 25 | 25 | 50 | 3 | |
| BECL203 | Network Theory | 3 | 1 | - | 4 | 4 | 20 | 20 | 60 | - | - | 100 | 3 | |
| BECL207 | Communication Electronics | 3 | 1 | - | 4 | 4 | 20 | 20 | 60 | - | - | 100 | 3 | |
| BECP207 | Communication Electronics | - | - | 2 | 2 | 1 | - | - | - | 25 | - | 25 | - | |
| BCOL203 | Computer Architecture& Organization | 3 | - | - | 3 | 3 | 20 | 20 | 60 | - | - | 100 | 3 | |
| BECGP203 | GENERAL PROFICIENCY-III: Hobby classes | 1 | - | 2 | 3 | Audit Course | - | - | - | G | - | - | - | |
| | **Total** | 16 | 4 | 6 | 26 | 21 | 100 | 100 | 300 | 50 | 25 | 575 | | |

# SEMESTER IV

| Scheme for S.Y | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SEMESTER-IV | | | | | | | | | | | | | | |
| Sub. Code | Name of the Course | Teaching Scheme | | | | Credits | Evaluation Scheme | | | | | | Duration of Paper / Practical (Hrs.) |
| | | | | | | | Theory | | | Practical | | Total | |
| | | Th | Tu | Pr | Total | | TAE (20) | CAE (20) | ESE (60) | Cont Ass. | Ext. (PR) | | |
| BECL204 | Digital System Design | 3 | 1 | - | 4 | 4 | 20 | 20 | 60 | - | - | 100 | 3 |
| BECP204 | Digital System Design | - | - | 2 | 2 | 1 | - | - | - | 25 | 25 | 50 | 3 |
| BECL205 | Field Theory | 3 | 1 | - | 4 | 4 | 20 | 20 | 60 | -- | - | 100 | 3 |
| BECL206 | Analog Systems & Design | 3 | 1 | - | 4 | 4 | 20 | 20 | 60 | - | - | 100 | 3 |
| BECP206 | Analog Systems & Design | - | - | 2 | 2 | 1 | - | - | - | 25 | 25 | 50 | 3 |
| BECP208 | Modeling & Simulation | - | - | 2 | 2 | 1 | - | - | - | 25 | - | 25 | 3 |
| BECL202/ BECL207 | Power Electronics / Communication Electronics | 3 | 1 | - | 4 | 4 | 20 | 20 | 60 | - | - | 100 | 3 |
| BECP202 / BECP207 | Power Electronics / Communication Electronics | - | - | 2 | 2 | 1 | - | - | - | 25 | - | 25 | - |
| BCOL201 / BCOL203 | Data Structures / Computer Architecture & Organization | 3 | 1 | - | 4 | 4 | 20 | 20 | 60 | - | - | 100 | 3 |
| | | 3 | - | - | 3 | 3 | 20 | 20 | 60 | - | - | 100 | 3 |
| BCOP201 | Data Structures | - | - | 4 | 4 | 2 | - | - | - | 25 | 25 | 50 | - |
| BECGP202 / BECGP203 | GENERAL PROFICIENCY:-II :Foreign Language / GENERAL PROFICIENCY-III: Hobby classes | 1 | - | 2 | 3 | Audit Course | - | - | - | G | - | - | - |
| | **Total** | **16** | **5/4** | **14/10** | **35/30** | **26/23** | **100** | **100** | **300** | **125/ 100** | **75/ 50** | **700/ 650** | - |

# SEMESTER IV

# Group A

| Scheme for S.Y | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SEMESTER-IV | | | | | | | | | | | | | | |
| **Sub. Code** | **Name of the Course** | **Teaching Scheme** | | | | **Credits** | **Evaluation Scheme** | | | | | | **Duration of Paper / Practical (Hrs.)** |
| | | | | | | | **Theory** | | | **Practical** | | **Total** | |
| | | **Th** | **Tu** | **Pr** | **Total** | | **TAE (20)** | **CAE (20)** | **ESE (60)** | **Cont Ass.** | **Ext. (PR)** | | |
| BECL204 | Digital System Design | 3 | 1 | - | 4 | 4 | 20 | 20 | 60 | - | - | 100 | 3 |
| BECP204 | Digital System Design | - | - | 2 | 2 | 1 | - | - | - | 25 | 25 | 50 | 3 |
| BECL205 | Field Theory | 3 | 1 | - | 4 | 4 | 20 | 20 | 60 | - | - | 100 | 3 |
| BECL206 | Analog Systems & Design | 3 | 1 | - | 4 | 4 | 20 | 20 | 60 | - | - | 100 | 3 |
| BECP206 | Analog Systems & Design | - | - | 2 | 2 | 1 | - | - | - | 25 | 25 | 50 | 3 |
| BECP208 | Modeling & Simulation | - | - | 2 | 2 | 1 | - | - | - | 25 | - | 25 | 3 |
| BECL207 | Communication Electronics | 3 | 1 | - | 4 | 4 | 20 | 20 | 60 | - | - | 100 | 3 |
| BECP207 | Communication Electronics | - | - | 2 | 2 | 1 | - | - | - | 25 | - | 25 | - |
| BCOL203 | Computer Architecture& Organization | 3 | - | - | 3 | 3 | 20 | 20 | 60 | - | - | 100 | 3 |
| BECGP203 | GENERAL PROFICIENCY-III: Hobby classes | 1 | - | 2 | 3 | Audit Course | - | - | - | G | - | 0 | - |
| | **Total** | **16** | **4** | **10** | **30** | **23** | **100** | **100** | **300** | **100** | **50** | **650** | - |

# Group B

| Scheme for S.Y | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SEMESTER-IV | | | | | | | | | | | | | |
| **Sub. Code** | **Name of the Course** | **Teaching Scheme** | | | | **Credits** | **Evaluation Scheme** | | | | | | **Duration of Paper / Practical (Hrs.)** |
| | | | | | | | **Theory** | | | **Practical** | | **Total** | |
| | | **Th** | **Tu** | **Pr** | **Total** | | **TAE (20)** | **CAE (20)** | **ESE (60)** | **Cont Ass.** | **Ext. (PR)** | | |
| BECL204 | Digital System Design | 3 | 1 | - | 4 | 4 | 20 | 20 | 60 | - | - | 100 | 3 |
| BECP204 | Digital System Design | - | - | 2 | 2 | 1 | - | - | - | 25 | 25 | 50 | 3 |
| BECL205 | Field Theory | 3 | 1 | - | 4 | 4 | 20 | 20 | 60 | - | - | 100 | 3 |
| BECL206 | Analog Systems & Design | 3 | 1 | - | 4 | 4 | 20 | 20 | 60 | - | - | 100 | 3 |
| BECP206 | Analog Systems & Design | - | - | 2 | 2 | 1 | - | - | - | 25 | 25 | 50 | 3 |
| BECP208 | Modeling & Simulation | - | - | 2 | 2 | 1 | - | - | - | 25 | - | 25 | 3 |
| BECL202 | Power Electronics | 3 | 1 | - | 4 | 4 | 20 | 20 | 60 | - | - | 100 | 3 |
| BECP202 | Power Electronics | - | - | 2 | 2 | 1 | - | - | - | 25 | - | 25 | - |
| BCOL201 | Data Structures | 3 | 1 | - | 4 | 4 | 20 | 20 | 60 | - | - | 100 | 3 |
| BCOP201 | Data Structures | - | - | 4 | 4 | 2 | - | - | - | 25 | 25 | 50 | - |
| BECGP202 | GENERAL PROFICIENCY:-II :Foreign Language | 1 | - | 2 | 3 | Audit Course | - | - | - | G | - | 0 | - |
| | **Total** | **16** | **5** | **14** | **35** | **26** | **100** | **100** | **300** | **125** | **75** | **700** | **-** |

# B.Tech.(Electronics and Telecommunication)

## Syllabus of Semester-III

| BEML201: ENGINEERING MATHEMATICS – III | | |
|---|---|---|
| **Teaching Scheme:** | **Examination Scheme (Theory)** | **Examination Scheme(Laboratory)** |
| **Lectures:** 3 Hrs/Week<br>**Tutorials:** 1 Hr/Week<br>**Practical:** Nil | **TAE:** 20 Marks<br>**CAE :** 20 Marks<br>**ESE :** 60 Marks | **Cont. Ass.:** Nil<br>**Practical:** Nil |
| **Credit** | **4** | |
| **Prerequisite(If any):** Engineering Mathematics-I (BEML101), Engineering Mathematics-II (BEML110) | | |
| **Course Objectives:** | | |
| 1. To develop skills to use Laplace Transform and its applications in the field of Electronics and Telecommunication engineering. | | |
| 2. To develop skills to use Fourier Transform and Z- Transform and its applications in the field of Electronics and Telecommunication engineering. | | |
| 3. To introduce complex variables and its application in the field of Electronics and Telecommunication engineering. | | |
| 4. To introduce Partial Differential Equations and its applications in the field of Electronics and Telecommunication engineering | | |
| **Course Outcome:** student shall be able to | | |
| 1. Understand and evaluate the various types of signals and systems, develop the input output relationship of the systems. | | |
| 2. Analyze the spectral characteristics of CT signals using Fourier series and Fourier transform. | | |
| 3. Demonstrate Laplace transform of the systems in s-domain. | | |
| 4. Apply the basic concepts of random processes, various density functions and their correlation to analyze system performance. | | |
| **Course Contents** | | **Hrs** |
| **Unit -I: Laplace Transforms:** | | 8 |
| Laplacetransform:definition andtheirsimple properties, transform of derivatives and integrals, evaluation of integrals by L.T. ,inverse L.T. &its properties , convolution theorem, Laplace transforms of periodic function & Unit step function, applications of | | |

| | |
|---|---|
| Laplace transforms to solve ordinary differential equations | |
| **Unit -II: Fourier Transform (FT)** | 8 |
| Fourier Transform (FT): Complex exponential form of Fourier series, Fourier integral theorem, Fourier Sine &Cosine integrals, Fourier transform, Fourier Sine and Cosine transforms and their inverses. | |
| **Unit –III: Z-Transform (ZT)** | 6 |
| Z-Transform (ZT): Introduction, Definition, Standard properties, Z T of standard sequences and their inverses Solution of difference equations. | |
| **Unit -IV: Partial Differential Equation** | |
| Partial Differential equation of first order first degree i.e. Lagrange's form. Linear non homogeneous Partial Differential equation of nth order with constant coefficient, method of separation of variables. Application to transmission lines. | 8 |
| **Unit V-:Complex Differentiation** | |
| FunctionsofComplexvariables,Analyticfunctions,Cauchy-Riemannequations,Conformal mapping, Bilinear transformation | 6 |
| **Unit - VI: Complex Integration** | |
| Cauchy's Integral theorem, Cauchy's integral formula, Laurent's series, Residue theorem. contour integration | 6 |

| **Text Books:** |
|---|
| 1. Erwin Kreyszig, "Advanced Engineering Mathematics", 9e, Wiley India |
| 2. B. S. Grewal, "Higher Engineering Mathematics" Khanna Publication, Delhi. |
| **Reference Books:** |
| 1. Jain, R.K. and Iyengar, S.R.K, Advanced Engineering Mathematics, Third Edition, New Delhi, Narosa Publishers, 2007 |
| 2. M. D. Greenberg, "Advanced Engineering Mathematics", 2e, Pearson Education |
| 3. PeterV. O'Neil, "Advanced Engineering Mathematics", 7e, Cengage Learning |

## BECL201: ELECTRONIC DEVICES & CIRCUITS

| Teaching Scheme: | Examination Scheme (Theory) | Examination Scheme (Laboratory) |
|---|---|---|
| **Lectures:** 3Hrs/Week<br>**Tutorials:** 1Hr/Week<br>**Practical:** 2Hrs/Week | **TAE:**20 Marks<br>**CAE :**20 Marks<br>**ESE:**60 Marks | **Cont. Ass.:** 25 Marks<br>**Practical:** 25 Marks |
| **Credit** | **4** | **1** |

**Course-Prerequisite:** Engineering Physics (BPHL102), Basic Electronics Engineering (BECL105)

**Course- Co requisite**: Network Theory (BECL203)

**Course Objective:**

1. To gain knowledge of electronics devices and semiconductor physics.
2. To study need of electronics devices and its applications.
3. To familiarize the student with the analysis and design of analog circuits.

**Course Outcome:**

**At the end of the course the student shall be able:**

1. Understand the operation of solid state devices
2. Apply the knowledge of operation of diodes,transistor in order to design basic circuits
3. Analyze dc circuits and relate ac models of semiconductor devices with their physical operation
4. Analyze the characteristics of different electronic devices such as diode,transistors,JFET,MOSFET etc and simple circuit like rectifiers,amplifiers etc.
5. Create small signal model for single stage amplifier

| Course Contents | Hrs |
|---|---|
| **Unit I: RECTIFIERS & FILTERS** | 8 |
| Half and full wave & bridge rectifiers with filters, all circuits with details working, analysis, Problems, designs of those rectifiers. | |
| **Unit II: BI-POLAR JUNCTION TRANSISTORS** | 8 |
| Theory of operation, Static Characteristics, Break down voltages, Current voltage, Power Limitations, Ebers-moll Model, Continuity Equation, Biasing BJT, Different Biasing arrangement, Stability factor, thermal runaway, Power Transistors. CE, CB, CC Classification and Characteristics, Small Signal Analysis, Regulators: Design of Shunt & Series regulators, Introduction to SMPS. | |
| **Unit III: FEEDBACK AMPLIFIERS & OSCILLATORS** | 8 |
| Feedback Amplifiers, Classification of Oscillators, Stability, Bark Hausen Criteria, Design of RC, LC and Crystal Oscillators. | |

| | |
|---|---|
| **Unit IV: POWER AMPLIFIER** | |
| Classification A, B, AB, C, Efficiency, Push Pull Configuration (A, B, AB) Complementary symmetry, Second Harmonic and Cross over Distortion, Design of Power Amplifiers (Class A and Class AB), Design of class A Small signal amplifiers, Emitter follower, Applications. | 8 |
| **Unit V: UNIPOLAR DEVICES** | 7 |
| Field Effect Transistor, MOSFET, NMOS, PMOS Principles of operation and characteristics, Biasing arrangement, small signal analysis of CG, CB and CD | |
| **Unit VI: CMOS Circuits** | 7 |
| An introduction to CMOS, Diode and MOSFET , Transistors, MOSFET Switches, Transmission Gate, Inverter - DC, AC Analysis. Advance topics on the subject. | |

| **Text Books:** |
|---|
| 1. Christos C Halkias, Jacob Millman, Jit |
| 2. Satyabrata, Millman's Electronic Devices and Circuits, 2nd Edition, The McGraw-Hill Company, 2011 |
| 3. S Salivahanan, N Suresh Kumar, Electronics Devices and Circuits, 3rd Edition, McGraw Hill, 2008 |
| 4. Millman and Halkies, 'Integrated Electronics', 2nd Edition, McGraw-Hill Inc, 2009 |
| **Reference Books:** |
| 1. Robert L. Boylestad, Louis Nashelsky, |
| 2. Electronics devices and Circuits and Theory, 10th Edition, Pearson India, 2009 |
| 3. Nagrath I J, Electronics Devices and Circuits, 3rd Edition, Phi Learning Pvt Ltd, 2009 |
| 4. One reference book need to add. |
| 5. Sung MO Kang Leblebici, 4 th Edition |
| 6. CMOS Digital Integrated circuits, McGraw Hill Inc. |

| BECP201: ELECTRONIC DEVICES & CIRCUITS | Total Hrs: 30 |
|---|---|
| **LIST OF EXPERIMENTS:** | |
| **Note: Perform any 10 experiments from the given list.** | |
| 1. To calculate ripple factor of full wave rectifier with and without filter. | |
| 2. To plot the characteristics of clipper circuit & to perform simulation on Multisim | |
| 3. To plot the characteristics of clamper circuit & to perform simulation on Multisim. | |
| 4. To design Zener Diode as a Voltage Regulator & to perform simulation on Multisim. | |
| 5. To design a transistor shunt voltage regulator on Multisim. | |
| 6. To design emitter follower type of voltage regulator using darlington pair and simulate it on Multisim | |
| 7. To design pushpull class A power amplifier and simulate it on Multisim | |
| 8. To design class AB audio power amplifier and simulate it on Multisim | |
| 9. To design Hartley oscillator and simulate it on Multisim. | |
| 10. To design a Wein Bridge Oscillator and simulate it on Multisim. | |
| 11. To design RC Phase Shift Oscillator and simulate it on Multisim. | |
| 12. To plot the drain & transfer characteristics of FET in CS mode & to perform simulation on Multisim. | |
| 13. To verify frequency response of single stage RC coupled amplifier & to perform simulation on Multisim. | |
| 14. To design a CMOS inverter using microwind. | |
| 15. Open Ended experiments. | |

# BECL202: POWER ELECTRONICS

| Teaching Scheme: | Examination Scheme (Theory) | Examination Scheme(Laboratory) |
|---|---|---|
| **Lectures:**3 Hrs/Week<br>**Tutorials:** 1Hr/Week<br>**Practical:** 2Hr/Week | **TAE:**20 Marks<br>**CAE :**20 Marks<br>**ESE:** 60 Marks | **Cont. Ass.:** 25 Marks<br>**Practical:** Nil |
| **Credit** | **4** | **1** |

**Course-Prerequisites:**Basic Electrical Engineering (BEEL106), Basic Electronics Engineering (BECL105)

**Course Objectives:**

1. To study characteristics & working of modern power electronic devices.
2. To study the working & applications of controlled converters &Inverters for different loads.
3. To study DC motors &its working using controlled converters.
4. To study cyclo converters.

**Course Outcomes:**

**At the end of the course the student shall be able to:**

1. To Understand various Power Electronic devices
2. To be able to Analyze Power Electronic Converters & Inverters
3. To design ,build .& troubleshoot various Power Electronic circuits
4. Applying the knowledge of Power Electronic Circuits for Industrial & Commercial based applications

| Course Contents | Hrs |
|---|---|
| **Unit I: Thyristors and Its characteristics** | 6 |
| Construction & steady characteristics of SCR, SCR ratings, Triac its construction & its working, Unijunction Transistors, Triggering circuits for SCR | |
| **Unit II: Line commutated converters with R and RL load** | 8 |
| Concept of line & forced communication, 1ϕsemi & full converters (R-RL load) in details & effect of Free wheeling diode. | |
| **Unit III: Line commutated converters with motor load** | 8 |
| Dc Motors construction &its working, 1ϕ semi and full converters for speed control of DC motors. Single phase cyclo converters. | |
| **Unit IV: Static controllable switches** | 8 |
| Characteristic and working of MOSFET, IGBT, over voltage and over current protection, | |

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|---|---|
| snubber circuit. | |
| **Unit V: D.C. Choppers** | 6 |
| Step down chopper & step up chopper for R & RL, 2 Quad & 4 Quad Choppers, and Applications of choppers. | |
| **Unit VI: Single phase and three phase inverters** | 6 |
| Single phase bridge inverters with R & RL Load, Single phase PWM Inverters, Three Phase voltage source Inverters with balanced R Load, Advance topics on the subject | |

| **Text Books:** |
|---|
| 1. M.H. Rashid, Power Electronics Circuits , Devices and Applications, 4th Edition, Pearson Education Publication, 2013 |
| 2. C. W. Lander, Power Electronics, 3rd Edition, Paper Back Publication, 1993 |
| 3. Dr. P. S. Bimbhra, Power Electronics, 4th Edition, Khanna Publishers, 2012 |
| 4. M.S. Jamil Asghar, ”Power Electronics”, PHI 2004,New Delhi. |
| **Reference Books:** |
| 1. P.C.Sen, Power Electronics, 30th reprint, 30th Reprint Tata McGraw Hill, 2001 |
| 2. Dr. M. Ramamoorthy, An Introduction to Thyristors and their Applications, 2nd Edition, East-West Press, 1991 |
| 3. Ned Mohan,T.Undeland & W. Robbins,”Power Electronic Converters applications & design” 2nd edition, John Wiley &sons,Singapore. |

| **BECP202 POWER ELECTRONICS** | **Total Hrs: 30** |
|---|---|
| **LIST OF EXPERIMENTS:** | |
| **Note: Perform any 8 experiments from the given list.** | |
| 1. To study and plot V-I characteristics of SCR | |
| 2. To study and plot V-I characteristics of MOSFET | |
| 3. To study and plot V-I characteristics of IGBT | |
| 4. To study Triggering ckts for SCR. | |
| 5. To study and plot the characteristics of single-phase converter | |
| 6. To study & plot the characteristics of Inverters | |
| 7. To study and plot characteristics of DC chopper | |
| 8. To Plot the characteristics of single phase Semi/Full converter in PSim Software. | |
| 9. To Plot the characteristics of single phase Inverter in PSim Software. | |

| BCOL201: DATA STRUCTURES | | |
|---|---|---|
| **Teaching Scheme:** | **Examination Scheme (Theory)** | **Examination Scheme (Laboratory)** |
| **Lectures:**3 Hrs/Week<br>**Tutorials:** 1 Hr/Week<br>**Practical:**4Hr/Week | **TAE:**20 Marks<br>**CAE :**20 Marks<br>**ESE:**60 Marks | **Cont. Ass:** 25 Marks<br>**Ext. :** 25 Marks |
| **Credit :** | **4** | **2** |

**Pre-requisite:** Programming in C (BITL104)

**Course Objective:**

1. To gain knowledge about basic concepts of data structures.
2. To learn the representation, implementation and applications of linear data structures
3. To acquire knowledge of stacks and queues with their applications
4. To aware about the concepts of trees with their applications.
5. To learn and design the algorithm for graphs with their applications.
6. To get the knowledge of tables and multi-way trees.

**Course Outcome:**

**Graduates shall be able to:**

1. Describe concepts of data structures.
2. Know the concepts of linked list
3. Apply the knowledge to implement the algorithms for stacks and queues..
4. Describe the applications of trees
5. Describe the concepts of graphs and its applications.
6. Apply the knowledge of tables and multi way trees in different applications.

| **Course Contents** | **Hrs** |
|---|---|
| **Unit I: Review of C** | |
| Functions: Parameter passing call by value and call by reference, scope rules, functions and pointers, function returning pointer and pointer to function, String manipulations using arrays, pointer to pointer. Structure and Union: Passing and returning structure as parameter for function, structure and pointer, Recursion: Definition, writing recursive functions & how recursion works. | 7 |
| **Unit II: Sorting and searching techniques** | 7 |
| Need of sorting and searching, sorting order & stability in sorting. | |

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| **Sorting Techniques:** Algorithms for Bubble sort, Selection sort, Insertion sort, Shell sort, Radix sort, Quick sort and Merge sort. Analysis of Bubble, Insertion and Quick sorting technique for best, worst and average case, Concept of Internal & External sorting.<br>**Searching Techniques:** Algorithms for Sequential search, Binary search, Fibonacci search & concept of Index Sequential search, analysis of sequential and binary searching technique for best, worst and average case. | |
| **Unit III: Linear Data Structures using Link List Organization** | 8 |
| Limitations of static memory allocation. Dynamic memory allocation in C. Concept of linked organization, Singly linked list, Doubly linked list, Circular linked list. Operations like insertion, deletion, traversal & other operations on these data structures.<br>**Applications:** Representation & manipulation of polynomials using circular linked lists, Application of doubly linked list in dynamic storage management. | |
| **Unit IV: Stacks and Queue** | 8 |
| **Stacks:** Concept of stack as ADT, Representation and implementation of stack using sequential & linked organization. Applications of Stacks:, Arithmetic expression conversion & evaluation, reversing a string, parsing: well- formed parenthesis checking.<br>**Queues:** Concept of queue as ADT, Representation and implementation of linear queue & circular queue using sequential organization.<br>Applications of Queues: Job scheduling, Queue simulation, Categorizing data,<br>**Types of Queue:** Priority Queue, DEQUE. | |
| **Unit V: Trees** | 9 |
| Basic tree concepts, binary trees and their properties, representation using linked organization, full and complete binary trees, converting tree to a binary tree, binary tree traversals, Binary search trees & operations. BST as an ADT, Threaded binary trees, Insertion and deletion of nodes in in-order threaded binary tree, pre-order, in-order and post order traversals of in-order threaded binary tree, AVL tree, and applications of trees: Gaming and Expression trees. | |
| **Unit VI: Graphs** | **7** |
| Graph as an ADT, operations, graphs storage structures: Adjacency list, Adjacency Matrix, Traversals: DFS, BFS, Minimum spanning trees: Kruskal's and Prim's. Algorithm for shortest path and topological sorting. | |

| **Text Books:** |
|---|
| 1. Horowitz, Sahani, "Fundamentals of Data Structures in C" second edition, Universities Press. |
| **Reference Books:** |
| 1. Thomos H. Corman, Charls E. Leiserson, Ronald E. Rivest, Clifford Stein,"Introduction to Algorithms", Third Edition, Prentice Hall India Learning Pvt. Ltd. |
| 2. Data Structures using c,Aron M. Tanenbaum, Pearson Education, 1 Edition(2003). |

| **BCOP201: DATA STRUCTURES** | **Total : 20 Hrs** |
|---|---|
| **Guidelines for Instructor's Manual** | |
| The instructor's manual is to be developed as a hands-on resource and reference. The instructor's manual need to include prologue (about University/program/ institute/ department/foreword/ preface etc), University syllabus, conduction & Assessment guidelines, topics under consideration-concept, objectives, outcomes. | |
| **Guidelines for Student's Lab Journal** | |
| The laboratory assignments are to be submitted by student in the form of journal. Journal consists of prologue, Certificate, table of contents, and handwritten write-up of each assignment (Title, Objectives, Problem Statement, Outcomes, software & Hardware requirements, Date of Completion, Assessment grade/marks and assessor's sign, Theory- Concept, conclusion/analysis). As a conscious effort and little contribution towards Green IT and environment awareness, attaching printed papers as part of write-ups and program listing to journal may be avoided. | |
| **Guidelines for Lab /TW Assessment** | |
| Continuous assessment of laboratory work is done based on overall performance and lab performance of student. Each lab assignment assessment should assign grade/marks based on parameters with appropriate weightage. Suggested parameters for overall assessment as well as each lab assignment assessment include- timely completion, performance, innovation, efficiency, punctuality and neatness. | |
| **Guidelines for Laboratory Conduction** | |
| The instructor is expected to frame the assignments by understanding the prerequisites, technological aspects, utility and recent trends related to the topic. The assignment framing policy need to address the | |

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| average students and inclusive of an element to attract and promote the intelligent students. The instructor may set multiple sets of assignments and distribute among batches of students. It is appreciated if the assignments are based on real world problems/applications. |
| **Guidelines for Practical Examination** |
| Both internal and external examiners should jointly set problem statements. During practical assessment, the expert evaluator should give the maximum weightage to the satisfactory implementation of the problem statement. The supplementary and relevant questions may be asked at the time of evaluation to test the student‘s for advanced learning, understanding of the fundamentals, effective and efficient implementation. So encouraging efforts, transparent evaluation and fair approach of the evaluator will not create any uncertainty or doubt in the minds of the students. So adhering to these principles will consummate our team efforts to the promising start of the student's academics. |

**LIST OF EXPERIMENTS:**

1. Write a program to perform Set operations - Union, Intersection, Difference, and Symmetric Difference.
2. Write a program to perform various string operations such as Copy, Length, Reversing, Palindrome, and Concatenation and to find occurrence substring with and without using library functions.
3. Implement Sorting Methods using functions- Bubble Sort, Selection Sort and Quick Sort.
4. Implement Sorting Methods using Insertion Sort, and Shell Sort, and Merge Sort.
5. Implement Searching Methods-Sequential Search, Binary Search.
6. Write a menu driven program to perform following operations on SLL: Create, Insert – Start, end, between, Search & delete -- Start, end, between, Reverse without creating temporary list, Display.
7. Perform polynomial addition using a CLL.
8. Implement Stack using an array and use this stack to perform conversion of an expression from infix to postfix form.
9. Implement Stack using a linked list. Use this stack to perform evaluation of a postfix expression.
10. Implement binary tree using linked list and perform recursive and non-recursive traversals.
11. Implement in-order threaded binary tree using linked list and perform traversals.
12. Implement graph using adjacency list or matrix and perform DFS and BFS.
13. Implement graph using adjacency matrix and generate minimum spanning tree using Prim's algorithm.
14. Determine single source shortest paths for a graph represented using adjacency matrix.
15. Mini Project - Implement the Mini Project of Student Database using Linked list for following requirements:

    a. Creation of Student Database in memory containing student ID, Name, Name Initials, Address, Contact No and Date of Birth .

    b. Insertion, Deletion, Modification of student record for a given student ID.

    c. Sorting on name initials and searching a particular student record on name initials.

## BECL203: NETWORK THEORY

| Teaching Scheme: | Examination Scheme (Theory) | Examination Scheme (Laboratory) |
|---|---|---|
| **Lectures:**3 Hrs/Week<br>**Tutorials:** 1Hr/Week<br>**Practical:** Nil | **TAE:**20 Marks<br>**CAE :**20 Marks<br>**ESE:**60 Marks | **Practical:**Nil |
| **Credit :** | **4** | |

**Course-Prerequisite:** Basic Electrical Engineering (BEEL106)

**Course-Co requisite:** Electronic Devices & Circuits BECL 201), Engineering Mathematics –III (BEML201)

**Course Objective:**

1. To introduce the concept of circuit elements lumped circuits, circuit laws and reduction.
2. To study the loop and nodal analysis of networks in ac and dc systems.
3. To study the transient response of series and parallel A.C. circuits.
4. To study the concept of coupled circuits and two port networks.

**Course Outcome:**

**At the end of the course the student shall be able to:**

1. Understand network theorems to calculate various network parameters.
2. Analyze the performance of a system in time and frequency domain.
3. Evaluate a given circuit with and without initial conditions.
4. Design a network based on driving point functions and transfer functions.

| Course Contents | Hrs |
|---|---|
| **Unit I: Nodal & Mesh Analysis** | 7 |
| Nodal and Mesh analysis basic equilibrium equations, matrix approach for complicated network, containing voltage, current sources, Mutual Inductances, source Transformations, Duality. | |
| **Unit II: Network Theorems** | 7 |
| Superposition, Reciprocity, Thevenin's, Norton's, maximum power transfer, compensation, Tellegen's theorem as applied to A.C. circuits. | |
| **Unit III: Fourier Analysis** | 7 |
| Trigonometric and exponential Fourier series. Discrete spectra and symmetry of waveforms, synthesis, steady state response of a network to non-sinusoidal periodic inputs. Fourier transforms and continuous spectra. | |
| **Unit IV: Laplace Transformation** | 7 |
| Laplace transformation and its properties, partial fractions, singularity functions, waveform | |

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| synthesis. Analysis of RC& RL network with and without initial conditions with Laplace transformation, evaluation of initial & final conditions. | |
| **Unit V: Network Function** | |
| Transient behaviors, concept of complex frequency, Driving points and transfer functions, poles, zeros of admittance function, their properties, sinusoidal response from Pole-zero locations, convolution theorem and integral solution. | 7 |
| **Unit VI: Two Port Network** | |
| Two port network parameters and inter connections study of series and parallel resonance in A.C. Three phase unbalanced circuits and power calculations. Advance topics on the subject | 7 |

| **Text Books:** |
|---|
| 1. Van Valkenburg, 'Network Analysis, 3rd Edition, Prentice Hall of India, 2001 |
| 2. Kelkar and Pandit, Linear Network Theory, 1st Edition, Pratibha Publication, 1995 |
| **Reference Books:** |
| 1. Sudhakar and S.P. Shyam Mohan, Circuit and Network, 2nd Edition, Tata McGraw Hill, 2002 |
| 1. D. Roy Choudhary, Network and System, 1st Edition, New Age International Publication, 1998 |
| 2. G.K. Mittal, Network Analysis, 11th Edition, Khanna Publication, 2003 |
| 3. B.R. Gupta, Network Systems & Analysis, 2nd Edition, S. Chand publication, 2005 |

| **BECGP202:GENERAL PROFICIENCY-II: Foreign Language** | | |
|---|---|---|
| **Teaching Scheme:** | **Examination Scheme (Theory)** | **Examination Scheme (Laboratory)** |

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|---|---|---|
| **Lectures:**1Hrs/Week<br>**Tutorials:** Nil<br>**Practical:** 2Hr/Week | **TAE:** Nil<br>**CAE :** Nil<br>**ESE:** Nil | **Cont. Ass.: Grade**<br>**Practical:** Nil |
| **Credit :** | **Audit Course** | |
| **Prerequisite (If any):** Nil | | |
| **Course Objective:** | | |
| 1. To learn foreign languages to improve inter personal skills. | | |
| 2. To enable improving business communications and having access to literature in globally recognized languages. | | |
| 3. To help communicate at international forums and explore opportunities for employment. | | |
| **Course Outcome:** | | |
| **Upon successful completion of the course, students will be able to:** | | |
| 1. Have basic communication and insight into their own language and culture. | | |
| 2. To have the knowledge of language script. | | |
| 3. Communicate effectively in more than one globally recognized languages like French, Spanish, German, Japanese, etc. | | |
| 4. Interact with technical and business communities at international forums. | | |
| 5. Act with greater awareness of self, of other cultures, and their own relationship to those cultures. | | |
| 6. Gain direct access to additional bodies of knowledge. | | |

| Topic | Learning Goals | Activities |
|---|---|---|

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|---|---|---|
| The Alphabets and accents | Pronunciations techniques | Worksheet and charts |
| Number 1 to 20 | | |
| Greetings & Salutations, | Articles , Personal Pronoun Day timing | Daily routines forms of respects , Vocabulary |
| Family and relations | Shapes and colors , Possessive Pronouns , Gender , Negative Sentence | Relations, Day of week |
| Weather and Seasons | Climate , Fabrics & Clothes , sizes , interrogatives , Basic verbs | Group Activities , Paragraph writing including , Names of months , Seasons, Sky , Stars |
| House & Household things. | Describing neighborhood Present Tense | Furniture , Household articles, Colors |
| Visit to supermarket | Learning the shopping etiquettes , vocabulary of food items , conversing with shopkeepers etc , Plurals | Project on vocabulary of vegetables and fruits , Bakery products , Group Activity / Role play |
| Timing , Telephonic Conversions | How to Ask time , converse on telephone | Timing and clock ( Hours & Minutes ) |
| Visit to city , Prominent places and park | Nature, Directions, Means of transportations, Tenses contd…. | Self introductions , Role-play , preparing charts |
| In Restaurant/Hotel | Ordering eatables , Table manner .Verbs | Enhancing vocabulary of food Dishes , cutlery |
| Visit to Doctor. | Health matters, illness. Commonly used verbs contd. | Worksheets , projects |
| French / German /Spanish culture – monuments , delicacies , wines visa vis Indian culture Diwali festival | Vocabulary of clothes , Accessories , Cuisines , Beverages , Adjectives | Presentations by students , situation based conversations |
| Receiving Guests/ Entertaining people / Good Bye's | Customs , Traditions , Manners , welcome & Audieu's | Activities , Role play , Assignments |

# Syllabus of Semester-IV

| BECL204: DIGITAL SYSTEM DESIGN | | |
|---|---|---|
| **Teaching Scheme:** | **Examination Scheme (Theory)** | **Examination Scheme (Laboratory)** |
| **Lectures:**3 Hrs/Week<br>**Tutorials:** 1Hr/Week<br>**Practical:** 2 Hr/Week | **TAE:**20 Marks<br>**CAE :**20 Marks<br>**ESE:**60 Marks | **Practical:** Nil |
| **Credit** | **4** | **1** |
| **Course-Prerequisite:** Basic Electronics Engineering (BECL105), Electronic Devices & Circuits (BECL201) | | |
| **Course-Co requisite:** Computer Architecture & Organization (BCOL203) | | |
| **Course Objective:** | | |
| 1. To impart fundamentals of digital system design | | |
| 2. To study system modelling using VHDL. | | |
| 3. To study CPLD and FPGA Architecture. | | |
| **Course Outcome:** | | |
| **At the end of the course the student shall be able to:** | | |
| 1. Understand and analyze the discrete time signals and systems. | | |
| 2. Evaluate the performance of a system using different transforms. | | |
| 3. Design and realize FIR and IIR filters. | | |
| 4. Apply knowledge to various real time cases. | | |
| **Course Contents** | | **Hrs** |
| **Unit I: Introduction**<br>Introduction to VHDL, Methodologies, design Units, data objects, VHDL data types, Attributes. | | 6 |
| **Unit II: VHDL Statements and concept of delays**<br>Concurrent and sequential statements, inertial and transport delays, delta delay, signal drivers. | | 6 |
| **Unit III: Programming concepts**<br>Subprograms – Functions, Procedures, generic, generate, package, IEEE standard logic library, file I/O, test bench, component declaration, instantiation, configuration. | | 8 |
| **Unit IV: Combinational System Design**<br>Combinational logic circuit design and VHDL implementation of following circuits – fast adder, Subtractor, decoder, encoder, multiplexer, ALU, barrel shifter, 4X4 key board encoder, multiplier, divider, Hamming code encoder and correction circuits. | | 8 |

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| **Unit V: sequential System Design** | 8 |
| Synchronous sequential circuits design – finite state machines, Mealy and Moore, state assignments, design and VHDL implementation of FSMs, Linear feedback shift register. | |
| **Unit VI: Introduction to PLDS** | 6 |
| Introduction to place & route process, Introduction to ROM, PLA, PAL, Architecture of FPGA(Xilinx / Altera). Advanced trends in digital system design. | |

| **Text Books:** |
|---|
| 1. Stephen Brown, Zvonko Vranesic, Fundamentals of Digital Logic with VHDL design, 4th Edition, TMH, 2006 |
| 2. S.S. Limaye, 'VHDL A Design Oriented Approach', 4th Edition, The McGraw Hill, 2009 |
| 3. Manjita Shrivastava, Digital Design HDL-based approach, 2nd Edition, Cenage Learning, 2011 |
| **Reference Books:** |
| 1. J Bhasker, VHDL Primer, 3rd Edition, Pearson Education, 2007 |
| 2. Douglas Perry, VHDL, 3rd Edition, TMH, 2008 |
| 3. Zainalabedin Navabbi, VHDL, 3rd Edition, |
| 4. McGraw-Hill professional, 2007 |

| **BECP204: DIGITAL SYSTEM DESIGN** | |
|---|---|
| **LIST OF EXPERIMENTS** | **30 Hrs** |

| **Note: Perform any 10 experiments from given list** |
|---|
| 1. Write a VHDL code for different logic gates. |
| 2. Design 4:1 multiplexer and write a VHDL code for same using data flow style of modelling. |
| 3. Design 4-to-16 decoder by combining two 3-to-decoders and write a VHDL code for same using behavioural style of modelling. |
| 4. Design BCD to & segment decoder and write a VHDL code for same using behavioural style of modelling. |
| 5. Design of F/F and write a VHDL code for same using behavioural style of modelling. |
| 6. Design half adder and full adder and write a VHDL code for same using dataflow style of modelling.. |
| 7. Design a 9-bit Parity generator circuit and write a VHDL code for the same using structural style of modelling. |
| 8. Design a Decade Counter using J-K flip-flops and write a VHDL code for the same using structural style of modelling. |
| 9. Design Three –bit up-down counter and write a VHDL code for the same using structural style of modelling. |
| 10. Design of Finite state machine to detect a sequence “1011” using Mealy model .and write VHDL code for the same. |
| 11. Implementation & Testing of Counter on Xilinx FPGA |
| 12. Implementation & Testing of Clock circuits on Xilinx FPGA. |
| 13. Design a 4 bit comparator |
| 14. Design 16:1 MUX using 4:1 MUX using structural style of modeling. |
| 15. Design Arithmetic and Logic Unit. |
| 16. Open ended experiments. |

| BECL205: FIELD THEORY | | |
|---|---|---|
| **Teaching Scheme:** | **Examination Scheme (Theory)** | **Examination Scheme (Laboratory)** |
| **Lectures:**3Hrs/Week<br>**Tutorials:** 1 Hrs/Week<br>**Practical:** Nil | **TAE:** 20 Marks<br>**CAE :** 20 Marks<br>**ESE:** 60 Marks | **Cont. Ass.: Nil**<br>**Practical: Nil** |
| **Credit** | **4** | |
| **Course-Prerequisite:** Engineering Mathematics-I (BEML101) Engineering Mathematics-II (BEML 102), Engineering Mathematics –III (BEML 201) | | |
| **Course Objective:** | | |
| 1. To study electric and magnetic fields from stationary and dynamic charge and current distributions. | | |
| 2. To study and understand properties of waves, its propagation and waveguides. | | |
| 3. To impart knowledge of radiations, dipoles and potentials in electromagnetic fields. | | |
| 4. To inculcate the fundamentals of antennas and its parameters | | |
| **Course Outcome:** | | |
| At the end of the course the student shall be able to: | | |
| 1. Classify the concepts of Vector calculus for understanding the behaviour of electric and magnetic fields | | |
| 2. Summarize the concepts of Maxwell's equations for static and time-varying fields | | |
| 3. Illustrate simplified solutions to electromagnetic wave propagation and wave guide problems | | |
| 4. Design Fundamental concepts of antenna to solve basic problems of antenna based on radiations | | |
| **Course Contents** | | |
| **Unit I: ELECTROSTATICS** | | 8 |
| Introduction to Cartesian, cylindrical and spherical coordinate systems, Concept of Gradient Divergence and curl, Electric field intensity, flux density, Gauss's law, divergence, divergence theorem, Electric potential and potential gradient. | | |
| **Unit II: MAGNETOSTATICS** | | 6 |
| Current density and continuity equation, B-S law, Ampere's circuital law and applications, Magnetic flux and Flux density, Scalar and Vector magnetic potentials. | | |
| **Unit III: MAXWELL'S EQUATIONS AND BOUNDARY CONDITIONS** | | 6 |
| Maxwell's equations for steady fields. Maxwell's equations for time varying fields. Electric and magnetic boundary conditions. | | |

| | |
|---|---|
| **Unit IV: ELECTROMAGNETIC WAVES** | 8 |
| Electromagnetic wave equation, wave propagation in free space, in a perfect dielectric, and perfect conductor, skin effect, Poynting vector and Poynting theorem, reflection and refraction of uniform plane wave at normal incidence plane, reflection at oblique incident angle | |
| **Unit V: WAVEGUIDES** | 6 |
| Introduction, wave equation in Cartesian coordinates, Rectangular waveguide, TE, TM,TEM waves in rectangular guides, wave impedance, losses in waveguide, introduction to circular waveguide. | |
| **Unit VI: RADIATION** | 6 |
| Retarded potential, Electric and magnetic fields due to oscillating dipole (alternating current element), power radiated and radiation resistance, application to short monopole and dipole. Antenna Efficiency, Beam width, Radiation Intensity, Directive Gain Power Gain and Front To Back Ratio. Advance topics on the subject | |

| **Text Books:** |
|---|
| 1. W.H Hayt. and J.A. Buck, Engineering Electromagnetics, 7th Edition, Tata Mc-Graw Hill, 2006 |
| 2. A.U.Tinguria, Fundamentals of Electromagnetic Fields, 3rd Edition, Denett& Co., 2010 |
| **Reference Books:** |
| 1. K. D. Prasad, Antenna & wave propagation, 3rd Edition, PHI Publication, 2009 |
| 2. E.C. Jordan and K.C. Balamin, Electromagnetic |
| 3. Waves and Radiating System, 2nd Edition, Prentice Hall of India Private Limited, 1985 |
| 4. J.D Krauss, Electromagnetics, 3rd Edition, Mc-Graw Hill, 1984 |
| 5. Rao, Elements of Engineering Electromagnetics, 6th Edition, Pearson education, 2006 |

**Assignment:**

Students have to submit 5 assignments out of 7 assignments.(Assignment questions given during semester)

| **BECL206: ANALOG SYSTEMS AND DESIGN** | | |
|---|---|---|
| **Teaching Scheme:** | **Examination Scheme (Theory)** | **Examination Scheme(Laboratory)** |

| | | |
|---|---|---|
| **Lectures:**3 Hrs/Week<br>**Tutorials:** 1Hr/Week<br>**Practical:** 2Hr/Week | **TAE:**20 Marks<br>**CAE :**20 Marks<br>**ESE:**60 Marks | **Cont. Ass.: 25 Marks**<br>**Practical: 25 Marks** |
| **Credit** | **4** | **1** |

**Course-Prerequisite:** Basic Electronics Engineering (BECL105)

**Course-Co requisite:** Digital System Design (BECL204)

**Course Objective:**

1. To understand analog circuits and systems.
2. To know linear and nonlinear applications of operational amplifier ICs.
3. To study frequency response of different circuits based on operational amplifier applications.
4. To study and use different ICs such as timers for applications.

**Course Outcome:**

At the end of the course the student shall be able to:

1. Identify the scope of analog opamp circuits/devices in industrial engineering practices
2. Summarize performance of PLL and its applications
3. Apply knowledge of multivibrator using IC555 to design complex hardware
4. Classify linear and non-linear applications of op-amp and IC555

| **Course Contents** | **Hrs** |
|---|---|
| **Unit I: OPERATIONAL AMPLIFIER FUNDAMENTALS** | 8 |
| Operational Amplifier, Basic Op-Amp Configuration, an Op-Amp with Negative Feedback, Voltage Series and Voltage Shunt Configurations, Difference amplifiers, Instrumentation Amplifier, Specification of an Op-Amp, Offset Voltages and Currents, CMRR, Slew Rate | |
| **Unit II: GENERAL LINEAR APPLICATIONS** | **7** |
| Constant Current Source and Voltage Source, Summing, Scaling and Averaging Amplifiers, Voltage To Current Converter with Floating And Grounded Load, Current To Voltage Converter, Integrator and Differentiator | |
| **Unit III: STRUCTURE OF OP-AMP** | **7** |
| Differential Amplifier, Cascaded Differential Amplifier Stages and Level Translator, AC and DC Analysis of Cascade Amplifier, Design of two stage direct-coupled amplifier. | |
| **Unit IV: ACTIVE FILTERS AND OSCILLATORS** | 8 |
| Classification of Filters , Active Filters, First to Sixth – Order Butterworth filter , Multiple–Feedback Filters (Band Pass And Band Reject Filters) IGMF configuration, All Pass Filter, | |

| | |
|---|---|
| Cascade Design Of Filters, Classification of Oscillators, Design of Op-amp based Phase Shift And Wein Bridge Oscillators, Square, Triangular And Saw Tooth Wave Generators | |
| **Unit V: NON-LINEAR CIRCUITS** | 6 |
| Schmitt Trigger, Voltage Comparator, Voltage Limiters And Window Detector, Clippers And Clampers, Peak Detector, Precision Rectifiers, Analog Switches | |
| **Unit VI: SPECIAL ICs APPLICATIONS** | 6 |
| The 555 Timer, Phase Locked Loops IC565, ICL8038 & XR2206 Function Generator, Voltage Controlled Oscillator Basic Operation, IC based Voltage Regulator Circuits, Dual Track Voltage Regulator, Three - Terminal Regulator(Fixed Regulator) Voltage Adjustment AndCurrent Boosting of Fixed Regulator, Merits and Drawbacks of Linear Regulators, Advance topics on the subject | |

**Text Books:**


1. RamakantGayawad., Op-Amps And Linear Integrated Circuits, 3rd Edition, PHI, 1993
2. K.R.Botkar, Integrated Electronics, Khanna Publishers,1996


**Reference Books:**


1. Franco, 'Design With Operational Amplifiers And Analog Integrated Circuits', 2nd Edition, McGraw-Hill., 1992
2. Coughlin and Driscol, Op-Amps And Linear Integrated Circuits', 5th Edition, PHI,1998
3. Sedra and Smith, 'Microelectronic Circuits', 4th Edition, Oxford University Press, 1996


| **BECP206: ANALOG SYSTEMS AND DESIGN** | |
|---|---|
| **LIST OF EXPERIMENTS** | **30 Hrs** |

| |
|---|
| 1. Design and verify gain and frequency response of Inverting and Non-inverting amplifier using IC 741. Show its simulation results on multisim. |
| 2. Design and verify gain and frequency response of Integrator and Differentiator ckt. Using IC 741. Show its simulation results on multisim. |
| 3. Verify Op-amp parameters (a) CMRR (b) Slew Rate. |
| 4. Design and verify Multi vibrator circuits using IC |
| 5. To design 2nd order Low Pass Filter. |
| 6. To study the frequency Vs gain characteristic of Low Pass Filter using multisim. |
| 7. Design of Low Voltage Regulator using IC 723. Simulate and observe the regulated waveform on multisim. |
| 8. To design RC-phase shift oscillator and simulate using multisim. |
| 9. Design ,built and test square wave generator |
| 10. Design, built and test Schmitt trigger. |
| 11. Design built, test half, full, bridge precision rectifier. |
| 12. Design & simulate zener shunt regulator using multisim. |
| 13. Design any IC regulator application using multisim. |
| 14. Open ended experiment. |
| 15. Open ended experiments. |

| BECL207:COMMUNICATION ELECTRONICS | | |
|---|---|---|
| **Teaching Scheme:** | **Examination Scheme(Theory)** | **Examination Scheme (Laboratory)** |
| **Lectures:** 3Hrs/Week<br>**Tutorials:** 1 Hr/Week<br>**Practical:** 2Hr/Week | **TAE:**20 Marks<br>**CAE :**20 Marks<br>**ESE:**60 Marks | **Cont. Ass.:** 25 Marks<br>**Practical:** Nil |
| **Credit** | **4** | **1** |

**Course-Prerequisite:** Basic Electronics Engineering (BECL105), Engineering Mathematics – III (BEML201), Electronic Devices & Circuits (BECL201)

**Course Co-requisites**: Field Theory (BECL205)

**Course Objective:**

1. To understand the basic concept of communication and different modulation systems
2. To understand the concept of multiplexing.
3. To understand theory of digital modulation.
4. To understand working of radio receivers.

**Course Outcome:**

At the end of the course the student shall be able to:

1. Understand the fundamentals of communication systems.
2. Compare different analog modulation systems.
3. Design analog modulation based systems.
4. Analyse various modulation techniques and demonstrate it with hardware and software

| **Course Contents** | **Hrs** |
|---|---|
| **Unit I: INTRODUCTION TO COMMUNICATION, RADIATION AND PROPAGATION** | 6 |
| Block Schematic of Communication System, Base Band Signals and their bandwidth requirements, RF Bands, Carrier signals, Concept of Radiation and Electromagnetic waves, Mechanism of Propagations: Ground Wave, Sky Wave, Space Wave, Concept of Fading and diversity reception. | |
| **Unit II: AMPLITUDE MODULATION AND DETECTION** | 8 |
| Generation of AM (DSBFC) and its spectrum ,AM Modulators (DSBFC & DSBSC) & power calculations , modulation index, SSB modulation , SSB-SC modulation, AM demodulators, Block Diagram of AM Receiver, AM Detection methods. | |
| **Unit III: FREQUENCY MODULATION AND RADIO RECEIVERS** | 8 |
| Angle modulation, Narrow band & wide band FM, Modulation index, Bandwidth | |

| | |
|---|---|
| frequency modulation spectrum, Bessel's Function and its mathematical analysis, Phase Modulation, Generation of FM (Direct & Indirect Method),FM transmitters, FM detection using Phase lock loop(PLL) ,Slope detector, Balanced Slope detector etc. | |
| **Unit IV: PULSE MODULATION TECHNIQUES** | **6** |
| Introduction to Sampling, Sampling theorem, Nyquist criteria, sampling Techniques, Types of sampling- ideal, natural, flat top, Aliasing & Aperture effect. PAM, PWM & PPM. | |
| **Unit V: DIGITAL MULTIPLEXERS** | |
| Frequency Division multiplexing, Time Division Multiplexing. Introduction to Digital multiplexers and their classification, Introduction to PCM, Delta modulation, ADPCM | **6** |
| **Unit VI: DIGITAL MODULATION TECHNIQUES** | |
| PSK, FSK, QPSK, MSK, and DPSK. Advance topics on the subject | |

| BECP207: COMMUNICATION ELECTRONICS | |
|---|---|
| **LIST OF EXPERIMENTS:** | **30Hrs** |
| **Note: Transmitter and Receiver experiments are mandatory and to be carried out at radio Frequency (preferably above 500 KHz).** | |
| **Perform any 10 experiments from the given list** | |
| 1. AM Generation (DSB-FC): Calculation of modulation index by graphical method. | |
| 2. Envelop Detector-Practical diode detector, Observe effect of change in RC time constant. | |
| 3. Generation of DSB-SC with the help of balanced Modulator IC1496 &1596 & its detection. | |
| 4. SSB modulator using Filter method / phase shift method & its detection. | |
| 5. AM transmitter: Measure total power of transmitter with the help of Spectrum Analyzer or Wattmeter, Observe variation in total power by varying modulating signal level | |
| 6. Frequency modulator using varactor diode and NE 566 VCO, calculation of modulation index | |
| 7. FM demodulator using such as IC565 (PLL based) | |
| 8. Measurement of performance characteristics of Receiver: Sensitivity, selectivity, Fidelity. | |
| 9. Generation of PWM/PPM signal using IC on breadboard. | |
| 10. Experimental study of Generation & detection of PSK/FSK/QPSK signals. | |
| 11. Mini Project: Build & test AM/FM transmitter (Mandatory) | |
| **Following assignments may be performed using suitable software(Any two)** | |
| 12. Generate AM waveform for given modulation index, signal frequency and carrier frequency. | |
| 13. Generate FM waveform for given signal amplitude, signal frequency and carrier frequency. | |
| 14. Prove sampling Theorem. Reconstruct the analog signal from its samples. Observe aliasing effect by varying sampling frequency. | |


| **Text Books:** |
|---|
| 1. Kennedy, Davis, Electronics Communication System, 4th Edition, TMH, 2010 |
| 2. Roddy & Coolen, Communication Electronics, 4th Edition, PHI, 2010 |
| 3. Frenzel, Communication Electronics Principles and Applications, 3rd Ed, TATA McGraw-Hill, 2011 |
| 4. U.A.Bakshi, A.P.Godse, Communication Engineering, 3rd Edition, Technical Publications, 2009 |
| **Reference Books:** |
| 1. B.P.Lathi, Modern Digital & Systems, 3rd Edition, Oxford Press Publication, 1998 |
| 2. Simon Haykin, Digital Communication, 3rd Edition, Wiley and sons, 2003 |
| 3. John G.Prokis, Digital Communication, 3rd Edition, TMG, 2002 |
| 4. Shanmugham, Digital Communication, 4th Edition, Wiley student, 2009 |

| BCOL203: COMPUTER ARCHITECTURE & ORGANIZATION | | |
|---|---|---|
| **Teaching Scheme:** | **Examination Scheme (Theory)** | **Examination Scheme (Laboratory)** |
| **Lectures:**3Hrs/Week<br>**Tutorials:** Nil<br>**Practical:** Nil | **TAE:**20 Marks<br>**CAE :**20 Marks<br>**ESE:**60 Marks | **Practical:** Nil |
| **Credit :** | **3** | |

**Course-Prerequisite:** Basic Electronics Engineering (BECL105)

**Course Objective:**

1. To introduce basic fundamental units of a computer system.
2. To perform arithmetic operations using various algorithms.
3. To develop skills to understand control unit design.
4. To build concepts of memory system.
5. To study communication of I/O devices.
6. To enhance knowledge of parallel system.

**Course Outcome:**

Upon successful completion of the course, students will be able to

1. Describe fundamental units of computer system.
2. Apply concept of fixed and floating point arithmetic.
3. Identify different types of control unit.
4. Analyze organization and design of memory system.
5. Identify different ways of communicating with I/O devices and interfaces.
6. Describe working of parallel systems.

| **Course Contents** | **Hrs** |
|---|---|
| **Unit I: Basic Structure of Computers**<br>The Evolution of Computers, Functional Units, Basic operational concepts , Bus Structure, Performance Measures , System Architecture, VLSI Era, Von Neumann Architecture. Addressing modes, Execution of a Complete Instruction. | 7 |
| **UNIT II: DATA PATH UNIT**<br>Data Representation, Fixed and Floating point numbers, Signed numbers,Fixed-Point Arithmetic, Booths Algorithm, Division: Restoring and Non Restoring algorithms, Arithmetic Logic unit, Floating point representations, IEEE standards, Floating point arithmetic. | 8 |
| **UNIT III: PROCESSING UNIT** | 6 |

| | |
|---|---|
| Basic Concept, Hardwired control, Micro programmed Control, Coprocessor, Pipeline Control, Pipeline Performance. | |
| **UNIT IV: MEMORY ORGANIZATION** | 8 |
| Characteristics of memory, Internal and External Memory, Types of memory: RAM: SRAM, DRAM, SDRAM,RDRAM ROM: PROM, EPROM, EEPROM, Cache Memory, Virtual Memory, Associative Memory, Secondary Memory, Performance | |
| **UNIT V: INPUT /OUTPUT ORGANIZATION** | 7 |
| I/O mapped I/O and memory mapped I/O, interrupts and interrupts Handling Mechanisms,Direct Access Memory, Buses: synchronous vs. asynchronous, Interface Circuits, Standard I/O Interface: PCI,SCSI,USB. Computer Peripheral: I/O devices such as magnetic disk, magnetic tape, CDROM, USB systems. | |
| **UNIT VI: PARALLEL ORGANIZATIONS** | 7 |
| Superscalar Processors, Multiple Processor Organizations, Symmetric Multiprocessors, Clusters, Non -uniform Memory Access, Vector Computations, Bus allocation Schemes. RISC: Instruction execution characteristics, use of large register file, compiler based register optimization, RISC architecture and pipelining. RISC Vs CISC. | |

**Text Books:**


1. John Hayes, 'Computer Architecture and Organization", McGraw Hill, 3rd Edition.
2. V.C.Hamacher, Z.G. Vranesic and S.G.Zaky, 'Computer Organization', McGraw Hill, 5th edition, 2002.


**Reference Books:**


1. S. Tanenbaum, "Structured Computer Organization" 4th Edition, Pearson Education.
2. M. Mano, "Computer System and Architecture", Pearson Education.
3. W. Stallings, "Computer Organization & Architecture", Pearson Education.

| BECP208: MODELING&SIMULATION | | |
|---|---|---|
| **Teaching Scheme:** | **Examination Scheme (Theory)** | **Examination Scheme(Laboratory)** |
| **Lectures:** Nil<br>**Tutorials:** Nil<br>**Practical:** 2 Hrs/Week | **TAE:** Nil<br>**CAE :** Nil **ESE :** Nil | **Cont. Ass.:** 25<br>**Practical:** Nil |
| **Credit** | **0** | **1** |

**Prerequisites:** Basic Electronics Engineering (BECL105), Electronics Devices & Circuits(BECL201]

**Course-co requisite :** Analog Systems Design (BECL206)

**Course Objectives:**

1. To select and apply appropriate simulation tools and techniques.
2. To study the modeling of systems using various tools.
3. To obtain and study the results of models designed on advanced simulation tools

**Course Outcome:** student shall be able to

1. Identify scope of Op-amp circuits .
2. Summarize performance of Op-amp parameters using Op-amp circuit
3. Determine and demonstrate performance of Waveform generator circuit
4. Evaluate performance of Integrator and Differentiator Circuit
5. Design, Simulate and Build Timer, ADC application using Op-amp

| **List of Experiments [Any 10 Experiments]** | |
|---|---|
| 1. Introduction of T Spice & Tanner/Mentor Graphics. | |
| 2. Design current mirror using tanner/Mentor Graphics. | |
| 3. Design sample and hold circuit using tanner/Mentor Graphics. | |
| 4. Design cascade current mirror using tanner/Mentor Graphics. | |
| 5. Design Differential amplifier using tanner/Mentor Graphics. | |
| 6. Design Three MOSFET voltage divider using tanner/Mentor Graphics | |
| 7. Design common source amplifier using tanner/Mentor Graphics. | |
| 8. Design Feedback amplifiers using Tanner/Mentor Graphics. | |
| 9. Design a Pulse Code Modulation System usingsimulink | |
| 10. Design of Signal processing blocksetusing MATLAB | |
| 11. Design of multi-order system using MATLAB | |
| 12. Open Ended modeling experiments | |

**Text Books:**

| |
|---|
| 1. Allen Holberg, “Analog CMOS Design”, Oxford University Press |
| **Reference Books:** |
| 1. Rudra Pratap, “MATLAB7”, Oxford University Press, 2006. |
| 2. Modelling and Simulation using MATLAB-Simulink by Dr. Shailendra Jain, Wiley Publication January 2015. |

| BECGP203: GENERAL PROFICIENCY-III: Hobby Classes | | |
|---|---|---|
| **Teaching Scheme:** | **Examination Scheme (Theory)** | **Examination Scheme (Laboratory)** |
| **Lectures:**1Hrs/Week<br>**Tutorials:** Nil<br>**Practical:** 2Hrs/Week | **TAE:** Nil<br>**CAE :** Nil<br>**ESE:** Nil | **Cont. Ass.: Grade** |
| **Credit** | **Audit Course** | |
| **Prerequisite: Nil** | | |
| **Course Objective:** | | |
| 1. To enhance the inherent qualities of oneself and provide a platform to show hidden talents. | | |
| 2. To nurture one's special capability and interest in activities like sports, drama, singing etc. | | |
| 3. To help express oneself and be more compatible with outer world in the hobby domain. | | |
| 4. To enhance creativity & imagination to flow freely. | | |
| **Course Outcome:** | | |
| **Upon successful completion of the course students will be able to:** | | |
| 1. To explore and demonstrate the inherent talents within | | |
| 2. To fruitfully engage themselves in creative activities during spare time. | | |
| 3. To create balance between academic & work life. | | |
| 4. Acts as a stress buster in the stressed life. | | |
| 5. Students are guided to develop self-expression and communication skills. | | |
| 6. To help one learn a new skill and increase self-confidence and boosts self esteem. | | |

| Topics | Activities |
|---|---|
| Stress management sessions | Yoga, pranayam, meditation, relaxation techniques |
| Outdoor activities | Nature walks, treks, cycling, horse riding |
| Painting | Canvas, fabric , Sketching, knife, glass |
| Music (vocals and instrument) | Singing, Guitar, Synthesizer, Harmonium, Piano, Flute |
| Dance | Bharatnatyam, Kathak |
| Indoor sports | Chess, carom, table tennis |
| Movie club | Motivational movies and documentaries to be shown |
| Other creative skills | Embroidery , knitting, use of making things from waste materials, photography, puzzle solving |