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|------------------------------|------------------------|
| <b>Branch Name:</b>          | Electrical Engineering |
| <b>Program Code:</b>         | ET109                  |
| <b>Course Name:</b>          | FUNDAMENTALS OF ICT    |
| <b>Course Code:</b>          | 1ET1000108             |
| <b>Pre-requisite Course:</b> | -                      |

### Course Objectives:

1. The course aims to make the students familiar with basic tools and techniques associated with Information and Communication Technology (ICT)
2. The course intends to make the student understand fundamentals concepts associated with ICT.
3. The course intends to make the student understand the role of ICT in various sectors and various media for communications.

### Teaching and Examination Scheme:

| Teaching Scheme (Hours per week) |          |           |        | Evaluation Scheme (Marks) |      |                       |      |                       |      |                       |      |       |
|----------------------------------|----------|-----------|--------|---------------------------|------|-----------------------|------|-----------------------|------|-----------------------|------|-------|
| Lecture                          | Tutorial | Practical | Credit | Theory                    |      |                       |      | Practical             |      |                       |      | Total |
|                                  |          |           |        | University Assessment     |      | Continuous Assessment |      | University Assessment |      | Continuous Assessment |      |       |
|                                  |          |           |        | Min.                      | Max. | Min.                  | Max. | Min.                  | Max. | Min.                  | Max. |       |
| 3                                | -        | 2         | 4      | 28                        | 70   | 12                    | 30   | -                     | -    | 08                    | 20   | 120   |

| Sr. No | Course Contents                                                                                                                                                                                                                                                                                                                                                                                       | Total Hours | Weightage (%) |
|--------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|---------------|
| 1      | <b>Basic Building Blocks of Computer:</b> Introduction, Computer Hardware, Software, Central Processing Unit (CPU), main / internal memory (including ROM and RAM), Input / output devices, and secondary/backup storage.<br><b>Computing devices:</b> Desktops, PDAs, Tablets, Laptops, smart phones and other gadgets <b>Software Packages:</b> Database applications, Office suits, Graphics Tools | 4           | 10            |
| 2      | <b>Operating Systems:</b> Introduction and types, functions, working with windows / Linux                                                                                                                                                                                                                                                                                                             | 2           | 5             |
| 3      | <b>Computer Networks:</b> Introduction, types, Topologies, Protocols, WiFi/Bluetooth, IP, ISP, Network devices (routers, hubs, bridges, switches, proxy servers etc)<br><b>Internet:</b> WWW, Email, Social Networking, Dos and Don'ts on Internet                                                                                                                                                    | 4           | 10            |
| 4      | <b>Data analysis:</b> Create, and present data using a spreadsheet, Data management Operations, Generating graphs.                                                                                                                                                                                                                                                                                    | 1           | 4             |
| 5      | <b>General terminology:</b> Copyright, Plagiarism, Virus, Hacking, Trademark<br><b>Related technologies:</b> Sensors, CCTV, Webcam, Peripherals etc.                                                                                                                                                                                                                                                  | 3           | 6             |
| 6      | <b>Role of ICT in various sectors:</b> Education, Agriculture, Business, Aviation, Infrastructure, Smart Cities, Governance. ICT in day to day life: e-Learning, Blogs,                                                                                                                                                                                                                               | 6           | 15            |

|    |                                                                                                                                                                                                                                                                                                                                                                                                                                               |   |    |
|----|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|----|
|    | Social networking (virtual communities), Wikis, online shopping/e-Commerce.<br><b>Darker side of ICT:</b> Data security issues, virus, malfunctioning, hacking, identity theft                                                                                                                                                                                                                                                                |   |    |
| 7  | <b>Introduction to Waves and Signals:</b> Wave properties, relationship among waves properties. Electromagnetic Waves.<br><b>Electromagnetic spectrum:</b> Power and telephone band, radio and television band, microwaves, light bands. Electromagnetic energy, propagation of electromagnetic waves, factors that limit the propagation of electromagnetic waves, analog and digital data and signals, comparing analog and digital signals | 4 | 10 |
| 8  | <b>Transmission Media: Wire media:</b> Twisted pair cable, coaxial cables, fiber optical cables, <b>Wireless Media:</b> broadcast radio, microwave, light waves                                                                                                                                                                                                                                                                               | 4 | 10 |
| 9  | <b>Basic Communication System:</b><br><b>Introduction, Basic scheme of a modern communication system:</b> Information source and input transducer, Transmitter, channel or medium, Noise, Receiver, information and bandwidth, overview of analog and digital modulation                                                                                                                                                                      | 4 | 10 |
| 10 | <b>Wired &amp; Wireless transmission systems:</b> Telephone system structure, components of a telephone system, call routing,<br><b>Overview of cellular networks:</b> mobile station, base station                                                                                                                                                                                                                                           | 4 | 10 |
| 11 | <b>Overview of telecommunication technologies:</b> GSM, CDMA, GPRS, Bluetooth Wi-Fi                                                                                                                                                                                                                                                                                                                                                           | 4 | 10 |

### Text Books:

1. Rajaraman, V., Fundamental of Computer, PHI Learning Pvt Ltd.
2. Nagpal, D. P. Computer Fundamentals, Wheeler Publisher.
3. Goel, Anita, Computer Fundamentals, Pearson Education.

### Reference Books:

1. T. S. Rappaport, "Wireless Communication: Principle and Practices", 2nd Edition, Pearson
2. Behrouz A. Forouzan, Data Communication and Networking, 4th Edition,
3. G. Kennedy, B. Davis, "Electronics Communication System", 4th Edition, Tata Mcgraw-Hill Edition.

### List of Open Source Software/learning website:

1. <http://nptel.ac.in/courses/126104006/5#>
2. [http://www.itdesk.info/handbook\\_basic\\_ict\\_concepts.pdf](http://www.itdesk.info/handbook_basic_ict_concepts.pdf)
3. [http://www.ou.ac.lk/home/images/OER/Computer\\_Science/ICT%20Skills%20Full%20Book.pdf](http://www.ou.ac.lk/home/images/OER/Computer_Science/ICT%20Skills%20Full%20Book.pdf)
4. <http://www.igcseict.info/theory/index.html>
5. [https://www.f-secure.com/documents/996508/1030743/threat\\_summaries\\_2006\\_2002.pdf](https://www.f-secure.com/documents/996508/1030743/threat_summaries_2006_2002.pdf)

### LAB/Practical

Note: The experiment list provided beneath is for reference only. The course teacher may change/formulate it as per his/her methodology and requirement.

1. Learn and identify the fundamentals components in a typical computer system.
2. Learn and identify various memory modules and IO devices including secondary storage devices.
3. Getting familiar with Windows operating system.
4. Getting familiar with Linux operating system.
5. Learn and identify institute's computing networking structure.
6. Study various networking components involved in institute networks.
7. Learn and identify institute's CCTV networking structure. Also learn to manage the console.
8. Using spreadsheet suits learn to collect and analyze different data. Also represent the same in various charts/graphs/figures.

9. Getting acquainted with personal emails, blogs and social accounts.
10. Search various e-Learning sites available and prepare a comparison chart for common features.
11. Search various e-Commerce (shopping) sites available and prepare a comparison chart for common features.
12. Search various online matrimonial sites available and prepare a comparison chart for common features.
13. Prepare a short report on guidelines for novice Internet users mentioning Dos and Don'ts.
14. Learn and understand various communication cables (twisted pairs, coaxial cable, fiber optical cable, wireless channel).
15. Learn and understand various analog and digital signals
16. Learn and understand various blocks of Analog communication system (Analog Radio Tx/Rx)
17. Learn and understand various blocks of digital communication system (Digital Radio Tx/Rx)
18. Identify various blocks of a telephone system.
19. Identify various blocks of a mobile communicating system.
20. Draw electromagnetic spectrum and identify various bands and its applications

**Course Learning Outcomes (CLO): On completion of this course, the students will be able to:**

| CLO  | Description                                                                        | Bloom's Taxonomy Level                      |
|------|------------------------------------------------------------------------------------|---------------------------------------------|
| CLO1 | Understand and identify basic tools and techniques associated with ICT             | 2 Understanding<br>1 Remembering            |
| CLO2 | Develop digital literacy skills                                                    | 2 Understanding<br>3 Applying<br>6 Creating |
| CLO3 | Access various tools and applications related to ICT                               | 2 Understanding<br>3 Applying               |
| CLO4 | Operate a variety of hardware and software independently                           | 2 Understanding,<br>3 Applying              |
| CLO5 | Understand wired and wireless network and various transmission media and their use | 2 Understanding<br>1 Remembering            |
| CLO6 | Understand and develop local network                                               | 2 Understanding<br>3 Applying<br>6 Creating |

### Mapping of CLOs with POs & PSOs

| Course Learning Outcomes | Program Outcomes (POs) |     |     |     |     |     |     |     |     |      |      |      | Program Specific Outcomes(PSOs) |      |      |      |
|--------------------------|------------------------|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|---------------------------------|------|------|------|
|                          | PO1                    | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1                            | PSO2 | PSO3 | PSO4 |
| CLO1                     | H                      |     | M   | L   |     |     |     |     | H   |      |      |      | M                               |      | M    |      |
| CLO2                     | H                      |     |     | M   | M   | H   |     |     | H   |      |      |      | H                               | H    | M    | M    |

|             |   |  |   |   |   |   |  |  |   |  |  |  |   |   |   |   |
|-------------|---|--|---|---|---|---|--|--|---|--|--|--|---|---|---|---|
| <b>CLO3</b> | H |  |   | H |   |   |  |  | M |  |  |  | H | M | M | M |
| <b>CLO4</b> | H |  |   | M | M | H |  |  | H |  |  |  | H | H | M | M |
| <b>CLO5</b> | H |  | M | L |   |   |  |  | H |  |  |  | M |   | M |   |
| <b>CLO6</b> | H |  |   | M | M | H |  |  | H |  |  |  | H | H | M | M |

**H: High, M: Medium, L: Low**