

|           |                 |   |   |   |   |
|-----------|-----------------|---|---|---|---|
| 1152CS174 | GREEN COMPUTING | L | T | P | C |
|           |                 | 3 | 0 | 0 | 3 |

**Course Category: Program Elective**

**A. Preamble :**

Student must know about basic energy management option in individual components such as CPUs, network interfaces, hard drives, memory and operating systems.

**B. Prerequisite Courses:**

| Sl. No | Course Code | Course Name             |
|--------|-------------|-------------------------|
| 1      | 1150CS201   | Problem solving using C |

**C. Course Educational Objectives :**

Upon completion of the course, students should be able to:

- give an account of the concept green IT,
- give an account of environmental perspectives on IT use,
- give an account of standards and certifications related to sustainable IT products,
- describe green IT in relation to technology,
- relate green IT to sustainable development,
- evaluate IT use in relation to environmental perspectives,
- discuss how the choice of hardware and software can facilitate a more sustainable operation,
- use methods and tools to measure energy consumption

**D. Course Outcomes :**

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

| CO No's | Course Outcomes  | Knowledge Level (Based on revised Bloom's Taxonomy) |
|---------|--|---|
| CO1     | To understand the concepts of technologies that conform to low-power computation   | K2  |
| CO2     | To understand green (power-efficient) technologies for components of one single computer, such as CPU, memory and disk, and appreciate cutting edge designs for these components | K2  |
| CO3     | To have a basic understanding of a variety of technologies applied in building a green system and to identify the various key sustainability and green IT trends                 | K2  |
| CO4     | To discuss the various laws, standards and protocols for regulating green IT   | K2  |
| CO5     | Be able to use a range of tools to help monitor and design green systems   | K3  |

**E. Correlation of COs with POs :**

| COs | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|------|------|
| CO1 | M   |     |     |     |     | M   | M   |     |     |      |      |      |      |      |      |
| CO2 | M   |     |     |     |     | M   | H   |     |     |      |      |      |      |      |      |
| CO3 | M   |     |     |     |     | M   | H   |     |     |      |      |      |      | M    |      |
| CO4 | M   |     |     |     |     | H   | H   |     |     |      |      |      |      | M    | H    |
| CO5 | M   |     |     |     |     | H   | H   |     |     |      |      |      | L    | M    | H    |

H- High; M-Medium; L-Low

**F. Course Content:**

**UNIT I FUNDAMENTALS**

**9**

Green IT Fundamentals: Business, IT, and the Environment –Green computing: carbon foot print, scoop on power –Green IT Strategies: Drivers, Dimensions, and Goals –Environmentally Responsible Business: Policies, Practices, and Metrics.

**UNIT II GREEN ASSETS AND MODELING**

**9**

Green Assets: Buildings, Data Centers, Networks, and Devices - Green Business Process Management: Modeling, Optimization, and Collaboration –Green Enterprise Architecture – Environmental Intelligence Green Supply Chains –Green Information Systems: Design and Development Models.

**UNIT III GREEN FRAMEWORK**

**9**

Virtualizing of IT systems –Role of electric utilities, Telecommuting, teleconferencing and teleporting – Materials recycling –Best ways for Green PC –Green Data center –Green Grid framework.

**UNIT IV GREEN COMPLIANCE**

**9**

Socio-cultural aspects of Green IT –Green Enterprise Transformation Roadmap –Green Compliance: Protocols, Standards, and Audits –Emergent Carbon Issues: Technologies and Future.

**UNIT V CASE STUDIES**

**9**

The Environmentally Responsible Business Strategies (ERBS) –Case Study Scenarios for Trial Runs – calculating the carbon footprint – greening mobile devices - CASE STUDIES –Applying Green IT Strategies and Applications to a Home, Hospital, Packaging Industry and Telecom Sector.

**TOTAL: 45 periods**

**i) Text Books**

1. Bhuvan Unhelkar, Green IT Strategies and Applications-Using Environmental Intelligence, CRC Press, June 2011
2. Woody Leonhard, Katherrine Murray, Green Home computing for dummies, August 2009.

**ii) Reference Books:**

1. Alin Gales, Michael Schaefer, Mike Ebbers, Green Data Center: steps for the Journey, Shoff/IBM rebook, 2011.
2. John Lamb, The Greening of IT, Pearson Education, 2009.
3. Jason Harris, Green Computing and Green IT-Best Practices on regulations & industry, Lulu.com, 2008.
4. Carl Speshocky, Empowering Green Initiatives with IT, John Wiley & Sons, 2010.
5. Wu Chun Feng (editor), Green computing: Large Scale energy efficiency, CRC Press, 2012