Course Specification

— (Bachelor)

Course Title: **Green Computing**

Course Code: **Comp 595**

Program: **Bachelor in Computer Science**

Department: **Computer Science**

College: **College of Engineering and Computer Science**

Institution: **Jazan University**

Version: **V1**

Last Revision Date: **07 January 2023**

Table of Contents

A. General information about the course:

1. Course Identification

1. Credit hours: (03)

2. Course type

A.	☐University	☐College	☒ Department	☐Track	☐Others
B.	☒ Required			☐ Elective	

3. Level/year at which this course is offered: (Level 10 / Year 04)

4. Course General Description:

To acquire knowledge to adopt green computing practices to minimize negative impacts on the environment, skill in energy saving practices in their use of hardware, examine technology tools that can reduce paper waste and carbon footprint by user, and to understand how to minimize equipment disposal requirements.

5. Pre-requirements for this course (if any):

Nil

6. Pre-requirements for this course (if any):

Nil

7. Course Main Objective(s):

- To learn the fundamentals of Green Computing.
- To analyze the Green computing Grid Framework.
- To understand the issues related with Green compliance.
- To study and develop various case studies.

2. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	39	100%
2	E-learning		
3	Hybrid • Traditional classroom • E-learning		
4	Distance learning (Self-Learning)		

3. Contact Hours (based on the academic semester)

No	Activity	Contact Hours
1.	**Lectures**	39
2.	**Laboratory/Studio**	
3.	**Field**	--
4.	**Tutorial**	--
5.	**Others (specify)**	4
Total		60

B. Course Learning Outcomes (CLOs), Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
1.0	**Knowledge and understanding**			
1.1	**Define** the basic terminology, Green IT Fundamentals, Green Assets: Buildings, Data Centers, Networks, and Devices, Virtualization of IT systems.	K1	• Exam 1 • Assignment- 1 • Assignment- 2 Final Theory Exam	• Lectures/Presentations Media Lectures
1.2	**Explain** Green IT Strategies: Drivers, Dimensions, and Goals, Green Business Process Management: Modeling, Optimization, and Collaboration.	K2	• Exam 1 • Assignment- 1 • Assignment- 2 Final Theory Exam	• Lectures/Presentations Media Lectures
2.0	**Skills**			

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Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
2.1	Evaluate issues related with Green compliance, Protocols, Standards, and Audits.	S1	• Lectures /Presentations • Media Lectures Tutorials	• Exam 2 • Assignment - 1 • Assignment – 2 Final Theory Exam
2.2	**Justify** the use of green computing in specific business and technological needs.	S1	• Lectures /Presentations • Media Lectures Tutorials	• Assignment - 1 • Assignment – 2 Final Theory Exam
2.3	**Analyze** Green Data center – Green Grid framework.	S1	• Lectures /Presentations • Media Lectures Tutorials	• Exam 2 • Assignment -1 Final Theory Exam
2.4	**Develop** various case studies, Applying Green IT Strategies and Applications to a Home, Hospital, Packaging Industry and Telecom Sector	S2	Case Study	• Assignment - 2 Final Theory Exam
3.0	**Values, autonomy, and responsibility**			
3.1	**Demonstrate** the ability to work in-group to achieve common assignments and activities in the field of Green Computing.	V2	Group Discussion	Assignment – 2 (Group Assignment)

C. Course Content

No	List of Topics	Contact Hours
1	FUNDAMENTALS 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.	9T
2	GREEN ASSETS AND MODELING 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	9T

3	**GRID FRAMEWORK** Virtualization of IT systems – Role of electric utilities, Telecommuting, teleconferencing and teleporting – Materials recycling – Best ways for Green PC – Green Data center – Green Grid framework.	6T
4	**GREEN COMPLIANCE** Socio-cultural aspects of Green IT – Green Enterprise Transformation Roadmap – Green Compliance: Protocols, Standards, and Audits – Emergent Carbon Issues: Technologies and Future.	6T
5	**CASE STUDIES** The Environmentally Responsible Business Strategies (ERBS) – Case Study Scenarios for Trial Runs – Case Studies – Applying Green IT Strategies and Applications to a Home, Hospital, Packaging Industry and Telecom Sector.	9T
Total		**39T**

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Midterm Exam	7th-8th week	15%
2.	Assignment I	4th week	10%
3.	Assignment II (Group assignment)	10th week	15%
4.	Case Study	11th Week	20%
5.	Final Theory Exam	15th Week	40%

*Assessment Activities (i.e., Written test, oral test, oral presentation, group project, essay, etc.).

E. Learning Resources and Facilities

1. References and Learning Resources

Essential References	• Bhuvan Unhelkar, —Green IT Strategies and Applications-Using Environmental Intelligence, CRC Press, June 2014. • Woody Leonhard, Katherine Murray, —Green Home computing for dummies, August 2012.

Supportive References	• Alin Gales, Michael Schaefer, Mike Ebbers, —Green Data Center: steps for the Journey, Shroff/IBM rebook, 2011. • John Lamb, —The Greening of IT, Pearson Education, 2009. • Jason Harris, —Green Computing and Green IT- Best Practices on regulations & industry, Lulu.com, 2008 • Carl speshocky, —Empowering Green Initiatives with IT, John Wiley & Sons, 2010. • Wu Chun Feng (editor), —Green computing: Large Scale energy efficiency, CRC Press
Electronic Materials	• https://learncryptography.com/ • https://www.garykessler.net/library/crypto.html • https://gpgtools.tenderapp.com/kb/how-to/introduction-to-cryptography • https://www.khanacademy.org/computing/computer-science/cryptography
Other Learning Materials	

2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	• Classroom equipped with projector, whiteboard, and sufficient seating arrangements.
Technology equipment (projector, smart board, software)	• Whiteboards and projectors for classroom
Other equipment (depending on the nature of the specialty)	None

F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching	Students	Indirect (Course evaluation survey form)
Effectiveness of Students assessment	CRC / QAU / HoD	Direct (Course reports/result analysis)
Quality of learning resources	Track leaders / CRC	Indirect (Review, meetings, and star rating with suggestions for further modification and improvements)
The extent to which CLOs have been achieved	CRC / QAU	Direct (CLO assessment template further verified at course coordinator, Track leader and QAU level)
Other		

Assessors (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify)

Assessment Methods (Direct, Indirect)

G. Specification Approval

COUNCIL /COMMITTEE	DEPARTMENT COUNCIL
REFERENCE NO.	
DATE	15/10/2023