



# Circular Economy

An elective, Credit Point Course!

Proposed by  
International Council for Circular Economy (ICCE)  
New Delhi

In Collaboration with  
All India Council for Technical Education (AICTE)  
New Delhi



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## Introduction

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ICCE is India's first organization working as a thought leader with a global outlook to build regenerative and restorative systems. ICCE is working on research and innovation through various mechanisms to engage academia. In last one year, ICCE has given impetus to awareness generation, establishing research and building innovation within premier institutes and universities. Echoing the Hon'ble Prime Minister's vision of "**Circular Economy Mission**", and motivated by the recent reforms carried out by the government; ICCE engage with all stakeholders including the government and its agencies, to make India self-reliant, technologically advanced, innovative, research-oriented and a leading player in circularity.

ICCE promotes businesses, innovators and thought leaders to build and scale a circular economy. The transition to a circular economy requires action from stakeholders across the globe. We have created a movement to enable organisations to join together as a community to accelerate the transition. ICCE is continuously taking efforts towards expanding the research base by engaging faculties, researchers, scientists, start-ups and industries for developing targeted emerging and futuristic technologies to accelerate the transition towards a circular, self-reliant nation. ICCE proposes to collaborate with All India Council for Technical Education (AICTE) for inclusion of Circular Economy as a Credit point course in technical and non-technical courses.



## Need for inclusion of Circular Economy as a Credit point course

All India Council for Technical Education (AICTE) is a national-level Apex Advisory Body to conduct a survey on the facilities available for technical education and to promote development in the country in a coordinated and integrated manner. ICCE has established very good connect with academic and research institutes with faculties and researchers through research projects. So far, the technical and non-technical under-graduate programs in the country do not have subject on Circular Economy which could result in a huge skill-gap in the coming years. We need to adapt to impart knowledge related to circularity and sustainability.

Even though knowledge is the main content of teaching and universities are key knowledge producers wherein the scholars have to actively explore research on knowledge studies in higher education programs. As this field of study has grown, it has increasingly overlapped with the research focus of other fields. However, these have developed independently with little interaction between them, causing our understanding of knowledge to be limited, compartmented, and lacking a multidimensional perspective. This course is designed to improve knowledge studies in higher education by stimulating interactions between different approaches. This course would include-

1. Knowledge on the subject
2. Research and development
3. Emerging Innovation systems
4. Utility of knowledge production
5. Entrepreneurship development

With its comprehensive overview and multidisciplinary perspective, this course would provide/ update the scholars with the theoretical and R&D based information to make more informed decisions.



## Committee for Circular Economy course

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<b>S.No</b>	<b>Name</b>	<b>Designation &amp; Organization</b>
1	Ms Shalini Goyal Bhalla	Managing Director, ICCE
2	Prof. S.S. Marwaha	Former Chairman, PPCB, Advisor, AgriIn
3	Edward Clarence-Smith	Advisor, UNIDO
4	Axel Darut	European & International affairs advisor in the Circular Economy, France
5	Pooran Chandra Pandey	Climate ScoreCard, USA
6	Dr. Sameer	Chairman, Indian Plastics Institute
7	Prof. KV Jayakumar	NIT Warangal
8	Piotr Barczak	Circular Economy Expert, European Environmental Bureau (EEB)
9	Ravinder Dahiya	Director, ICCE



## General Course Structure & Theme

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### A. Definition of Credit:

1 Hr. Lecture (L) per week	1 Credit
1 Hr. Tutorial (T) per week	1 Credit
1 Hr. Practical (P) per week	0.5 Credit
2 Hours Practical (P) per week	1 Credit

### B. Course code and definition:

Course code	Definitions
L	Lecture
T	Tutorial
P	Practical
C	Credits
PO	Program Outcome
CO	Course Outcome
CE	Circular Economy



Course Code	:	CE
Course Title	:	Circular Economy
Number of Credits	:	4 (L: 2; T: 1; P: 2)
Course Category	:	Open Elective
Pre-requisites	:	None

## Course Objective:

1. To develop graduates who have the necessary theoretical, practical and research knowledge, skill and aptitude in circularity and can get job opportunities by the industry in various sectors both public and private at national and international level.
2. To contrive skilled manpower and entrepreneurship in the field of Circular Economy.
3. To enhance interaction of students with the senior/experienced manpower who have real time knowledge / experience in the technology development, research, innovation, entrepreneurship deployment and circular business models.
4. To acquaint students about the needs of businesses related to circularity and to create zeal among students to pursue research and development (R&D), and Entrepreneurship in this domain.
5. Create entrepreneurs who would promote knowledge in core competencies of environmental education and work on “innovation to industry” approach through university-industry partnerships.

## Program Outcomes:

S. No.	Program Outcome	Attributes
PO-01	Acquire comprehensive knowledge and understanding the methodologies associated with Circular Economy. Apply knowledge to identify, formulate and analyse new circular business models	Subject Knowledge
PO-02	Having ability to apply knowledge of 3R's, principles of circularity for development of circular business models	Critical Thinking
PO-03	Having ability to design system thinking and life cycle assessment with realistic constraints, including operational and environmental	Research
PO-04	Acquire skills for developing circular techniques, resources and business models	System Thinking and Entrepreneurship
PO-05	Ability to identify, investigate, understand and analyse complex problems, apply creativity, carry out research	Design, Development, and solutions

	and development work to solve practical problems related to product life extension, reducing negative externalities and designing out waste	
PO-06	Ability to communicate both oral and written contexts effectively in the form of technical papers, project reports, design documents and seminar presentations.	Communication
PO-07	Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings	Individual and Team work

## Course Articulation Matrix:

	PO-01	PO-02	PO-03	PO-04	PO-05	PO-06	PO-07
CO-01	3	4	1	2			
CO-02		1			2		
CO-03	2	2		1	1	1	1
CO-04	2	2	1		1	1	2

## Course Content: (30 Hours)

### Module I: Introduction to Circular Economy (04 Hours)

Linear Economy and its emergence, Economic and Ecological disadvantages of linear economy, Replacing Linear economy by Circular Economy, Development of Concept of Circular Economy, A differential - Linear Vs Circular Economy

### Module II: Characteristics of Circular Economy (04 Hours)

Material recovery, Waste Reduction, reducing negative externalities, Explaining Butterfly diagram, Concept of Loops

### Module III: Circular design, innovation and Assessment (08 Hours)

Zero waste: Waste Management in context of Circular Economy, Circular design, Research and innovation, LCA, Circular Business Models

### Module IV: Case Studies (09 Hours)

Business models, Solid Waste Management / Wastewater, Plastics: A case study, EPR: polluters pay principle, Industrial symbiosis/ Eco-parks

### Module V: Legal and policy framework (05 Hours)

Role of governments and networks, Sharing best practices, Universal circular economy policy goals, India and CE strategy, ESG

## Learning Resources:

### Textbook:

Name of the book	Name of the Author	Publication
The Circular Economy A User's Guide	Walter R Stahel	Routledge; 1 <sup>st</sup> Edition (24 June 2019)
Circular Economy: (Re) Emerging Movement	Shalini Goyal Bhalla	Invincible Publisher
The Circular Economy Handbook: Realizing The Circular Advantage	Peter Lacy, Jessica Long, Wesley Spindler	Palgrave Macmillan UK
Waste to Wealth: The Circular Economy Advantage	Peter Lacy, Jakob Rutqvist	Palgrave Macmillan

### References:

1. Towards Zero Waste: Circular Economy Boost, Waste to Resources María-Laura Franco-García, Jorge Carlos Carpio-Aguilar, Hans Bressers. Springer International Publishing 2019
2. Strategic Management and the Circular Economy Marcello Tonelli, Nicolo Cristoni, Routledge 2018.
3. Circular Economy: Global Perspective Sadhan Kumar Ghosh, Springer, 2020
4. The Circular Economy: A User's Guide Stahel, Walter R. Routledge 2019
5. An Introduction to Circular Economy Lerwen Liu, Seeram Ramakrishna, Springer Singapore 2021.

### Online Resources:

1. <https://www.coursera.org/learn/circular-economy>
2. <https://www.edx.org/course/circular-economy-an-introduction>
3. <https://www.coursera.org/learn/sustainable-digital-innovation>
4. <https://online-learning.harvard.edu/course/introduction-circular-economy?delta=0>
5. <https://www.oecd.org/cfe/regionaldevelopment/Ekins-2019-Circular-Economy-What-Why-How-Where.pdf>
6. <https://ic-ce.com/product/principles-of-circular-economy/>
7. <https://ic-ce.com/product/circular-business-management/>
8. <https://ic-ce.com/product/bootcamp/>
9. <http://ic-ce.com/journal-on-circular-economy/>

## Course Outcomes:

At the end of the program students will be able to:

C01	Apply the concept of circular economy to environmental engineering problems
C02	Understand the concept of circularity and conduct relevant research
C03	Use the principles of circularity for application to sustainable development
C04	Apply complexity aspects of circular economy for creating circular business models