Unit-II. The innovation portfolio: What to innovate?; Vision, portfolios and feelings; Identifying the right question, feelings and needs; Innovating Experiences, Battling Commoditization; Technology and Psychology; Creating Emotional Appeal; Searching for Innovation Opportunities; Innovation Portfolios for Established Organizations **[10 hours]**

Unit-III. The innovation voices: How to innovate?; Thinking 'Inside and outside The Box'; Profiling Product for Profit and Growth; Understanding the voice of the product, customer and organization; Fostering creativity in organizations**.** **[12 hours]**

Unit-IV. The innovative mind: Who Innovates?; Three Levels of Innovation; The Individual Innovator; Creativity Muscles; Innovative Teams; Building a Global Team; The Innovative Organization
[12 hours]

Essential/recommended readings

- Innovation Management: Strategies, concept and tools for growth and profit, S. Maital D.V.R. Sheshadri, Response Books, 2007.
- Innovation Management and New Product Development, P. Trott, Pearson Education, 7th Edition, 2021.
- Innovation and Entrepreneurship, M. Kennard, Routledge, 2021.

GENERIC ELECTIVES (GE-IV4.2): Electronics at work & circuit simulation

CREDIT DISTRIBUTION, ELIGIBILITY AND PRE-REQUISITES OF THE COURSE

Course title & Code	Credits	Credit distribution of the course			Eligibility criteria	Pre-requisite of the course	Department offering the course
		Lecture	Tutorial	Practical / Practice			
Electronics at work and Circuit simulation, GE IV.4.2.	**4**	**2**	**0**	**2**	**Class XII pass**	**Basic knowledge of science**	**Physics/ Electronics Faculty of CIC**

Learning Objectives

This is a basic introductory module to provide an insight of the field of electronics to the students. In this paper students learn about basics of analog and digital electronics. The emphasis is on basic electronics components and devices and their application in real world.

Learning Outcomes

After the completion of the course, the students will be familarized with

- concepts of Electronics.
- following analog electronic components and their identification: resistor, capacitor, inductor, power source, transducer, sensor, detector, switch, Potentiometer - Integrated Circuit – Transformer;
- following digital electronic components, circuits, devices and their identification: logic families, logic gates, Boolean algebra - Combinational circuits: adders, encoders, decoders, multiplexer and de- multiplexer - Sequential circuits: like flip flops, counters, shift registers, memories
- following semiconductor devices, circuits and their identification: PN Junctions characteristics, Zener and Avalanche breakdown, diode applications, transistor & applications. Operational Amplifier (Op Amp): inverting and noninverting amplifier, integrator, differentiator, summing amplifier.
- practical and circuit simulations to understand basic electronics circuits used in everyday life.

SYLLABUS

Unit I: Analog World: resistor, capacitor, inductor, power source, transducer, sensor, detector, switch – Potentiometer - Integrated Circuit – Transformer. **[10 hours]**

Unit II: Digital World: logic families, logic gates, boolean algebra - Combinational circuits: adders, encoders, decoders, multiplexer and de-multiplexer - Sequential circuits: like flip flops, counters, shift registers, memories. **[10 hours]**

Unit III: Semiconductor Devices: PN Junctions characteristics, Zener and Avalanche breakdown, diode applications, transistor & applications. Operational Amplifier (Op Amp): inverting and non-inverting amplifier, integrator, differentiator, summing amplifier.

[10 hours]

Practicals - **[60 Hours]**

- Design basic electric switch board used in home
- Simulation of rectifier circuit
- Designing device charging circuit
- Deconstructing mobile charger circuit
- Simulation of CE amplifier circuit

- Designing basic amplifier circuit using transistors
- Simulation of phase shift oscillator circuit
- Designing of oscillator circuit for frequencies in audio range
- Simulation of digital clock circuit
- Innovation Project: Deconstructing mobile phone circuit

Recommended/ Suggested Readings:

- Electronic Principles. Albert Paul Malvino, McGraw-Hill, 1998
- Electronic Devices & Circuit Theory. Robert L. Boylestad, and Louis Nashelsky, Pearson Education, 2009
- Digital Logic and Computer Design. M. Morris Mano, Pearson Education, 2008
- Signals and Systems. Alan V. Oppenheim, Alan S. willsky, and Nawab S. Hamid, Prentice Hall, 1997
- Art of Electronics. Paul Horowitz, and Winfield Hill, Cambridge University Press, 2008
- Practical Electronics for Inventors, Fourth Edition – by Paul Scherz and Simon Monk, Mc Graw Hill Education, 2022

GENERIC ELECTIVES (GE-IV.4.3): *In Silico* Biology

CREDIT DISTRIBUTION, ELIGIBILITY AND PRE-REQUISITES OF THE COURSE

Course title & Code	Credits	Credit distribution of the course			Eligibility criteria	Pre-requisite of the course	Department offering the course
		Lecture	Tutorial	Practical / Practice			
***In Silico* Biology, GE IV.4.3.**	**4**	**2**	**0**	**2**	**Class XII pass**	**NIL**	**Chemistry/ Biology Faculty of CIC**

Learning Objectives

This module is designed to:

- Develop an understanding of the advancement of computational models and simulations in studies applied to complex biological phenomena.
- Aware students of different types of bioinformatics analysis software and their related applications so that they can solve biological problems

Learning Outcomes

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

- Do computational simulations using protein and DNA sequences
- Be able to build computational models of biological data and systems