

Faculty of Physical Sciences
For Undergraduate Programme

Course Structure under Choice Based Credit System (CBCS): 2018-19

The University Grants Commission (UGC) has initiated several measures to bring equity, efficiency and excellence in the Higher Education System of country. The important measures taken to enhance academic standards and quality in higher education include innovation and improvements in curriculum, teaching-learning process, examination and evaluation systems under Choice Based Credit System. Choice Based Credit System opens pathways for learning opportunities and follows a credit system which is attached to course components offered to students. A credit system for higher education measures various parameters like student performance, outcomes, entrepreneurship skills, contact hours, innovation and creativity talents, etc. With this initiative The Faculty of Physical Sciences, Shree Guru Gobind Singh Tricentenary University, Gurugram introduced four Open Elective (OE) Courses for the UG students of SGT University except students of Faculty of Physical Sciences.

Selection of students to the OECs:

The Departmental Committee shall follow a selection procedure on a first come first served basis, fixing the maximum number of students, giving counseling to the students etc. to avoid overcrowding to particular course(s) at the expense of some other courses.

Course Structure of OECs

S. No.	COURSENAME	CODE	L	T	P	Contact hours/ week	Credits	Max. Marks	Formative Assessment	Summative Assessment
1.	Radiation Physics	PS-1	2	0	0	2	2	50	20	30
2.	Green Chemistry and Technology	PS-2	2	0	0	2	2	50	20	30
3.	Introduction to Forensic Science	PS-3	2	0	0	2	2	50	20	30
4.	Social Issues and Environment	PS-4	2	0	0	2	2	50	20	30
	Total		8	0	0	8	8	200	80	120

Syllabus

Radiation Physics

UNIT- I

Basics of Radiation Physics

Latent images formation and its processing. Various units used for measuring radiation, Half life, decay factor, details about radium, cobalt and cesium, doze and doze rate, exposure doze, exit doze, surface doze, depth doze, maximum permissible dose, iso-dose charts and their uses.

UNIT – II

Radiation production and measurement Techniques

X-rays–its production, properties and quality, Ionization chambers, G.M. Counter and Scintillation Counter, Interaction of radiation with matter, linear absorption coefficient, Grid, Cones and Filters, scattered radiations and appliances used to reduce it.

UNIT – III

Radiation Protection

Radiation Hazards, Protection against it, film badge, pocket ionization chamber, Radiation protection of people; Radiation protection of the environment; radioactive source security; particle physics and statistics related to radiation protection.

References:

1. Radiation physics for medical physicists by Ervin B. Podgorsak, Second Edition, Springer.
2. Physics for radiation protection; A hand book, Second edition by J.E.Martin
3. A Primer in applied radiation physics by Frederic Alan smith.
4. Fundamentals of nuclear physics by Jagdesh Verma, Roop Chand Bhandari and D.R.S.Somayajulu.

Green Chemistry and Technology

UNIT-I

Green Chemistry: Introduction- Definition, Scope and need of green Chemistry, basic principles of green chemistry. Limitations /Obstacles in the pursuit the goals of the Green Chemistry and technology. Reasons for Green Chemistry (resource minimization, waste minimization concepts), Green synthesis: Evaluation of the type of the reaction i) Rearrangements (100% atom economic), ii) Addition reaction (100% atom economic).

UNIT-II

Fundamentals of Catalytic Science and Engineering

Homogenous and heterogeneous catalysis, Fundamentals of homogeneous catalysis mechanisms and kinetics, Acid--base catalysis, Transition metal catalysis. Green catalysts (Natural and Modified Clays, Zeolites, Ionic Liquids) and Bio catalysts (Enzymes).

UNIT-III

Green Technology in Day to Day life & Industries:

Implications of Green Technology in day to day life. Some of the case studies (including Dry Cleaning of cloths, Hydrogen peroxide as a bleaching agent, Green solution to turn turbid water clear) and different fields including Pharma & Polymer science (Paracetamol, Irubfen, polylactic acid, etc.), Organic electronics (such as OLED, Organic sensors, Green mobile phones, conductive paper), IT, Civil and Mechanical Engineering.

Reference books:

1. Green Chemistry Theory and Practice. P.T.Anatas and J.C. Warner
2. Green Chemistry V.K. Ahluwalia Narosa, New Delhi.
3. Real world cases in Green Chemistry M.C. Cann and M.E. Connelly
4. Green Chemistry: Introductory Text M.Lancaster: Royal Society of Chemistry(London)
5. Green Chemistry: Introductory Text, M.Lancaster

Introduction to Forensic Science

UNIT-I

Forensic Science : Definition, Introduction, Basic Principles & Significance, History & Development of Forensic Science in India and World, Organizational Structure of Forensic Science laboratory, Different divisions and units of Forensic Science Laboratory, Organizational Structure of Forensic Science teaching Institution.

UNIT-II

Criminalistics

Definition, Introduction, Scope, Significance and use, Coordination of Forensic Science activities and its use for court of Law.

UNIT-III

Forensic Ethics

Introduction, Definition, Scope, Ethics in Forensic Science, Professionalism and ethics: Importance of professional ethics, the importance of professional ethics to science practitioners, development of code of conduct and code of ethics for Forensic Science; Application of codes and ethics, How ethical requirements impact the daily work of a forensic scientist; Ethical dilemmas and their resolution.

Reference books:

Reference Books:

1. Houck, M.M. & Siegel, JA; Fundamentals of Forensic Science, Academic Press, London, 2006.
2. Sharma, B.R., Forensic Science in Criminal Investigation & Trials, Universal Publishing Co., New Delhi, 2003
3. Nanda B.B and Tewari, R.k. Forensic Science in India- A vision for the Twenty First Century, Select publisher, N. Delhi, 2001.
4. James, SH and Nordby, J.J., Forensic Science- An Introduction to Scientific and investigative Techniques, CRC Press, USA (2003)
5. Saferstein; Criminalistics- An Introduction of Forensic Science, Prentice Hall Inc, USA,2007.
6. Sharma, B.R. (1974) Forensic Science in Criminal Investigation and Trials, Central Law Agency, Allahabad, 1974.

SOCIAL ISSUES AND ENVIRONMENT

Unit- 1

Environment and Culture

Ancient civilizations and their environmentalism, Consumerism and advertising in environmental degradation, Land Acquisition and Resettlement, Compensation and benefits for displaced persons, Social impact assessment, resettlement planning and implementation, Government-managed resettlement, Indigenous People, their relocation and their rights, Impacts on traditional or customary lands, Cultural Heritage and its protection.

Unit-2

Environment and Pollution

Sources of different pollutions: Air, Water, Soil, Noise, Radiation, Thermal and Biological; Case studies: Fe-Al use, Use of cleaners in domestic sector and their harms, Overuse of fertilizers and pesticides in agriculture, Silent Spring, Lack of urban planning in pollution, Common toxins introduced in environment such as Pb, Hg, VOCs etc. Point sources, Mobile sources and Fugitive sources of Air pollution.

Unit-3

Energy and Water Conservation

Energy use and conservation: in process heating (including heating for fluids, calcining, drying, heat treating, metal heating, melting, melting agglomeration, curing and forming) and process cooling (in refrigeration and cooling).

Water Use and Conservation: In industrial process heating and cooling, operations, in agriculture, in domestic sector; Wastewater disposal standards and cautions for different sectors.

References:

1. Environmental Chemistry by A K De by NEW AGE Publishers
2. Energy Conservation Guidebook by Dale R. Patrick, Stephen W. Fardo, Ray E. Richardson, Brian W. Fardo. CRC Press
3. Elixir: A History of Water and Humankind by Brian Fagan, Bloomsbury Press
4. Hazardous Waste Management by Michael D. Lagrega, Waveland Pr Inc
5. This Sacred Earth: Religion, Nature and Environment by Roger S Gottlieb, Psychology Press
6. Worldviews, Religion, and the Environment: A Global Anthology by Richard C. Foltz., Wadsworth Publishing.