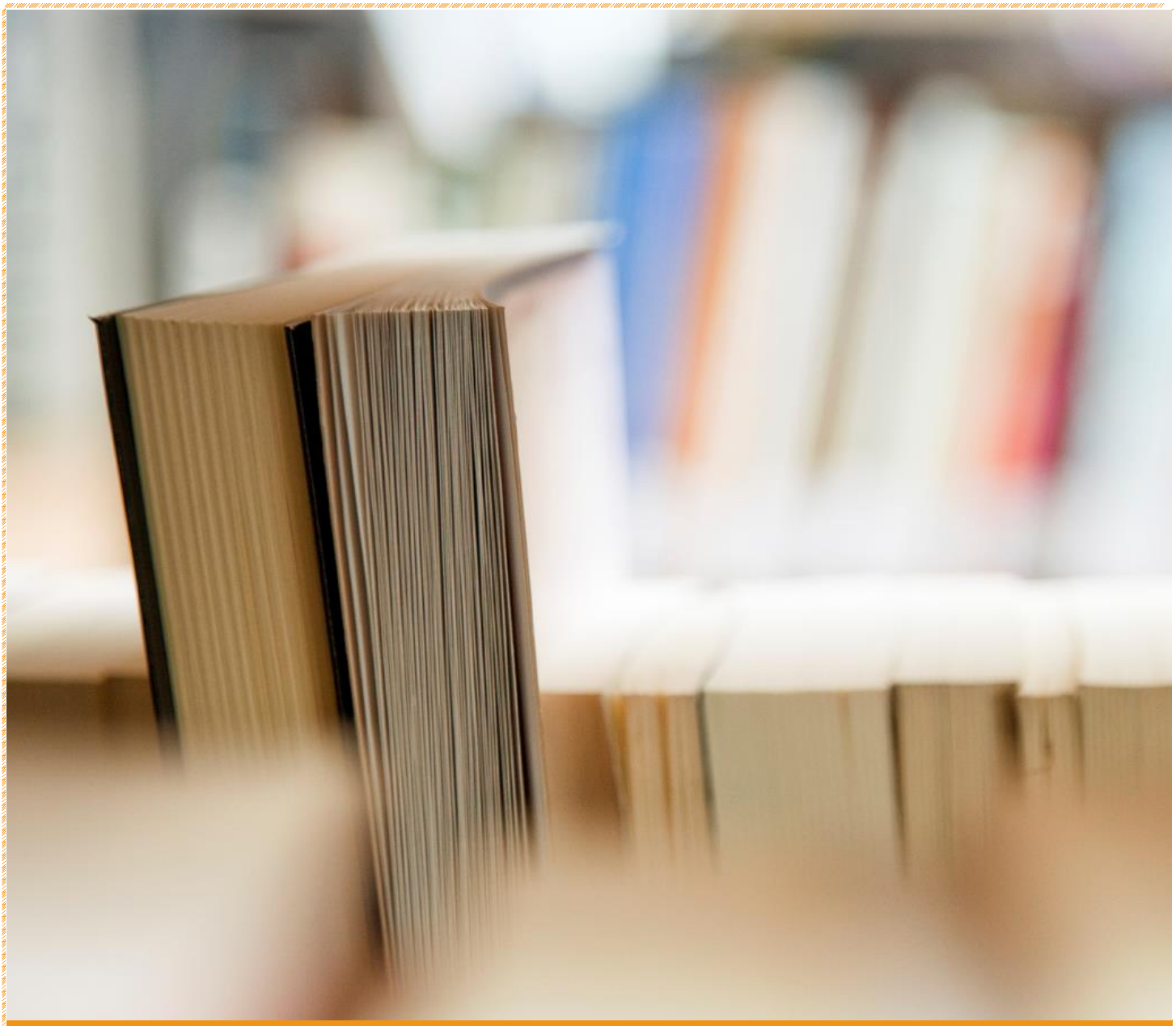

SGRR UNIVERSITY

Brochure of Value-Added Courses
School of Basic and Applied Sciences
2020-2021

ABOUT THE UNIVERSITY

Shri Guru Ram Rai University was established by a religious and philanthropic leader, Shri Mahant Devendra Dass Ji Maharaj in the year 2017. It is situated in the heart of city, Uttarakhand. We are extremely privileged to extend the values and ethos of the Shri Guru Ram Rai Education mission through SGRR University to impart quality education and in successfully placing more than 80% students in various companies across the globe. SGRR University has humongous campus spread over 80 acres of land. Its state-of-art facilities give opportunities to develop leadership skills and to achieve professional excellence. It has 7000+ students from different countries, 29 states and Union Territories and providing cultural melange and global exposure to our students. One of the biggest boosts from University is its unmatched experience of delivering quality education that helps to develop confidence and will give you more knowledge, industry exposure, building good networking and high self-esteem. This will change your overall personality and develop you into a complete professional to face any challenge.

Vision

"To establish Sri Guru Ram Rai University to be a Center of Excellence in higher education, innovation and social transformation by nurturing inquisitive and creative minds and by enabling the stakeholders to become committed professionals and educators of national and global relevance."

Mission

- To provide a comprehensive and sustainable educational experience that fosters the spirit of enquiry, scientific thinking and professional competence along with ethical and spiritual values
- To deliver a classic, well rounded learning experience that is distinctive and impactful on the young generation preparing them for a successful career
- To engage, inspire and challenge the stakeholders to become leaders with ethics and positive contributors to their chosen field and humane citizens
- To attract, train and retrain qualified staff to work efficiently to bring forth the maximum resource potential

- To develop committed and responsible professionals who work for the welfare of the society by providing innovative and efficient solutions and creating long term relationship with the stakeholders

- To create a sustainable career, by collaborating with stakeholders and participating in community partnership for life and livelihood in the local society in a responsive and dynamic way

- To make our students globally competent by introducing specialized training leading to professional capabilities and developing diverse skills in them for competitive advantage.

- To establish quality standards for generations by epitomising professionalism and integrity while raising the achievements of students.

- To ceaselessly pursue excellence by strengthening a learning environment that makes the institution the most preferred destination in the country.

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INTRODUCTION

The ever-changing global scenario makes the world more modest and needs high levels of lateral thinking and the spirit of entrepreneurship to cope up with the emergent challenges. Many a times, the defined skill sets that are being imparted to students today with Programme Specific Objectives in educational institutions become redundant sooner or later due to rapid technological advancements. No university curriculum can adequately cover all areas of importance or relevance. It is important for higher education institutions to supplement the curriculum to make students better prepared to meet industry demands as well as develop their own interests and aptitudes.

Objectives The main objectives of the Value-Added Course are:

- ✓ To provide students an understanding of the expectations of industry.
- ✓ To improve employability skills of students.
- ✓ To bridge the skill gaps and make students industry ready.
- ✓ To provide an opportunity to students to develop inter-disciplinary skills.
- ✓ To mould students as job providers rather than job seekers.

Course Designing The department interested in designing a Value Added Course should undertake Training Need Analysis, discuss with the generic employers, alumni and industrial experts to identify the gaps and emerging trends before designing the syllabus.

Conduction of value added courses :

Value Added Course is not mandatory to qualify for any programme and the credits earned through the Value-Added Courses shall be over and above the total credit requirement prescribed in the curriculum for the award of the degree. It is a teacher assisted learning course open to all students without any additional fee.

Classes for a VAC are conducted during the RESERVED Time Slot in a week or beyond the regular class hours The value-added courses may be also conducted during weekends / vacation period. A student will be permitted to register only one Value Added Course in a Semester.

student will be encouraged to opt for the VAC offered by his/her parent Department/Faculty. Industry Experts / Eminent Academicians from other Institutes are eligible to offer the value-added course. The course can be offered only if there are at least 5 students opting for it. The students may be allowed to take value added courses offered by other departments after obtaining permission from Dean offering the course. The duration of value added course is 30 hours with a combination 18 hours (60%) of theory and 12 hours (40%) of practical. However,

the combination of theory and practical shall be decided by the course teacher with the approval of the Dean

GUIDELINES FOR CONDUCTING VALUE ADDED COURSES

- Value Added Course is not mandatory to qualify for any program.
- It is a instructor supported learning course open to all students without any added fee.
- Classes for VAC will be conducted during the **RESERVED** Time Slot in a week or beyond the regular class hours.
- The value-added courses may be also conducted during weekends / vacation period.
- A student will be permitted to register only one Value Added Course in a Semester.
- Students may be permitted to enrol in value-added courses offered by other departments/ Schools after obtaining permission from the Department's Head offering the course.

DURATION AND VENUE

- The duration of value-added course should not be less than 30 hours.
- The Dean of the respective School shall provide class room/s based on the number of students/batches.
- VAC shall be conducted in the respective School itself.

REGISTRATION PROCEDURE

The list of Value-Added Courses, along with the syllabus, will be available on the University Website. A student must register for a Value-Added Course offered during the semester by completing and submitting the registration form. The Department Head shall segregate according to the option chosen and send it to the Dean of the school offering the specific Value-Added Courses.

- Each faculty member in charge of a course is responsible for maintaining Attendance and Assessment Records for candidates who have registered for the course.
- The Record must include information about the students' attendance and Assignments, seminars, and other activities that were carried out.

- The record shall be signed by the Course Instructor and the Head of the Department at the end of the semester and kept in safe custody for future verification.

- Each student must have a minimum of 75% attendance in all courses for the semester in order to be eligible to take certificate.

- Attendance requirements may be relaxed by up to 10% for valid reasons such as illness, representing the University in extracurricular activities, and participation in NCC.

- The students who have successfully completed the Value Added Course shall be issued with a Certificate duly signed by the Authorized signatories.

Modern Algebra and Data Management

Course Code: VAC2020-19

Course Objectives :

- Develop a Solid Foundation in Modern Algebra
- Apply Algebraic Structures to Data Management
- Bridge Algebraic Theories with Data Modeling
- Develop Proficiency in Data Management Techniques
- Integrate Algebraic Thinking into Data Analysis

Course Outcomes:

- After completing this course students will be able to learn:
- Applying the concepts of modern mathematics Divisibility rule, Remainder Theorem, HCM/LCM in Number System.
- Relating the rules of permutation and combination, Fundamental Principle of Counting to find the probability.
- Applying calculative and arithmetical concepts of ratio, Average and Percentage to analyze and interpret data.
- Correlating the various arithmetic concepts to check sufficiency of data

Course Content:

Module I : Number theory

Classification of Numbers, Divisibility Rules, HCF and LCM, Factors, Cyclicity (Unit Digit and Last Two digit), Remainder Theorem, Highest Power of a Number in a Factorial, Number of trailing zeroes

Module II : Data interpretation

Data Interpretation Basics, Bar Chart, Line Chart, Tabular Chart, Pie Chart, DI tables with missing values

Module III : Data Sufficiency

Introduction of Data Sufficiency, different topics based DS

Module IV : Permutations and combinations

Fundamental counting, and or, arrangements of digits, letters, people in row, identical objects, rank, geometrical arrangements, combination: - basic, handshakes,

committee, selection of any number of objects, identical and distinct, grouping and distribution, de-arrangements

Module V: Probability

Introduction, Probability based on Dice and Coins, Conditional Probability, Bayes Theorem

References:

- Arun Shrama:- How to Prepare for Quantitative Aptitude
- Quantitative Aptitude by R.S. Agrawal
- M Tyra: Quicker Maths
- Nishith K Sinha:- Quantitative Aptitude for CAT
- Reference website:- Lofoya.com, gmatclub.com, cracku.in, handakafunda.com, tathagat.mba, Indiabix.com
- Logical Reasoning by Nishith K Sinha
- Verbal and Non Verbal Reasoning by R.S. Agrawal

Nanotechnology Physics

Course Code: VAC2020-20

Course Objectives: The objectives of the course are as follows:

- To make the students understand the Nanotechnology.
- To study the properties of nanomaterials and also be able to bring out innovative products using this cutting-edge technology.
- To get exposure of various techniques of synthesis of nanomaterials.
- To understand applications of nano materials.

MODULE-I (7hrs)

Definition of Nano, Scientific revolution-Atomic Structure and atomic size, emergence and challenges of nanotechnology, influence of nano over micro/macro, size effects and crystals, large surface to volume ration.

MODULE- II (12hrs)

One dimensional, Two dimensional and three-dimensional nanostructured materials, Quantum Dots shell structures.

MODULE- III (7hrs)

Bottom-up approach & top-down approach with examples. properties and nanoparticles metal nanoparticles geometric & electronic structure, Nature of carbon clusters and discovery of C60, Cabon nanotubes, synthesis structure, electrical and mechanical properties.

MODULE- IV (7hrs)

Bulk nanostructured magnetic materials, Molecular switches and electronics, Spintronics, nanoelectronics, photonic crystals nanoparticle LED, sensors

References:

- Nanoparticles: From theory to applications – G. Schmidt, Wiley Weinheim 2004.
- Instrument E L Principe, P Gnauck and P Hoffrogge, Microscopy and Microanalysis (2005), 11: 830- 831, Cambridge University Press.
- Processing & properties of structural nanomaterials - Leon L. Shaw, Nano chemistry: A Chemical Approach to Nanomaterials, Royal Society of Chemistry, Cambridge UK 2005.
- Charles P. Poole Jr. & Frank J. Owens, "Introduction to nanotechnology", John Wiley & Sons (Asia) Pte Ltd.

Enviornmental impoact Assessment

Course Code: VAC2020-21

Course objectives:

- To understand the fundamental concepts in EIA
- To understand the different stages of EIA Process
- To analyse the regulatory framework and standards governing EIA processes

Course Outcomes:

- Demonstrate a comprehensive understanding of the principles, purpose, and historical development of EIA.
- Explain the methodologies, processes, and key concepts involved in conducting an effective EIA
- Identifying the causes and consequences of Environmental pollution.
- Conducting EIA studies.
- Apply EIA techniques to identify, predict, and assess potential environmental impacts in diverse developmental projects.

Module 1: Introduction to Environmental Impact Assessment

Definition and Purpose of Environmental Impact Assessment (EIA), Historical Development and Evolution of EIA, Regulatory Framework and International Standards, Key Concepts: Baseline Studies, Scoping, and Stakeholder Engagement

Module 2: EIA Process and Methodologies

E I A Methodologies: introduction, Criteria for the selection of EIA Methodology, E I A methods, EIA Screening and Scoping, Prediction and Assessment of Environmental Impacts, Mitigation Measures and Impact Management, Monitoring, Auditing, and Post-Assessment

Module 3: Sectoral Applications of EIA

EIA in Energy Sector (Renewable Energy Projects, Oil & Gas Exploration), EIA in Infrastructure Development (Roads, Dams, Urban Development), EIA in Agriculture, Forestry, and Mining Projects, Case Studies and Best Practices in Different Sectors

Module 4: Emerging Trends and Advanced Topics in EIA

Strategic Environmental Assessment, Climate Change and EIA, Public Participation and Social Impact Assessment, Technology Integration and Future Prospects

References:

- Anjaneyulu Y., Manickam Valli, "Environmental Impact Assessment Methodologies", CRC Press 2011
- Glasson J., Therivel Riki, Chadwick Andrew, "Introduction to Environmental Impact Assessment", Oxford Brookes University 2012/ 4th edition
- Marriott B., "Environmental Impact Assessment: A Practical Guide", McGraw-Hill Publication,1997
- Shrivastava A.K., Baxter Nicola, Grimm Jacob, "Environmental Impact Assessment", APH Publishers, 2003

Solid Liquid Waste Management

Course Code: VAC2020-22

Course Objectives:

- To examine the various types of solid waste and methods to categorize it.
- To find out methods to reduce solid waste at the source.
- To carry out analysis and audit of waste.
- To understand people's responsibility in reducing and managing waste.

Course Outcomes:

- Understanding of the types of waste and methods of its categorization.
- Knowledge of the methods to reduce solid waste at the source.
- Skills to audit solid waste.
- Knowledge of the people's responsibility in waste management

Course Content:

MODULE I:

Introduction to waste. Problem of Wastes, Types of Solid Waste, Categories of Solid Waste, Effects of Excess Waste Generation, Waste Characterization.

MODULE II:

Source Reduction. Solid Waste Reduction, Waste Reduction Strategies - How to Start a Waste Reduction Program Guideline, Economic benefits of Waste Reduction, Operation on a daily basis.

MODULE III:

Waste Analysis and Waste Audit. Introduction to Terminology of Waste, Waste Analysis, Introduction to Waste Audit, Checklist for Performance Audit in Waste Collection, Segregation, Transport, Treatment.

MODULE IV:

People's Responsibility of Waste Management. Responsibility of Waste Management.

Waste Reduction- Towards Zero Waste. Sustainable Living, Waste Reduction at the Business (Producer) Level, Waste Reduction at the Individual Level: Zero Waste Living, Waste Reduction at the Community Level.

References :

- Gitanjali Nain Gill, 2011, SAGE Publication's Green Technology: An A-Z Guide (2011) whose work for that encyclopedia formed the basis of her contributions to Britannica.

- Hester, R. E., and R. M. Harrison, (2002). Environmental and health impact of solid waste management activities. Cambridge: The Royal Society of Chemistry.
- https://www.downtoearth.org.in/coverage/costs-and-benefits-of-india-s waste-disposal-options-5623
- https://swachhindia.ndtv.com/national-aluminium-company-limited advocates-for-use-of-aluminium-foil-as-alternative-to-plastic-26056 https://www.downtoearth.org.in/blog/india-s-challenges-in-waste management-56753
- http://rsos.royalsocietypublishing.org/content/4/3/160764#sec-17 https://www.downtoearth.org.in/coverage/waste-smart-cities-54119

Radiation Physics

Course Code: VAC2020-23

Course Objectives:

- To give the knowledge of the basics of atomic and nuclear Physics..
- To provide students an exposure to radiation detection and monitoring devices
- To develop the management skills of radiation safety skills.
- To understand the ionizing radiation fundamentals, key concept of radioactivity & amp ; protection principles and biological effects of ionizing radiation.
- To estimate the radiation measurement and monitoring using multi-wire proportional counters, Geiger Muller Counter, Scintillation detector, solid states detectors and neutron detectors
- To apply the working procedure in handling irradiation apparatus, nuclear and radioactive materials

Course Outcomes:

- Understanding of Fundamental Radiation Physics Principles
- Proficiency in Radiation Detection and Measurement Techniques
- Application of Radiation Safety and Protection Measures
- Analytical Skills in Radiation Physics Applications

Course Outcomes :

Module I: Types of radiations (08 Lectures)

Basic concept of atomic structure; X rays characteristic and production; Concept of cross section and kinematics of nuclear reactions, types of nuclear reaction, Fusion, fission. Types of Radiation: Alpha, Beta, Gamma and Neutron and their sources, Interaction of Photons - Photoelectric effect, Compton Scattering, Pair Production, Linear and Mass Attenuation Coefficients, Interaction of Charged Particles**.**

Module II: Radiation detection (08 Lectures)

Basic concept and working principle of gas detectors (Ionization Chambers, Proportional Counter, Multi-Wire Proportional Counters (MWPC) and Gieger Muller Counter), Scintillation Detectors (Inorganic and Organic Scintillators), Solid States Detectors and Neutron Detectors.

Module III: Radiation safety and management (08 Lectures)

Radiation protection standards, International Commission on Radiological Protection (ICRP) principles, justification, optimization, limitation, introduction of safety and risk management of radiation. Nuclear waste and disposal management.

Module IV: Applications of radiation Physics (06 Lectures)

Application in medical science (e.g., MRI, PET, Projection Imaging Gamma Camera, radiation therapy), Archeology, Art, Crime detection, Mining and oil. Industrial Uses: Tracing, Gauging, Material Modification, Sterilization, Food preservation.

References :

- W.E. Burcham and M. Jobes - Nuclear and Particle Physics - Longman (1995)
- W.J. Meredith and J.B. Massey, Fundamental Physics of Radiology. John Wright and Sons, UK, 1989.
- Martin and S.A. Harbisor, An Introduction to Radiation Protection, John Willey & Sons,Inc. New York, 1981.
- W.R. Hendee, Medical Radiation Physics, Year Book - Medical Publishers Inc. London,1981