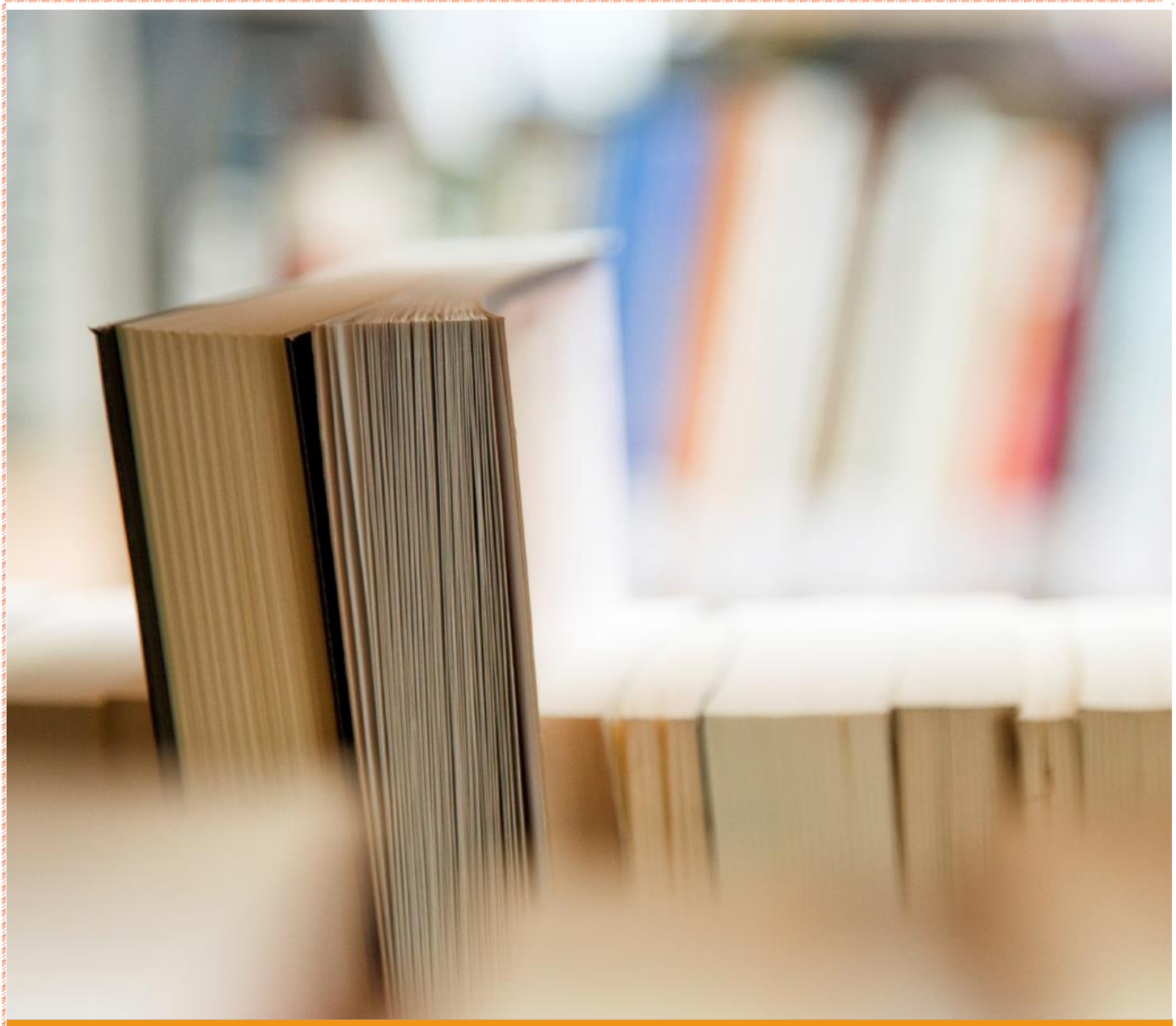

SGRR UNIVERSITY

Brochure of Value-Added Courses
School of Basic and Applied Sciences
2023-2024

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 8000+ 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 67 years of in 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.

Aquifer Investigation and Hydrogeological Practices

Course Code: VCSBAS015

Course Objectives:

- Study the geological and hydrological processes influencing aquifers.
- Understand the methodologies for determining aquifer properties.
- Understand different methods for ground water exploration.

Course Outcomes:

- Comprehensive understanding of aquifer systems and hydrogeological principles.
- Proficiency in Hydrological cycle and its relevance to groundwater.
- Ability to understand groundwater flow.

Course Syllabus:

Module I: Aquifer types and properties. Concept & methods of artificial ground water recharge.

Module II. Basic principles of Geohydrology. Hydrological cycle and its relevance to groundwater.
Module III. Objective and Overview of methods of groundwater exploration,

Reference Books:

- "Applied Hydrogeology" by C.W. Fetter.
- "Groundwater Science" by Charles R. Fitts.
- "GIS and Remote Sensing Applications in Hydrogeology" by Michael E. Hodgson.
- "Groundwater Hydrology" by David Keith Todd and Larry W. Mays.
- "Legal and Ethical Issues in Water Resources" by Gilbert J. Butman.

Contemporary Algebraic Concepts in Data Handling

Course Code: VCSBAS016

Course Objectives:

- Establish a strong foundation in algebraic concepts relevant to data handling.
- Understand the role of algebra in structuring and manipulating data.
- Explore matrices, vectors, and tensors for data organization.
- Understand the use of algebraic structures in statistical modeling.
- Understand eigenvalues, eigenvectors, and their significance in data analysis.
- Learn algebraic approaches to handle complex datasets.

Course Outcomes:

- Proficiency in using algebraic concepts for data representation.
- Advanced skills in applying algebraic operations for data analysis.
- Understanding the application of linear algebra in machine learning.
- Ability to handle multivariate data using algebraic techniques.

Course Syllabus:

Module I: Algebraic Foundations for Data Handling

- Basic algebraic operations.
- Algebraic structures and their role in data representation.

Module II: Advanced Data Representation Techniques

- Matrices, vectors, and tensors in data organization.
- Algebraic representation of graphs and networks.
- Duration: 5 hours.

Module III : Algebraic Operations for Data Analysis

- Transformation and manipulation of data using algebraic operations.
- Application of algebraic structures in statistical modeling.
- Duration: 6 hours.

Module IV : Linear Algebra in Machine Learning

- Basics of linear algebra in machine learning.
- Eigenvalues, eigenvectors, and their role in data analysis.
- Duration: 5 hours.

Module V : Multivariate Algebra for Complex Datasets

- Extension of algebraic concepts to multivariate data.
- Algebraic approaches to handle complex datasets.
- Duration: 4 hours.

References :

- "Linear Algebra and Its Applications" by David C. Lay.
- "Matrix Analysis and Applied Linear Algebra" by Carl D. Meyer.
- "Algebra for Data Science" by Kenneth Berenhaut.
- "Introduction to Linear Algebra" by Gilbert Strang.
- "Multivariate Data Analysis" by Joseph F. Hair Jr., William C. Black, Barry J. Babin, Rolph E. Anderson.

Advanced Concepts in Radiological Physics

Course Code: VCSBAS017

Course Objectives:

- Learn advanced techniques for measuring and calculating radiation doses.
- Understand the principles of dose planning in medical applications.
- Explore advanced imaging technologies in radiology.
- Understand the principles of magnetic resonance imaging (MRI) and computed tomography (CT).
- Understand methods and technologies for radiation protection.
- Stay updated on the latest advancements and emerging trends in radiological physics.

Course content :

Module I: Advanced Radiation Physics

- Interaction of radiation with matter.
- Advanced principles of radiation physics.

Module II: Radiation Dosimetry

- Techniques for measuring radiation doses.
- Principles of dose planning in medical applications.

Module III: Advanced Imaging Technologies

- Principles of magnetic resonance imaging (MRI).
- Computed tomography (CT) in-depth.

Module IV : Radiation Safety and Protection

- Protocols for radiation safety.
- Technologies for radiation protection.

Module V : Emerging Trends in Radiological Physics

- Latest advancements in radiological physics.
- Exploration of cutting-edge technologies.

References:

- "Radiation Physics for Medical Physicists" by Ervin B. Podgorsak.
- "Introduction to Radiological Physics and Radiation Dosimetry" by Frank H. Attix.
- "The Essential Physics of Medical Imaging" by Jerrold T. Bushberg.
- "Radiation Protection in Medical Radiography" by Mary Alice Statkiewicz Sherer.
- "Magnetic Resonance Imaging: Physical and Biological Principles" by Stewart C. Bushong.

Ethical Considerations in Biotechnology and Biosafety

Course Code: VCSBAS018

Course Objectives:

- Discuss the ethical responsibilities of biotechnologists.
- Develop strategies for addressing ethical dilemmas.
- Understand the importance of biosafety in biotechnological practices.
- Implement and adhere to biosafety protocols in laboratory settings.
- Evaluate the social and environmental impacts of biotechnological advancements.
- Develop an understanding of compliance with ethical standards and legal frameworks.

Course Outcomes:

- A solid understanding of ethical principles in the context of biotechnology.
- Competence in identifying and addressing ethical challenges in biotechnological research.
- Proficiency in implementing biosafety protocols in laboratory settings.
- Awareness of the social and environmental impacts of biotechnological advancements.
- Knowledge of regulatory compliance and ethical standards in biotechnological practices.

Course Syllabus:

Module I: Understanding Ethical Principles

- Introduction to ethical principles in biotechnology.
- Responsibilities of biotechnologists.

Module II : Ethical Challenges in Biotechnology

- Identifying ethical challenges in biotechnological research.
- Strategies for addressing ethical dilemmas.

Module III : Biosafety Protocols

- Importance of biosafety in biotechnological practices.
- Implementing biosafety protocols in laboratories.
- Duration: 6 hours.

Module IV : Social and Environmental Impacts

- Assessing social and environmental impacts of biotechnological advancements.
- Ethical considerations in the release of genetically modified organisms.
- Duration: 5 hours.

Module V : Regulatory Compliance

- National and international regulations in biotechnological research.
- Compliance with ethical standards and legal frameworks.
- Duration: 4 hours.

References:

- "Biotechnology and the Human Good" by C. Ben Mitchell.
- "Ethics of Biotechnology" by Gary L. Comstock.
- "Biosafety in Microbiological and Biomedical Laboratories" by U.S. Department of Health and Human Services.
- "Environmental Ethics, Ecological Theology, and Natural Selection" by Lisa H. Sideris.
- "Biotechnology and Genetic Engineering" by Sandra Senyo Lattin.

General Relativity and Cosmology

Course Code: VCSBAS019

Course Objectives:

- Grasp the fundamental principles and concepts of general relativity.
- Understand the expansion of the universe and its observational evidence.
- Study the nature of black holes, their formation, and observational aspects.
- Understand the significance of gravitational wave astronomy.
- Understand its role in studying the early universe.

Course Outcomes:

- Comprehensive knowledge of the principles of general relativity.
- Familiarity with different cosmological models and the expanding universe.
- Understanding the formation and characteristics of black holes and theoretical aspects of wormholes.
- Proficiency in gravitational wave astronomy.
- Knowledge of the significance of cosmic microwave background radiation in cosmology.

Course Content :

Module I : Fundamentals of General Relativity

- Introduction to general relativity.
- Basics of spacetime geometry and gravity.

Module II : Cosmological Models

- Overview of different cosmological models.
- Observational evidence for the expanding universe.

Module III: Black Holes and Wormholes

- Formation and characteristics of black holes.
- Theoretical aspects of wormholes.

Module IV : Gravitational Waves

- Generation and detection of gravitational waves.

- Significance in astronomy and astrophysics.

Module V : Cosmic Microwave Background Radiation

- Understanding cosmic microwave background radiation.
- Its role in studying the early universe.

References :

- "A Brief History of Time" by Stephen Hawking.
- "Gravitation" by Charles W. Misner, Kip S. Thorne, and John Archibald Wheeler.
- "Cosmology" by Steven Weinberg.
- "Black Holes and Time Warps" by Kip S. Thorne.
- "The Early Universe" by Edward Kolb and Michael Turner.