# DETAILS OF NOVEL ENGAGING COURSES

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| **Name of Faculty** | **Gavendra Norkey** |
| **Course Name/Code** | **3D Printing (2000001)** |
| **Objectives** | To gain knowledge and skills related to 3D printing technologies or Additive Manufacturing (AM). |
| **Content** | • Introduction: Additive manufacturing, evolution, origin, manufacturing cycle, advantages and disadvantages, difference between CNC and AM.<br>• Classification of AM:<br>• AM Techniques: SLS, SLM, DMLS, FDM, LOM and Equipment's<br>• Materials: Polymers, Metals, Non-Metals, Ceramics Process, Process parameter, Process Selection for various applications<br>• Applications |
| **Contact hrs. per semester** | 30 |
| **Outcomes** | After completion of this course, the students will be able to:<br>1. Develop models for 3D printing.<br>2. Select a specific material for the given application.<br>3. Select a 3D printing process for an application.<br>4. Produce a product using 3D Printing or Additive Manufacturing (AM). |

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| **Name of Faculty Mentor** | **Sharad Agrawal** |
| **Course Name/Code** | **Design Skills Using Simulation Software(2000003)** |
| **Objectives** | 1. To understand design and simulation software/Techniques<br>2. To provide technical knowledge and information about analytical/Simulation tools |
| **Content** | 1. Concept Generation, Conventional and Modern Design Process, Factor of Safety, Design Standards<br>2. Basic Introduction of Industrial Design, Design for Reliability and Quality<br>3. 2D and 3D commands using AUTOCAD software<br>4. Introduction to FEM, 1D,2D and 3D elements, Solid Modelling, Meshing, Boundary conditions, Post Processing<br>5. Structural, Linear, Thermal, Bucking Analysis of Engineering components |
| **Contact hrs. per semester** | 30 |
| **Outcomes** | After completion of the course, students will be able to:<br>1. Analyze the latest trends/approach in Design field<br>2. Apply the knowledge in design related projects<br>3. Analyse technical aspects related to Design and simulation field<br>4. Formulate strategies by participating the work in design/ R&D field |

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| **Name of Faculty Mentor** | **D K Jain** |
| **Course Name/Code** | **Data Analysis Skills(2000004)** |
| **Objectives** | • To equip students with tools to collate, organize and draw valuable inferences from large data.<br>• To provide students with information about latest methods/techniques data analysia<br>• To help students understand the capabilities and limitations of data analysis as a tool.. |
| **Content** | • Inferential Statistics/ Descriptive Statistics<br>• Management/Decision Based/Case Solving Skills<br>• Coding/Tool based Skill |
| **Contact hrs. per semester** | 30 |
| **Outcomes** | After completion of the course, students will be able to:<br>• Solve decision problems in different settings<br>• Apply statistical skills and employ them in real life<br>• Analyze complex unstructured business problems<br>• Formulate appropriate courses of action for a given managerial situation |

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| **Name of Faculty Mentor** | **Karuna Markam** |
| **Course Name/Code** | **Robotics (2000007)** |
| **Objectives** | To facilitate students to learn, understand and design robotics. |
| **Content** | 1. Explanation about basics of robotics including different types of sensors, motors and their working principles.<br>2. Basics of python, C++, JavaScript.<br>3. Competitive programming.<br>4. Basics of Arduino<br>5. Basics of Aero modelling<br>6. Working principles of RC Plane , Line Follower, Maze Solver and Drone |
| **Contact hrs. per semester** | 30 |
| **Outcomes** | After completion of the course, students will be able to:<br>1. Develop creativity and engineering skills through robotics.<br>2. Build self-confidence, teamwork and leadership.<br>3. Apply real time robot applications |

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| **Name of Faculty Mentor** | **Vedansh Chaturvedi** |
| **Course Name/Code** | **Vehicular Skill Development(2000008)** |
| **Objectives** | 1. To provide opportunities for student's enrichment of automotive related knowledge and skills.<br>2. To provide opportunities for students to understand working of BAJA, Go-Kart, and other racing competitions.<br>3. To provide opportunities for students to understand the software/Techniques used in automotive vehicles.<br>4. To motivate students, participate in national level racing competitions. |
| **Content** | Introduction, History, Basic Structure, Classification, e-Vehicles/Solar Vehicles, Prime Mover and PowerSystem, Transmission System, Steering System, Braking Systems, Auxiliaries, Concepts of Racing vehicles, Recent trends in automobile, Software used in drawing/Design of Automotive components. |
| **Contact hrs. per semester** | 30 |
| **Outcomes** | After completion of the course, students will be able to:<br>• **Describe** the working principles of automotive vehicles.<br>• **Classify** the different automotive vehicles as per energy used<br>• **Analyse** the latest trends in automobile field.<br>• **Design** automobile models on different software. |

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| **Name of Faculty Mentor** | **Amit Kumar Manjhvar** |
| **Course Name/Code** | **Animation (2000009)** |
| **Objectives** | 1. To identify animation as a particular form of visual communication.<br>2. To identify the major technological developments and aesthetic movements in the history of animation.<br>3. To understand the importance of new media technology.<br>4. To learn about the production of effective educational and entertainment programmes for different fields. |
| **Content** | 1. Early Animation<br>2. Animation Techniques<br>3. Education for Media<br>4. 2D Graphic and Animation |
| **Contact hrs. per semester** | 30 |
| **Outcomes** | After completion of the course, students will be able to:<br>• Identify animation as a particular form of visual communication<br>• Explain the establishment of films practices & its basics techniques.<br>• Use the techniques of traditional hand drawing methods.<br>• Apply knowledge gained to real world scenarios<br>• Create animation using basics shapes and sketching methods. |

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| **Name of Faculty Mentor** | **Punit Kumar Johari** |
| **Course Name/Code** | **Digital Learning (Part I - 2000010, Part II-2000011)** |
| **Objectives** | 1. To understand principles, concepts and issues concerning the use of digital technologies to support learning, and apply these in their own practice<br>2. To understand the effect of Computer Based Information Systems (CBIS) on an organization<br>3. To acquire sufficient IT skills and knowledge to appreciate (evaluate) a CBIS |
| **Content** | **Part I :**<br>Introduction to Spreadsheet Modelling, Presentation of Quantitative Data, Analysis of Quantitative Data, Presentation of Qualitative Data, Analysis of Qualitative Data, Inferential Statistical Analysis of Data. |
| | **Part II:**<br>Advance Data Analysis: Modelling and Simulation, Solver, Scenarios, and Goal Seek Tools, Data Visualization Tools and Techniques like Excel, Tableau etc. |
| **Contact hrs. per semester** | 30 |
| **Outcomes** | **Part I:**<br>After completion of the course, students will be able to:<br>• Analyse a range of locally available digital technologies<br>• Explore digital technologies that can be used to support analytical learning.<br>• Participate in an organization's information systems and technology decision-making processes.<br>• Identify ways information systems & technology may improve an organization's performance, including improving organizational processes, decision-making, and collaboration. |
| | **Part II:**<br>After completion of the course, students will be able to:<br>• Use computer-based information systems and technologies to solve business problems.<br>• Analyze business scenarios and make recommendations regarding the strategic use of IT.<br>• Demonstrate competency in using tools, techniques, methodologies, and practices of various forms of the systems development life cycle.<br>• Apply MIS knowledge sets, skills, and tools to a real-world complex problem |

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| **Name of Faculty Mentor** | **Deep Kishore Parsediya** |
| **Course Name/Code** | **Elements of Photographic Skills(2000012)** |
| **Objectives** | • To Develop Photographic Skills among Students<br>• To empower the students to become young short film makers or photographers. |
| **Content** | Basics of photography, Creative images with emotional responses, photo with story, tips for effective photography & videography, photo editing. |
| **Contact hrs. per semester** | 30 |
| **Outcomes** | After completion of the course, students will be able to:<br>• Know the basics of photography and video-graphy.<br>• Create short film and professional videos.<br>• Apply the different editing concepts on photographs.<br>• Use professional techniques to develop effective photo/ video. |

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| **Name of Faculty Mentor** | **Aditya K. Agarwal** |
| **Course Name/Code** | **Environment Protection (Part I – 2000013, Part II- 2000014)** |
| **Objectives** | 1. To imbibe habits & lifestyle for minimum waste generation and management.<br>2. To create awareness for proper management of waste with right attitude.<br>3. To implement efficient solid waste management practices in the city. |
| **Content** | **Part I**<br>1. Solid waste management & other environment issues.<br>2. Field Practices.<br>3. Preparation of inventory of waste management<br>4. Action against environmentally unsound practices like unsafe disposal of wastes etc.<br>**Part II**<br>1. Solutions to waste management issues.<br>2. Wealth out of waste.<br>3.Importance of World Environment day, World Water day, etc. |
| **Contact hrs. per semester** | 30 |
| **Outcomes** | **Part I**<br>After completion of the course, students will be able to:<br>1. Identify various environmental issues that concerns public.<br>2. Illustrate waste management practices..<br>3. Devise innovative ideas for waste management.<br>4. Create environmental awareness in the society<br>**Part II**<br>1. Apply various solutions to waste management problems.<br>2. Inculcate proper waste management practices among the public.<br>3. Create environmental awareness in the society<br>4. Plan an effective waste management system. |

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<tr><td>Name of Faculty Mentor</td><td colspan="2">M K Sagar</td></tr>
<tr><td>Course Name/Code</td><td colspan="2">National Service Scheme (NSS) (Sem. III – 2000016, Sem. IV- 2000017, Sem. V- 2000018, Sem.VI-2000019)</td></tr>
<tr><td>Objectives</td><td colspan="2">• To understand the community in which the students work.<br>• To understand themselves in relation to their community.<br>• To identify the needs and problems of the community and involve in problem- solving.<br>• To develop a sense of social and civic responsibility.<br>• To utilize knowledge in finding practical solution to individual and community problems.<br>• To develop competence required for group- living and sharing responsibilities.<br>• To gain skills in mobilising community participation.<br>• To acquire leadership qualities and democratic attitudes.<br>• To develop capacity to meet emergencies, natural disasters, practice national integration and social harmony.</td></tr>
<tr><td>Content</td><td>Semester-III<br>Unit-I: Introduction and Basic Concepts of National<br>Service Scheme<br>A. History, philosophy, aims & objectives of NSS<br>B. Emblem, flag, motto, song, badge etc.<br>C. Organizational structure of N.S.S. at National, State,<br>University and College Levels<br>D. Advisory committee and their functions with special<br>reference to Director, Programme officer, N.S.S. group<br>leader and N.S.S. volunteers in the implementation.<br>Unit-II: NSS Programmes and Activities<br>A. Concept of Regular activities, special camping, Day<br>Camps<br>B. Basis of adoption of village/slums, Methodology of<br>conducting Survey<br>C. Financial pattern of the scheme<br>D. Other youth programme/schemes of GOI</td><td>Semester-IV<br>Unit-I: Social Harmony and National Integration<br>A. Need of National integration,<br>B. Various obstacles in the way of National Integration; such as caste, religion, language and provisional problems etc.<br>C. Indian history and culture<br>D. Role of youth in peace-building and conflict resolution<br>E. Role of youth in Nation building<br>Unit-II: Family and Society<br>A. Concept of family, community, and society<br>B. Growing up in the family- dynamics and impact<br>C. Human values<br>Unit III: Special Programme/ Activities-I<br>A. Health awareness<br>B. Medical Camp<br>C. First-aid<br>D. One Day Camps<br>E. Distribution of stationary/ study material to needy students</td></tr>
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| | E. Coordination with different agencies<br>F. Maintenance of the Diary<br>**Unit-III: N.S.S. Regular Activities-I**<br>A. Volunteerism and Shramdan<br>B. Plantation<br>C. Yoga and Meditation<br>D. Voter Awareness Programme<br>E. Literacy Cum Awareness Programme<br>F. Traffic Awareness Programme<br>G. Cultural event on NSS Day<br>H. Blood Donation<br>I. Swachchh Bharat Abhiyan<br>J. Awareness on Air Pollution/ Rally on Eco-Deepawali<br>K. Activities assigned by Government of India/State Government/AICTE/ UGC/ University/Institute, etc. | F. Awareness programme on Economic Social Political and Cultural impacts.<br>G. Food and Nutrition<br>**Unit-IV: Special Camping programme-I**<br>A. Nature and its objectives<br>B. Selection of camp site and physical arrangement<br>C. Organization of N.S.S. camp through various committees and discipline in the camp.<br>D. Activities to be undertaken during the N.S.S. camp. Use of the mass media in the N.S.S. activities. |

| | Semester-V | Semester-VI |
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| | **Unit -I: Citizenship**<br>A. Basic Features of Constitution of India<br>B. Fundamental Rights and Duties<br>C. Human Rights<br>D. Consumer awareness and the legal rights of the consumer<br>E. RTI<br>**Unit - II: Youth and Yoga**<br>A. History, philosophy and concept of Yoga<br>B. Myths and misconceptions about yoga<br>C. Different Yoga traditions and their Impacts<br>D. Yoga as a preventive, promotive ,and curative method<br>E. Yoga as a tool for healthy lifestyle<br>F. Home Nursing<br>**Unit-III: N.S.S. Regular Activities-II**<br>A. Gender equality/ Women empowerment/ Self defense<br>B. Social Harmony and National Integration<br>C. National Youth Day<br>D. Rally/ awareness programme on HIV/ AIDS<br>E. Anti- Tabacco- Rally/ Awareness programme<br>F. Working with NGO/ Health Department/ Municipal Corporation/ City Administration<br>G. Waste Management<br>H. Natural resources management (Rain water harvesting, energy conservation, waste land development, soil conservations and afforestation)<br>I. One-day Camp for awareness regarding government scheme at adopted village<br>J. Awareness programme regarding How to qualify for Technical education | **Unit - 01**: **Disaster Management**<br>A. Introduction to Disaster Management, classification of disasters<br>B. Role of youth in Disaster Management<br>**Unit III: Special Programme/ Activities-I**<br>A. Health awareness<br>B. Medical Camp<br>C. First-aid<br>D. One Day Camps<br>E. Distribution of stationary/ study material to needy students<br>F. Awareness programme on Economic Social Political and Cultural impacts.<br>G. Food and Nutrition<br>**Unit-III: Special Camping programme-II**<br>A. Nature and its objectives<br>B. Selection of camp site and physical arrangement<br>C. Organization of N.S.S. camp through various committees and discipline in the camp.<br>D. Activities to be undertaken during the N.S.S. camp.<br>E. Use of the mass media in the N.S.S. activities. |

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| **Outcomes** | After the completion of course, the student will be able to:<br>1. Understand the community and relation to their community<br>2. Develop the community problem-solving behavior<br>3. Develop a sense of social and civic responsibility.<br>4. Accept the new challenges and ready to face the problems with confidence.<br>5. Motivate themselves to participate and lead the work.<br>6. Enhance the reading, learning, communication, presentation & interpersonal skills. |

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| **Name of Faculty Mentor** | **B.P.S. Bhadoria** |
| **Course Name/ Code** | **National Cadet Corps(NCC) (Sem. III – 2000020, Sem. IV- 2000021, Sem. V- 2000022, Sem.VI- 2000023)** |
| **Objectives** | 1 .To create human resource of organized, trained & motivated youth,<br>2 .To provide a suitable environment to motivate the youth to take up a career in the Armed forces.<br>3.To develop character, comradeship, discipline, leadership, outlook, sprite of adventure and ideas of selfless service amongst the youth of the country |
| **Content** | **SEMESTER 3**<br>Personality development, leadership, Disaster management, Adventure, Border and coastal Areas.<br>Drill, FC&BC, Map reading, weapon training, social service and community development, obstacle training, Camp.<br>**SEMESTER 4**<br>Personality development, leadership, Disaster management, Environmental awareness and conservation, General awareness, Armed forces.<br>Drill, FC&BC, Map reading, weapon training, social service and community development, Health and hygiene<br>**SEMESTER 5**<br>Personality development, Border and coastal Infantry weapons, Military history.<br>Drill, FC&BC, Map reading, weapon training, social service and community development, obstacle training, Camp.<br>**SEMESTER 6**<br>Personality development, Border and coastal areas, Armed forces, Communication, Military history.<br>Drill, FC&BC, Map reading, weapon training, Communication, social service and community development, Infantry weapons. |
| **Outcomes** | **Semester 3**.<br>1. Acquaint themselves with the different types of leadership<br>2. Recognize the importance of time and its management<br>3. Have an insight into weapon training for NCC cadets<br>4. Understand the technical terms their meaning and use them training with Arms.<br>5. Develop awareness to social service and community development.<br>**Semester 4**.<br>1. Analyze the different factors that influence personality and shape it<br>2. Appreciate the grace and dignity in the performance of drill.<br>3. Develop awareness social service, community development and health and hygiene.<br>**Semester 5**<br>1. Appreciate the improvement of drill, FC and BC, MR, WT<br>2. Examine the principles of effective communication and the barriers in communication<br>**Semester 6**<br>1. Develop the qualities of patience and confidence and become better individuals<br>2. Assess the different steps to be followed while arms drill is conducted<br>3. Appreciate the diversity in personality of individuals and its influence on their behaviour<br>4. Improvement of drill FC and BC, MR, WT, communication, infantry weapons. |

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| **Name of Faculty** | **Archana Tiwari** |
| **Course Name/Code** | **Organic Farming (2000028)** |
| **Objectives** | 1.To learn natural pesticides and their uses.<br>2.To know right cultivation at right time.<br>3.To learn to maintain soil and crop health. |
| **Content** | Introduction to organic farming and its status. Organic farming and Human health. Components of organic farming, concepts principles. Compost production. Soil and crop health management. |
| **Contact hrs. per semester** | 30 (in one semester) |
| **Outcomes** | After completion of course students will be able to:<br>1. Appreciate the advantages of organic forming<br>2. Plan Organic Farming on small scale |

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| **Name of Faculty Mentor** | **B.P.S. Bhadoria** |
| **Course Name/Code** | **Games & Sports (Sem. III -2000032, Sem. IV - 2000033, Sem. V - 2000034, Sem.VI-2000035)** |
| **Objectives** | 1. To provide opportunity for every student to participate in sports<br>2. To Develop physical fitness<br>3. To Develop Leadership quality among students |
| **Content** | **Semester 3**<br>Basketball, Volleyball, Handball, Hockey<br>History, Rules, Techniques, Tactics, Playfields, Equipment, Tournaments, Awards and personalities.<br>**Semester 4**<br>Cricket, Table Tennis, Tennis, Badminton<br>History, Rules, Techniques, Tactics, Playfields, Equipment, Tournaments, Awards and personalities.<br>**Semester 5**<br>Athletics, Kho - Kho , Kabaddi, Chess.<br>History, Rules, Techniques, Tactics, Playfield, Equipment, Tournaments, Awards and Personalities.<br>**Semester 6**<br>Football, Swimming, Yoga<br>History, Rules, Techniques, Tactics, Playfield, Equipment, Tournaments, Awards and personalities. |
| **Contact hrs. per semester** | 30 |
| **Outcomes** | After completion of the course, students will be able to:<br><br>**Semester 3 :** Apply the passing, receiving, dribbling, shooting skills in Basketball, Volleyball, Handball & Hockey;<br>Develop team spirit<br>**Semester 4 :** Apply batting, bowling, fielding, catching, grip, service, strokes, stance skills in Cricket, Table tennis, Tennis & Badminton; Develop team spirit<br>**Semester 5 :** Track and field events, starting, finishing, jumps and throws, raiding, holding, raider, dodging, faking.<br>Develop team spirit<br>**Semester 6 :** Develop Awareness and knowledge for dribbling, kicks, heading, goalkeeping, strokes, physical and mental development, Develop team spirit |

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| **Contact hrs** | 20 |
| **No. of sem. required** | 4 |
| **Mode of Delivery** | Online/offline lectures, Visit to Charak Udyaan for identification of herbal medicines, Preparation of herbarium, Quiz Competition on Importance of Ayurveda in Daily life, Exhibition on Herbs and their products, Organizing Camp, Visit to rehabilitation centre to learn the basic physiotherapy practices, Demonstrations on Physiotherapy Practices, Visit to Panchkarma Centre to learn common panchkarma kriyas, Visit to Vivekanand Needam to learn aasnas, Join the camp at Vivekanand Needam to learn Naturopathy, Seminars on Importance of Alternative medicines |
| **Performance assessment** | Conduction of Activities: 20%<br>Participation in activities: 20%<br>Presentation:30%<br>Report Submission:30% |
| **Outcomes** | After completion of the course, students will be able to:<br>1. Describe health and healing process<br>2. Explain the cause and symptoms of common illness<br>3. Identify the importance of alternative medicines for healthy life<br>4. Apply alternative medicines for the management of common health problems. |
| **External Mentors /Collaborations** | 1. College of Ayurveda, Gwalior<br>2. Nidanam Physiotherapy and Rehabilitation Centre<br>3.College of Professional Studies, BIMR, Gwalior<br>4.Mangalam Ayurved Hospital and Panchkarma Research Center<br>5.Sai Ram Ayurveda &Panchkarma Chikitsa Kendra<br>6.NIRAMAYA : "Academy of Yoga and Natural Therapy", Vivekanand Needam, Gwalior |

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| **Name of Faculty Mentor** | **Vishal Chaudhary** |
| **Course Name/Code** | **Holistic Health (Part I – 2000042, Part II- 2000043)** |
| **Objectives** | • To inspire young minds and promote healthy living.<br>• To spread holistic behaviour among colleagues and campus.<br>• To promote positive mindset post covid-19 pandemic.<br>• To develop kill enhancement and personality of the student. |
| **Content** | **Part I**<br>Promoting positive mindset covid-19 post pandemic, yoga sessions, awareness campaigning. |
| | **Part II**<br>Webinars on social topics, social and holistic conclave in the campus. |
| **Contact hrs. per semester** | 30 |
| **Outcomes** | After completion of the course, students will be able to:<br>**Part I**<br>• Perform yoga, meditation to improve health.<br>• Promote healthy and inspired living in society<br>• Spread happiness and skill enhancement in pandemic situation.<br>**Part II**<br>• Conduct holistic behaviour.<br>• Develop awareness towards social problems<br>• Act as a responsible team mate. |

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| **Name of Faculty Mentor** | **Pranshi Jain** |
| **Course Name/Code** | **Sculpture Making (Part I – 2000046, Part II - 2000047)** |
| **Objectives** | **Part I (Sculpture Making: Clay)** This course will enable students to:<br>1. Build curiosity and creativity.<br>2. Enhance sculpting skills.<br>3. Learn the associated theories and history.<br>4. Develop the thought process into physical model.<br>5. Enhance innovative thinking.<br>**Part II (Sculpture Making: Wood, Metal and Waste)** This course will enable students to:<br>1. Improve Sculpting skills.<br>2. Develop understanding of tools and techniques for carving hard materials.<br>3. Transform ideas into physical products.<br>4. Enhance innovative thinking.<br>5. Develop understanding of sculpting with varied materials. |
| **Content** | **Part I:**<br>1. Importance of course<br>2. Clay as a Sculpting material<br>3. Basics of Sculpting, concept making.<br>4. History and Importance in Architectural education.<br>5. Other materials (Epoxy clay, air-dry clay, polymer clay etc)<br>6. Hands-on modelling and exercises<br>**Part II:**<br>7. Importance of course<br>8. Sculpting with Hard Materials like wood and metal.<br>9. Theories and history of Sculpting on Hard materials.<br>10. Tools and techniques for wood carving. Hands-on exercise on wood.<br>11. Tools and techniques for Metal carving. Hands-on exercise on metal.<br>12. Waste as a Sculpting material. |
| **Contact hrs. per semester** | 30 |
| **Outcomes** | **Part I** After completion of the course, students will be able to:<br>• Use pottery clay as sculpting material.<br>• Evolve concept into a model.<br>• **Express** ideas through modeling.<br>• **Use** new materials like polymer clay, epoxy clay for sculpture.<br>• **Develop** innovative designs and forms.<br>**Part II** After completion of the course, students will be able to:<br>• **Implement** the basics of sculpting with hard materials.<br>• **Use** various tool and techniques associated with sculpture making<br>• **Create** models in readable scales.<br>• **Develop** innovative products and forms. |

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| **Name of Faculty Mentor** | **Sanjeev Khanna** |
| **Course Name/Code** | **English Literary Skills (2000048)** |
| **Objectives** | • To hone the talent of students toward literary and artistic activities and interests of a student.<br>• To provide a socio-cultural platform to students to reveal the artist in him and to socialise with other students. |
| **Content** | Literary Activities like creative writings, open mic, skit, brain storming sessions, debates, etc. |
| **Contact hrs. per semester** | 30 |
| **Outcomes** | After completion of the course, students will be able to:<br>• Infer meanings of text from what is written and what is not written<br>• Present his thought lucidly<br>• Inculcate fluency in spoken English<br>• Socialise with others |

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| **Name of Faculty Mentor** | **Angad Singh Ojha** |
| **Course Name/Code** | **Hindi Language Skills (2000049)** |
| **Objectives** | 1. To enhance the basic understanding of Hindi grammar.<br>2. To create the ability of drafting in Hindi<br>3. To create efficiency of expressing views in Hindi effectively and grammatically correct. |
| **Content** | Sandhi, samas, alankar, synonyms, one word substitution, administrative vocabulary, drafting of official letter, note sheet , advertisement, circular, notification, essay, translation of Hindi to English and vice-versa, general introduction of Hindi literature as Kavita, Kahani, Upanyas, Natak , etc. |
| **Contact hrs. per semester** | 30 |
| **Outcomes** | After completion of the course, students will be able to:<br>• Write grammatically correct Hindi document.<br>• Speak Hindi confidently<br>• Qualify Hindi paper in various competitive exams. |

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| **Name of Faculty Mentor** | **Anish P. Jacob** |
| **Course Name/Code** | **Preliminary Journalism Skills (2000050)** |
| **Objectives** | • To impart the basic knowledge of Journalism and related areas of studies.<br>• To equip the learner with reporting & writing skill<br>• To inculcate professional ethics in the learner. |
| **Content** | Basics of journalism, Types of Journalism, Journalist Vs Reporter, Content writing, reporting skills, communication skills, creative writing, technical writing, social media & its impact, public relations |
| **Contact hrs. per semester** | 30 |
| **Outcomes** | After completion of the course, students will be able to :<br>• Explain the basics of journalism<br>• Apply basic writing skills<br>• Analyze the types of journalism<br>• Display good oral communication skills |

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| **Name of Faculty Mentor** | **Anjula Gaur** |
| **Course Name/Code** | **Food and Nutrition (2000052)** |
| **Objectives** | To provides basic understanding of the correlation between food and health. |
| **Content** | 1. Food, Nutrition, Health and Hygiene Interrelationship<br>2. Malnutrition and Assessment of Nutritional Status<br>3. Balance diet<br>4. Nutraceuticals and Functional Foods<br>5. Micro nutrients in food<br>6. Conserving and enhancing nutritive value of Food<br>7. Medicinal Properties of the Food Ingredients |
| **Contact hrs. per semester** | 30 |
| **Outcomes** | After completion of the course, students will be able to:<br>• Utilize knowledge of food & nutrients in maintaining good health<br>• Identify sources of nutrients in locally available food<br>• Summarize the medicinal value of food. |

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| **Name of Faculty Mentor** | **Praveen Bansal and Swati Gupta** |
| **Course Name/Code** | **Career Guidance & Preparedness (2000053)** |
| **Objectives** | 1. To provide guidance and motivation to students in exploring various career avenues.<br>2. To conduct sessions by inviting eminent personalities from academia, industries and renowned organizations<br>3. To guide students and support to be a industry ready professionals |
| **Content** | **1. Career Guidance Workshops:** Importance of career guidance and career development, Exercises on self-knowledge with emphasis on personality, values, interests and abilities, Guidance on Job Applications (CV writing, finding employment, cover letters etc), Occupational and study option awareness.<br>**2. Counseling Sessions:** Healthy relationships, Developing your identity, Team building and cohesion, Assertiveness, Social skills training.<br>**3. Recruitment Preparation:** Identify the key skills of a job, Use social media and conventional advertising, Choose appropriate short listing and selection techniques, Prepare and conduct effective interviews, Make selections based on evidence.<br>**4. Training:** Goals, Resources, Effective use of resources and create success story.<br>**5.** Connect employers to motivate students. |
| **Contact hrs. per semester** | 30 |
| **Outcomes** | After completion of the course, students will be able to:<br>• Explore job opportunities in different domain<br>• Prepare for competitive examinations such as GATE/IES/PSUs<br>• Develop skills for future learning<br>• Set career options |

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| **Name of Faculty Mentor** | **Rajni Ranjan Singh** |
| **Course Name/Code** | **Coding Skills (III- 2000062, IV- 2000063)** |
| **Objectives** | 1. To provide a platform to the students with different interests such as coding, Machine Learning and Web Designing.<br>2. To prepare for various competitions like ACM-ICPC, Google Code Jam, etc.<br>3. To provide a forum for the discussion of theory and applications of algorithms. |
| **Content** | 1) Part III- Web Designing<br>2) Part IV- Information Security, Machine Learning |
| **Contact hrs. per semester** | 30 |
| **Outcomes** | After completion of the course, students will be able to:<br>**III**<br>Develop Web Pages using HTML and CSS<br>Develop fully functioning website and deploy on a web server<br>Design responsive web pages including multimedia contents<br>**IV**<br>Analyze software vulnerabilities and security solutions to reduce the risk of exploitation<br>Implement cyber security solutions and use of cyber security, information assurance, and cyber/computer forensics software/tools.<br>Implement machine learning methods to solve real-world problems |

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| **Name of Faculty Mentor** | **Mahesh Parmar** |
| **Course Name/Code** | **Emerging Technologies in Computer Science (2000064)** |
| **Objectives** | To expose students to new technologies and programming skill for improving and learning about various computer science topics, such as computer programming, machine learning approach and data analysis. |
| **Content** | Python, List, tuple, sets, dictionaries, function, NumPy, pandas and Matplotlib, Introduction to AI, Differences between AI and machine learning, Linear regression, classification and clustering approaches in machine learning. |
| **Contact hrs. per semester** | 30 |
| **Outcomes** | After completion of the course, students will be able to:<br>• Write program in Python.<br>• Identify machine-learning techniques suitable for a given problem.<br>• Analyze simple problems using machine-learning approach.<br>• Compare different data mining techniques like linear regression, classification, clustering. |

<table>
<tr><td>Name of Faculty Mentor</td><td>Atul Chauhan</td></tr>
<tr><td>Course Name/Code</td><td>Software Development (Sem. III – 2000066, Sem. IV- 2000067, Sem. V- 2000068, Sem.VI- 2000069)</td></tr>
<tr><td>Objectives</td><td>• To inculcate the logical and analytical skills to the students for inhabiting the new developments in the field of software development.<br>• To empower the students with hands-on experience.<br>• To enable students to develop software/ application.</td></tr>
<tr><td>Content</td><td>Semester 3<br>Linux, basic concepts in PHP / Python, MySQL, etc.<br>Semester 4<br>Python, MySQL, Java, etc.<br>Semester 5<br>Small software module development through PHP, Python, Java etc.<br>Semester 6<br>Open-source Application development, Android Application and Web based application development through various languages.</td></tr>
<tr><td>Contact hrs. per semester</td><td>30</td></tr>
<tr><td>Outcomes</td><td>
<table>
<tr><th>III Sem</th><th>IV Sem</th><th>V Sem</th><th>VI Sem</th></tr>
<tr>
<td>• Formulate the computing problems<br>• Recognize all possible solutions to given problem.<br>• Identify the computer problems solutions tools.</td>
<td>• Solve the computing problems through programming.<br>• Apply computing knowledge in given problem</td>
<td>• Retrieve and manipulate data from one or more tables.<br>• Update and insert data into the existing tables<br>• Develop problem solving capability using Python</td>
<td>• Inculcate programming skills in different environment.<br>• Use relevant language for development of web & android applications.</td>
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| **Name of Faculty Mentor** | **Versha Sinha** |
| **Course Name/Code** | **Photo Editing Software: Adobe Photoshop (2000070)** |
| **Objectives** | ● **Introduction** to the Basics<br>● **Learn** all of the editing tools available in Photoshop.<br>● **Design** actual graphics that can be used for business or for fun. |
| **Content** | **Prerequisites**: Adobe Photoshop software downloaded & Laptop to practice on.<br>Week 1: Introduction to the software : To use the Home Screen, create new files, set up the Photoshop interface, open images, work with multiple files that are open at once, save and export files in different file formats.<br>Week 2: Quick Start Photoshop for Image Editing : To make your images "POP", retouch your photos in Photoshop, resize and save yourimages for social media.<br>Week 3: Photoshop Layers : What layers are & how to use them, an overview of the layers panel, power of Photoshop Adjustment Layer.<br>Week 4: Photoshop Tools : How to crop, straighten and fix perspective in Photoshop.<br>Week 5: Photoshop Tools : How to color Images to B&W and B&W to color images.<br>Week 6: Photoshop Tools : How to precisely edit photos in Photoshop using dodge, burn and sponge tools forediting, smudging, blending.<br>Week 7: Photoshop Tools : How to Use the Tone Curve in Photoshop, basic color corrections that can be donewith the curves tool, the Levels tool to edit photos, how to add contrast with it.<br>Week 8: Photoshop Tools : How to use the Stamp Tool, the Healing Tools for all retouching and the Eraser Tool inPhotoshop.<br>Week 9: Photoshop Tools : "Selecting", in Photoshop. Using the Marquee Selection tool, the Lasso tool, the Magic Wand tool, the Quick Mask mode, the Mask selection, etc and editing the photos.<br>Week 10: Photoshop Tools : How to Use Photoshop filters and brushes for more creative edits. Taking creativity to the next level with Photoshop filters.<br>Week 11: Adobe Photoshop Bridge : How to use free plugin Adobe Photoshop Bridge to manage digital assets,<br>Week 12: Adobe Photoshop Actions : How to Use Photoshop Actions, a powerful tool for helping streamline the workflow. how to record specific steps taken to edit the photos and save it (as an action) to be re-used on other photos.<br>Week 13: Light Effects : How to add light, enhance existing light, enhance and add color to the sunsets and sunrises, create lens leaks, add lens flare and much more.<br>Week 14: Other Photo Editing Softwares : Information about other advanced photo editing softwares Adobe Lightroom,Coreldraw, etc. |
| **Contact hrs. per semester** | 30 |
| **Outcomes** | Get a thorough **understanding** of how to **use** Adobe Photoshop for **fun activities,college assignments** or as a **career opportunity.** |

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| **Name of Faculty Mentor** | **Ankit Kumar** |
| **Novel Engaging Course Title** | **Basics of Technical Analysis in Stocks (2000071)** |
| **Objectives of Course** | • To gain practical knowledge of technical analysis.<br>• To Know how technical tools are used to predict the future behaviour of stocks.<br>• To know how charting techniques are useful to take buy or sell decision.<br>• To study market trends and movement. |
| **Content** | **Component 1:**Introduction to stock market.<br>**Component 2:**Introduction to Technical analysis and its core concepts.<br>**Component 3:**Price Bars & Candle stick patterns.<br>**Component 4:**Trading Gaps in market.<br>**Component 5:**Trend lines and how to draw different trend lines.<br>**Component 6:**Different Chart patterns and how to identify them.<br>**Component 7:**Different types of Moving averages.<br>**Component 8:**Momentum trading indicators.<br>**Component 9:**How to use multiple trading indicators.<br>**Component 10:**Various order types. |
| **Contact hrs** | 30 hrs |
| **Outcomes of Course** | This course will help learner **to**<br>1. Make decisions on when to buy or sell a stock – without knowing anything about the company.<br>2. Know the management, without analysing the balance sheet & the profit and loss statement. |

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| **Name of Faculty Mentor** | **Satyam Shukla** |
| **Novel Engaging Course Title** | **Graphic Design (2000072)** |
| **Objectives of Course** | This course will equip the learners with skills to understand the role of graphic design in presentations and vital elements of different modes of presentations. |
| **Content** | Graphic design, Importance of graphic in present world, skills require to present better, what observers look for when students present ideas, few examples of great presentations delivered like apple new product launch. |
| **Contact hrs** | 30 hrs |
| **Outcomes of Course** | Students will be able to<br>1. Present their ideas through new ways of presentations and adding graphic elements<br>2. Communicate clearly in visual, verbal, and written forms using appropriate techniques |

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| **Name of Faculty Mentor** | **RICHA MISHRA** |
| **Novel Engaging Course Title** | **WORLD HERITAGE SITES: A BRIEF OVERVIEW (2000073)** |
| **Objectives of Course** | 1. To understand the concept of World Heritage Sites.<br>2. To provide in-depth know how on the criteria's for World Heritage listings.<br>3. To understand the provisions under World heritage lists.<br>4. To develop the understanding of criteria's for the designated world Heritage Sites. |
| **Content** | 1. Understanding the basic concept of World heritage sites and Outstanding Universal Values.<br>2. Criteria's for listing World Heritage Site.<br>3. Concept of Authenticity and Integrity in World Heritage Sites.<br>4. World Heritage sites in India.<br>5. Case examples and understanding of criteria's for the designated world Heritage Sites. |
| **Contact hrs** | 30 hrs |
| **Outcomes of Course** | After completion of the course, students will be able to:<br>• **Relate** the concept of heritage and World Heritage Sites.<br>• **Recognize** the provisions under World heritage lists.<br>• **Develop** designation of Heritage as a heritage of "Outstanding Universal Value". |

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| **Name of Faculty Mentor** | **Abhilash Shukla** |
| **Novel Engaging Course Title** | **Basic and Advanced Excel (2000074)** |
| **Objectives of Course** | Build a solid understanding on the Basics of Microsoft Excel |
| **Content** | Introduction to spreadsheets, reading data, manipulating data. Basic spreadsheet operations and functions<br>Introduction to the Data filtering capabilities of Excel, the construction of Pivot Tables to organize data and introduction to charts in Excel.<br>Constructing various Line, Bar and Pie charts. Using the Pivot chart features of Excel.<br>Understanding and constructing Histograms and Scatterplots<br>Review Basic Formulas and Functions and explore Formula Tab<br>Use advanced Financial Functions to calculate time value of money metrics.<br>Write and use Logic functions.<br>Write and use formulas and functions in Excel to perform text functions<br>Write and use formulas and functions in Excel to perform lookup and reference functions |
| **Contact hrs** | 30 hrs |
| **Outcomes of Course** | At the end of the course, the student will be able to:<br>• Edit the worksheet (including inserting/deleting cells, columns, and rows),<br>• Manage the Data by using sorting, filtering, consolidating, removing duplicates, data validation, and one-way lookups.<br>• Create and apply several advanced excel functions to real world examples.<br>• Create mathematical predictive regression models using the Regression tool in Excel<br>• Visualize the data using scatter plots, column charts, pie charts, Slicers, Sparklines, and Pivot Tables. |

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| **Name of Faculty Mentor** | **Hemant Shrivastava** |
| **Novel Engaging Course Title** | **Fire Safety and Regulation in Building (2000076)** |
| **Objectives of Course** | Understanding of Fire Hazards, Identify Various Fire Protection Systems and Implement Fire Safety Regulation. |
| **Content** | Fire alarm system and their types, Fire Suppression Agents, Types of Water Distribution Systems, System Readiness, Building Fire Hazards, Fire Safety in Building – Basic Principles, Fire Safety Management, Codes and Regulation |
| **Contact hrs** | 30 hrs |
| **Outcomes of Course** | Student will be<br>1. Explain the working of fire alarm systems, suppression systems, and portable fire extinguishers<br>2. Identify the various types of water storage devices, types of pipe material, and different types of valves in the water supply system<br>3. Apply fire safety principles, management, and regulation in the building. |

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| **Name of Faculty Mentor** | **Shourabh Singh Raghuwanshi** |
| **Novel Engaging Course Title** | **Shutter Up-Flash Me Photography (2000080)** |
| **Objectives of Course** | To Explore the principles of lighting and colour theory to a variety of photographic scenarios by measuring, evaluating, and adjusting light and colour to create quality images. |
| **Content** | Basics of Photography, Digital Photography, Photography lighting, Adobe Light room, Photoshop Retouching, Landscape photography, Photography composition, Image editing, Photoshop, Digital Camera Functionality, Portrait Photography |
| **Contact hrs** | 30 hrs |
| **Outcomes of Course** | At the end of this course, the student will be able to:<br>1. Demonstrate the basic Technique of photography<br>2. Compare traditional film and digital cameras and photography<br>3. Analyze the various Equipment which can enhance photography<br>4. Create a quality photograph using basic rules and technology<br>5. Discuss the impact of photography in publications |

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| **Name of Faculty Mentor** | **Rakesh Dubey** |
| **Novel Engaging Course Title** | **Science and Technology Around Us (2000081)** |
| **Objectives of Course** | a. Promote excellence in real life practices happening around us.<br>b. Skill enhancement and personality development among team<br>c. Providing students a forum for interaction with faculties, prominentpersonalities of the various field |
| **Content** | a) Introduction to the science and technology available around us.<br>b) Selection of appropriate scientific problems<br>c) Discussion of problems in practical manner<br>d) Monthly Quiz on various aspect of Engineering and Technology.<br>e) Interactive Questioning<br>f) Workshop on conventional energy resources<br>g) Scientific/technical discussion among students on given topics<br>h) Extempore speech on random topics<br>i) Industrial expert talk<br>j) Technical/Scientific exhibition |
| **Contact hrs** | 30 hrs |
| **Outcomes of Course** | At the end of this course, the student will be able to:<br>a) Work as a team within specified time<br>b) Explain the various domain problems in Practical manner<br>c) Enhance the communication and technical skill by participating in various activities<br>d) Implement the technical knowledge in daily life |

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| **Name of Faculty Mentor** | **Mir Shahnawaz Ahmad** |
| **Novel Engaging Course Title** | **Cloud Computing: Techniques & Tools (2000083)** |
| **Objectives of Course** | ● To understand the basics of cloud computing techniques.<br>● To explore the applications of cloud computing.<br>● To evaluate different cloud computing techniques for deploying cloud infrastructure. |
| **Content** | Overview of Cloud Computing: Definition and essential characteristics, a brief history and evolution of cloud, architecture, cloud services and deployment models. Basics of virtualization and its importance in cloud computing, virtualization tools & techniques. Programming models for cloud computing. Amazon AWS, Eucalyptus, CloudSim. Security risks and threats cloud computing. Security architecture for cloud computing. |
| **Contact hrs** | 30 hrs |
| **Mode of Delivery** | Online |
| **Outcomes of Course** | After completing the course, the students will be able to:<br>● Identify the fundamental principles of distributed computing.<br>● Apply the concept of virtualization and other related techniques for the development of Cloud Computing.<br>● Assess different cloud computing techniques & platforms. |

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| **Name of Faculty Mentor** | **Arun Kumar** |
| **Novel Engaging Course Title** | **Demystifying Online Social networks (2000085)** |
| **Objectives of Course** | ● To understand the basics of online social network foundations.<br>● To explore the impact of online social networks.<br>● To build a system for real-time analysis of online social networks. |
| **Content** | Types and overview online social networks: Brief history and evolution of online social networks, the analogy with real-world social networks, architecture, business model.<br>Analysis of online social networks: Data collection and processing, use of API, visualization tools & techniques, Privacy and Security Issues<br>Social Engineering & Digital Marketing: Sentiment analysis and sentiment building, identifying the target audience, social campaign implementation, and monitoring. Career opportunities. |
| **Contact hrs** | 30 hrs |
| **Outcomes of Course** | After completing the course, the students will be able to:<br>● Specify the fundamental concepts of online social networking.<br>● Apply the concept of online social networking to analyze public sentiments.<br>● Solve real-world problems using sentiment analysis |

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| **Name of Faculty Mentor** | **Anshu Chaturvedi** |
| **Novel Engaging Course** | **Gender Sensitization (2000088)** |
| **Objectives** | • To develop students' sensibility with regard to issues of gender in contemporary India.<br>• To provide a critical perspective on the socialization of men and women.<br>• To introduce students to information about some key biological aspects of genders.<br>• To implement measures for ensuring safety of women and programmes for gender sensitization.<br>• To develop an understanding about gender inequalities and their adverse effects.<br>• To sensitise students about integrating gender sensitive practices in their private & professional life. |
| **Content** | 1. Aims and objectives of gender sensitization<br>2. Socializing<br>3. Preparing for Womanhood.<br>4. Growing up Male.<br>5. Sex v/s Gender and barriers<br>6. Bioethics, Morals and Conditioning<br>7. Sexual Education<br>8. Feminism and Patriarchy, Feminist ideology<br>9. Feminist Movements in brief<br>10. Communication and Relation<br>11. Stress and how do the opposite sex cope with the stress?<br>12. Constitutional Laws and Fundamental rights, Human Rights, Women related Law<br>13. Women in Politics<br>14. Man and Woman relationship<br>15. LGBTQ+ |
| **Contact hrs** | 30 |
| **Outcomes** | After completion of the course, students will be able to:<br>• **Create** awareness about gender issues and gender inequalities prevalent in society.<br>• **Develop** social consciousness<br>• **Analyze** policy decisions to remove gender biases.<br>• **Sensitize** Gender conscious workforce who aim at creating a congenial work environment.<br>• **Attain** a finer grasp of how gender discrimination works in our society and how to counter it. |

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| **Name of Faculty Mentor** | **Abhishek Dixit** |
| **Novel Engaging Course Title** | **IT Tools (2000089)** |
| **Objectives of Course** | To learn different components of the Excel worksheet and PowerPoint.<br>To understand the features of interactive online platforms. |
| **Content** | **Excel:** Getting Started with Excel, Working with Formulas and Functions, Creating Charts and Graphics, Use Advanced Excel Features, Analyzing Data With Excel.<br>**PowerPoint:** Creating Presentation, Setting Backgrounds, Editing Presentation, Formatting Presentation, Insert Slide Numbers, Header & Footer, Working with Multimedia, Sharing Presentation.<br>**Working with online platforms:** Microsoft 365, Google Services, Google Sheet, Google Docs, Google Slides, Google form.<br>Video and Audio Tools, Documents Scanning Tools, Format Conversion Tools.<br>**Interactive Platforms with their features:** Goole Meet, Zoom, Microsoft Team etc., |
| **Contact hrs** | 30 hrs |
| **Outcomes of Course** | After completion of this course, the students would be able to:<br>1. choose various online platforms for preparing worksheet and presentation.<br>2. apply various formulas and functions in Excel worksheet.<br>3. analyze the data using Excel.<br>4. examine the working of various interactive platforms tools.<br>5. design Excel worksheet and PowerPoint presentation. |

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| **Name of Faculty Mentor** | **Saumil Maheshwari** |
| **Novel Engaging Course Title** | **Understanding Financial Markets (2000090)** |
| **Objectives of Course** | 1. To build up the strong portfolio and understand the role of financial market in economy<br>2. To understand themost important financial markets, that people can invest in and break down their key drivers and attributes. |
| **Content** | General introduction and key concepts, Major financial Markets, other financial markets |
| **Contact hrs** | 30 hrs |
| **Outcomes of Course** | .Upon completion of the course, the students will be able to:<br>1. Describe the different components of a financial system and their role.<br>2. Explain the recent developments in the Indian financial system<br>3. Describe the instruments, participants and operation of the money market |

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| **Name of Faculty Mentor** | **Vikram Rajpoot** |
| **Novel Engaging Course Title** | **Intellectual Property : Rules, Drafting and Processing (2000091)** |
| **Objectives of Course** | Main objective of this course is to help students to draft their own ideas and process their intellectual work. |
| **Content** | **Unit 1**<br>Patent: Rules, Drafting and Processing.<br>**Unit 2**<br>Copyright: Rules, Drafting and Processing.<br>**Unit 3**<br>Design: Rules, Drafting and Processing.<br>**Unit 4**<br>Trademarks: Rules, Drafting and Processing. |
| **Contact hrs** | 30 hrs |
| **Outcomes of Course** | Student would be able to<br>• Infer how to protect their innovation and artistic work.<br>• Draft their invention according to laws of Intellectual Property Right.<br>• Process the invention and their artistic work. |

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| **Name of Faculty Mentor** | **Dr. R.S. Jadon** |
| **Novel Engaging Course Title** | **Modern techniques for business correspondence (2000093)** |
| **Objectives of Course** | ● To improve overall English writing skills.<br>● To learn various techniques for effective email writing.<br>● To understand how culture affects the business emails.<br>● To inculcate powerful business emails writing skills in students. |
| **Content** | Understand basic professional email structures in English. DOs and DON'Ts in Professional Email. Organization, Style & Editing Basics, Common Errors in Punctuation and Capitalization. Consent Form, Write a Practice Email. Writing Effective Subject Lines and Well-organized Email Text. Overview of Introduction & Announcement Emails, Key Language for Writing different Types of Emails. Analyze and identify the traits of request and apology emails. Learn specific language associated with making requests and apologies. Practice focused on key language. |
| **Contact hrs** | 30 hrs |
| **Outcomes of Course** | After completing the course, the students will be able to:<br>● Discover the basic structure of professional emails.<br>● Apply various techniques for effective business correspondence.<br>● Evaluate the rhetorical strategies and the formal elements of various communicationgenres. |

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| **Name of Faculty Mentor** | **Tej Singh** |
| **Novel Engaging Course Title** | **Integrating Engineering and Literacy (2000094)** |
| **Objectives of Course** | Engaging students in engineering by having them work through Novel Engineering activities and aanticipating student responses while planning lessons can focus attention back to the students, and builds in a check to see if the tasks allow for multiple design paths. |
| **Content** | Introduction to the theory, curricula and practices of teaching integrated engineering and literacy. Topics include disciplinary engineering practices, connecting literacy to engineering, analysis of example implementations, and literacy practices. Required implementation of sample curricular units in educational settings. |
| **Contact hrs** | 30 hrs |
| **Outcomes of Course** | On completion of this course, the student will be able to:<br>• Experience engineering themselves and reflect on their own understandings of engineering and the engineering design process.<br>• Focus not only on engineering within Novel Engineering, but engineering as a discipline. |

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| **Name of Faculty Mentor** | **Bhagat Singh Raghuwanshi** |
| **Novel Engaging Course Title** | **Imbalance Learning (2000095)** |
| **Objectives of Course** | • The course will give the student the basic ideas and intuition behind modern imbalance learning methods<br>• To learn, various imbalance machine learning methods<br>• To handle the imbalanced classification problems |
| **Content** | Unit –I Introduction to Imbalance learning.<br><br>Unit-II Extreme learning machine, Support Vector Machine, SMOTE methods, Training of feed forward networks by back propagations, Stochastic Gradient Descent.<br><br>Unit-III Different tool used for imbalance learning<br><br>Unit-IV Random vector functional link, Least square methods<br><br>Unit-V Weighted Extreme learning machine, class-specific extreme learning machine |
| **Contact hrs** | 30 hrs |
| **Outcomes of Course** | • Apply imbalance classification algorithms for classify data.<br>• Apply imbalance learning algorithms for finding relationships between data variables.<br>• Examine various imbalance supervised leaning and unsupervised leaning techniques and their comparison<br>• Build the concept of working of Algorithms for imbalance learning |

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| **Name of Faculty Mentor** | **Pawan Dubey** |
| **Novel Engaging Course Title** | **Python for Image processing applications using Open CV (2000096)** |
| **Objectives of Course** | 1. To understand the Fundamentals Image processing.<br>2. To understand the python application in Image processing<br>3. To understand the researchimplementation aspects in Image processing |
| **Content** | **Fundamentals of Python**: What is Programming, Importance and history of Programming.High Level Language, Assembly Language, and Machine Language, How Compiler compiles source code to machine code.Operators and Data type of Python.Lists.Sets and Tuples. Dictionaries.Conditional statements.<br>**Image Processing algorithms:** Image Transforms. Image Enhancement. Spatial Domain: Basic relationship between pixels- Basic Gray level Transformations – Histogram Processing – Smoothing spatial filters- Sharpening spatial filters. Image Restoration, Feature Extraction, Image Reconstruction from Projections.<br>**Image processing through OpenCV**: Essential software installation, OpenCV Implementation: Basic Gray level Transformations – Histogram Processing – Smoothing spatial filters- Sharpening spatial filters. Image Restoration, Feature Extraction.<br>**OpenCV IP Application instances**: Image smoothing, finger print classification, Iris classification, Noise Filtering through open. Morphological operations |
| **Contact hrs** | 30 hrs |
| **Outcomes of Course** | Students will be able to:<br>1. Explain image processing fundamentals.<br>2. Describe python applications in image processing application.<br>3. Apply OpenCV and Python for real life application. |

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| **Name of Faculty Mentor** | **Atul Kumar Ray** |
| **Novel Engaging CourseTitle** | **Basics and Applications of Matheamatica (2000099)** |
| **Objectives of Course** | 1. To introduce basics of Mathematica<br>2. To solve Algebraic equations easily with Mathematica<br>3. To do Integration and Differentiation of real life problems<br>4. To know the use of Mathematica in statistics and Data analysis<br>5. To know the application of Mathematica in Science and Engineering |
| **Content** | **Introduction of Mathematica**: Basic of Mathematica, Calculations, Parentheses, Brackets, and Braces, Algebraic Manipulation, syntax for defining variable and functions, entering exponents, radicals, and fractions, Special Characters, Piecewise-defined Functions, Abs, Floor, and Mod, Lists, Creating and manipulating Lists, Union and Join, Loops, Creating Table, map and apply, 2 Dimensional and 3 Dimensional Graphics and Plots<br>**Algebra using Mathematica**: Solving Algebraic Equations, finding root of a Polynomial and finding polynomial from Given Root, Methods for finding root, Generating Polynomials, Decomposing Polynomials into their constituent parts, Dividing Polynomials by Other Polynomials, Solving system of linear equations, methods **Calculus using Mathematica**: Computing Limits, working with Piecewise Functions, Using Power Series Representations, Differentiating Functions, Integration, Solving Minima and Maxima Problems, Solving Vector Calculus Problems, Generating Functions and Sequence, Solving DifferentialEquations, Solving Difference Equations, DSolve and NDSolve,<br>**Statistical and Data Analysis**: Computing Common Statistical Metrics of Numerical and Symbolic Data, Generating Pseudorandom Numbers with a Given Distribution, Working with Probability Distributions, Demonstrating the Central Limit Theorem, Covariance and Correlation of Vectors and Matrices, Measuring the Shape of Data, Fitting Data Using a Linear and Nonlinear Model, Creating Interpolation Functions from Data, Testing for Statistically Significant, Difference Between Groups Using ANOVA, Hypothesis Testing with Categorical Data<br>**Few Applications in real life (Science and Engineering)**: Working with Chemical Data, Modeling Predator-Prey Dynamics, modeling a Vibrating String, Modeling Electrical Circuits. **Image Processing**: Extracting Image Information, Converting Images from RGB Color Space to HSV Color Space, Enhancing Images Using Histogram Equalization, **Finite element method** |
| **Contact hrs** | 30 hrs |
| **Outcomes of Course** | After completion of the course, students will be able to:<br><br>1. Know the basic syntax of Mathematica<br>2. Solve Algebraic equations easily with Mathematica<br>3. Solve differential equations based on real life problems<br>4. Use concepts of Mathematica in statistics and Data analysis<br>5. Apply Mathematica in different discipline of Science and Engineering |

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| **Name of Faculty Mentor** | **Minakshi** |
| **Novel Engaging Course Title** | **Technical Report Writing for Engineers (2000100)** |
| **Objectives of Course** | To learn written communication skills in the wake of present day professional world<br>To enhance the understanding of written communication with practice oriented approachTo collect, analyse, report data and increase technical paper writing skills.<br>To familiarize with grammar and usage. Also, this course will increase the presentation skills.<br>To acquire higher order writing skills through project assignments |
| **Content** | Fundamentals and elements of Report writing. Types of reports such as memo, corrigendum. How to write a laboratory report?<br>What is scientific writing? What is the origin of writing?<br>What is a scientific article? How to prepare a title?<br>How to list the authors and their affiliations?<br>How to prepare a short summary? How to write an introduction, Materials and method, Results and discussion?<br>How to write acknowledgements, references, tables, and figures.How to communicate with the editors.<br>How to select the sources of data?<br>How to do the Data analysis, illustrating data and mechanics of writing.<br>How to prepare the presentation and key points to be considered during the oral presentation?How to write the Conference papers, and Book reviews?<br>Key points regarding the poster presentation, Ethical issues, rights and permissions, and abbreviations.Flow of IPR.Issues related to plagiarism and ways to counter the same. |
| **Contact hrs** | 30 hrs |
| **Outcomes of Course** | Upon completion of this course, students will:<br>1. Demonstrate the characteristics of technical and business writing.<br>2. Demonstrate the stages of the writing process (prewrite/draft/revise/edit) and apply them to technical and workplace writing tasks.<br>3. Produce documents related to technology and writing in the workplace and will have improved their ability to write clearly, concisely, and accurately. |

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| **Name of Faculty Mentor** | **Nikhil Paliwal** |
| **Novel Engaging Course Title** | **Proficiency in Microsoft Excel (2000101)** |
| **Objectives of Course** | • Build a solid understanding on the Basics of Microsoft Excel |
| **Content** | • Creating a Microsoft Excel Workbook<br>• The Ribbon<br>• The Backstage View (The File Menu)<br>• The Quick Access Toolbar<br>• Entering Data in Microsoft Excel Worksheets<br>• Formatting Microsoft Excel Worksheets<br>• Using Formulas in Microsoft Excel<br>• Working with Rows and Columns<br>• Editing Worksheets<br>• Finalizing Microsoft Excel Worksheets, etc. |
| **Contact hrs** | 30 hrs |
| **Outcomes of Course** | As a result of taking the Proficiency in Microsoft Excel Course, Students Will Be Able to:<br>• Identify the different components of the Excel worksheet.<br>• Move & Copy alpha and numeric data<br>• Construct formulas to manipulate numeric data in an Excel Worksheet<br>• Create a spreadsheet to tabulate and record numeric values<br>• Change the appearance of an Excel spreadsheet<br>• Set up the chart function of Excel to represent numeric data in multiple formats..<br>• Access and manipulate data using the database functions of Excel, and many more. |

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| **Name of Faculty Mentor** | **Saurabh Kumar Rajput** |
| **Novel Engaging Course Title** | **Electrical Wiring, hazards & safety (2000107)** |
| **Objectives of Course** | To impart practical knowledge on electrical wiring, hazards and safety precautions related to domestic and industrial usages. |
| **Content** | 1. Domestic electrical wiring, switchboard including inverter connections (06 hours).<br>2. Three phase industrial wiring connections, cableand load(06 hours).<br>3. Basic electrical measuring components/ tools and their use (06 hours).<br>4. Understanding electricity bill/ tariff and analysis(06 hours).<br>5. Electrical hazards and safety precautions (06 hours). |
| **Contact hrs** | 30 hrs |
| **Outcomes of Course** | Upon completion of the course, the student will be able to:<br>1. Imbibe the basic knowledge about domestic and industrial wiring connections.<br>2. Inculcate the understanding about switches, meters, cables and electrical loads.<br>3. Use of different electrical measuring equipment & tools.<br>4. Apply the electricity concepts for analysing the electricity bill components.<br>5. Recognize the reasons behind electrical hazards and apply the precautions for safety. |

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| **Name of Faculty Mentor** | **Hemant Choubey** |
| **Novel Engaging Course Title** | **Basic Programming of Python using Google Colab (2000109)** |
| **Objectives of Course** | Development of Programming skill |
| **Content** | Unit1-Basic Installation steps for software.<br>Unit2-Variable ,data type and Mathematical Operation.<br>Unit3-Use of Function in Python.<br>Unit4-Ploting.<br>Unit5-Data Visualization . |
| **Contact hrs** | 30 hrs |
| **Outcomes of Course** | Upon successfully completing this course, students will be able to:<br>• Design a program to solve the problem<br>• Create executable codes<br>• Read most Python codes<br>• Interpret data effectively |

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| **Name of Faculty Mentor** | **Vikas Mahor** |
| **Novel Engaging Course Title** | LTSpice Tutorial for Circuit Simulation **(2000110)** |
| **Objectives of Course** | To make the students learn about the usage of CAD tools for analyzing microelectroniccircuits. |
| **Content** | • Installation of LTpsice software tool.<br>Historical Context , The SPICE Algorithm, Device Models , Netlists , LTspice, Device Parameter Models<br>• Creating a Circuit in the Schematic Editor<br>The Schematic Editor, The Toolbar, Manipulating the Canvas, Placing Components, Placing a Resistor, an Inductor or a Capacitor, Searching for a Component, Voltage Reference, Moving Components Around, Connecting Components, Assigning Parameter Values, Naming Components, Labelling Nets, Printing your Circuit<br>• Running Analyses, DC Operating Point Analyses, DC Sweep Analyses, Transient Analyses, AC Analyses, Printing your Plots<br>• Using Simulator Directives |
| **Contact hrs** | 30 hrs |
| **Outcomes of Course** | Upon completion of the course students should be able to:<br>1. Use basic electrical DC concepts and theorems to analyze circuits.<br>2. Build and simulate electrical DC circuits and perform measurements with electronic test equipment.<br>3. Write technical reports using collected data. |

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| **Name of Faculty Mentor** | **Rahul Dubey** |
| **Novel Engaging Course Title** | **Understanding Logic Gates (2000114)** |
| **Objectives of Course** | The objective of this course is to help student learn basic concepts of Logic gates. |
| **Content** | Boolean Algebra, Number system, OR gate, AND gate, Not gate, NAND gate, NOR gate, Digital codes- BCD Codes, Excess-3 Codes, Binary codes |
| **Contact hrs** | 30 hrs |
| **Outcomes of Course** | Student will be able to:<br>1. Explain basic concept of number system<br>2. Describe the operation and application of logic gates |

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| **Name of Faculty Mentor** | **Deepak Batham** |
| **Novel Engaging Course Title** | **MATLAB Simulink (2000115)** |
| **Objectives of Course** | To gain knowledge and skills related to MATLAB Simulink. |
| **Content** | • Introduction to MATLAB Simulink.<br>• Constants, Variables and Expressions, Vectors and Matrices, Polynomials, Input-Output Statements.<br>• MATLAB Graphics, Control Structures, Writing Program and Functions.<br>• Simulink applications in Analog and Digital Electronics, Control Engineering and Neural Networks. |
| **Contact hrs** | 30 hrs |
| **Outcomes of Course** | After completion of the course, students are able to-<br>1. Develop MATLAB code/graphics for engineering and scientific problems.<br>2. Design Analog and Digital Electronics Circuits using Simulink.<br>3. Analyze Control System using MATLAB Simulink.<br>4. Simulate Neural Networks using MATLAB Simulink. |

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| **Name of Faculty Mentor** | **Ravi Kant Ranjan** |
| **Novel Engaging Course Title** | **Solar Applications (2000118)** |
| **Objectives of Course** | 1. To understand the basic concepts of solar energy.<br>2. To understand the basic principle and function of solar thermal system.<br>3. To understand the basic principle of solar PV systems and their application. |
| **Content** | **Unit1: Solar Radiation 10 Hours**<br>Sun as a source of energy, Solar radiation, basic concepts, various Sun-Earth angles, Atmospheric absorption of solar radiation, Solarradiation measuring instruments.<br>**Unit 2: Solar Thermal System 10 Hours**<br>Principle of conversion of solar radiation into heat, Collectors used for solar thermal conversion: Flat plate collectors and Concentrating collectors, Overview of the different components in a CSP system and their functions, Solar cookers,Solar dryers, Solar Distillation, Solar greenhouses.<br>**Unit 3: Solar PV System 10 Hours**<br>The function of solar cell from semi-conductor physics,Photovoltaic Effect,Solar Cell and its function, Solar Cell Parameters, Efficiency of Solar Cell, Solar PV Module, Connection of PV Module in Series and Parallel,Types of Solar PV System, Photovoltaic materials. |
| **Contact hrs** | 30 hrs |
| **Outcomes of Course** | Student will be able to:<br>1. Explain basic terms used in Solar system.<br>2. Measure and evaluate different solar energy technologies through knowledge of the function of the devices.<br>3. Calculate the required size of solar PV system and solar collector for a given power need. |

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| **Name of Faculty Mentor** | **Nitin Upadhyay** |
| **Novel Engaging Course Title** | **Computational Methods for Engineers using MATLAB (2000119)** |
| **Objectives of Course** | 1. To Impart the Knowledge to the students with MATLAB software<br>2. To provide a working introduction to the MATLAB technical computing environment. |
| **Content** | 1. Introduction, Applications, Features, General overview of the MATLAB software<br>2. Basic operations, MATLAB as calculator, basic commands, Creating arrays, Mathematical Operation with Array<br>3. Creating function and Scripts, Basic Plotting, Creating Simple Plot<br>4. Solving linear equations, Matrix inverse, Matrix function<br>5. Results interpretation |
| **Contact hrs** | 30 hrs |
| **Outcomes of Course** | Course Outcomes: After successful completion of this course students will be able to:<br><br>1. Select the suitable tool to solve the engineering problems in MATLAB<br>2. Study how to break a complex problem up into smaller, simpler task<br>3. Compare the various tool available in MATLAB.<br>4. Analyze the results and interpretation of mathematical model |

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| **Name of Faculty Mentor** | **Dinesh Kumar Rathore** |
| **Novel Engaging Course Title** | **Material Characterization Techniques for Engineering Applications (2000122)** |
| **Objectives of Course** | The objectives of this course are to:<br>1. Introduce the students to various engineering materials (i.e. metals, polymers, ceramics, composites) used in different applications<br>2. Develop the understanding on different performance requirements in specific engineering application<br>3. Apply various characterization techniques and select a material for intended application |
| **Content** | Module-1: Physical Characterization<br>Module-2: Mechanical Characterization<br>Module-3: Thermal Characterization<br>Module-4: Chemical Characterization<br>Module-4: Topographic, Morphological, Phase, Interphase and Fracture Characterization<br>Module-5: Characterization of Smart Materials |
| **Contact hrs** | 30 hrs |
| **Outcomes of Course** | Course Outcomes: After successful completion of this course students will be able to:<br>CO1. Select suitable material characterization techniques required for specific application<br>CO2. Study the effect of different material related parameters on the material's performance<br>CO3. Compare the properties and performance of different engineering materials.<br>CO4. Determine the effect of different phases, impurities on the behaviour of materials.<br>CO5. Analyse crystal structure and composition of different materials. |

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| **Name of Faculty Mentor** | **Trilok Pratap Singh** |
| **Novel Engaging Course Title** | **Basics of Campus Recruitment Training (2000124)** |
| **Objectives of Course** | 1. To train students for all the stages of Campus Recruitments done at the institute level. The course has different modules for written test or aptitude test, group discussions and personal interviews.<br>2. To train the students to meet the expectations of the industry through our Campus Recruitment Training (CRT) program .<br>3. This course is updated on a regular basis to keep pace with the changes in the recruitment procedures adopted by various companies at campuses. |
| **Content** | Identified, Design & implemented-In house training (technical, Aptitude, communication skills), Interview foresight Session for students, Mock Interview, Training Orientation program, Students interaction program, Company Specific training Interview Techniques and Resume Building-Learning from Any company, Career Guidance & Importance of Training- Global Career Point, Aptitude in-house training class, Communication skills in-house training class, Outsourced training class through the support of different Institution. . |
| **Contact hrs** | 30 hrs |
| **Outcomes of Course** | Upon the completion of this course, the student will be able to:<br>1. Distinguish the industry requirement.<br>2. Appear in the campus recruitment process more confidently. |

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| **Name of Faculty Mentor** | **Namrata Gupta** |
| **Novel Engaging Course Title** | **Corporate Governance (2000125)** |
| **Objectives of Course** | To Providing Idea about corporate Governance and its implications on society and legal system. |
| **Content** | • Various models and mechanisms of corporate governance<br>• Shareholder/stakeholder rights and responsibilities<br>• Issues pertaining to the board of directors and management<br>• An the audit committees<br>• Analyze the corporate scandals along with corporate best practices<br>• Legislations on corporate governance and responsibility |
| **Contact hrs** | 30 hrs |
| **Outcomes of Course** | At the end of the course, the student will be able to:<br>CO1 : Adopt the appropriate mechanism for effective governance<br>CO2 :Value the shareholder and stakeholder rights and responsibilities<br>CO3 :Adhere to sound principles of direction and management<br>CO4 :Analyze the significance of audit committee, its composition and responsibilities<br>CO5 : Implement best practices on corporate management |

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| **Name of Faculty Mentor** | **Monica Chauhan Bhadoriya** |
| **Novel Engaging Course Title** | **Professional Networking & CSR (2000126)** |
| **Objectives of Course** | 1. To introduce new concepts and methods being used while providing a platform for students to interact with business people and learn from theirexperience.<br>2. To create awareness of the latest trends or technology in the industry.<br>3. To understand the role of CSR practices for achieving competitive advantage for firms.<br>4. To understand the importance of Corporate Social Responsibility and allied practices |
| **Content** | The Meaning and Importance of Corporate Social Responsibility<br>The Role of Stakeholders in CSR<br>The Strategic Importance of CSR Implementation<br>Importance of Professional Networking<br>Connection and Interaction with Professionals<br>Case studies, etc. |
| **Contact hrs** | 30 hrs |
| **Outcomes of Course** | On completion of this course, the students will be able to:<br>1. Network with experienced business professionals<br>2.Analyze the role of networking with other people and connecting with society<br>3. Apply various practices of CSR<br>4. Analyze the complex issues confronting organizational leaders as they develop their CSR programs.<br>5. Evaluate the level of commitment to CSR of various organizations and explain how it can be a source of competitive advantage<br>6. Build your knowledge by taking advantage of the viewpoints and prior experience of others. |

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| **Name of Faculty Mentor** | **Gautam Bhadoriya** |
| **Course Title** | **Craft practices in India (2000127)** |
| **Objectives of Course** | The objective of this Novel engaging course is to impart knowledge of various Indian craft and its functioning. It's current scenario as well as factors influencing them. |
| **Content** | **1. Historical Background of Indian craft:** Introduction to the basic concept in the evolution of crafts. Journey of various crafts over several decades and centuries<br>**2. Zone wise Introduction of craft:** North, South, East, West, Central & North-east<br>**3. Types of craft:** Metal craft, Wood craft, Leather craft, Paper craft, Textile craft, Stone craft, Pottery / Clay work, Terracotta work, Gems and stone, Grass craft, Bamboo craft, etc.<br>**4. Current Scenario of Craft:** Current situation of Craft in Domestic and International Market.<br>**5. Factors influencing Craft:** Social, Economic, Technological, Psychological etc. |
| **Contact hrs** | 30 hrs (Fixed) |
| **Outcomes of Course** | **At the end of the course the students will develop ability to:**<br>**1.** Develop understanding of various Indian crafts.<br>**2.** Analyze the impact of various factors such as Social, Economic, Technological, Psychological on crafts market. |

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| **Name of Faculty Mentor** | **Jaimala Jha** |
| **Novel Engaging Course** | **Study of Historical Monuments of Gwalior (2000130)** |
| **Objectives** | • To promote scientific approach toward the study of Historical Monuments of Gwalior<br>• To design brochure based on observation skills and the history of monuments. |
| **Content** | 1. Introduction about Historical monuments.<br>2. Observe a monument and construct the history of the monument.<br>3. Analyze need for preserving a historical monument.<br>4. Demonstrate their appreciation of the architecture through a sketch/Drawing.<br>5. Create a brochure and database of the monuments, using their knowledge. |
| **Contact hrs** | 30 |
| **Outcomes** | After completion of the course, students will be able to:<br>• Develop monuments database & Brouchre using appropriate software. |

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| **Name of Faculty Mentor** | **Kuldeep Swarnkar** |
| **Course Title** | **Digital Circuit Design (2000133)** |
| **Objectives of Course** | To provides in-depth knowledge of switching theory and the logic design techniques of digital circuits, which is the basis for design of any digital circuit. |
| **Content** | 1. Familiarization of 7400, 7402, 7404, 7408, 7432 & 7486.<br>2. Verification of truth tables of AND, OR, NOT, NOR, NAND, XOR, XNOR gates.<br>3. Implementation of various logic gates using NAND & NOR gates (Truth table verification).<br>4. Verification of De'Morgans theorem.<br>5. Implementation of Adder using minimum number of gates.<br>6. Implementation Sub tractor using minimum number of gates. |
| **Contact hrs** | 30 hrs |
| **Outcomes of Course** | After the completion of this course, the student will be able to :<br>1. Design various logic gates starting from simple ordinary gates to complex digital circuits logic devices & array<br>2. Use the concepts of Boolean algebra for the analysis & design of various combinational & sequential logic circuits. |

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| **Name of Faculty Mentor** | **Madhav Singh** |
| **Course Title** | **Practical Electronics for Inventors (2000134)** |
| **Objectives of Course** | 1. To encourage students to look beyond their textual knowledge and establish a relationship between theory and application of the learned concepts.<br>2. To provide a platform for the students to give a shape to their innovative ideas |
| **Content** | **Electronic Components:** Familiarization/Identification of electronic components with specification, Functionality, type, size, symbol, cost etc. Active, Passive, Electrical, Electronic, Electro-mechanical, Wires, Cables, Connectors, Fuses, Switches, Relays, Displays, Heat sink etc.<br>**Cellular and Mobile Communication:** Cellular Communications, Transmitting Receiving Antenna, Digital Cellular Phone Block Diagram, Types of Mobile Phones, Cellular Systems. Communication Devices: Wireless Technology: Cellular (3G/4G/5G Zigbee) , Bluetooth, Wi-Fi, Radio Frequency Identification (RFID).<br>**Domestic Appliances:** Microwave Oven: Microwaves, Transit Time, Magnetrons, Wave Guides, Microwave Oven Block Diagram. Air conditioning system: components of air conditioning system,<br>**Sensors:** Proximity Sensors, Temperature Sensors, Humidity Sensors, Pressure Sensors Accelerometers , Gyroscope, Gas Sensors<br>**Boards:** Arduino- UNO, Arduino UNO (R3) , Arduino Nano, Arduino Micro , Arduino Due LilyPad Arduino , Arduino Bluetooth.<br>**Training on Software Tools:** LT Spice, Tinkercad, Circuit Wizard ,Virtual Labs etc.<br>**Product/ Project Designing:** Health Monitoring System, Night Patrol Robot, Face Recognition Bot Air Pollution Monitoring System Home Automation System Smart Parking System Smart Agriculture System Weather Reporting System. |
| **Contact hrs** | 30 hrs (Fixed) |
| **Outcomes of Course** | On the completion of this course, the student will be able to:<br>1. Validate software and hardware required in real-Life applications<br>2. Establish a relationship between theory and application of the concept of Electronics |

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| **Name of Faculty Mentor** | **Rakesh Narvey** |
| **Novel Engaging Course Title** | **Research Paper Preparation and Publication –Basics (2000135)** |
| **Objectives of Course** | The objective of this course to introduce the principles, techniques and tools of academic and research report writing. |
| **Content** | Part a) Introduce the idea of core subjects studies, creativity and innovation, basic case studies.<br>Part b) Advantages of publication in the career.<br>Part c) Explaining the existing topic, available research content.<br>Part d) Approach towards the results using software or data based.<br>Part e) Plagiarism checking, its importance and how to resubmit paper if correction is required |
| **Contact hrs** | 30 hrs |
| **Outcomes of Course** | After completion of the course, students will be able to:<br>1. Write reports on various academic activities including research effectively and efficiently<br>2. Learn the basic structure of a scientific article to be published in a peer reviewed journal. |

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| **Name of Faculty Mentor** | **R. P. Narwaria** |
| **Course Title** | **Basics of Control Systems for Engineers (2000136)** |
| **Objectives of Course** | To understand concepts of the mathematical modeling, feedback control and stability analysis in Time and Frequency domains. |
| **Content** | Basic control system terminology, Open loop and Closed loop system, Feedback control, Block diagram algebra and Signal flow graphs, Effects of negative feedback, Test input signals, First order systems, Second order systems, Steady state error, Constant and error coefficients for type 0, 1, and 2 systems. Concept of stability of linear systems, Relation between the closed loop poles and stability, Relative stability, Absolute stability, Routh Hurwitz criteria and its applications |
| **Contact hrs** | 30 hrs |
| **Outcomes of Course** | After the successful completion of the course the students will be able to:<br>Analyze the response and stability of the closed and open loop systems. |

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| **Name of Faculty Mentor** | **Sanjiv Sharma** |
| **Novel Engaging Course Title** | **Computational Thinking for Problem Solving (2000137)** |
| **Objectives of Course** | This course deals with the techniques needed to practice computational thinking, the art of using computers to solve problems and the ways the computers can be used to solve problems. |
| **Content** | • Concept of Problem Solving, Problem definition, Generate the alternative solution, implement & evaluate the solution, Selection of appropriate solution<br>• Pillars of Computational Thinking: Decomposition, Pattern recognition, Data representation and Abstraction, and algorithms.<br>• Express and analyzing the Algorithms, Flowchart, Pseudo code<br>• Apply computational thinking using computer programming language |
| **Contact hrs** | 30 hrs |
| **Outcomes of Course** | After completion of this course, the student will be able to:<br>• Select appropriate concepts and methods from a variety of disciplines to solve problems effectively and creatively.<br>• Utilize a combination of approaches to analyze the problem to make accurate and timely decisions to solve problems<br>• evaluate the implementation of solutions to problems<br>• Develop the capability for designing an application for solving real world problems. |

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| **Name of Faculty Mentor** | **Vikas Sejwar** |
| **Course Title** | **Smart Home Technologies (2000139)** |
| **Objectives of Course** | The objective of this course to make familiar the students with the latest technologies to reduce energy consumption and to create a comfortable family environment |
| **Content** | Internet, WiFi, Infrared, Sensors, Smart Lighting Solutions, Smart Entertainment Devices for the Home, Smart Home Appliances, Smart Home Utilities, Smart Blinds Solutions, Smart Home Surveillance Cameras, Smart Door Locks, Smart Garage Door Openers and Gadgets, Smart Home Sensors, Smart Voice Recognition and Voice Activated Products, Smart Home Window Solutions, Eco-Friendly Smart Home Products, Smart Remote Controls, Smart Home<br>Apps, |
| **Contact hrs** | 30 hrs |
| **Outcomes of Course** | Student will able to:<br>1. Know the basic framework of a home automation system<br>2. Analyze the technology of systems of control of lightning, security and their integration in smart houses |

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| **Name of Faculty** | **Vijay Bhuria** |
| **Course Name/Code** | **Electrical Safety (2000141)** |
| **Objectives** | To aware about electric shock or other injuries resulting from either direct or indirect electrical contact |
| **Content** | • Introduction: Rules, Slogan, Poster, Devices<br>• Principles, Working of Safety department<br>• Safety Tips<br>• Safety concerns<br>• Electrical Safety-Related Work Practices<br>• Electrical Hazards |
| **Contact hrs. per semester** | 30 |
| **Outcomes** | After completion of this course, the students will be able to:<br>1. Distinguish the importance of electrical safety in day to day life.<br>2. Classify the safety devices based on application<br>3. Acquire knowledge of electrical safety rules and Government policies issued time to time |

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| **Name of Faculty Mentor** | **Abhilash Sonker** |
| **Course Title** | **Microsoft Office -Excel Skills (2000142)** |
| **Objectives of Course** | In this student will familiarize with basics of spreadsheet construction and formatting with a basic overview of how to generate formulas and use of functions for data analysis. |
| **Content** | Create Worksheets and Workbooks, Navigate in Worksheets and Workbooks, Format Worksheets and Workbooks, Customize Options and Views for Worksheets and Workbooks, Configure Worksheets and Workbooks for Distribution, Apply Custom Data Formats and Validation, Apply Advanced Conditional Formatting and Filtering, Create and Modify Custom Workbook Elements, Create and Manage Tables, Manage Table Styles and Options, Filter and Sort a Table, Summarize Data by using Functions, Perform Conditional Operations by using Functions, Format and Modify Text by using Functions,Create Charts, Format Charts, Insert and Format Objects. |
| **Contact hrs** | 30 hrs |
| **Outcomes of Course** | After completing this course, the students will be able to:<br>1. Gain the basic skills needed to operate and navigate MS Excel.<br>2. Calculate, organize, and evaluate quantitative data<br>. |

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| **Name of Faculty Mentor** | **Neha Bhardwaj** |
| **Course Title** | **Know your Country History, Culture & Traditions (2000143)** |
| **Objectives of Course** | • To understand Indian History; From Chanakya to Britishers & Britishers to Indian Govt.<br>• To understand culture & traditions of various states wrt dress, dance, music and foods. |
| **Content** | 1. Rulers<br>2. Winners & their struggle<br>3. State Power<br>4. State Culture<br>5. State Traditions |
| **Contact hrs** | 30 hrs |
| **Outcomes of Course** | After completion of the course, students would be able to:<br>1. Identify cultures & traditions of various states.<br>2. Interpret qualitative and quantitative data in order to evaluate historical events |

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| **Name of Faculty Mentor** | **Nidhi Saxena** |
| **Course Title** | **Technical writing (2000144)** |
| **Objectives of Course** | The aim of the course is to familiarize the students to prepare an articles, technical reports, thesis, books, and slide presentations using technical writing and drawing tools for block diagrams, graphs, referencing, equations etc. |
| **Content** | Introduction: Introduction and Installation of Tools for writing, drawing of block diagram, graphs, referencing etc. Article writing: Prepare the articles according to the different publishers like IEEE, Elsevier, springer etc. Technical Report Writing: Preparing filesfor practical's, seminars, presentations etc.<br>Thesis writing: Writing all the chapters of the thesis without repetition of tables, images, graphs etc. according to the institute format Books writing: Writing all the chapters of the book without repetition of tables, images, graphs etc. according to the publisher format Slide Presentation: Preparing of the slide of the presentation including Table, Figures, block diagrams, referencing etc. |
| **Contact hrs** | 30 hrs |
| **Outcomes of Course** | After completion of the course, students would be able to:<br>• Work on the skill of using high-quality typesetting systems for publication of research papers, thesis and book chapters etc.<br>• Create Tables, Graphics and Pictures Lists, Arrays and Bibliography<br>• Create Slides with Beamers and posters. |

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| **Name of Faculty Mentor** | **Shubhi kansal** |
| **Course Title** | **Digital Image Enhancement Techniques (2000147)** |
| **Objectives of Course** | 1. To study the image fundamentals and mathematical transforms necessary for image processing.<br>2. To study the image enhancement techniques. |
| **Content** | Basics of images, Gray and Colour images, Properties of images,<br>Various transformations on images, Simulation through MATLAB. |
| **Contact hrs** | 30 per semester |
| **Outcomes of Course** | After the completion of this course, the student will be able to:<br>1. Know the basics of images.<br>2. Apply various transformations on images and analyze the results.<br>3. Apply enhancement techniques through MATLAB. |

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| **Name of Faculty Mentor** | **Jyoti Vimal** |
| **Course Title** | **Project Management (2000148)** |
| **Objectives of Course** | • To understand the concepts of Project Management for planning to execution of projects.<br>• To understand the feasibility analysis in Project Management and network analysis tools for cost and time estimation.<br>• To analyze, apply and appreciate contemporary project management tools. |
| **Content** | **Introduction to Project Management** :Project Definition, Project Performance Dimensions, Project Life Cycle, Project Classification, Benefits of Project Management Approach<br>**Project Identification and Formulation:** Economic and Market Analysis, Technical Analysis, Financial Analysis, Risk and Uncertainty, Project Appraisal<br>**Project Management Techniques:** Bar Charts, Gantt Chart, Milestone Chart<br>**Networks analysis:** Programme Evaluation and review Technique, Critical Path Method, Expected Time, Earliest Start Time, Latest Start Time, Optimistic time, Most likely time, Pessimistic time |
| **Contact hrs** | 30 per semester |
| **Outcomes of Course** | On completion of this course, the students will be able to:<br>1. Explain about the project characteristics and various stages of a project.<br>2. Gain the conceptual clarity about project organization and feasibility analyses<br>3. Analyze the techniques for Project planning, scheduling and Execution Control. |

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| **Name of Faculty Mentor** | **Parul Saxena** |
| **Novel Engaging Course** | **Software Model and Project Management Life Cycle (2000149)** |
| **Objectives** | • To describe key concepts, issues, and operational terminology in developing models<br>• To normalize any application problem using $1^{st}$,$2^{nd}$,$3^{rd}$,$4^{th}$,$5^{th}$ normal form<br>• To draw DFDs using specific rules and components to depict logical process models |
| **Content** | 1. ER model, DFD<br>2. Relational Algebra & SQL<br>3. Functional Dependencies and Normalization<br>4. System Development Life Cycle (SDLC)<br>5. Project documentation |
| **Contact hrs** | 30 |
| **Outcomes** | After completion of the course, students will be able to:<br>• **Define** the terminology, features, classifications, and characteristics embodied in database systems.<br>• **Design** principles for logical design of databases, including the E-R method and improve the database design by normalization.<br>• **Design** and mapping of different real world problems using SDLC<br>• **Identify** and select the most suitable conversion strategy for a new application |

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| **Name of Faculty Mentor** | **Dhananjay Bisen** |
| **Course Title** | **Statistical data analysis through programming (2000150)** |
| **Objectives of Course** | To develop ability among students that deal with numerical and quantitative issues in real-time data as well as to enable the use of statistical and graphical libraries of programming in data analysis. |
| **Content** | Introduction to programming languages, Programming libraries for statistical analysis, numerical computing, complex mathematical computation, data visualization, working with all libraries and packages. |
| **Contact hrs** | 30 per semester |
| **Outcomes of Course** | Students will be able to<br>1. Develop programming abilities with statistical analysis of data.<br>2. Use statistical libraries for working with data sets. |

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| **Name of Faculty Mentor** | **Ankit Tiwari (Part I and Part II), Varun Sharma (Part III), Nitin Upadhyay (Part IV)** |
| **Course Title** | **Innovation- From Creativity to Entrepreneurship** |
| **Part I- Idea Generation (2000151)** | |
| **Objectives of Course** | • To understand and apply certain methods of idea generation on any self chosen topic.<br>• To understand and apply methods such as Mind Mapping &Clustering, Concept Mapping.<br>• To understand Scenario Techniques, Roadmapping andmany more - always in a structured process. |
| **Content** | Idea Generation Process, Innovation Process and fuzzy front end, Design Aspects, Methods, Sources, Context Definition, Agenda Setting, Problem Representation, Present Situation and Future Assumptions, Bundling Projection, Interpretation of Scenario, Wild Cards, SWOT, Proposals for Action, Definition of a Road- mapping Topic, Needs Analysis, Analysis of Potentials,<br>Establishing a Roadmap, Consistency Analysis and Evaluation. |
| **Contact hrs** | 30 Hours per semester |
| **Outcomes of Course** | On completion of this course, the student will be able to:<br>• Acquire an understanding about Idea Generation Process.<br>• Acquire an understanding about context definition, agendasetting, and problem representation.<br>• Conduct consistency analysis and evaluation.<br>• Perform SWOT analysis |
| **Part II-Technology, Science, Innovation, and Society (2000152)** | |
| **Objectives of Course** | Primary objective of the course is to understand the social shaping of technology (how science and technology together shape the waysto solve real life problem). Another objective of the course is to understand the meaning of innovation (as no single definition of innovation and therefore different researchers, scholars and scientistshifted their emphasis from its definition to innovation processes understanding and proposed different models) and its relevance for the development of the society. |
| **Content** | 1. Techno science and the Interpenetration of Science & Technology (questioning the trans boundary between technology and science andhow science and technology shapes human experience)<br>2. Social-Psychological Theories of Innovation.<br>3. Innovation and its impact in the society.<br>4. Gender and Technology. |
| **Contact hrs** | 30 |
| **Outcomes of Course** | Students will be able to:<br>1. Develop an understanding of Science – Technology relationship<br>2. Acquire an understanding of transition in Socio-TechnicalSystems.<br>3. Recognize how gender influences technologies. |

| Part III: Challenges and Opportunities (2000153) | |
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| **Objectives of Course** | To introduce the basics of entrepreneurship skills.<br>To introduce the existent entrepreneurial support system<br>To introduce the concept of product/service selection<br>To introduce the concept of formulation of business plan, analysis and extension |
| **Content** | Introduce the idea of entrepreneurship, the core competencies, creativity and innovation, basic case studies.<br>Explaining the existing support system at various level including financial and tech support, basic outlines of MSME act, Loans and Grants, Legislations and Acts<br>Explaining the basics of opportunity sensing, idea generation by opportunity identification, product or service selection based on the idea.<br>Essentials of the formulation and launch of business plan, team building and networking, understanding the art of pitching |
| **Contact hrs** | 30 hrs |
| **Outcomes of Course** | Students will be able to:<br>1. Explain the basics of entrepreneurship<br>2. Acquire an understanding about the existing financial and tech support<br>3. Groom ideas as per the market needs by surveys and research<br>4. Setup a business plan |
| **Part IV: Start-up: How to start, survey, Financial, Legal, Pitching and Funding (2000154)** | |
| **Objectives of Course** | The main objective of this course to help students get theirinnovation, ideas and ventures to the next level through learning. To<br>promote the start activity. |
| **Content** | Identify your idea, idea assessment, market survey, customer, Legal foundation, fundamentalslike company registration, patent, compliances. Understanding basic of finance, how to buildeffective business model, fundraising, understand investor mindset, valuation of companies.<br>Pitching, learn how to approach investors, key focusarea, various scheme funds offered by Govt. of India. |
| **Contact hrs** | 30 |
| **Outcomes of Course** | On completion of this course, the student will be able to:<br>**1.** Plan new technology/ knowledge/ innovation basedstartups.<br>**2.** Identify legal issues that impact financial and other risks affecting business.<br>**3.** Prepare for Pitching & Term Sheet |

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| **Name of Faculty Mentor** | **C S Malvi** |
| **Novel Engaging Course** | **Bhagwad Gita- An introduction (2000157)** |
| **Objectives** | To familiarise students with the teachings of Bhagwad Gita to become successful in life. |
| **Content** | There are five main part of *Bhagwad Gita* course (i) depression and Motivation management, (ii) living entity (Jiv), (iii) Prakriti (Material Nature), (iv) Kala (time) and (v) Karma (Action). |
| **Contact hrs** | 30 |
| **No. of sem. required** | 1 |
| **Outcomes** | After completion of the course, students will be able to:<br>1. Realize the scope and relevance of the pursuits of knowledge and action in the *Bhagavad Gita*.<br>2. Resolve paradoxes and seemingly competing viewpoints in the verses.<br>3. Gain clarity on the meaning of moksa, karmayoga, bhakti, and meditation, in the Gita.<br>4. Discern some of the paradigms that underlie various interpretations of the Gita. |

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| **Name of Faculty Mentor** | **Bhavna Rathore** |
| **Novel Engaging Course Title** | **Arduino: Getting Started with IoT (2000158)** |
| **Objectives of Course** | To provide the fundamental knowledge of Arduino programming, combined with practice, to make students ready for creating complex Arduino programs in future. |
| **Content** | • Understanding of Arduino Uno<br>• Arduino Nano<br>• ESP32<br>• Node MCU<br>• HS-05<br>• Understanding of analog and digital inputs and outputs<br>• Arduino IDE, write, compile and upload sketches, install libraries<br>• Arduino programming, it's basic concepts, structures, and keywords<br>• Tinkercad: Basics, online model development, logic programming<br>• Detect and measure visible light intensity, temperature, humidity, acceleration, shock, heartbeat, heat, pressure, flow level, soil moisture etc. |
| **Contact hrs** | 30 hrs |
| **Mode of Delivery** | offline |
| **Outcomes of Course** | After the completion of the course, the student will be able to<br>**CO 1.** **Create** basicprograms of Arduino programming<br>**CO 2.** **Compare** the performance of Arduino, Node MCU and Arduino Nano<br>**CO 3.** **Develop** the IoT models on Tinkercad<br>**CO 4.** **Design** IoT applications using sensor and Arduino<br>**CO 5.** **Develop** team work skills for working effectively in the group |

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| **Name of Faculty Mentor** | **Dr. Vikram Saini** |
| **Novel Engaging Course Title** | **Control System Design using MATLAB (2000159)** |
| **Objectives of Course** | • To introduce students the use of programming language, MATLAB to solve control design problems.<br>• To learnbasics for solving numerical fractional calculus.<br>• To introduce various basic control design structures ex. PID, LQR control.<br>• To provide application of control design for DC Motor, plane dynamics etc. |
| **Content** | • Control system Design: Introduction.<br>• MATLAB for control engineering.<br>• Introduction to basic control design structures.<br>• Control design applications to engineering problems.<br>• Introduction to fractional calculus and fractional control.<br>• Fractional order control applications to engineering problems. |
| **Contact hrs** | 30 hrs |
| **Mode of Delivery** | Blended |
| **Outcomes of Course** | After completion of the course, students will be able to:<br>• Solve system of differential equations and physical systems using MATLAB.<br>• Implement controller design and fractional control in MATLAB.<br>• Solve fractional order calculus to solve control problems.<br>• Apply control design techniques to engineering problems. |

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| Name of the faculty Mentor | **Preeti Gupta** |
| Course Name/Code | **Creative Writing (2000160)** |
| Objectives | Students gather and analyze relevant information in writing and also communicate ideas effectively through writing. |
| Contents | • Understanding Creative Writing<br>• Difference between Blogging & Creative Writing<br>• Writing Styles, Tones, and their usage to build Write-Ups<br>• Structure of a Story<br>• The importance of Point of View<br>• Writing prompts<br>• Difference between Prose & Poetry<br>• Forms of Poetry<br>• Understanding Rhyming Schemes & Rhythms<br>• Resume Writing |
| Contact hrs | 30 |
| Outcomes | After completion of the course, Students will be able to;<br>• Create a narrative pace and perfect draft.<br>• Analyze relevant information in writing.<br>• Communicate ideas effectively through writing. |

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| **Name of Faculty Mentor** | **Dr. NookalaVenu** |
| **Novel Engaging Course Title** | **E-commerce Supply Chain (2000161)** |
| **Objectives of Course** | The objective of this course is to impart practical knowledge on e-commerce supply chain and operations to up skill students and thereby enabling them to become effective supply chain management professionals in the domain of e-commerce. The course also imparts the tools and techniques for improving e-commerce supply chain performance. |
| **Content** | e-business/e-commerce models and their supply chain models, tools and techniques to carry out effective decision making for e-commerce supply chain, correlation between supply chain parameters and customer satisfaction in e-commerce, application of state-of-the-art technologies for e-commerce supply chain integration. |
| **Contact hrs** | 30 hrs |
| **Mode of Delivery** | Blended |
| **Outcomes of Course** | At the end of the course, the student will be able to:<br>1.Describe different e-business/e-commerce models and the corresponding supply chain configurations.<br>2. Explain various aspects of e-commerce supply chain such as inventory management, returns management and last-mile delivery.<br>3. Apply state-of-the-art technologies such as robotics, automation, drone delivery and associated risks in e-commerce supply chain.<br>4. Apply supply chain management concepts to the design, analysis, and improvement of e-business. |
| **External Mentors / Collaborations** | NIL |

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| **Name of Faculty Mentor** | **Dr. Sunil Kumar Shukla** |
| **Novel Engaging Course Title** | **Electrical Home Appliances (2000162)** |
| **Objectives of Course** | The main objective of the course is to enrich the concepts of electrical practices and educate the students to apply those in respective fields as well as in day-to-day life. |
| **Content** | **Wiring Techniques**<br>Types of domestic and industrial wiring, selection of wire, load calculations.<br>**Introduction to Electronic Components**<br>Study of various electronic components like, power and signal diodes, zener diodes, BJTs, LED, Photo diode, general purpose ICs, use of bread board, overview of multimeter.<br>**Introduction to Electrical Components**<br>Study of different types of switches, solid state and electromagnetic relays, contactors, rheostats, different types of capacitors, resistors, variable inductor (choke), protective devices - fuses, MCB, ELCB and relays<br>**Soldering Techniques**<br>Basics of soldering techniques, effectiveness of soldering and problem associated with soldering, general purpose board soldering.<br>**Basics of Household Electrical Equipment**<br>Rewiring / replacement of fuse, switch board layout, functioning of switch, fan regulator, tube light, electric iron, electric heater. |
| **Contact hrs** | 30 hrs |
| **Mode of Delivery** | Blended mode (Online/Offline) |
| **Outcomes of Course** | After completion of course, student will be able to –<br>1. Identify and propose appropriate electrical and electronic components for relevant applications.<br>2. Design basic electronic and electrical circuits for electrical home appliances<br>3. Build simple domestic and industrial wiring systems,<br>4. Apply basic maintenance and troubleshooting skills to house hold electrical appliances<br>5. Identify and propose appropriate protection scheme for electrical home appliances |
| **External Mentors / Collaborations** | 1. Dr. Tarun Kumar Tailor, Assistant Professor, Nirma University Ahmedabad, Gujrat |

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| **Name of Faculty Mentor** | **Sushmita Chaudhari** |
| **Novel Engaging Course Title** | **Fundamental of Transfer Function (2000163)** |
| **Objectives of Course** | The objective of this course is to gain knowledge and insight into how a system or process responds to input signals, allowing for analysis, prediction, and control of its behavior. |
| **Content** | A clear comprehension of what a transfer function represents in the context of a system or process. Itis a mathematical representation of the relationship between the input and output of a linear time- invariant system in the frequency domain. |
| **Contact hrs** | 30 |
| **Mode of Delivery** | online |
| **Outcomes of Course** | Student will be able to:<br>Make informed decisions and improvements in various fields- such as control systems, signal processing, andcommunication systems. |
| **External Mentors / Collaborations** | NA |

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| **Name of Faculty Mentor** | **Dr. Kritika Bansal** |
| **Novel Engaging CourseTitle** | **Fundamentals of R Programming (2000164)** |
| **Objectives of Course** | To introduce to students with the basics of R: a free programming language and software environment used for statistical computing and graphics. R is widely used by data analysts, statisticians, and data scientists around the globe. |
| **Content** | Introduction to R, from installation to basic statistical functions. Students will learn to work<br>with variables, external data sets, write functions, data wrangling, data analysing, and datavisualization. |
| **Contact hrs** | 30 hrs |
| **Mode of Delivery** | Blended Mode |
| **Outcomes of Course** | By the end of this course, students will be able to :<br>1. Perform operations in R.<br>2. Perform Sorting, Data Wrangling.<br>3. Use of dplyr and making plots. |
| **External Mentors / Collaborations** | Only if required. |

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| **Name of Faculty Mentor** | **Dr. Priyanka Garg** |
| **Novel Engaging CourseTitle** | **High Frequency Structure Simulator (2000165)** |
| **Objectives of Course** | To acquire the skills and knowledge necessary to design, simulate, and analyze high-frequencystructures. |
| **Content** | Introduction to High frequency structures parameters and HFSS, Modelling and simulation ofrectangular waveguide, Dipole antenna, microstrip transmission line, microstrip patch antenna using microstrip line feeding and quarter wave transformer feed, multiband microstrip antenna, monopole microstrip antenna, frequency reconfigurable patch antenna, Multiple Input multiple output (MIMO) antenna and analysis of its parameters. |
| **Contact hrs** | 30 hrs |
| **Mode of Delivery** | Hybrid mode |
| **Outcomes of Course** | Students will be able to<br>1. Demonstrate a proficient understanding of HFSS software, its user interface, and itscapabilities.<br>2. Design and analyze high-frequency systems using HFSS.<br>3. Acquire skills in simulating and optimizing high-frequency systems using HFSS.<br>4. Identify and troubleshoot common issues that may arise during HFSS simulations.<br>5. Apply HFSS to real-world problems in areas such as telecommunications, wirelesscommunication, radar systems, and antenna design. |
| **External Mentors / Collaborations** | NA |

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| **Name of Faculty Mentor** | **Smita Parte** |
| **Novel Engaging Course Title** | **Inculcating Universal Human Values in Technical Education (2000166)** |
| **Objectives of Course** | To make aware our students about "Importance of Universal Human Values in Technical Education" |
| **Content** | **Module 1-Introduction to Value Education:**<br>Understanding Value Education, Self-exploration as the Process for Value Education( Sharing about Oneself), Continuous Happiness and Prosperity – the Basic Human Aspirations, Right Understanding, Relationship and Physical Facility ( Exploring Human Consciousness) Happiness and Prosperity – Current Scenario Method to Fulfill the Basic Human Aspirations( Exploring Natural Acceptance)<br>**Module 2-Harmony in the Human Being:**<br>Understanding Human being as the Co-existence of the Self and the Body Distinguishing between the Needs of the Self and the Body(Exploring the difference of Needs of Self and Body), The Body as an Instrument of the Self Understanding Harmony in the Self(Exploring Sources of Imagination in the Self), Harmony of the Self with the Body, Programme to ensure self-regulation and Health(Exploring Harmony of Self with the Body)<br>**Module 3-Harmony in the Human Being:**<br>Harmony in the Family – the Basic Unit of Human Interaction Values in Human-to-Human Relationship 'Trust' – the Foundational Value in Relationship (Exploring the Feeling of Trust) 'Respect' – as the Right Evaluation(Exploring the Feeling of Respect) Understanding Harmony in the Society Vision for the Universal Human Order(Exploring Systems to fulfil Human Goal)<br>**Module 4-Harmony in the Nature/Existence:**<br>Understanding Harmony in the Nature. Interconnectedness, self-regulation and Mutual Fulfillment among the Four Orders of Nature ( Exploring the Four Orders of Nature). Realizing Existence as Co-existence at All Levels. The Holistic Perception of Harmony in Existence. Exploring Co-existence in Existence<br>**Module 5-Implications of the Holistic Understanding – a Look at Professional Ethics**<br>Natural Acceptance of Human Values. Definitiveness of (Ethical) Human Conduct(Exploring Ethical Human Conduct). A Basis for Humanistic Education, Humanistic Constitution and Universal Human Order. Competence in Professional Ethics (Exploring Humanistic Models in Education). Holistic Technologies, Production Systems and Management Models-Typical Case Studies. Strategies for Transition towards Value-based Life and Profession(Exploring Steps of Transition towards Universal Human Order) |
| **Contact hrs** | 30 hrs |
| **Mode of Delivery** | BLENDED |
| **Outcomes of Course** | Students are expected to:<br>• Become aware of themselves, and their surroundings (family, society, nature);<br>• Become more responsible in life, and in handling problems with sustainable solutions, while keeping human relationships and human nature in mind. Develop better critical ability.<br>• Become sensitive to their commitment towards what they have understood (human values, human relationship and human society).<br>• Apply what they have learnt to their own self in different day-to-day settings in real life. |

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| **Name of Faculty Mentor** | **Shubha Mishra** |
| **Novel Engaging Course Title** | **Internet as Social Media (2000167)** |
| **Objectives of Course** | • To enable students to learn and understand aspects of social media.<br>• To make students aware about the possible consequences of misusing social media.<br>• Developing understanding and intelligence for distinguishing among fake and genuine information prevalent across the web.<br>• To acquire skills for dealing with fake data. |
| **Content** | Introduction to Social Media, its scope, need, utilities, pros and cons, demand, Social media as a part of Internet, Fake News- definition, types, understanding the nature of news and its impacts on society, Intro to Cyber Crime, types, legal remedies, initiatives by government, awareness on how to use social platforms. |
| **Contact hrs** | 30 |
| **Mode of Delivery** | Online/offline |
| **Outcomes of Course** | The students will be able to:<br>• Use social media in safe and secure way.<br>• Analyze online social user's behavior.<br>• Write good quality review/research paper. |
| **External Mentors / Collaborations** | - |

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| **Name of Faculty Mentor** | **Dr. Gagandeep Kaur** |
| **Novel Engaging Course Title** | **JIRA Agile Project Management (2000168)** |
| **Objectives of Course** | • To learn to work on, manage & administer Agile projects<br>• To understand Role of Project Manager<br>• To understand Agile Terminology and Jira Software<br>• To understand SCRUM, JIRA issue workflow and how to create issues |
| **Content** | **Introduction to Agile Project Management:** Project Management, Project Scheduling Techniques, Problems Agile Solves, Agile Principles, Why Use Agile Agile Terminologies, Scrum and Kanban.<br>**Working within Agile Team**: Creating Issue Types: Overview, Epics, Stories,Tasks, Board, Scrum Vs Kanban Board, Backlog View, Creating Issues<br>**JQL & Agile Boards**: Searching for Issues, Advanced searching using JIRA Query Language (JQL),Search filters, configuring agile boards, creating software releases, versions, sprints and viewing reports, Burn down charts.<br>**JIRA Administration & Practices:** Creating a new user, creating groups, New User admin role, Understanding the different permission levels, Project Roles, JIRA Workflows, Roadmaps, Estimating. |
| **Contact hrs** | 30 hrs |
| **Mode of Delivery** | Blended (Offline/Online) |
| **Outcomes of Course** | At the end of the course, the student will be able to:<br>• Apply SCRUM and Agile Practices<br>• Describe JIRA as a user working within an agile team.<br>• Execute JQL and Create Agile Boards<br>• Recognize Project Roles and JIRA Administration |

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| **Name of Faculty Mentor** | **Dr. Surendra Kumar Chourasiya** |
| **Novel Engaging Course Title** | **Materials Characterization Techniques (2000169)** |
| **Objectives of Course** | To aware students about the basic and advanced techniques of materials characterization. |
| **Content** | 1. Introduction and historical background<br>2. Mechanical Properties and its need<br>3. Traditional characterization techniques<br>4. Advanced characterization techniques |
| **Contact hrs** | 30 hrs |
| **Mode of Delivery** | Blended |
| **Outcomes of Course** | Students will be able to:<br>1. Apply the basic and advanced techniques of materials characterization.<br>2. Evaluate and estimate the properties of materials. |
| **External Mentors / Collaborations** | NA |

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| **Name of Faculty Mentor** | **Pooja Sahoo** |
| **Novel Engaging Course Title** | **Microsoft word and PowerPoint for Beginners (2000170)** |
| **Objectives of Course** | Identify the various benefits of using word processing software and the main parts of the Microsoft power point window. |
| **Content** | Create and Manage Documents, Format a Document, Customize Options and Views for Documents, Print and save documents, Format Text, Paragraphs, and Sections, Create Tables and Lists, Create and Manage References, Manage document options and settings, Design advanced documents using power point software, Create Advanced References |
| **Contact hrs** | 30 hrs |
| **Mode of Delivery** | Blended Mode |
| **Outcomes of Course** | At the end of the course, the student will be able to: Utilize word and Power Point in a variety of professional, educational and personal situations. |
| **External Mentors / Collaborations** | No |

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| **Name of Faculty Mentor** | **Rajni Ranjan Singh, Ms. Jigyasa Mishra** |
| **Course Name/Code** | **Programming Skills* – I (2000171) & II (2000172)** |
| **Objectives** | 1.To provide aplatform to thestudents with differentinterestssuchascoding,Web Designing& Information Security.<br>2. To prepare for variouscompetitions likeACM-ICPC,Google CodeJam, etc.<br>3. To provide aforum for thediscussion oftheoryandapplications of |
| **Content** | 1) Part –I (2000171) : Procedural & Object Oriented Programming<br>2) Part – II (2000172): Web Designing & Information Security |
| **Contact hrs.** | 30 |
| **Outcomes** | After completion of the course, students will be able to:<br>**Part I :**<br>○ Implement the algorithms and draw flow charts for solving Mathematical and Engineering problems.<br>○ Develop programs using decision making and looping concepts<br>○ Implement Arrays, strings, structures and files<br>○ Implement the concepts of object-oriented programming<br>○ Illustrate the process of data file manipulations<br>○ Code, document, test, and implement a well-structured, robust computer program<br>**Part II**<br>○ Develop Web Pages using HTML and CSS<br>○ Develop fully functioning website and deploy on a web server<br>○ Design responsive web pages including multimedia contents<br>○ Analyze software vulner abilities and security solutions to reduce the risk of exploitation<br>○ Implement cyber security solutions and use of cyber security, information assurance and cyber/computer forensic software / tools |

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| **Name of Faculty Mentor** | **Dr. Devesh Kumar Lal** |
| **Novel Engaging Course Title** | **Real-Time Big Data Processing: Concepts, Techniques & Applications (2000173)** |
| **Objectives of Course** | 1. Understand Real-Time Big Data Processing.<br>2. Explore Techniques for Real-Time Big Data Processing.<br>3. Understand Scalability and Fault-Tolerance.<br>4. Explore Emerging Trends and Applications.<br>5. Explore different Case Study of Real-Time Big Data. |
| **Content** | "Real-Time Big Data Processing: Concepts, Techniques, and Applications" provides an in-depth exploration of the fundamental concepts, techniques, and applications involved in processing large volumes of data in real time. It is designed to equip students with the knowledge and skills required to tackle the challenges and leverage the opportunities presented by real-time big data. |
| **Contact hrs** | 30 hrs |
| **Mode of Delivery** | Blended |
| **Outcomes of Course** | After completion of the course, the students will be able to:<br>1. Explain the fundamentals concept of Big Data.<br>2. Create an architecture for real time data processing<br>3. Identify challenges of Real-Time Big Data Processing<br>4. Describe different technologies and RTDP frameworks<br>5. Apply Knowledge to Real-World Scenarios |
| **External Mentors / Collaborations** | NIL |

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| **Name of Faculty Mentor** | **Divya Chaturvedi** |
| **Course Title** | **Scientific Research Writing (2000174)** |
| **Objectives of Course** | The objective of course is<br>1. To introduce basics of Research Writing<br>2. To know ethics in writing<br>3. To explain the types of paper<br>4. To have information of core components of a paper<br>5. To improve writing skilland to get knowledge of publishing work |
| **Content** | **Zero Level for Scientific Writing**:<br>Use of search engines, authenticating the information, editing in MS office, style analysis programs, data entry and working knowledge of excel, creating tables, figures, graphs, making a poster, indexing systems available for various science streams, e-resources, e-journals, Sodhganga& INFLIBNET<br>**Overview**: Introduction of science writing, Difference between scientific writing and general writing, popular articles and popular lectures, science reporting, Science news, explanatory writing, lengthy magazine article<br>**Types of Paper:**Short communication, original research article, review;<br>**Component of Paper:** Title, author affiliation, abstract, key words, introduction, material and methods, results and discussion, conclusion, references and bibliography, citation.<br>**Ethics**: Ethics in writing, plagiarism, plagiarism checker online.<br>**Publishing work**: Selection of Journal, impact factors, h index, following author guidelines, on line submission, proof reading of a manuscript. |
| **Contact hrs** | 30 hrs |
| **Mode of Delivery** | Online/Offline |
| **Outcomes of Course** | **Attenders will able to**<br>1. Write a good research paper<br>2. Apply ethics in writing<br>3. Use the Word and Excel<br>4. Use knowledge of e-resources and e-journals<br>5. Select good Journal for publishing the research work |
| **External Mentors / Collaborations** | NA |

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| **Name of the faculty Mentor** | Ashok Kumar Sharma |
| **Course Name/Code** | **Scientific Temperament of Indian Thoughts and Traditions (2000175)** |
| **Objectives** | To familiarise students about the Basic science behind Indian culture. |
| **Contents** | Indian culture is an oldest culture of the world, It provides the solution of each and every moment of human routine life, and some are (1). Time management of human life. (2) Habits and society. (3). What is good and what is not good? (4) Social learning, the base of future stands. (5) Celebration of Indian festivals. |
| **Contact hrs** | 30 |
| **Outcomes** | After completion of the course, Students will be able to;<br>• Create awareness about Indian traditions.<br>• Develop the social awareness.<br>• Analyse the correlation between our past and present.<br>• Summarize the traditional and scientific approach. |

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| **Name of Faculty Mentor** | **Dr. Anshika Srivastava** |
| **Novel Engaging CourseTitle** | **Smart Sensing and Intelligent Systems (2000176)** |
| **Objectives of Course** | This course provides an in-depth exploration of smart sensing technologies and intelligent systems. Students will learn about the principles, design considerations, and applications of smart sensors and how they are integrated into intelligent systems. |
| **Content** | Introduction to Smart Sensing and Intelligent Systems, Sensor Technology and Selection, Sensor Data Acquisition and Signal Processing, Machine Learning for Sensor Data Analysis, Intelligent Algorithms and Decision-Making Systems, Applications of Smart Sensing and Intelligent Systems, Hands-on Projects and Case Studies. |
| **Contact hrs** | 30 hrs |
| **Mode of Delivery** | Blended Mode (Offline/Online) |
| **Outcomes of Course** | After the completion of this course, students will be able to:<br>CO1: Explain the fundamental concepts and principles of smart sensing and intelligent systems. CO2: Classify different types of sensors and their applications in various domains.<br>CO3: Identify the techniques and methodologies for handling sensor data.<br>CO4: Analyze the integration of sensors with intelligent algorithms and decision-making systems. CO5: Determine the strategy and implementation of intelligent systems using smart sensingtechnologies.<br>CO6: Design practical projects to solve real time problems. |
| **External Mentors / Collaborations** | 1. Dr. Ankita Srivastava (Assistant Professor, SATI, Vidisha, M. P.- 464001)<br>2. Dr. Nilesh Anand Srivastava (Assistant Professor, Central University of Allahabad, Prayagraj,U. P.- 211002)<br>3. Dr. Priyank Khare (Assistant Professor, IIIT Ranchi, Jharkhand- 834010) |

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| **Name of Faculty Mentor** | **Kuldeep Narayan Tripathi** |
| **Novel Engaging Course Title** | **Solving Problems Using Modelling and Simulation (2000177)** |
| **Objectives of Course** | Objective of the course is to make students familiar with various modelling and simulation techniques to solve the real-world problems. |
| **Content** | Modelling & Simulation: Introduction, Concepts & Classification, Verification & Validation, Discrete System Simulation, Continuous Simulation, Modelling & Simulation – Database, Neural Networks in Modelling & Simulation, Fuzzy Set in Modelling & Simulation, Network Simulation, NS-2 Simulator |
| **Contact hrs** | 30 |
| **Mode of Delivery** | Online |
| **Outcomes of Course** | After the completion of this course, students will be able to:<br>• Explain simulation and modelling concepts.<br>• Apply various modelling techniques to solve the real-life problems. |
| **External Mentors / Collaborations** | NA |

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| **Name of Faculty Mentor** | **Dr.Vibha Tiwari** |
| **Novel Engaging Course Title** | **The Art of Mandala Meditation (2000178)** |
| **Objectives of Course** | 1. Relieve Stress<br>2. Improve Focus<br>3. Reduce Anxiety |
| **Content** | Mandala is a Sanskrit word that means circles. Mandala is made using geometric patterns. The purpose of this is to relax and find harmony in oneness with the universe, making it both art and a form of meditation.<br>This mandala course teaches students how to self-soothe by using pen and paper and making various different types of Mandalas. |
| **Contact hrs** | 30 hrs |
| **Mode of Delivery** | Offline |
| **Outcomes of Course** | 1. Improve concentration<br>2. Develop creativity<br>3. Build self confidence |
| **External Mentors / Collaborations** | - |

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| **Name of Faculty Mentor** | **Dr. Gaurav Khare** |
| **Novel Engaging Course Title** | **The Art of Technical Analysis: Decoding Market Patterns (2000179)** |
| **Objectives of Course** | The course aims to equip students with a comprehensive understanding of technical analysis principles and tools to effectively analyze stock market trends and make informed trading decisions. |
| **Content** | Introduction to Technical Analysis, Chart Analysis, Technical Indicators, Trend Analysis and Confirmation, Support and Resistance Levels, Technical Analysis Tools and Software, Trading Strategies and Risk Management. |
| **Contact hrs** | 30 |
| **Mode of Delivery** | Hybrid |
| **Outcomes of Course** | Upon completion of the course, students will be able to:<br>• Use various technical indicators.<br>• Develop and implement trading strategies based on technical analysis.<br>• Apply technical analysis knowledge to make informed trading decisions in the stock market. |

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| **Name of Faculty Mentor** | **External Mentor** |
| **Novel Engaging Course Title** | **Umpiring of Sports (2000180)** |
| **Objectives of Course** | To provide opportunity for students to learn basic concept of umpiring/ Referee in different games / sports. |
| **Content** | Cricket, Basketball, Volleyball, Football, Badminton, Table-Tennis, Official and their duties, rules and regulations. |
| **Contact hrs** | 30 |
| **Mode of Delivery** | Blended |
| **Outcomes of Course** | The students will be able to:<br>1. Explain basic rules of umpiring in various sports.<br>2. Perform umpiring in friendly matches. |
| **External Mentors / Collaborations** | -- |

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| **Name of Faculty Mentor** | **Rohit Agrawal** |
| Novel Engaging Course Title | **Probability and Statistics (2000181)** |
| Objectives of Course | This Course Covers Probability, conditional probability, independence, random variables, expected value, moment generating function, probability generating function, characteristic function, specific discrete and continuous distributions, covariance, correlation coefficient, central limit theorem. |
| Content | Probability, Conditional Probability, Independence, Law of total probability, Bayes' theorem, Montyhall problem, Random Variables: discrete and continuous, Expected value, Variance, Properties of Variance, PMF,CDF,JointProbability,JointConditionalProbability,Convolution,Numericalsamples, Correlation,Covariance.<br><br>Discrete Distributions, Bernoulli, Binomial, Poisson, Geometric, Applications of Discrete Distribution, Continuous Random Variables, Continuous domain and correlation with discrete domain, Continuous Distribution: Probability density function, Cumulative distribution function, Uniform Distribution, Normal Distribution, Standard normal distributions, Z Scores, Z tables, Exponential, applications of distributions, Sampling distribution, Central Limit Theorem, Confidence Interval Estimation, Known sigma and unknown sigma base destimation, Markov Inequality, Chebyshev inequality, WLLN, Outlier detection, Zero shot learning. |
| Contact hrs | 30 |
| Mode of Delivery | Online |
| Outcomes of Course | The Students will be able to but not limited to:<br>CO1: Apply key concepts of probability, including discrete and continuous random variables, probability distributions, conditioning, independence, expectations, and variances.<br>CO2: Define and explain the different statistical distributions (e.g., Normal, Binomial, Poisson) and the typical phenomena that each distribution often describes.<br>CO3: Apply the basic rules and theorems in probability including Bayes's theorem and the Central Limit Theorem (CLT). |
| External Mentors / Collaborations | NA |