FREE ONLINE EDUCATION
swayam
शिक्षित भारत, उन्नत भारत

NPTEL

NATIONAL PROGRAMME ON
TECHNOLOGY ENHANCED LEARNING

IIT Guwahati MOOCs Courses

Annual Report 2016-2020

Massive Open Online Courses (MOOCs)

The Ministry of Human Resource Development (MHRD) has a MOOC (Massive Open Online Course) scheme under SWAYAM, which refers to the process of course delivery through an online portal open for anyone with an Internet connection. Under this scheme, several higher educational institutes have been entrusted with creating course content primarily at the college and university levels for science, engineering and humanities.

Since 2013, through the online portal, 4-, 8-, and 12-week online courses were delivered semester wise, typically on topics relevant to students in all years of higher technical education along with basic core courses in sciences and humanities with exposure to relevant tools and technologies. The enrolment to and learning from these courses involves no cost. An in-person, proctored certification exam (optional) will be conducted at Rs. 1000/- per course and a certificate is provided through the participating institutions and industry, when applicable.

IIT Guwahati, through Centre for Educational Technology, is very actively involved in the implementation of various Mission projects of National importance under MHRD along with very rigorous academic outreach programs. The vision and mission are to achieve the highest synergy between education, human resource development and the technological integration through collective & collaborative interdisciplinary team work.

IIT Guwahati contribution in 2016 run

Prof. S. Biswas
Computer Science and Engineering

Prof. A. Sarkar
Computer Science and Engineering

Prof. J. K. Deka
Computer Science and Engineering

Type of the course: Repurposed, July 2016 run
Duration: 12 weeks

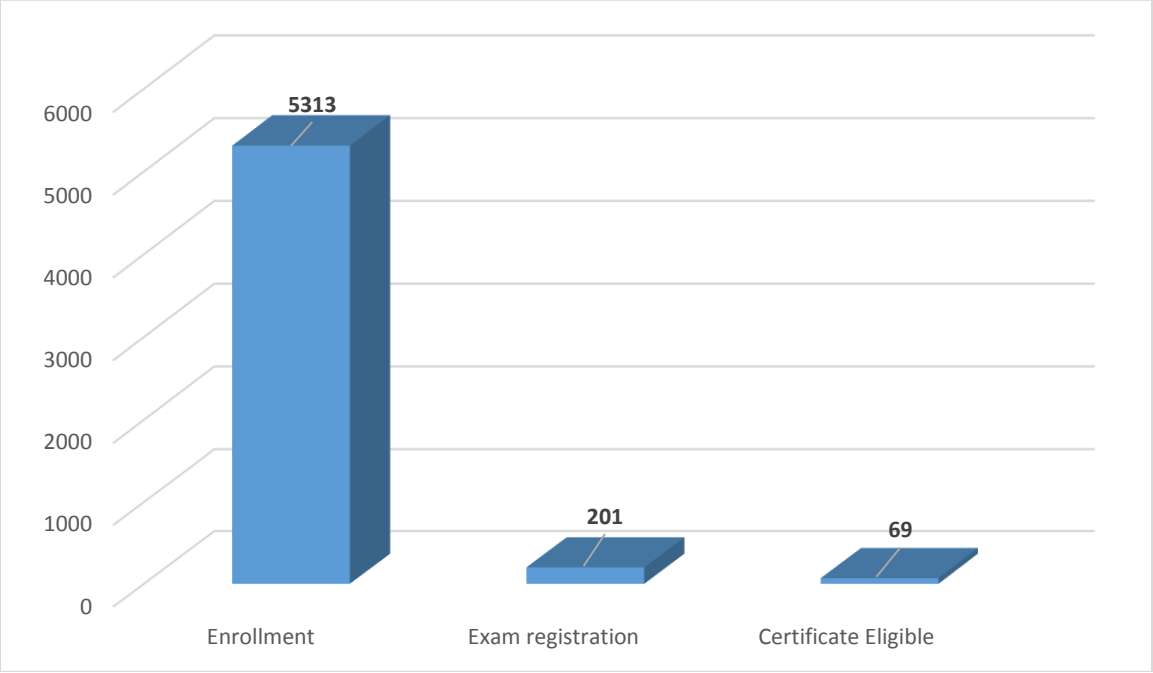
Course Outline:

Digital VLSI Design flow comprises three basic phases: Design, Verification and Test. The web course would cover theoretical, implementation and CAD tools pertaining to these three phases. Although there can be individual full courses for each of these phases, the present course aims at covering the important problems/algorithms/tools so that students get a comprehensive idea of the whole digital VLSI design flow. VLSI Design: High level Synthesis, Verilog RTL Design, Combinational and Sequential Synthesis Logic Synthesis (for large circuits). Verification Techniques: Introduction to Hardware Verification and methodologies, Binary Decision Diagrams (BDDs) and algorithms over BDDs, Combinational equivalence checking, Temporal Logics, Modeling sequential systems and model checking, Symbolic model checking. VLSI Testing: Introduction, Fault models, Fault Simulation, Test generation for combinational circuits, Test generation algorithms for sequential circuits and Built in Self-test.

Total nos. of enrollment: 5313

Total nos. of Exam registration: 201

Total nos. of Certificate Eligible: 69



Digital Human Modeling and Simulation for Virtual Ergonomics Evaluation

Prof. Sougata Karmakar
Design

Type of the course: New, July 2016 run Duration: 8 weeks

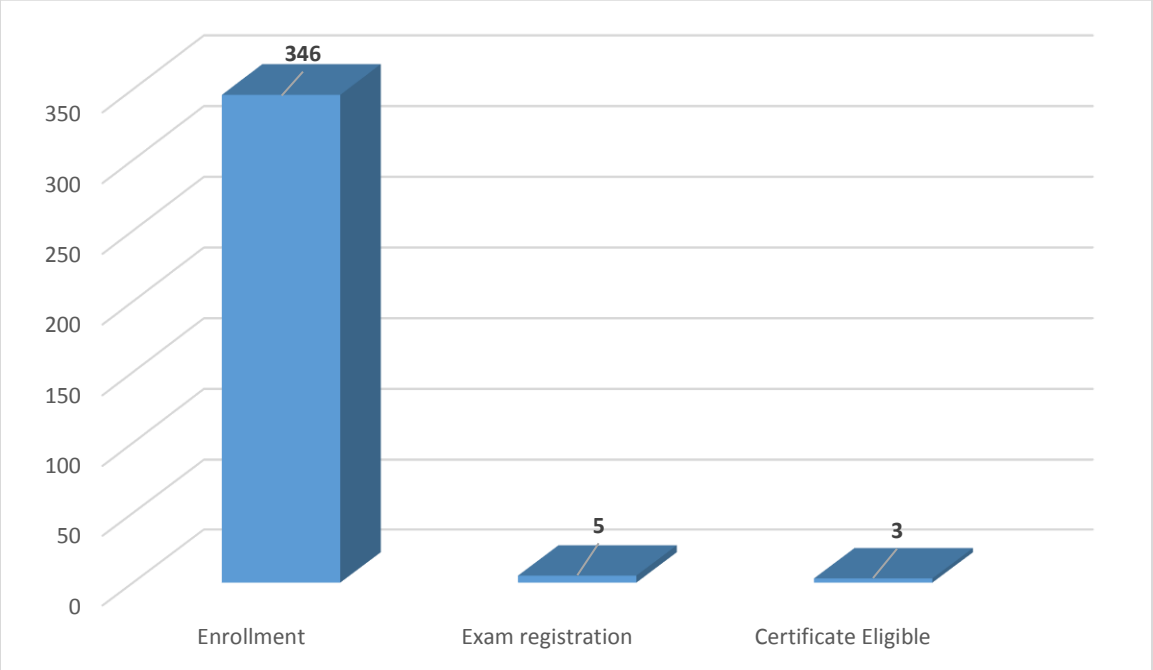
Course Outline:

It is well known that knowledge of 'Ergonomics/ Human Factors Engineering' is of utmost necessity for any product, facility and workplace design to achieve optimal man-machine compatibility in terms of physical, cognitive and environmental factors. While ergonomics evaluation using physical mockups and prototype with real human trials is tiresome, time-consuming, and costly; virtual ergonomics evaluation using CAD model of human and products/facilities is extremely beneficial to get rid of all these issues. The course 'Digital Human Modeling and Simulation for Virtual Ergonomics' deals not only with the basics of Ergonomics but also covers the all the relevant topics related to virtual ergonomics evaluation techniques including its advantages and limitations.

Total nos. of enrollment: 346

Total nos. of Exam registration: 05

Total nos. of Certificate Eligible: 03



Advanced Machining Processes

Prof. Manas Das
Mechanical Engineering

Type of the course: New, July 2016 run Duration: 8 weeks

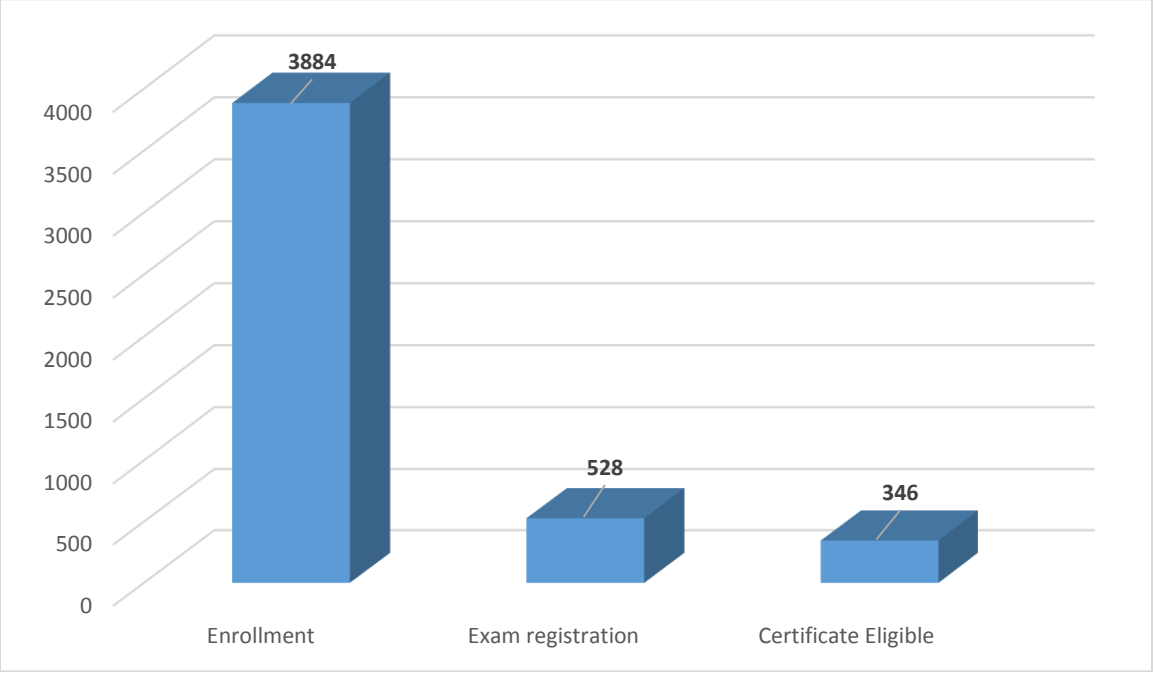
Course Outline:

There is a need for machine tools and processes which can accurately and easily machine the most difficult-to-machine materials and work pieces with intricate and accurate shapes. In order to meet these challenges, a number of newer material removal processes have now been developed to the level of commercial utilization. These newer methods are also called unconventional in the sense that conventional tools are not employed for metal cutting. Instead, energy in its direct form is used to remove the material from the work piece. This course aims at bringing the students up-to-date with the latest technological developments and research trends in the field of unconventional / nontraditional / modern machining processes.

Total nos. of enrollment: 3884

Total nos. of Exam registration: 528

Total nos. of Certificate Eligible: 346



Introduction to Crystal Elasticity and Crystal Plasticity

Prof. Swarup Bag
Mechanical Engineering

Type of the course: New, July 2016 run Duration: 8 weeks

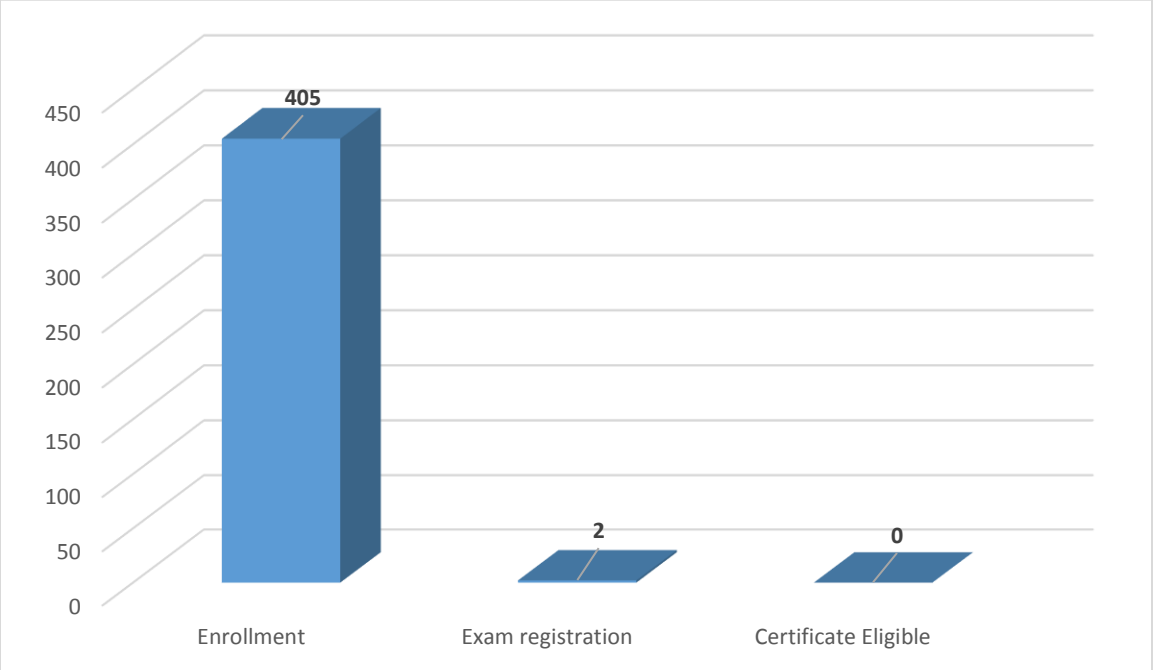
Course Outline:

This course is primarily designed based on students who are interested in physics based model in broad area of materials and manufacturing processes. The aim of this course is to bridges the gap between continuum mechanics and material science where the behavior is described at different length scales. The course emphasizes on basic understanding of the related topics by mathematical and physical problems involved in studying mechanical behavior of conventional metals and alloys. Students will be able to develop fundamental understanding on the response of common engineering materials to mechanical loading at different length scales through the lectures and will be reinforced through assignments. The course is highly enjoyable to the beginners as it will be presented in most simplified way.

Total nos. of enrollment: 405

Total nos. of Exam registration: 2

Total nos. of Certificate Eligible: 0



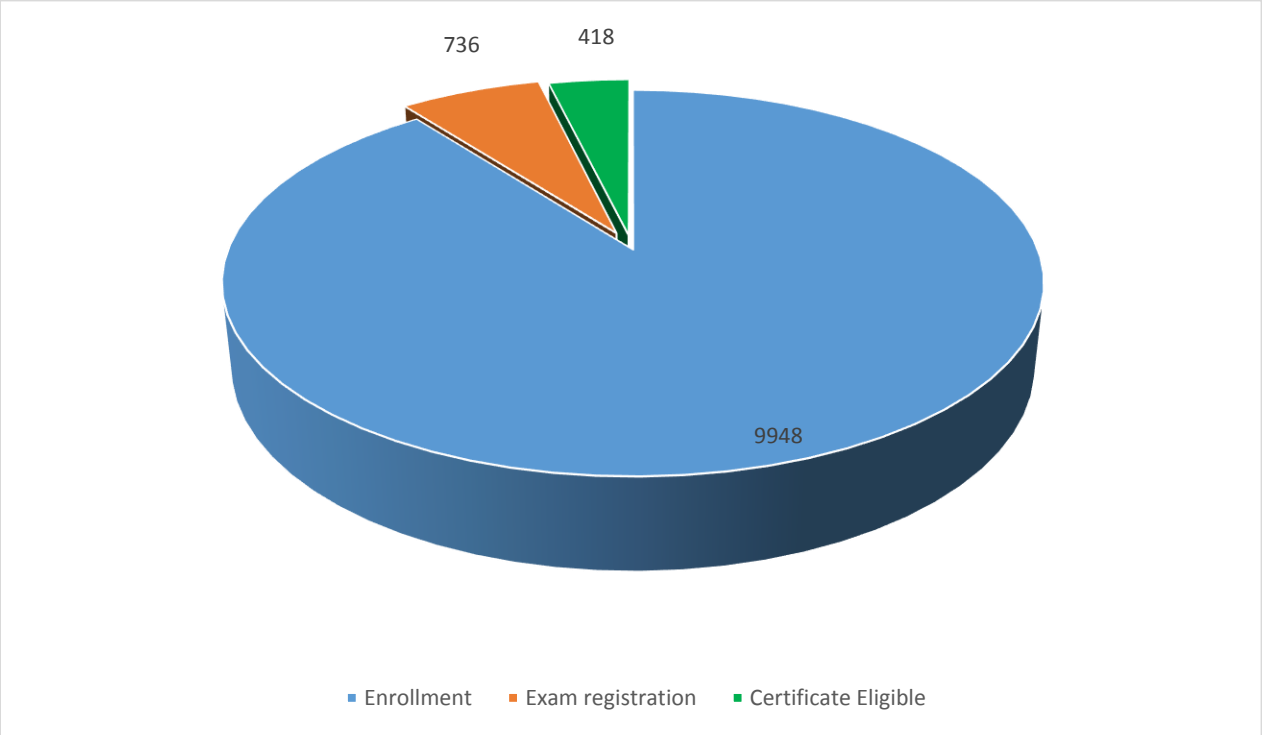
IIT Guwahati contribution in 2016 run Cumulative Data

Total nos. of Course Conducted: 4

Total nos. of Enrollment: 9948

Total nos. of Exam registration: 736

Total nos. of Certificate Eligible: 418



IIT Guwahati contribution in 2017 run

Prof. Avishek Parui
Humanities and Social Sciences

Type of the course: New, July 2017 run Duration: 8 weeks

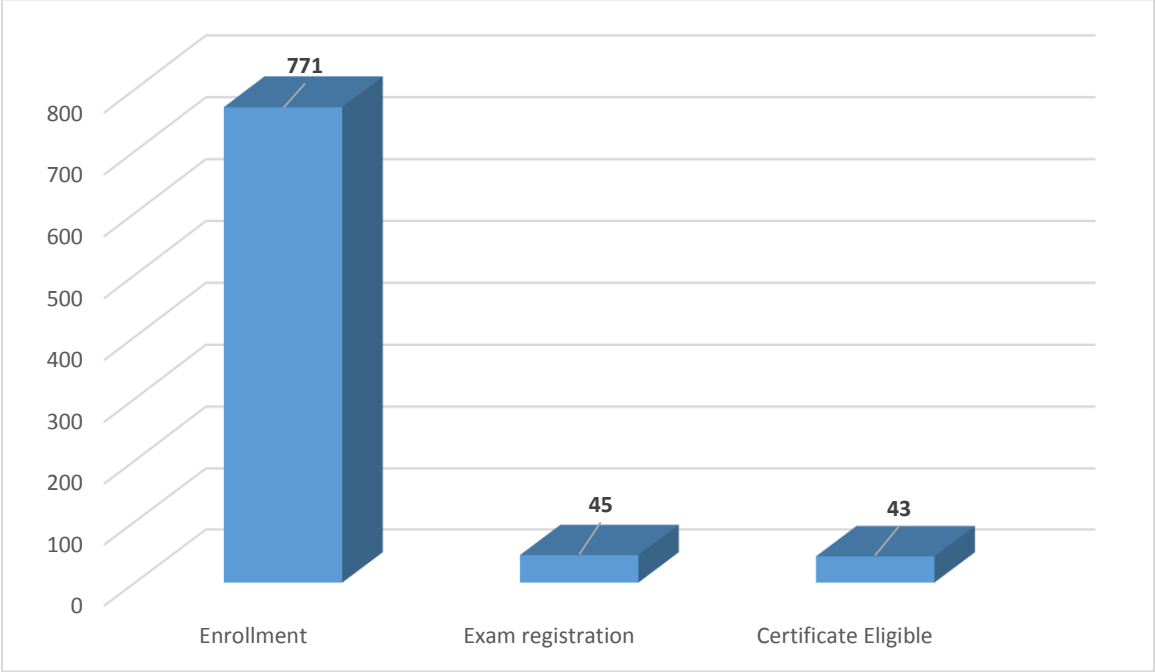
Course Outline:

Gender and Literature is an examination of selected literary texts and cultural conditions from the standpoint of gender theory. It will draw on established scholarship on gender studies and take the student through the various configurations and reconfigurations that determine gendered classifications such as masculinity and femininity.

Total nos. of enrollment: 771

Total nos. of Exam registration: 45

Total nos. of Certificate Eligible: 43



Prof. Sambit Mallick
Humanities and Social Sciences

Type of the course: New, July 2017 run Duration: 12 weeks

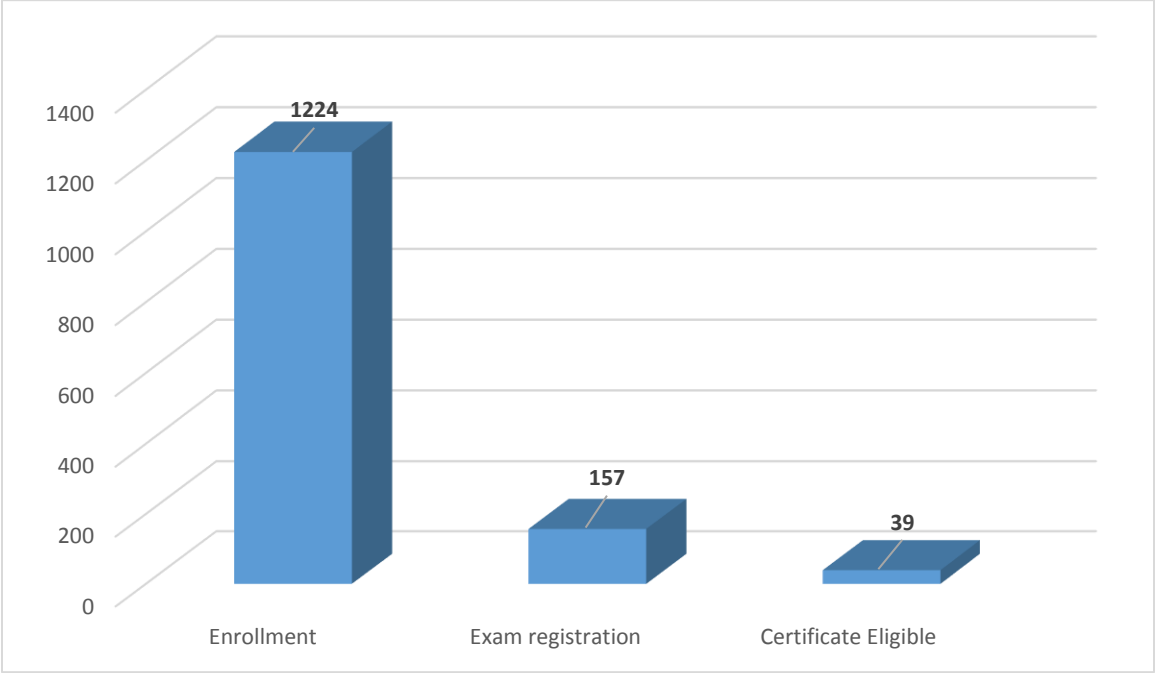
Course Outline:

The objective of the course is to enable students to understand science as a socio-cultural product in specific socio-historical contexts. The course exposes students to philosophical, historical and sociological perspectives to look at science as a practice deeply embedded in culture and society. It emphasizes the dynamic nature of the relations between wider cultural practices on one hand and scientific practices on the other. The attempt is to equip students with an understanding indispensable for an in-depth study of science-technology-society dynamics.

Total nos. of enrollment: 1224

Total nos. of Exam registration: 157

Total nos. of Certificate Eligible: 39



Prof. Ngamjahao Kipgen
Humanities and Social Sciences

Type of the course: New, July 2017 run Duration: 12 weeks

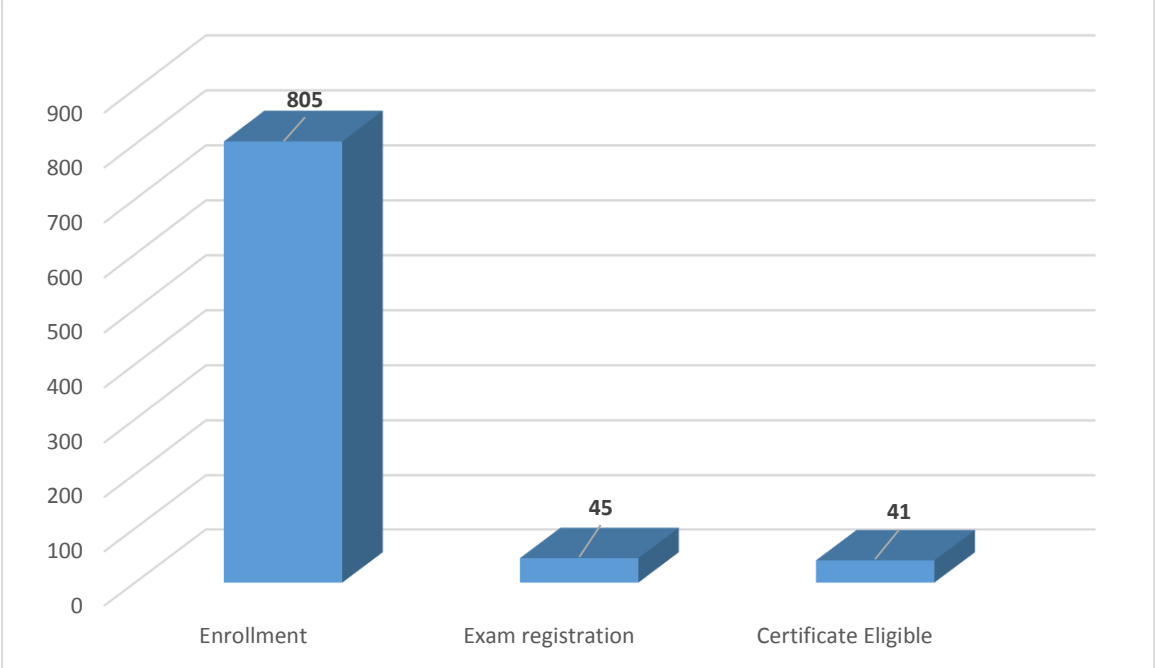
Course Outline:

The course focuses on the ecology of human societies human-environment relationships, with reference to cultural ecology and issues surrounding sustainable development. The ecology of human societies is about connections between ecological and human social, cultural, and organizational processes. Based on selected works of ecological anthropologists, this course focuses on the dynamic relationships between human cultures and their ecological environments. It uses basic concepts of anthropology, including the concept of culture as a dynamic system of learned behaviors and beliefs, to better understand how human beings adapt to and change their physical and social surroundings.

Total nos. of enrollment: 805

Total nos. of Exam registration: 45

Total nos. of Certificate Eligible: 41



Introduction to Dynamical Models in Biology

Prof. Biplab Bose
Biosciences and Bioengineering

Type of the course: New, Jan 2017 run Duration: 4 weeks

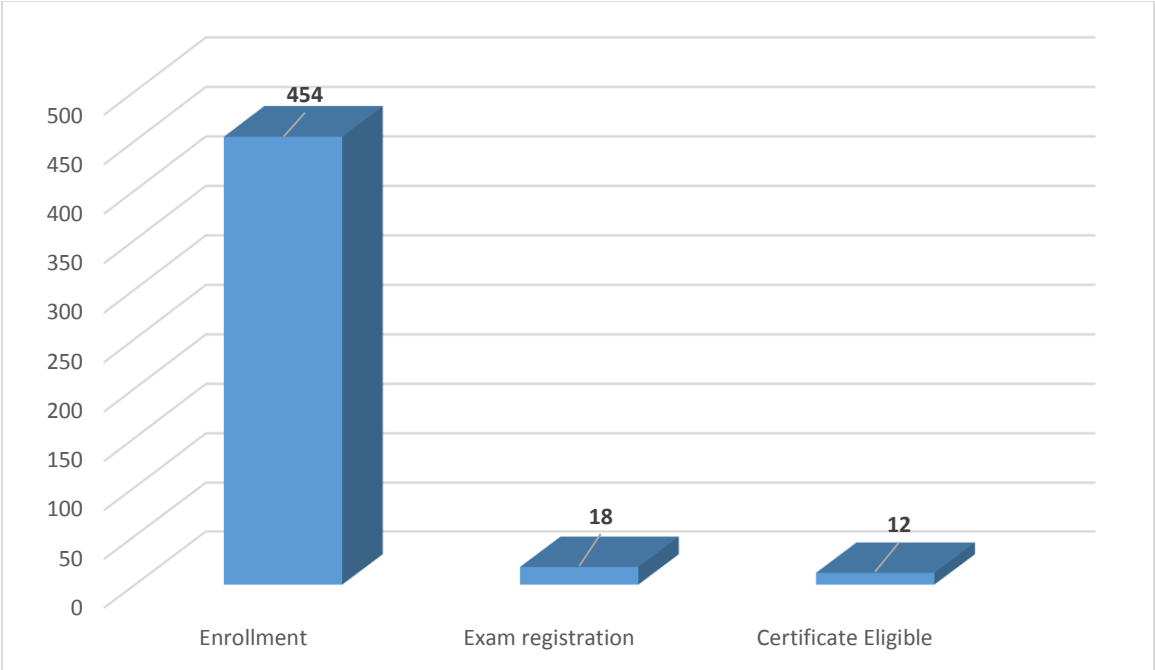
Course Outline:

Mathematical modeling has become integral part of different fields of biology, from ecology to cell biology. This course is intended to introduce students of biology to elementary mathematical concepts and tools for dynamical models. The course will focus on modeling using ordinary differential equations (ODEs). We will start with basic mathematical concepts of ODE-based models and then connect those with experimental biology. Mathematical models will be on cellular and molecular processes in biology, like cell signaling, and transcriptional networks. Students will learn basics of analytical techniques, graphical techniques, and numerical simulation.

Total nos. of enrollment: 454

Total nos. of Exam registration: 18

Total nos. of Certificate Eligible: 12



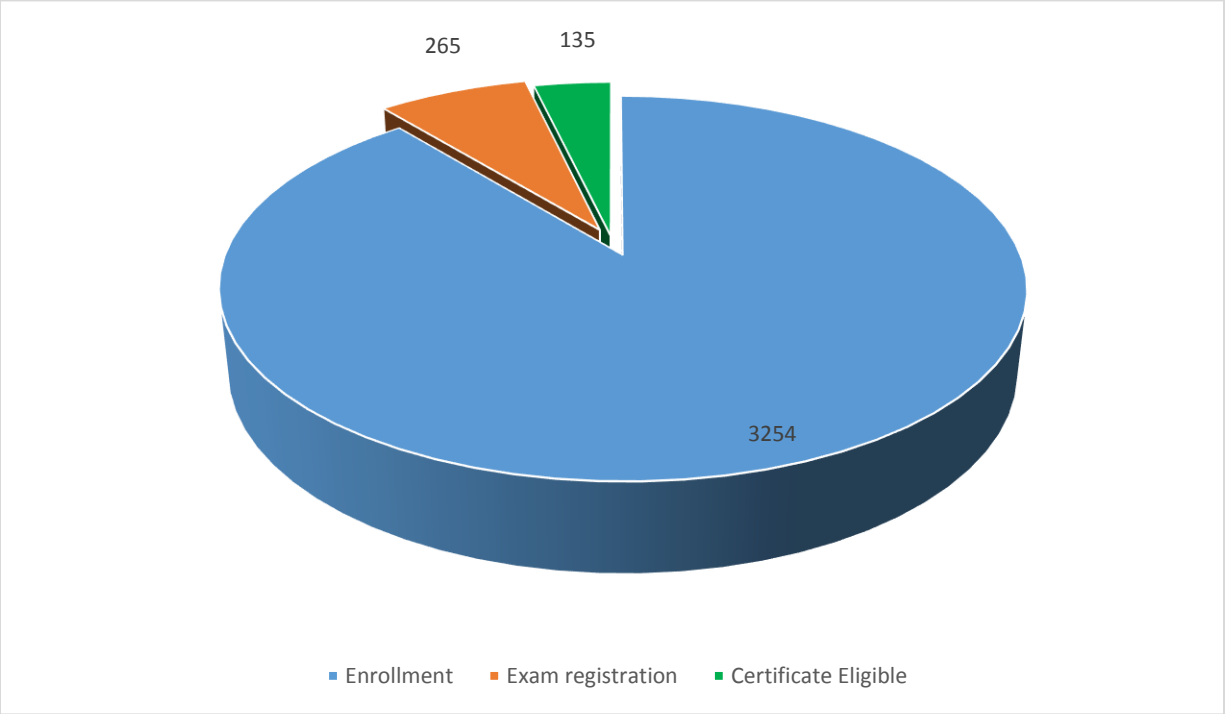
IIT Guwahati contribution in 2017 run Cumulative Data

Total nos. of Course Conducted: 4

Total nos. of Enrollment: 3254

Total nos. of Exam registration: 265

Total nos. of Certificate Eligible: 135



IIT Guwahati contribution in 2018 run

Prof. Biplab Bose
Biosciences and Bioengineering

Type of the course: Re-run, Jan 2018 run Duration: 4 weeks

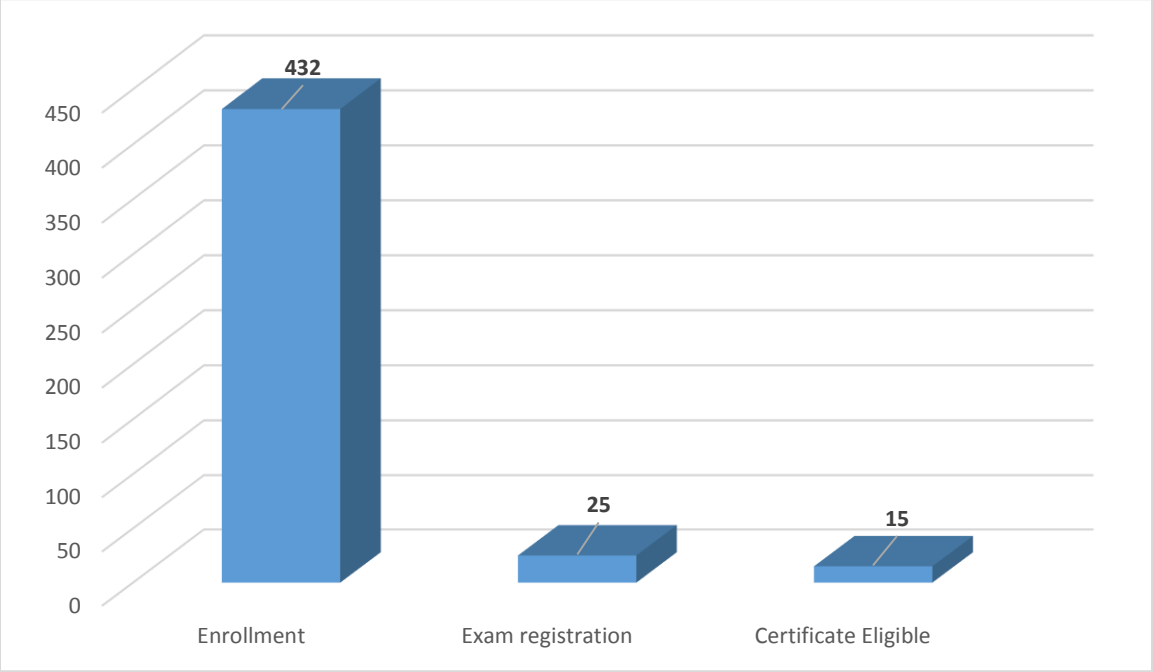
Course Outline:

Mathematical modeling has become integral part of different fields of biology, from ecology to cell biology. This course is intended to introduce students of biology to elementary mathematical concepts and tools for dynamical models. The course will focus on modeling using ordinary differential equations (ODEs). We will start with basic mathematical concepts of ODE-based models and then connect those with experimental biology. Mathematical models will be on cellular and molecular processes in biology, like cell signaling, and transcriptional networks. Students will learn basics of analytical techniques, graphical techniques, and numerical simulation.

Total nos. of enrollment: 432

Total nos. of Exam registration: 25

Total nos. of Certificate Eligible: 15



An Introduction to Cardiovascular Fluid Mechanics

Prof. Raghvendra Gupta
Chemical Engineering

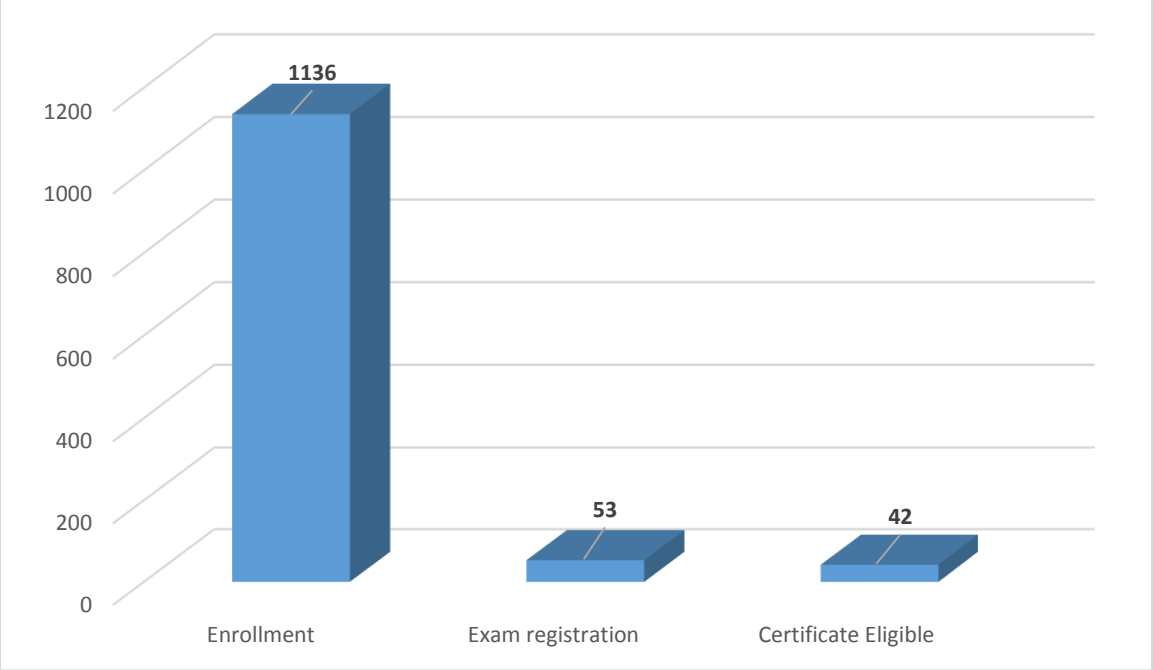
Type of the course: New, Jan 2018 run Duration: 4 weeks

Course Outline:
This course aims to provide an overview of the important problems in human circulatory system. The course would provide introduction to cardiovascular systems and important fluid flow problems in large arteries. The goal is to provide students with the necessary background to apply the knowledge of fluid mechanics to analyze the flow behavior in biological systems in general and human circulatory system in particular. It is hoped that with this course, the students would be able to develop a perspective towards the design and development of diagnostics and medical device development.

Total nos. of enrollment: 1136

Total nos. of Exam registration: 53

Total nos. of Certificate Eligible: 42



Measurement Technique in Multiphase Flows

Prof. Rajesh Kumar Upadhyay
Chemical Engineering

Type of the course: New, Jan 2018 run Duration: 4 weeks

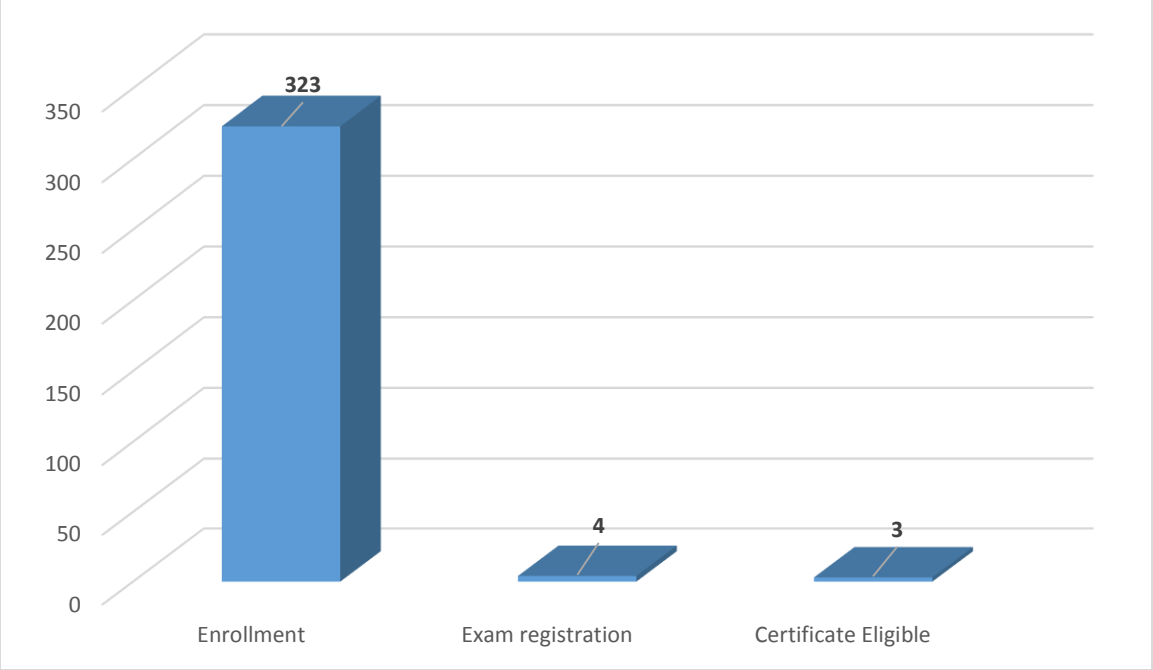
Course Outline:

Multiphase flow reactors are heart of many process industries. However, the flow dynamics of these reactors are not well understood mainly because of complex flow physics involved. In this course different technique available for monitoring and mapping of multiphase flow reactors will be discussed in detail. Techniques will be divided in two parts: Invasive, in which some probe will be intruded inside the vessel to measure the velocity and/or phase fraction and in Second part non-invasive techniques will be discussed in which measurement will be performed without disturbing the flow. The basic principle, equations, post processing methods, advantages and limitations of each technique will be discussed in detail.

Total nos. of enrollment: 323

Total nos. of Exam registration: 4

Total nos. of Certificate Eligible: 3



Multiphase Flows

Prof. Rajesh Kumar Upadhyay
Chemical Engineering

Type of the course: New, Jan 2018 run Duration: 8 weeks

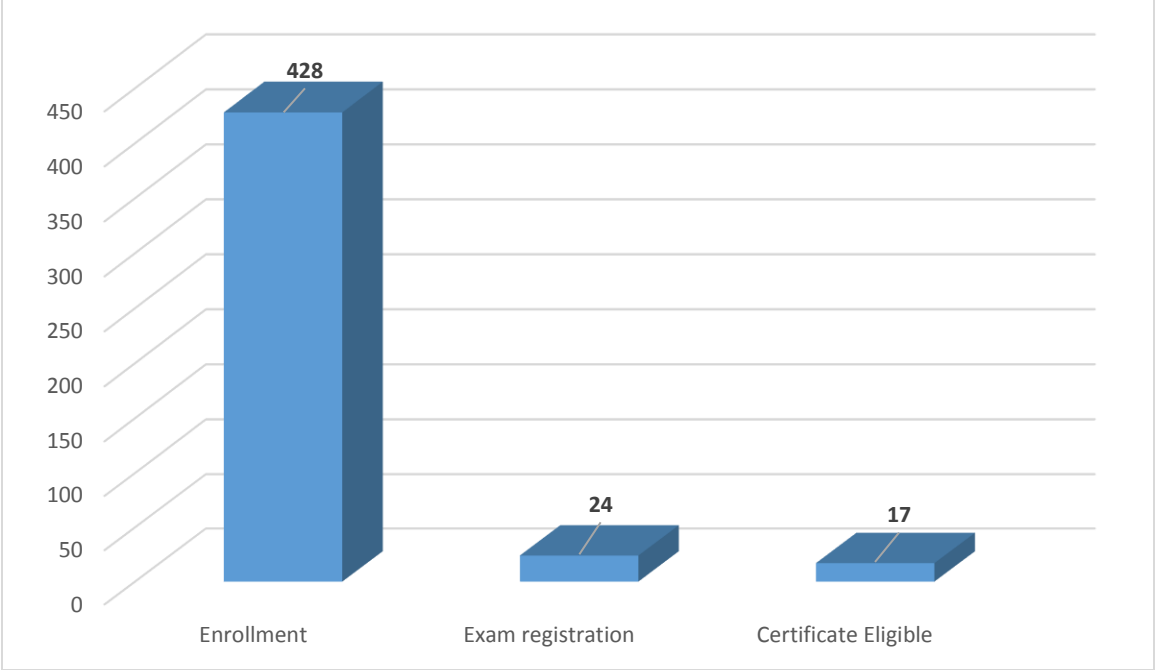
Course Outline:

Multiphase flow reactors are critically important many industries like, chemical, petroleum, petrochemicals, food, pharmaceuticals etc. The performances of these reactors largely depend on the interactions of different phases involved. In this course basic of Multiphase flow along with different flow regime map and pressure drop, and volume fraction calculation will be covered. Further, the interaction between different phases at different scales will be discussed. Modelling methods used for multiphase flow reactors will be covered. Finally, different type of multiphase flow reactors will be introduced and their functioning, advantage and disadvantages and challenges along with future direction of research will be discussed.

Total nos. of enrollment: 428

Total nos. of Exam registration: 24

Total nos. of Certificate Eligible: 17



Introduction to Machining and Machining Fluids

Prof. Mamilla Ravi Sankar
Mechanical Engineering

Type of the course: New, Jan 2018 run Duration: 8 weeks

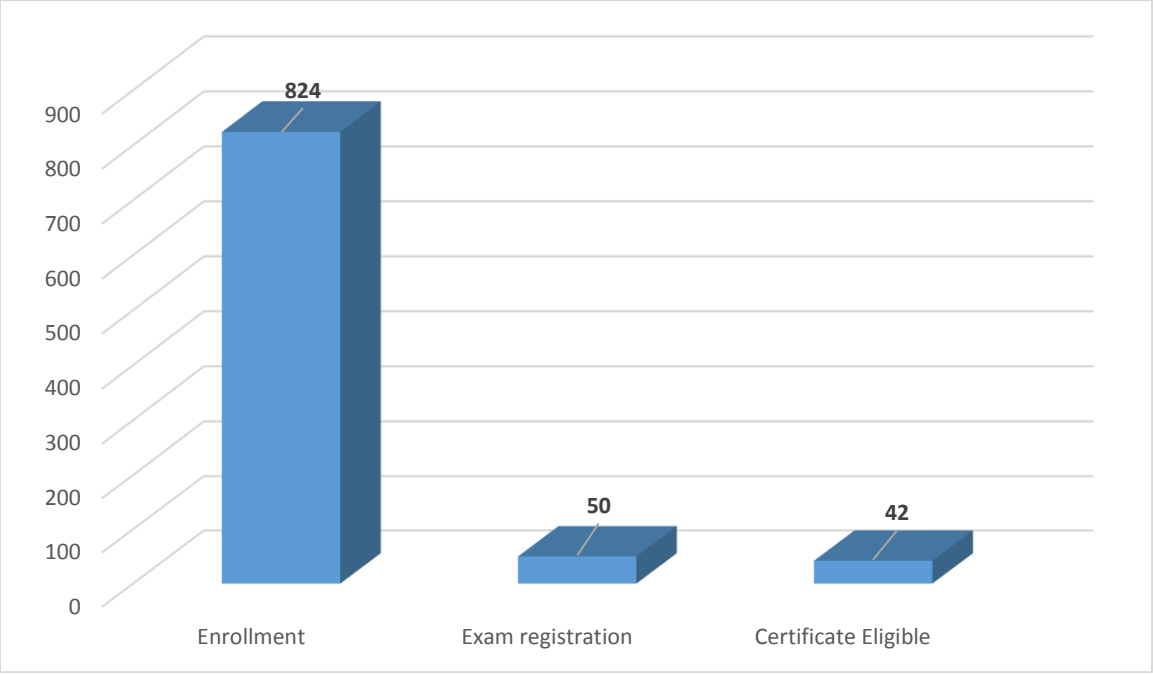
Course Outline:

Machining is one of the basic and very important courses for the mechanical undergraduate students. This process comes under the subtractive manufacturing processes where in material is removed. This course gives the basic understanding of the various machining processes and its physics. The mentioned syllabus is systematic order to understand gradually, importance of machining, machining region mechanism, tool signatures, tool life, multipoint machining processes, cutting fluid, cutting fluid emissions and its effect on human kind. This course also gives emphasis on cutting fluid emissions and its effect on operators, environment and water pollution. How to develop the eco-friendly cutting fluids as an alternative to commercial miner oils? Development of sustainable cutting fluids application techniques to improve the machining performance. This course is systemically arranged and taught in smooth as well as clear way so that students understand easily.

Total nos. of enrollment: 824

Total nos. of Exam registration: 50

Total nos. of Certificate Eligible: 42



Prof. Raghvendra Gupta
Chemical Engineering

Type of the course: New, Jan 2018 run Duration: 8 weeks

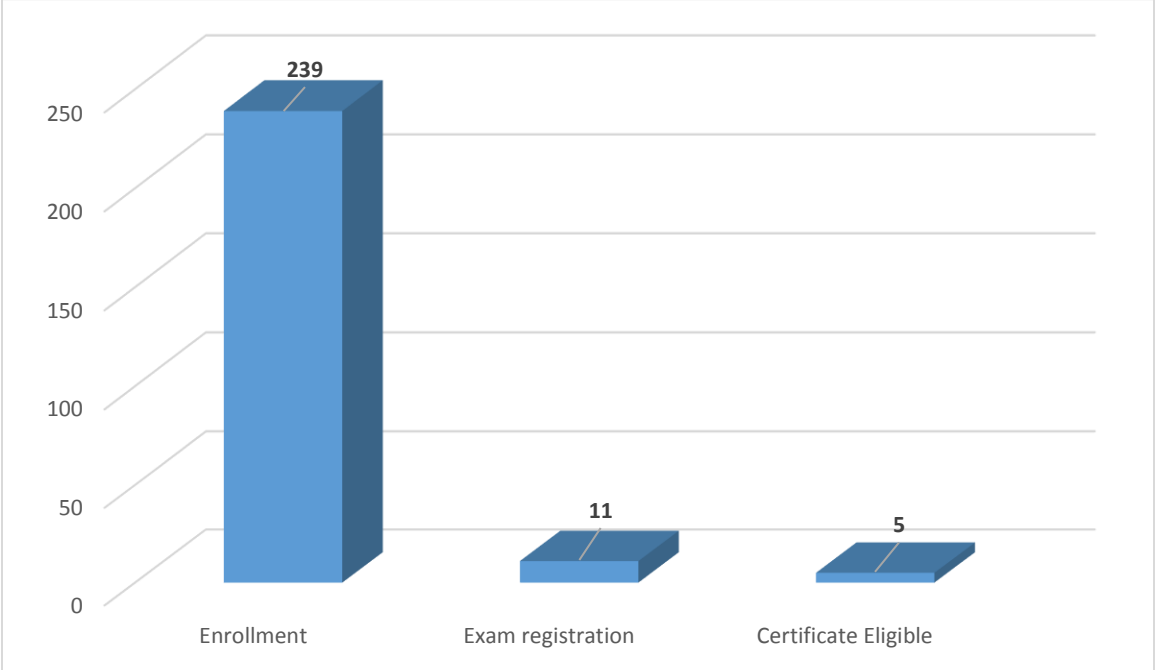
Course Outline:

With the advancement in manufacturing technology in past few decades, the trend towards miniaturization has accelerated in several industries. In chemical process industries, the viability of compact heat exchangers, microreactors for process intensification is being explored because of small diffusion lengths, high interfacial area density and relatively safe operation. Most of these equipments involve multiphase flows and their design requires a fundamental understanding of heat, mass and momentum transport in multiphase flow in microchannels. This course is aimed at introducing the students with the fundamental principles as well as recent developments in the area of multiphase flow at the small scale.

Total nos. of enrollment: 239

Total nos. of Exam registration: 11

Total nos. of Certificate Eligible: 05




Optimization Techniques for Digital VLSI Design

Prof. Chandan Karfa
Computer Science and Engineering

Prof. Santosh Biswas
Computer Science and Engineering

Type of the course: New, Jan 2018 run Duration: 8 weeks

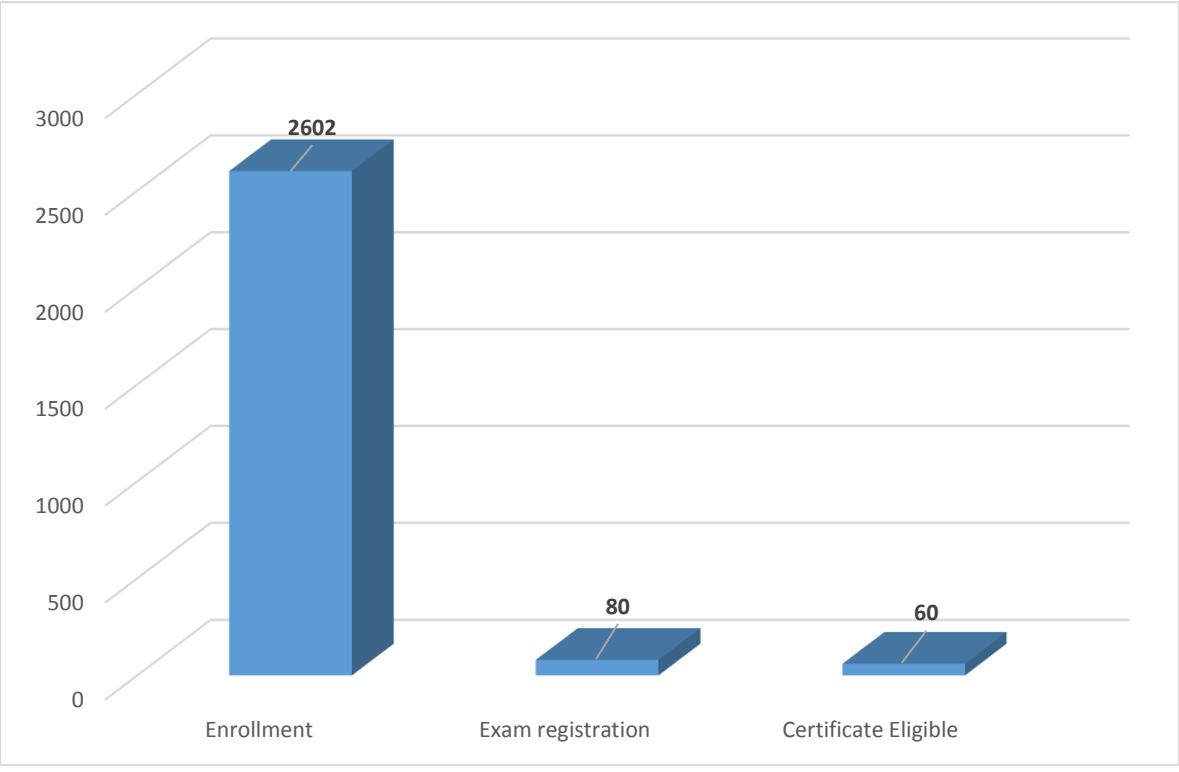
Course Outline:

Digital VLSI Design flow comprises three basic phases: Design, Verification and Test. This course will give a brief overview of the VLSI design flow. The primary emphasis of the course is to introduce the important optimization techniques applied in the Industry level electronic design automation (EDA) tools in the VLSI design flow. This course is unique in the sense that it will give a comprehensive idea about the widely used optimization techniques and their impact the generated hardware. The outline of the course is as follows: VLSI Design: Overview of digital VLSI design flow; High-level Synthesis, logic synthesis and physical synthesis and optimization techniques applied in these three steps; Impact of compiler optimization on hardware synthesis, 2-level logic optimization, multi-level logic optimizations, ESPRESSO; Technology Mapping: DSP and RAM inference for FPGA. RTL Optimizations: Area, power and timing optimization techniques like retiming, register balancing, folding. pipelining, and clock gating. VLSI Test: Introduction to Automatic Test Pattern Generation (ATPG), optimization Techniques for ATPG, design for Testability, optimization Techniques for design for testability, High-level fault modeling, RTL level Testing Verification: LTL and CTL based hardware verification, verification of large systems, binary decision diagram (BDD) based verification, arithmetic decision diagram based (ADD) and high-level decision diagram (HDD) based verification, symbolic model checking, bounded model checking.

Total nos. of enrollment: 2602

Total nos. of Exam registration: 80

Total nos. of Certificate Eligible: 60



Advanced Condensed Matter Physics

Prof. Saurabh Basu
Physics

Type of the course: New, Jan 2018 run Duration: 8 weeks

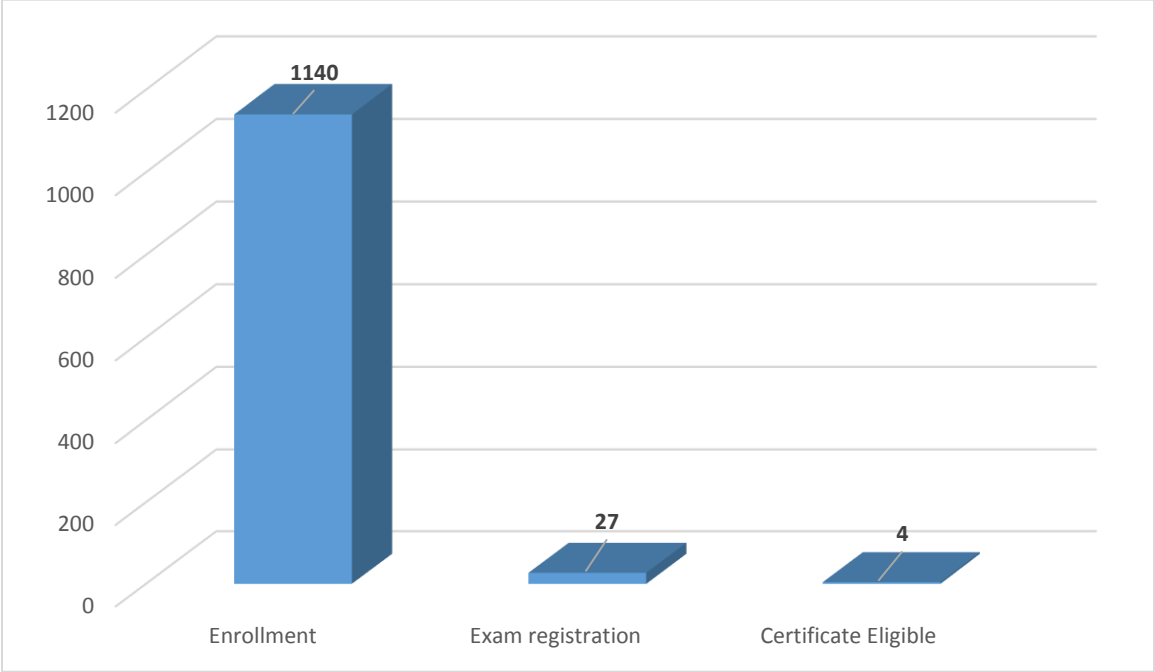
Course Outline:

The Course deals with the prerequisite material for studying advanced level research in Condensed Matter Physics. The course begins with a preliminary discussion on second quantization, followed by zero temperature and Matsubara Greens functions. Applications to Hubbard model, Kane Mele model and superconductivity are discussed.

Total nos. of enrollment: 1140

Total nos. of Exam registration: 27

Total nos. of Certificate Eligible: 04



Advances in Welding and Joining Technologies

Prof. Swarup Bag
Mechanical Engineering

Type of the course: New, Jan 2018 run Duration: 8 weeks

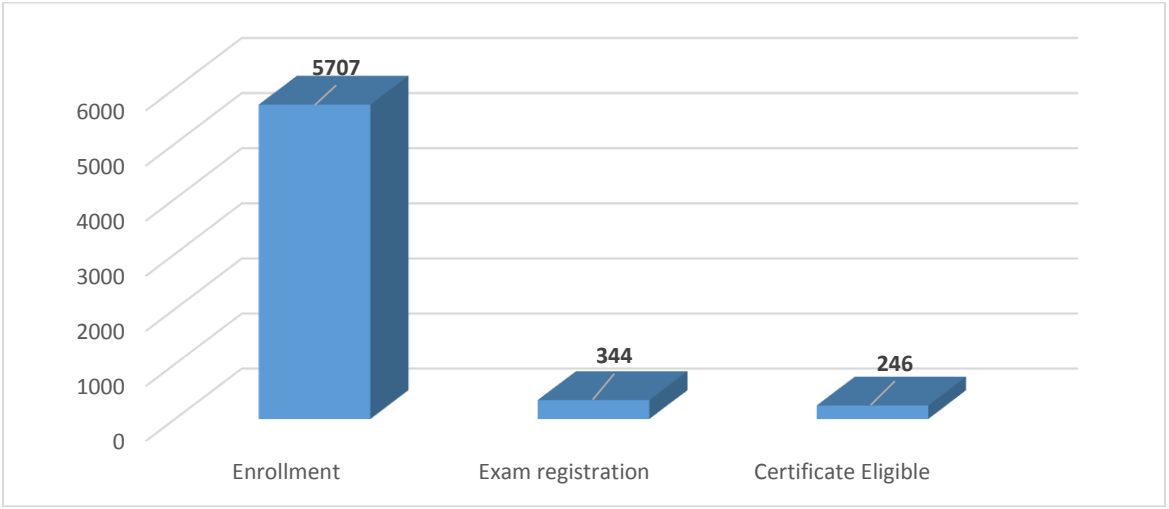
Course Outline:

The progress of several welding and joining processes is ever increasing with the development of new materials and their application in modern technologies. The microjoining and nanojoining is even more challenging area with the development of miniature components. This course is primarily designed from fundamental understanding to the most recent advances in welding and joining technologies. The syllabus is oriented to the advancement of the joining technologies which is different from conventional welding and joining processes. The modules cover almost all the direction of joining technologies and it is blended with fundamental development to the recent technologies. Audience will be able to develop fundamental understanding on different perspective and recent development in this field through the lectures and reinforce their knowledge by solving assignments. This course is presented in a lucid and The progress of several welding and joining processes is ever increasing with the development of new materials and their application in modern technologies. The microjoining and nanojoining is even more challenging area with the development of miniature components. This course is primarily designed from fundamental understanding to the most recent advances in welding and joining technologies. The syllabus is oriented to the advancement of the joining technologies which is different from conventional welding and joining processes. The modules cover almost all the direction of joining technologies and it is blended with fundamental development to the recent technologies. Audience will be able to develop fundamental understanding on different perspective and recent development in this field through the lectures and reinforce their knowledge by solving assignments. This course is presented in a lucid and simplified way to make it enjoyable to the beginners.

Total nos. of enrollment: 5707

Total nos. of Exam registration: 344

Total nos. of Certificate Eligible: 246



Fundamentals of Nuclear Power Generation

Prof. Dipankar N. Basu
Mechanical Engineering

Type of the course: New, Jan 2018 run Duration: 12 weeks

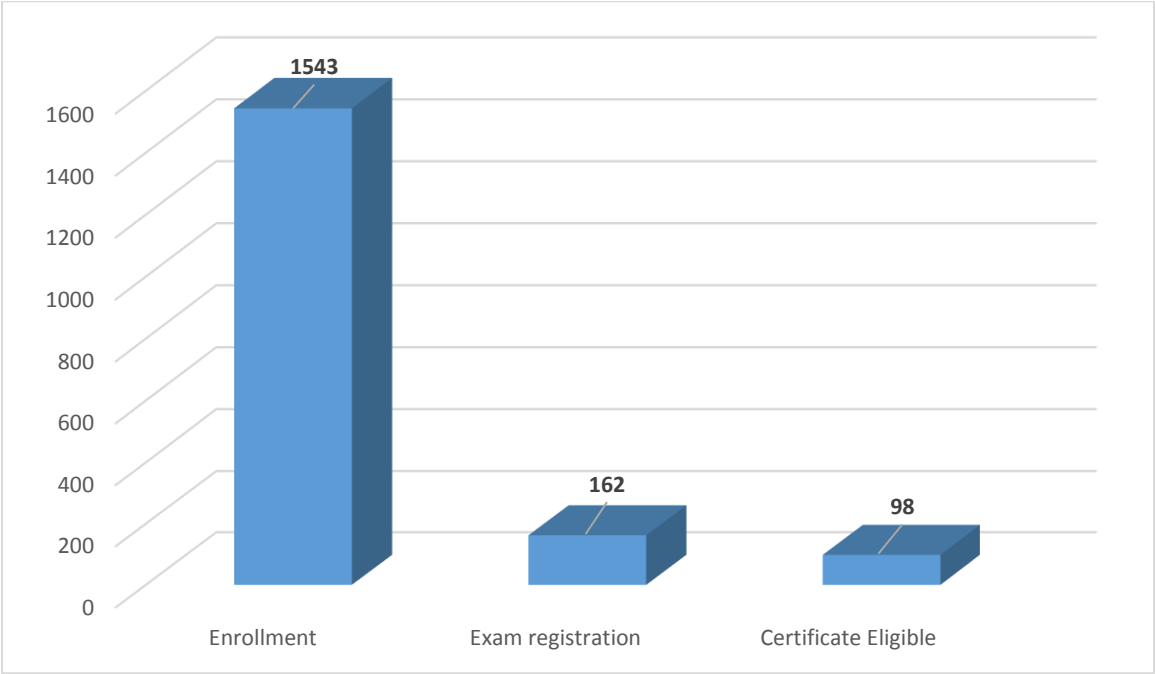
Course Outline:

The depleting stock of fossil fuels and global concern over the preservation of environment has projected nuclear energy as a very relevant option, particularly considering the near-zero emission and huge resource availability. From technological point of view, nuclear power production is quite different from the conventional thermal plants and therefore it is the need of the hour to grasp the essentials at an early level. Present course introduces the students to the fundaments of nuclear power generation. Starting from the atomic structure, students will be gradually familiarized with different concepts, finally leading to the design of different reactors. Important topics such as nuclear waste management, biological impact of radiation and safety issues pertinent to handling nuclear fuels will also be discussed.

Total nos. of enrollment: 1543

Total nos. of Exam registration: 162

Total nos. of Certificate Eligible: 98



Sociological Perspectives on Modernity

Prof. Sambit Mallik
Humanities and Social Sciences

Type of the course: New, Jan 2018 run Duration: 12 weeks

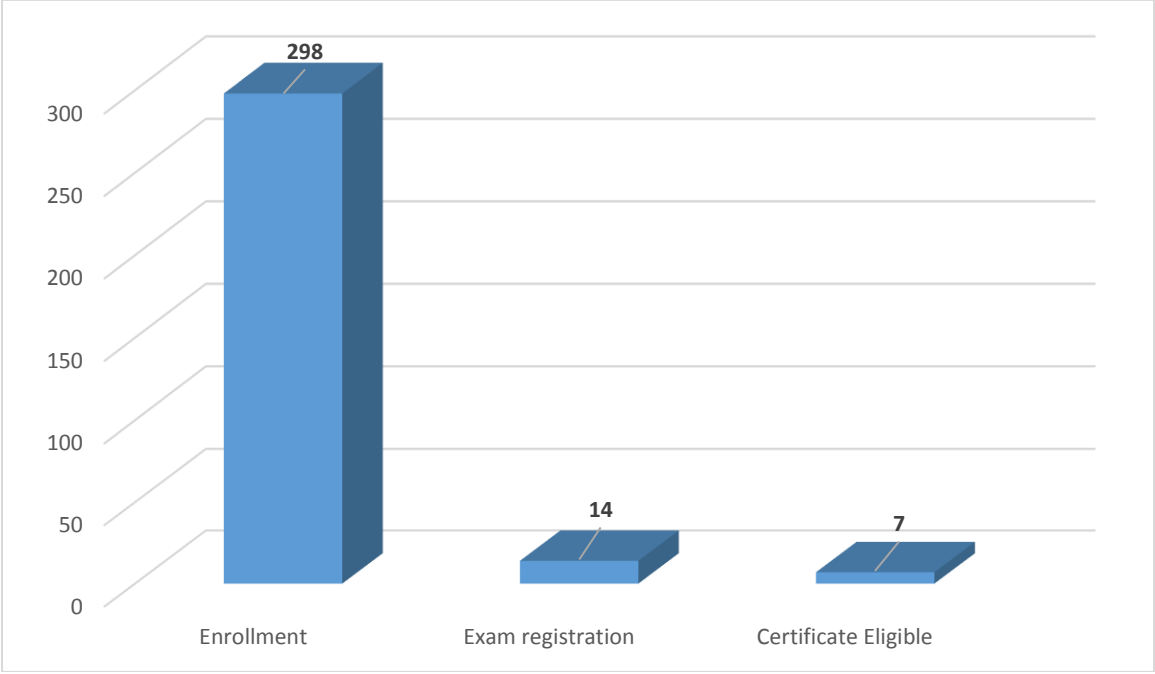
Course Outline:

The objective of the course is to enable students to understand modernity as a socio-cultural product in specific socio-historical contexts. The course exposes students to theoretical perspectives to look at modernity and its constituents as a practice deeply embedded in culture and society. It familiarizes students with encountering problems in their everyday life from more rationalist perspectives. It attempts to critically engage with and interrogate the multiple views on modernity.

Total nos. of enrollment: 298

Total nos. of Exam registration: 14

Total nos. of Certificate Eligible: 7



Introduction to Cognitive Psychology

Prof. Naveen Kashyap
Humanities and Social Sciences

Type of the course: New, Jan 2018 run Duration: 12 weeks

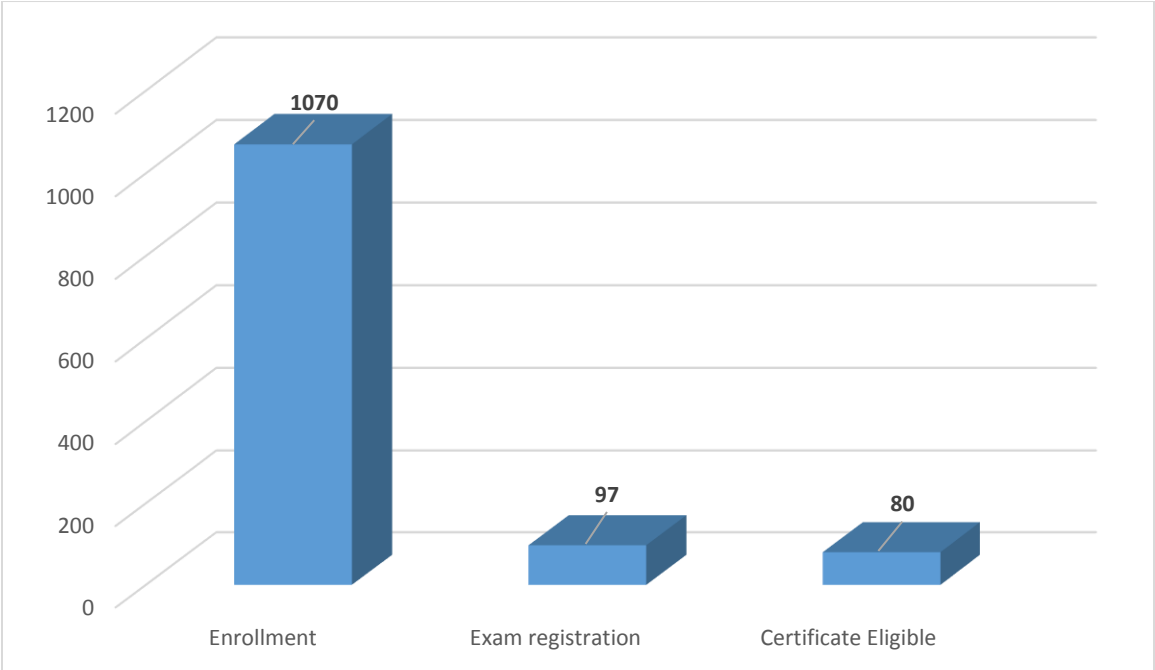
Course Outline:

One of the most puzzling fact for humans over the centuries has been the understanding of human behavior. Understanding and predicting human behavior will help humans in exerting more control over situations. The bases of human behavior are the cognitive processes underlying them. The present course is an attempt to discuss and understand the basic cognitive processes that guide human behavior. The knowledge from the course will be useful in tackling everyday problems and attaining optimal solutions. Additionally, we can use knowledge about human cognitive systems in designing sophisticated Artificial Intelligence (AI) systems that learn from mistakes and make our lives a lot easier to live.

Total nos. of enrollment: 1070

Total nos. of Exam registration: 97

Total nos. of Certificate Eligible: 80



Nuclear and Particle Physics

Prof. Poulose Poulose
Physics

Type of the course: New, Jan 2018 run Duration: 12 weeks

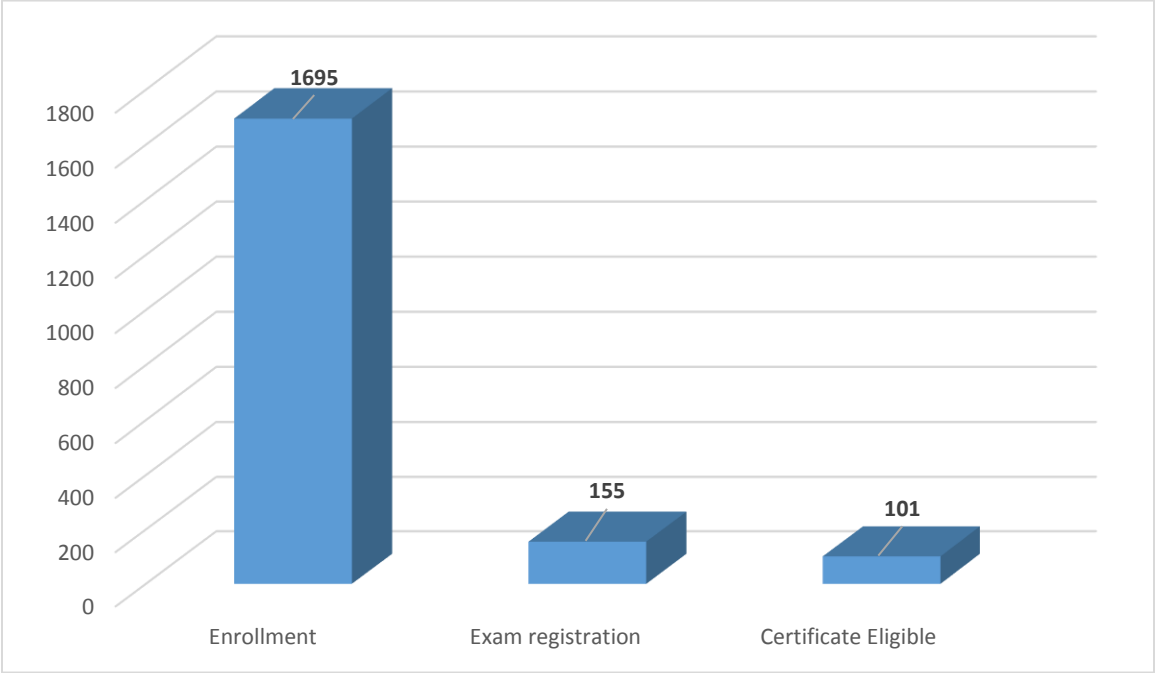
Course Outline:

The first part of the course will discuss nuclear physics. Properties of nuclei and details of popular nuclear models, properties of nuclear decays and nuclear reactions will be discussed in brief, but in a self-consistent manner. The second part will discuss the basics of particle physics. In this part, the fundamental forces and the dynamics of elementary particles under these forces will be considered. After introducing relativistic quantum mechanics, relativistic formulation of Maxwell's Equations and quantum electrodynamics will be discussed. This will be developed into the weak and strong nuclear forces based on the principle of gauge symmetry. The course will also introduce the physical principles of particle accelerators and detectors, including a very brief picture of the modern day complex detectors.

Total nos. of enrollment: 1695

Total nos. of Exam registration: 155

Total nos. of Certificate Eligible: 101



Fluidization Engineering

Prof. S. K. Majumder
Chemical Engineering

Type of the course: New, Jan 2018 run Duration: 12 weeks

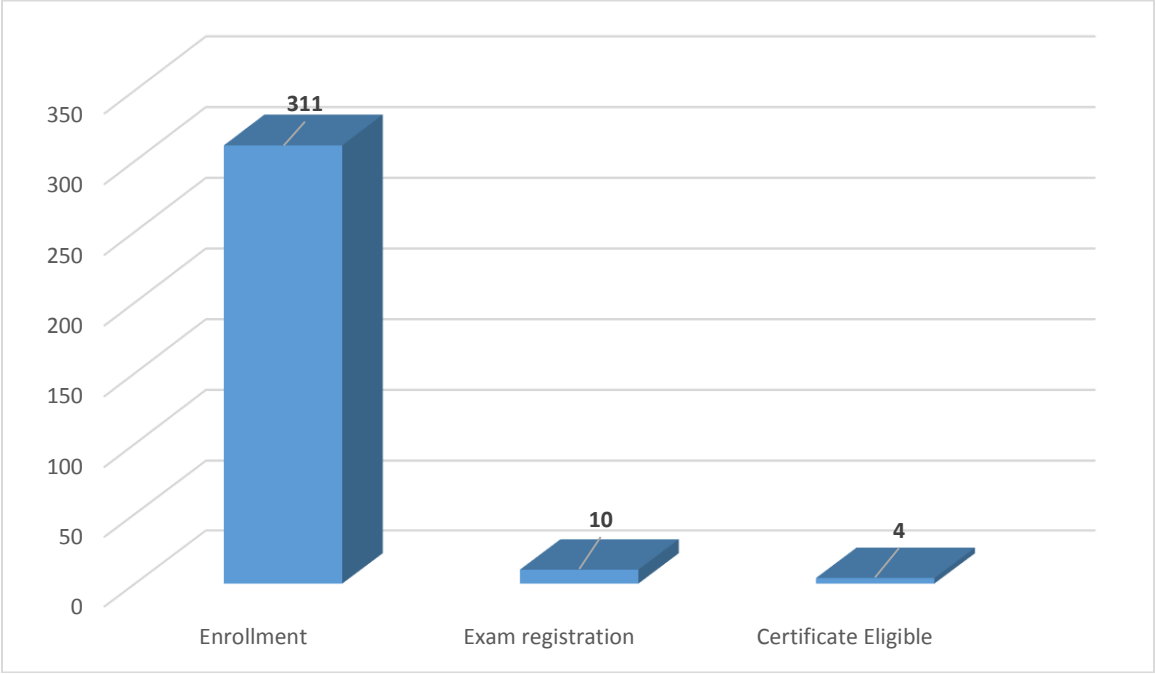
Course Outline:

This course is intended for learners who find themselves involved ranging from pure academic interest to direct industrial necessity in problems concerning the fluidized state. This course mainly covers the basic principles of fluidization phenomena and introduces the learner to the fundamental and practical aspects of basic fluidization operations for industrial application. This course may also be useful for who are doing research in multiphase system in chemical, metallurgical, and mining engineering programs.

Total nos. of enrollment: 311

Total nos. of Exam registration: 10

Total nos. of Certificate Eligible: 04





Computer Organization and Architecture: A Pedagogical Aspect

Prof. S. Biswas
Computer Science and Engineering

Prof. A. Sarkar
Computer Science and Engineering

Prof. J. K. Deka
Computer Science and Engineering

Type of the course: New, Jan 2018 run Duration: 12 weeks

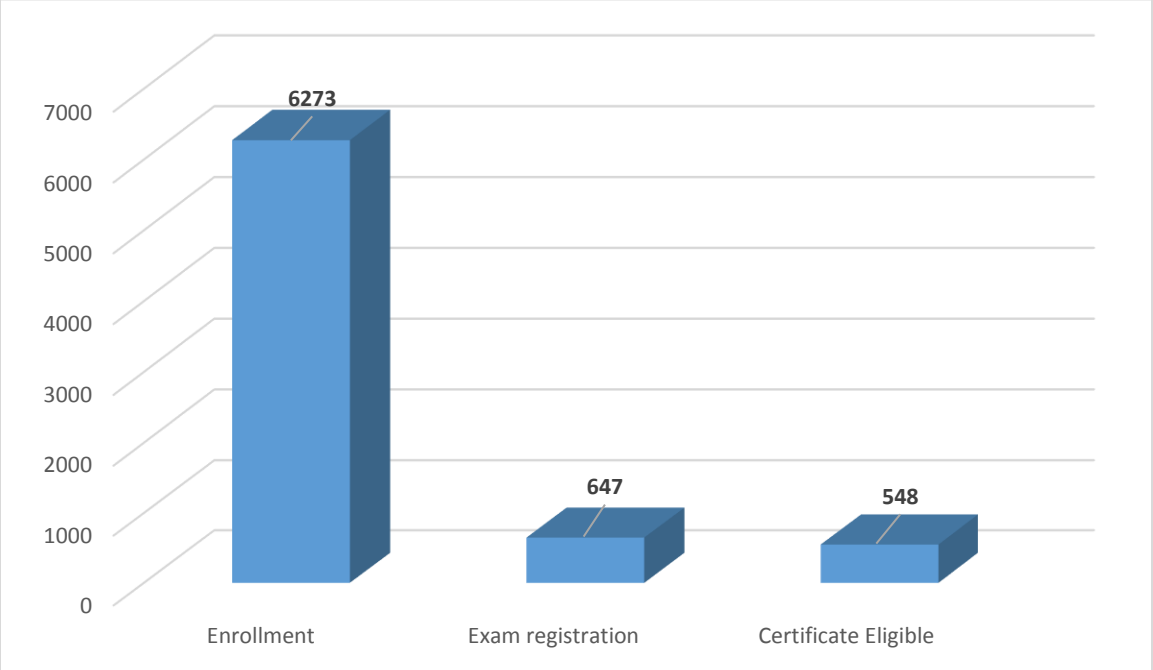
Course Outline:

Computer Organization and Architecture (COA) is a core course in the curricula of Computer Sciences as well as Electronics and Electrical Engineering disciplines at the second-year level in most of the Indian universities and technical institutions. This is the first course in COA and the course would provide students with an understanding of the design of fundamental blocks used for building a computer system and interfacing techniques of these blocks to achieve different configurations of an "entire computer system". This course will be developed and taught with respect to Objectives based on Bloom's Taxonomy. First, we will highlight the main objectives the course is aimed to achieve. Following that, at each module, we will specify the module level objectives and demonstrate how these objectives meet the course level main goals in unison. At the leaf level i.e., the units, we will point the specific objectives of the lecture. Also, it will be demonstrated how the unit level objectives satisfy the parent module level objectives. Further, each module will have a module level problem which needs concepts of all the units therein to solve. Finally, a comprehensive course level problem related to design of "entire computer system" will be discussed which meets all the course level objectives

Total nos. of enrollment: 6273

Total nos. of Exam registration: 647

Total nos. of Certificate Eligible: 548



Theory of Rectangular Plates -Part1

Prof. Poonam Kumari
Mechanical Engineering

Type of the course: New, July 2018 run Duration: 4 weeks

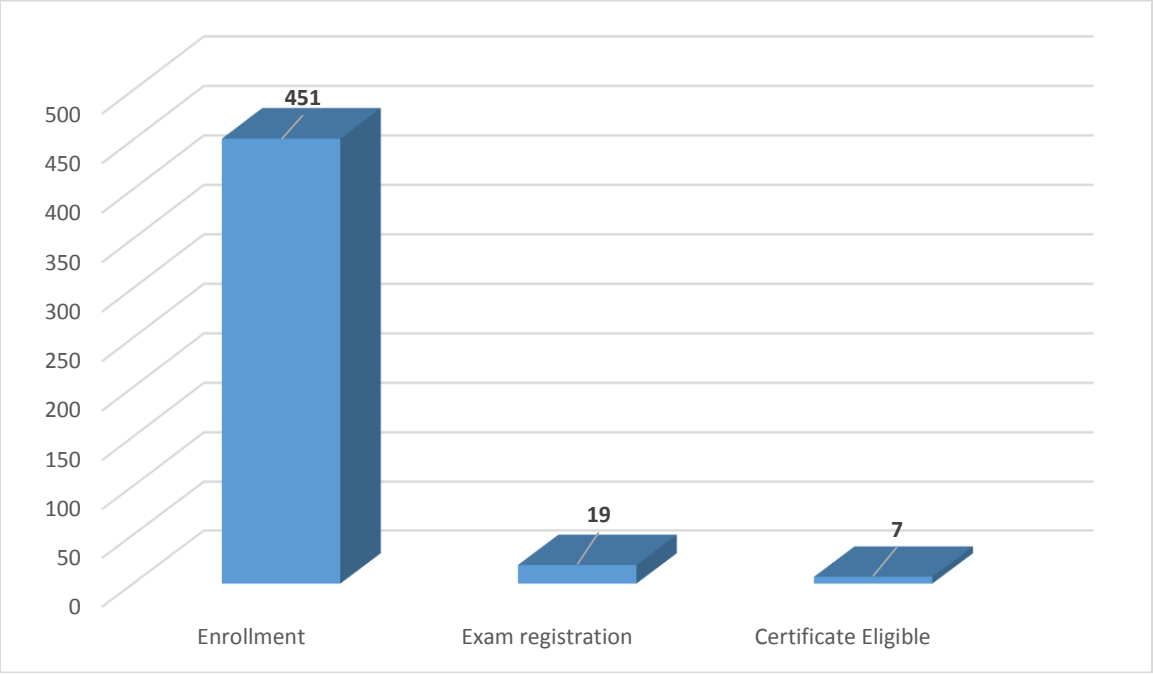
Course Outline:

Beams, plates and shells are fundamental structural elements in the field of mechanical engineering, civil structures, automobile and aerospace engineering. Therefore, analysis of these basic structural elements are required for design and development. This course presents systematic development of plate governing equations using the vibrational calculus. Basic analytical solutions techniques are discussed for bending, free vibration and buckling cases. Further this approach can be applied to develop governing equation and solutions for functionally graded plate, piezoelectric plates (current research topics).

Total nos. of enrollment: 451

Total nos. of Exam registration: 19

Total nos. of Certificate Eligible: 7



Prof. Supradip Das
Design

Prof. Debayan Dhar
Design

Prof. Swati Pal
Design

Type of the course: New, July 2018 run Duration: 4 weeks

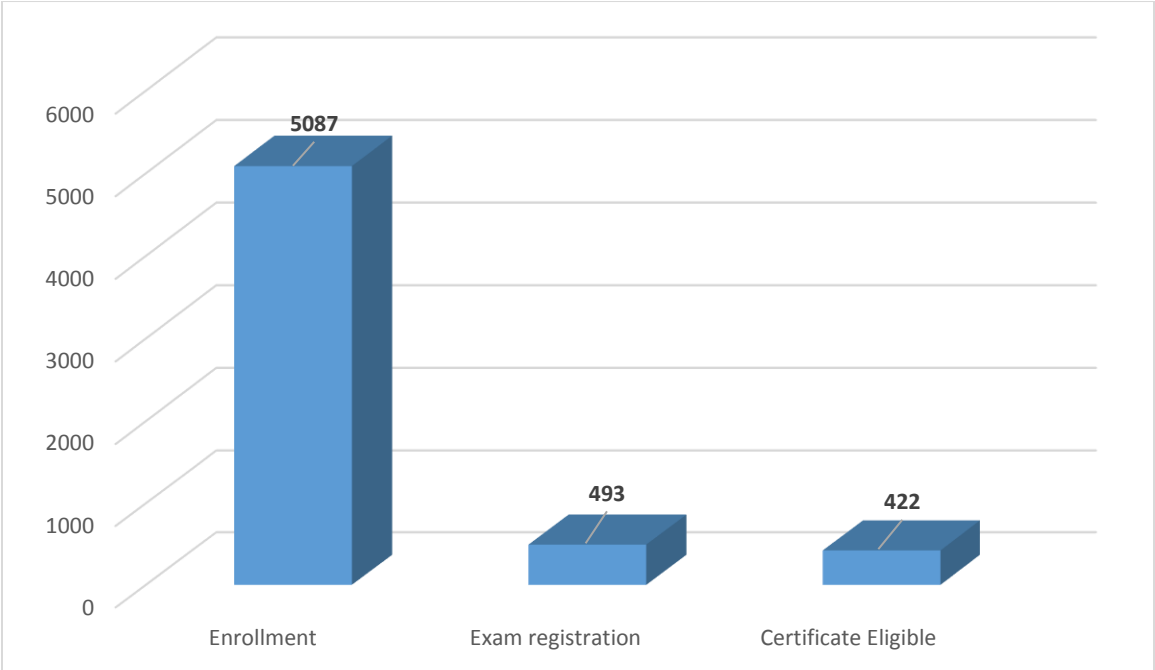
Course Outline:

Product Design and Innovation course is intended to introduce overall awareness of the product design process. This course will give an understanding of methods, tools and techniques applied in product design. This course includes overview of innovation, product design process, user study, need/problem identification, development of design brief, understanding competitive benchmarking, aspects of human factors in product design, tools for creative concept generation, prototyping/model making and evaluation techniques for user-product interaction. This course will be explained with lectures including case studies and hands-on exercises. This will help students to generate creative ideas in to product design, considering human factors aspects.

Total nos. of enrollment: 5087

Total nos. of Exam registration: 493

Total nos. of Certificate Eligible: 422



Prof. Abhishek Shrivastava
Design

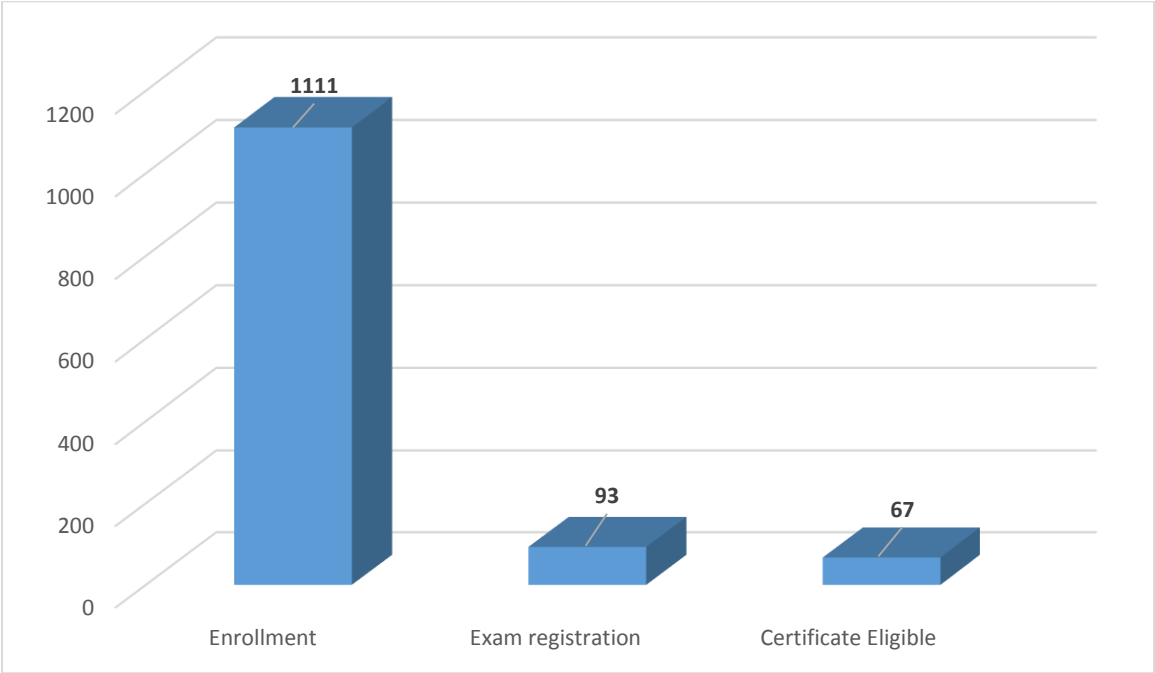
Type of the course: New, July 2018 run Duration: 4 weeks

Course Outline:
The course addresses issues involved in the design of interactive products for specific user groups. The course content covers basic aspects of these designs including their user interfaces and interactions, their design process and its milestones, and evaluation of designs. A student interested in the design of interactive products and services would find this course useful.

Total nos. of enrollment: 1111

Total nos. of Exam registration: 93

Total nos. of Certificate Eligible: 67



Introduction to Polymer Physics

Prof. Amit Kumar
Chemical Engineering

Type of the course: New, July 2018 run Duration: 8 weeks

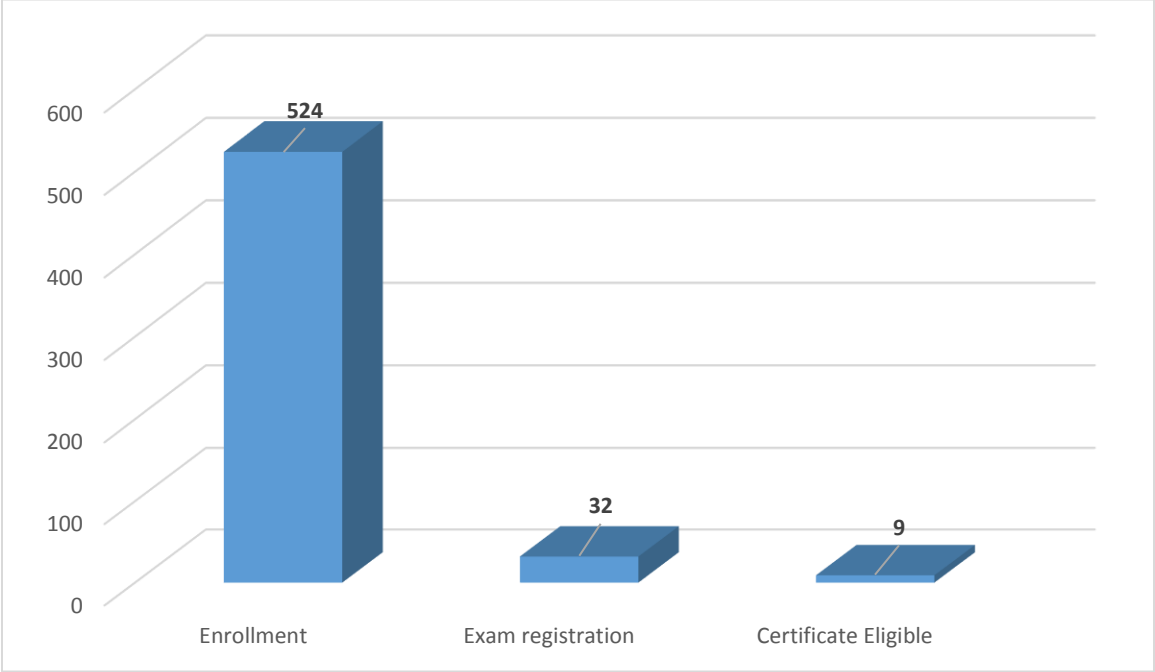
Course Outline:

Polymer physics is important to understand the structure-property relation in polymers. An understanding of the structural features and interactions responsible for polymer properties can aid in tuning the desirable properties. This introductory course will discuss the models for ideal polymer chains, and thermodynamics of polymer solutions and blends, focusing on miscibility. The course will also cover the different methods to measure polymer molar mass, which has a strong effect on polymer properties. The physics of branching and network formation will be introduced with reference to branched polymers, dendrimers and cross-linked polymers. The course will also discuss mechanical properties of polymers with focus on viscoelasticity and rubber elasticity. Finally, a brief introduction to polymer dynamics will be provided.

Total nos. of enrollment: 524

Total nos. of Exam registration: 32

Total nos. of Certificate Eligible: 9



Natural Gas Engineering

Prof. Pankaj Tiwari
Chemical Engineering

Type of the course: New, July 2018 run Duration: 8 weeks

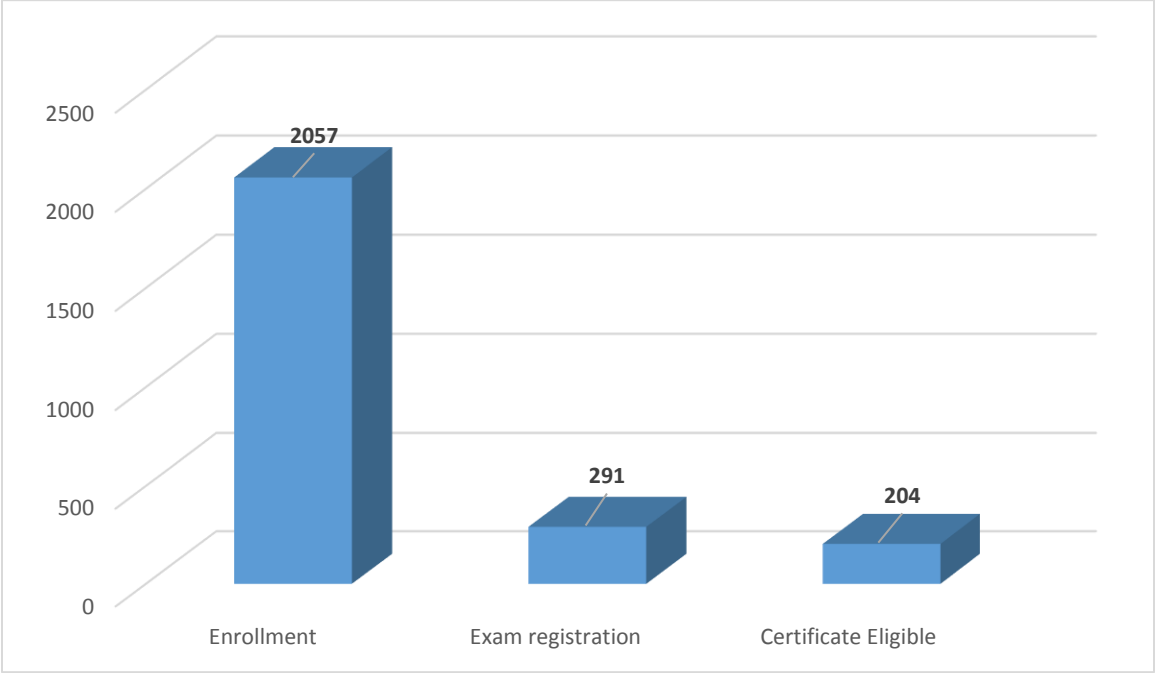
Course Outline:

The field of natural gas engineering is very much important for petroleum engineers specializing in gas processing technology. The course outlines an optimal balance between natural gas production, natural gas processing and gas transportation. An extensive treatise on natural gas engineering, both upstream and gas refining processes with key equipment and facility design will be covered. This course will also highlight the current status of production of natural gas through unconventional sources/technics and the applications of natural gas.

Total nos. of enrollment: 2057

Total nos. of Exam registration: 291

Total nos. of Certificate Eligible: 204



Multi-Core Computer Architecture – Storage and Interconnects

Prof. John Jose
Computer Sciences and Engineering

Type of the course: New, July 2018 run Duration: 8 weeks

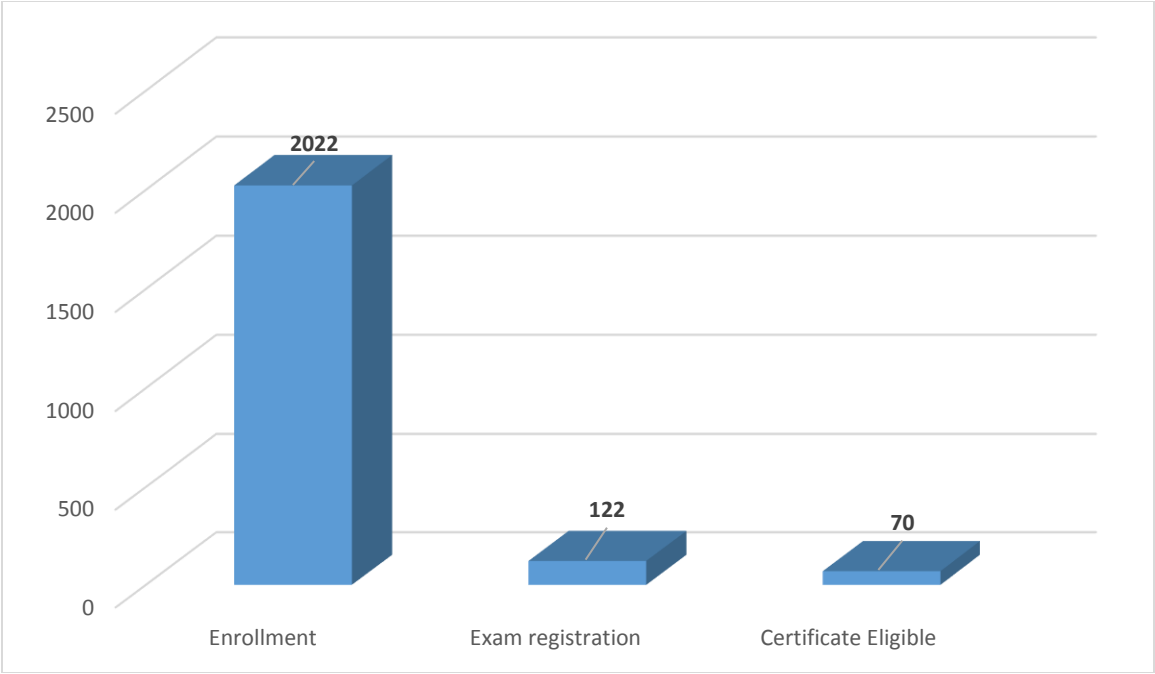
Course Outline:

We are in the era of multi-core systems where even the simplest of handheld devices like a smart phone houses many processors in a single chip. The core counts are ever increasing from 8 to 10 in smart phones to over 100s in super computers. This course will introduce the students to the world of multi-core computer architectures. With the unprecedented growth of data science, on-chip storage systems and inter-core communication framework are getting equal attention as that of processors. This course will focus on delivering an in-depth exposure in memory-subsystems and interconnects of Tiled Chip Multi-Core Processors with few introductory sessions on advanced superscalar processors. The course concludes with pointers to current research standings and on-going research directions for motivating the students to explore further

Total nos. of enrollment: 2022

Total nos. of Exam registration: 122

Total nos. of Certificate Eligible: 70



Advanced Topics in Probability and Random Processes

Prof. P. K. Bora
Electronics and Communication Engineering

Type of the course: New, July 2018 run Duration: 8 weeks

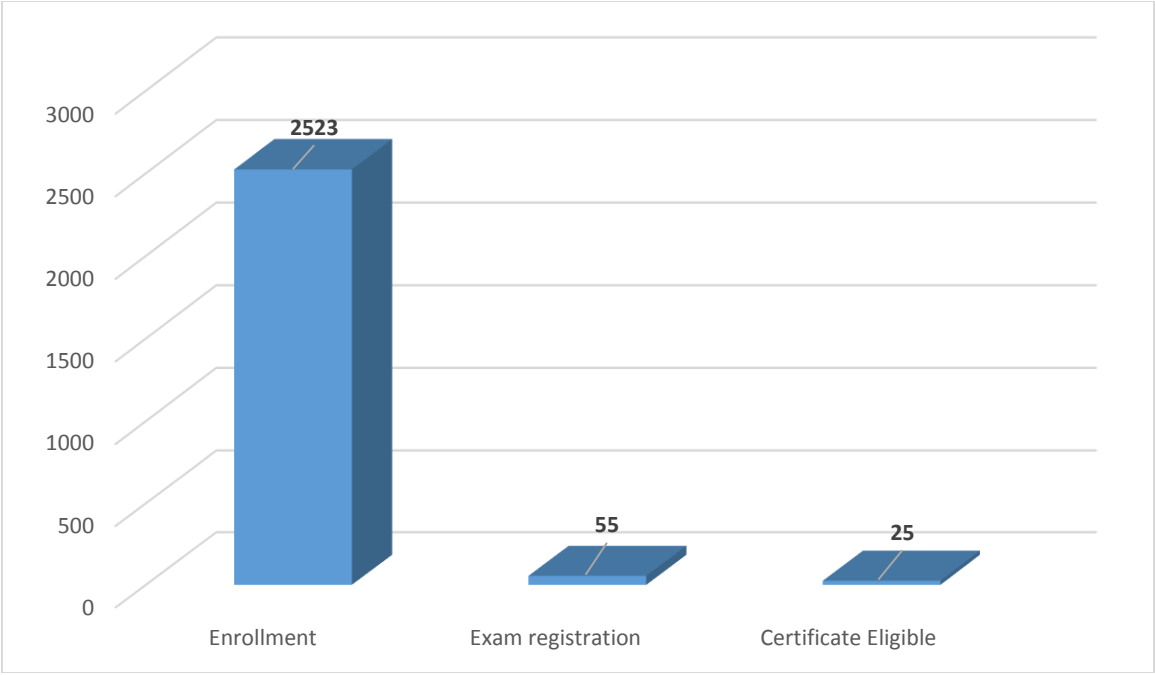
Course Outline:

The course will cover mainly two broad areas: (1) the concepts of the convergence a sequence of random variables leading to the explanation of important concepts like the laws of large numbers, central limit theorem; and (2) Markov chains that include the analysis of discrete and continuous time Markov Chains and their applications.

Total nos. of enrollment: 2523

Total nos. of Exam registration: 55

Total nos. of Certificate Eligible: 25



Economic Growth and Development

Prof. Rajshree Bedamatta
Humanities and Social Sciences

Type of the course: New, July 2018 run Duration: 8 weeks

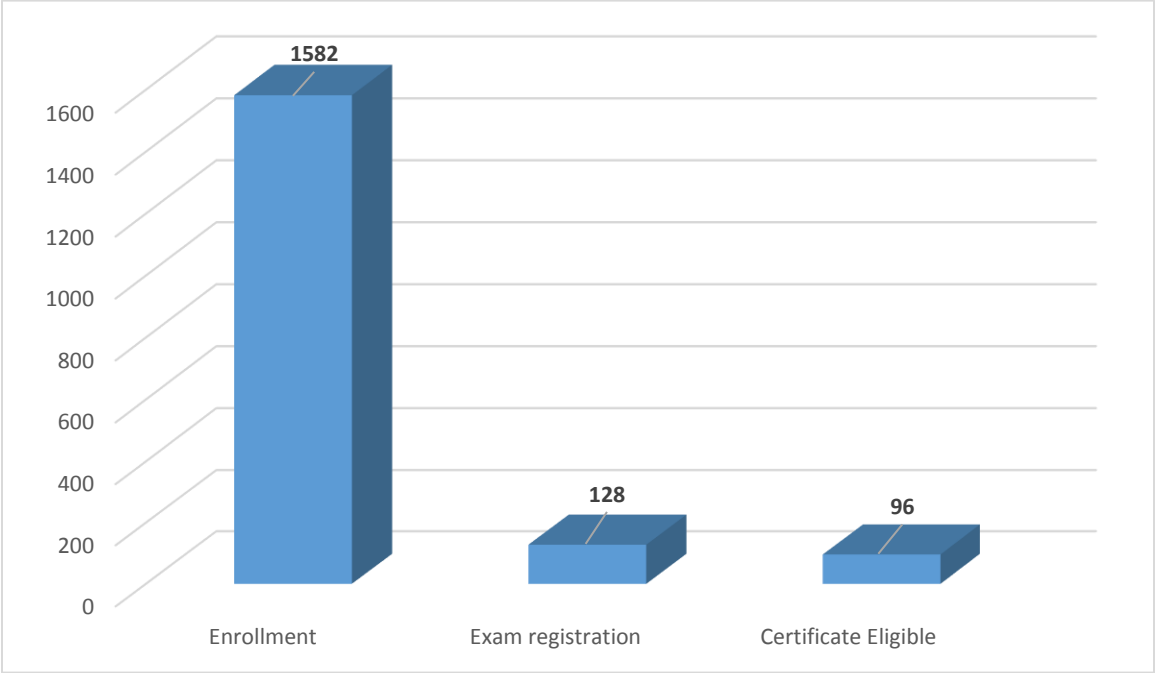
Course Outline:

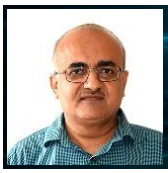
This course engages the student with the much debated theories of growth versus development. The decades following liberalization and globalization have been a period of very high levels of economic inequality. With the focus on issues surrounding inequality, this course will introduce students to the major ideas and theories surrounding the often used and misused concepts of economic growth and economic development. With the help of major concepts used in growth and development economics, a student taking this course will be able to participate in the debate and understand the nuances surrounding the issue of economic development.

Total nos. of enrollment: 1582

Total nos. of Exam registration: 128

Total nos. of Certificate Eligible: 96





Mechanics of Machining

Prof. Uday S. Dixit
Mechanical Engineering

Type of the course: New, July 2018 run Duration: 8 weeks

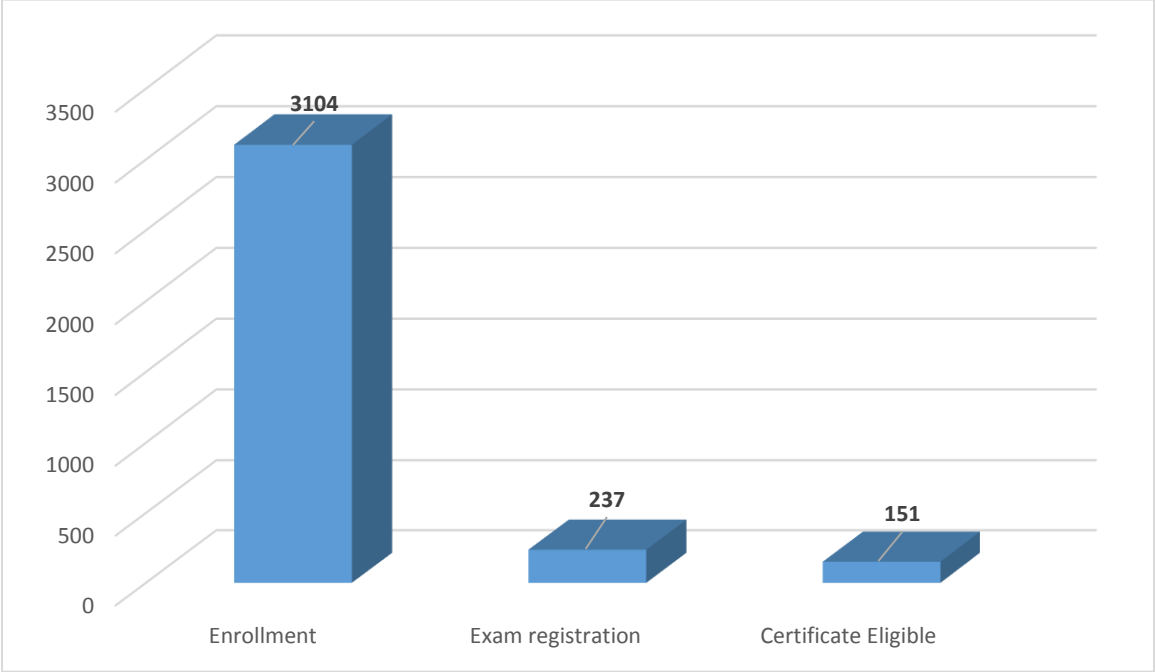
Course Outline:

In this course an attempt is made to standardize the course material and to emphasize on the fundamental mechanics of machining process using analytical approach. The changing of raw material into a final product involves various machining and finishing processes. In the last decade, a lot of development has taken place in the area of non-traditional machining and many non-traditional machining processes have become very popular in industries. However, the importance of traditional machining processes like turning, milling, shaping, drilling, and grinding still continues. The course is developed with a view to disseminate knowledge in the area of traditional machining processes. Also, newer technology like CNC is included. This course aims at bringing the students up-to-date with the latest technological developments and research trends in the field of conventional machining processes.

Total nos. of enrollment: 3104

Total nos. of Exam registration: 237

Total nos. of Certificate Eligible: 151



Principle of Hydraulic Machines and System Design

Prof. Pranab K. Mondal
Mechanical Engineering

Type of the course: New, July 2018 run Duration: 8 weeks

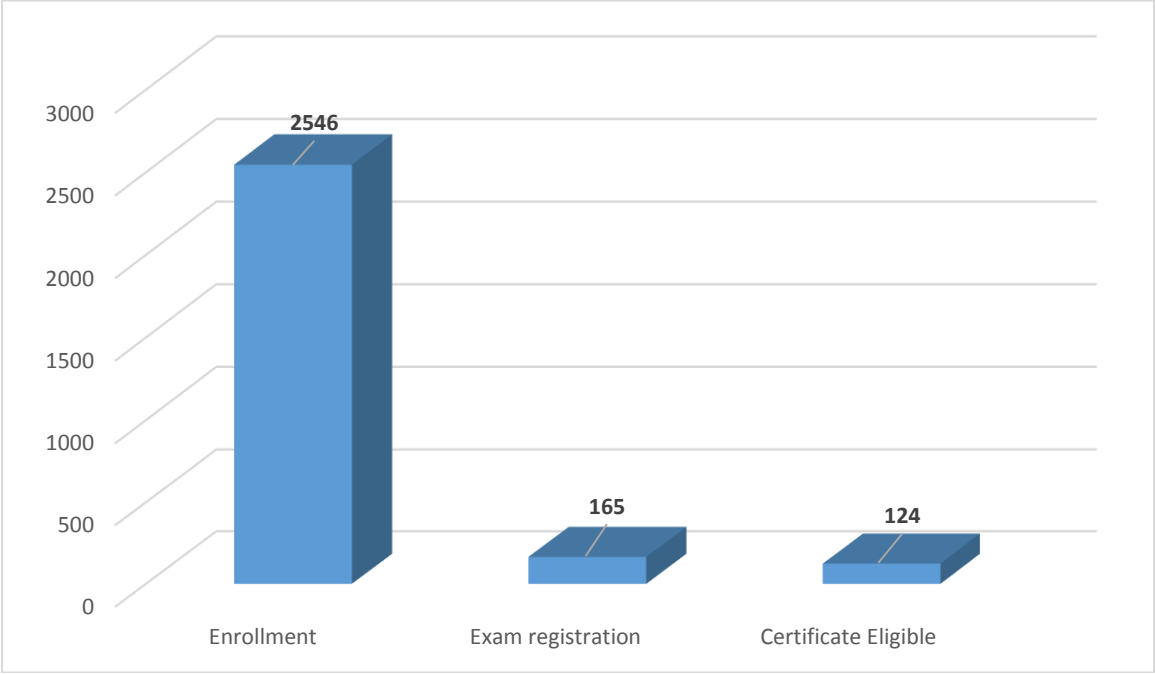
Course Outline:

Principle of operation of hydraulic machines and their system design is important from the perspective of their huge applications in different industries. Present course introduces the students to the fundamentals of hydraulic machines. Starting from the operational principle, students will be gradually familiarized with different concepts like velocity triangle, net head developed, finally leading to the design of their system. Important topics such as design of pumping system of two dissimilar pumps, which find practical relevance as well, will also be discussed.

Total nos. of enrollment: 2546

Total nos. of Exam registration: 165

Total nos. of Certificate Eligible: 124



Introduction to Abrasive Machining and Finishing Processes

Prof. Mamilla Ravi Sankar
Mechanical Engineering

Type of the course: New, July 2018 run Duration: 8 weeks

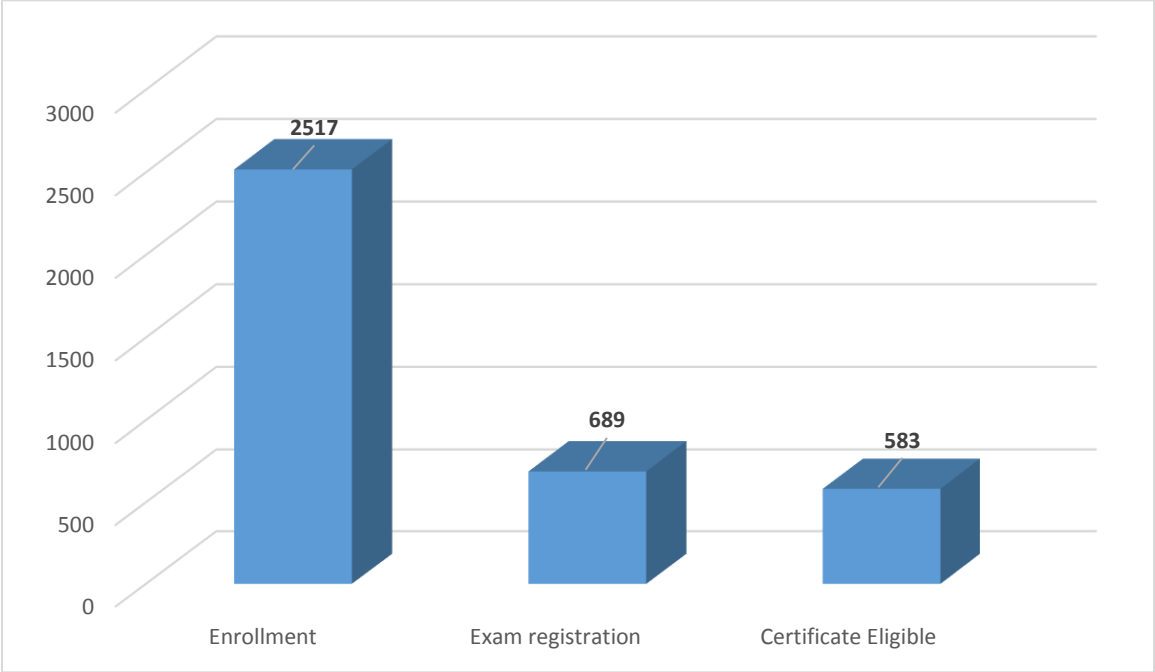
Course Outline:

This course will define the areas of application of traditional as well as non-traditional abrasive finishing processes in the manufacturing industry. The lectures will introduce the basic principles of material removal by use of abrasives particles and material removal mechanism of different abrasive process. The effects of various input parameters on the outputs as well as the use of cutting fluids in various finishing process will be discuss. A variety of numerical problems and MCQs, discussions will also be included.

Total nos. of enrollment: 2517

Total nos. of Exam registration: 689

Total nos. of Certificate Eligible: 583



Advanced Quantum Mechanics with Applications

Prof Saurabh Basu
Physics

Type of the course: New, July 2018 run Duration: 8 weeks

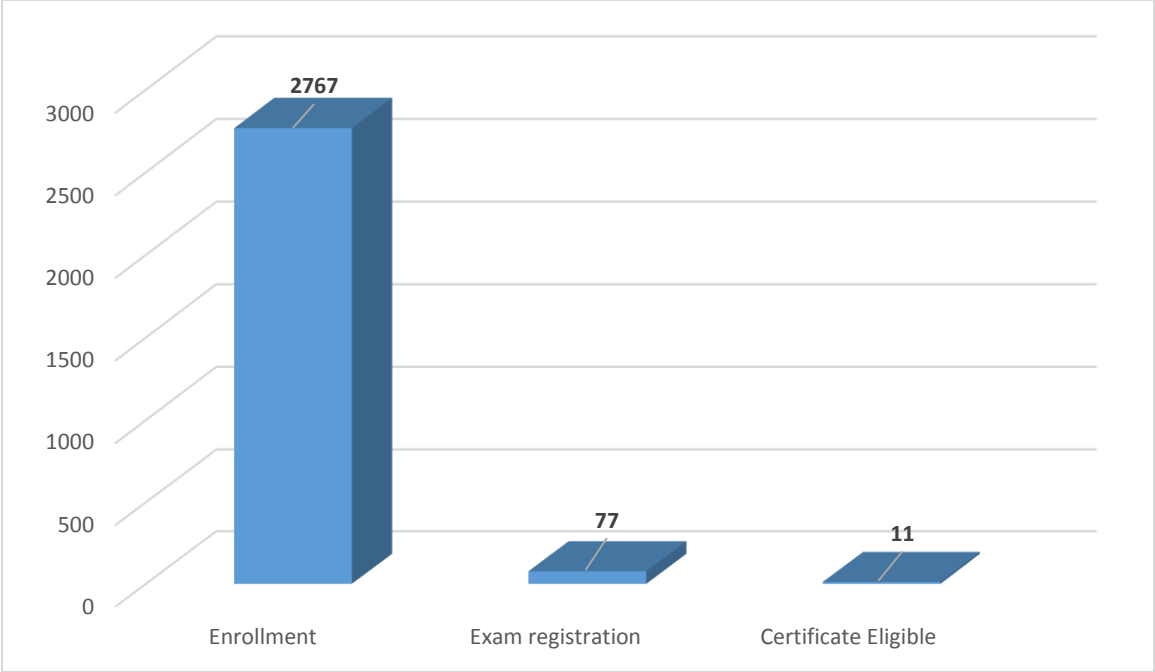
Course Outline:

The Course deals with the prerequisite material for studying advanced level research in various fields of Physics, Applied Physics and Electrical Engineering. The course begins with an introduction to advanced topics, such as, the Density Matrix formalism and its applications to quantum optics. Hence angular momentum is introduced to discuss nuclear magnetic resonance. Hence basics of quantum information theory is brought into consideration with a view to explain quantum information algorithms. Quantum dynamics is hence studied with a view to understand quantum optics for driven systems. A glossary of the approximate methods is described with a few examples. Finally, basics of quantum transport is presented to understand the conductance properties of semiconductors.

Total nos. of enrollment: 2767

Total nos. of Exam registration: 77

Total nos. of Certificate Eligible: 11



Consumer Psychology

Prof. Naveen Kashyap
Humanities and Social Sciences

Type of the course: New, July 2018 run Duration: 8 weeks

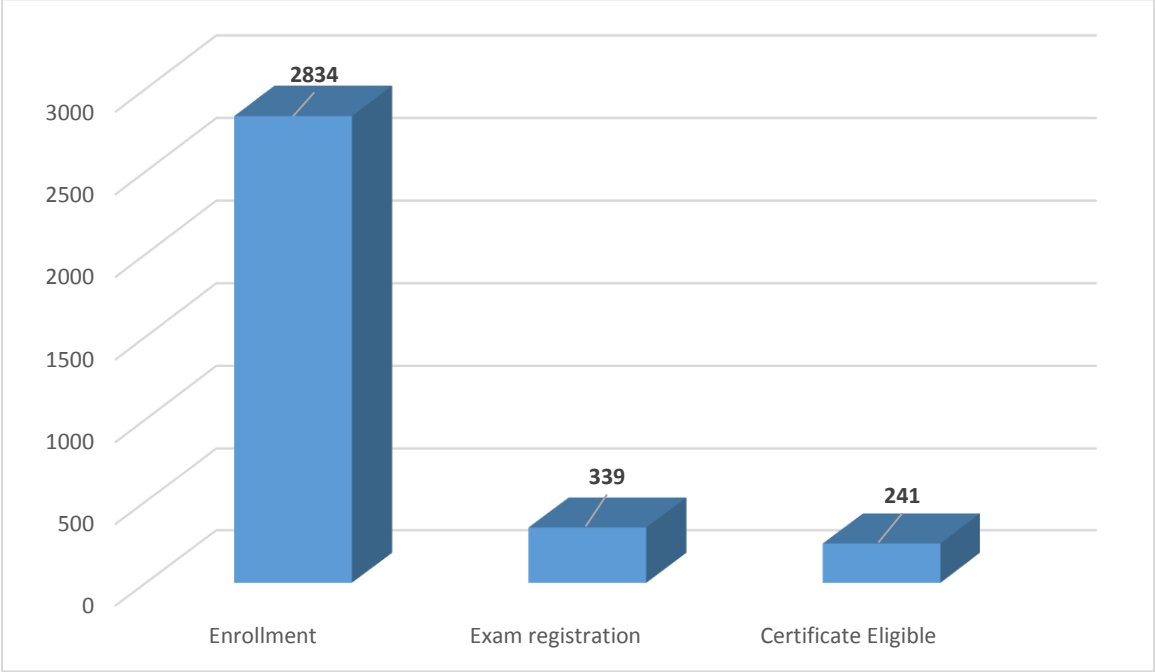
Course Outline:

Human beings have basic needs that they fulfill by making transactions in the market. Transactions mostly in the form of monetary exchange for goods and services are very basic for the survival of the human race. The present course is designed to study how consumers behave on the market and what the consequences of various behavior patterns. Additionally, the present course also looks at various psychological factors that shape the behavior and actions of the consumer in the global market.

Total nos. of enrollment: 2834

Total nos. of Exam registration: 339

Total nos. of Certificate Eligible: 241



Introduction to Modern Indian Political Thought

Prof. Mithilesh Kumar Jha
Humanities and Social Sciences

Type of the course: New, July 2018 run Duration: 12 weeks

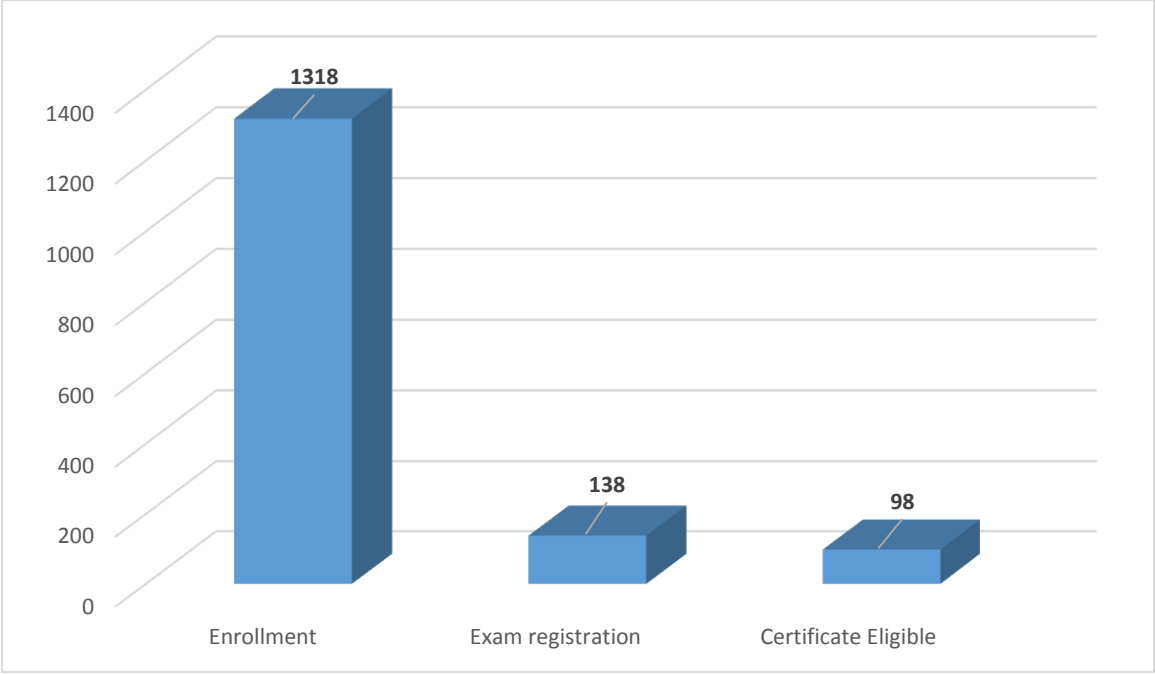
Course Outline:

Modern Indian political thought is one of the fascinating areas of scholarly debates and discussions in contemporary India. It also signifies a shift away from excessive reliance upon Eurocentric views, methods and concepts to study and interpret Indian society and its politics. The major objective of this course is to introduce the students to some of the key modern Indian thinkers and their ideas which helped in shaping the society and politics of modern India.

Total nos. of enrollment: 1318

Total nos. of Exam registration: 138

Total nos. of Certificate Eligible: 98



Prof. T. V. Bharat
Civil Engineering

Type of the course: New, July 2018 run Duration: 12 weeks

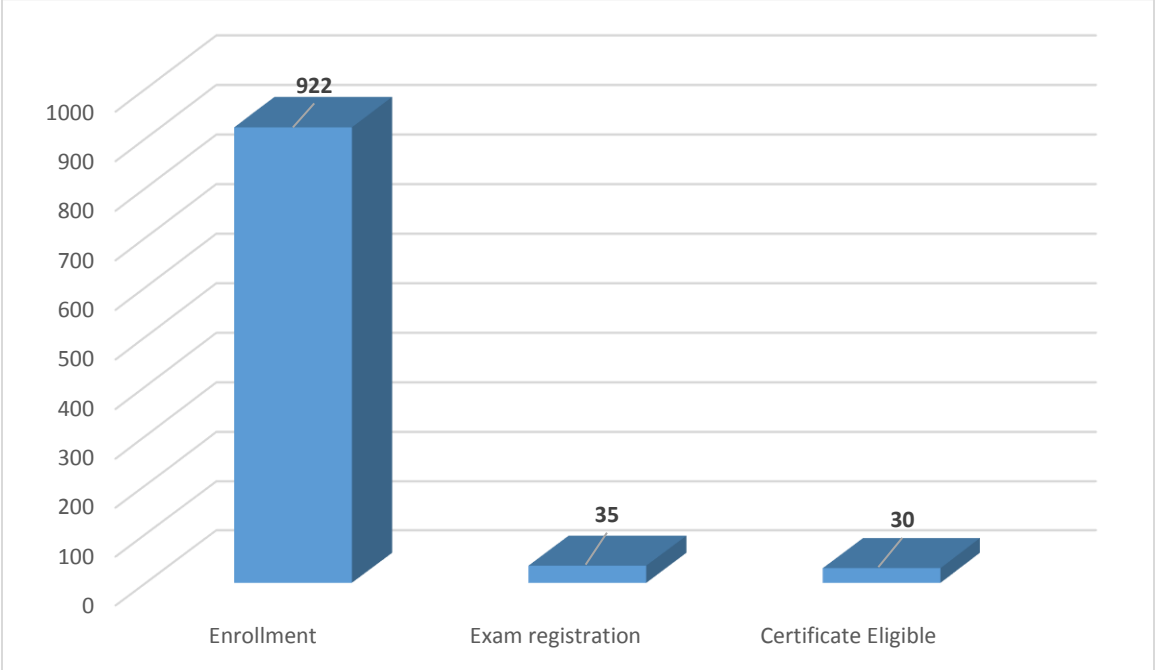
Course Outline:

The knowledge of soil behavior is very important in the Geotechnical engineering practice. The soil behavior in saturated state is widely taught in the undergraduate and graduate programs, all over. The existence of air-phase in natural soils prompts the soil to behave differently from the saturated soils. The present course would provide the fundamental principles, mechanisms, and behavior of partly saturated soils.

Total nos. of enrollment: 922

Total nos. of Exam registration: 35

Total nos. of Certificate Eligible: 30



System Design for Sustainability

Prof. Sharmistha Banerjee
Design

Type of the course: New, July 2018 run Duration: 12 weeks

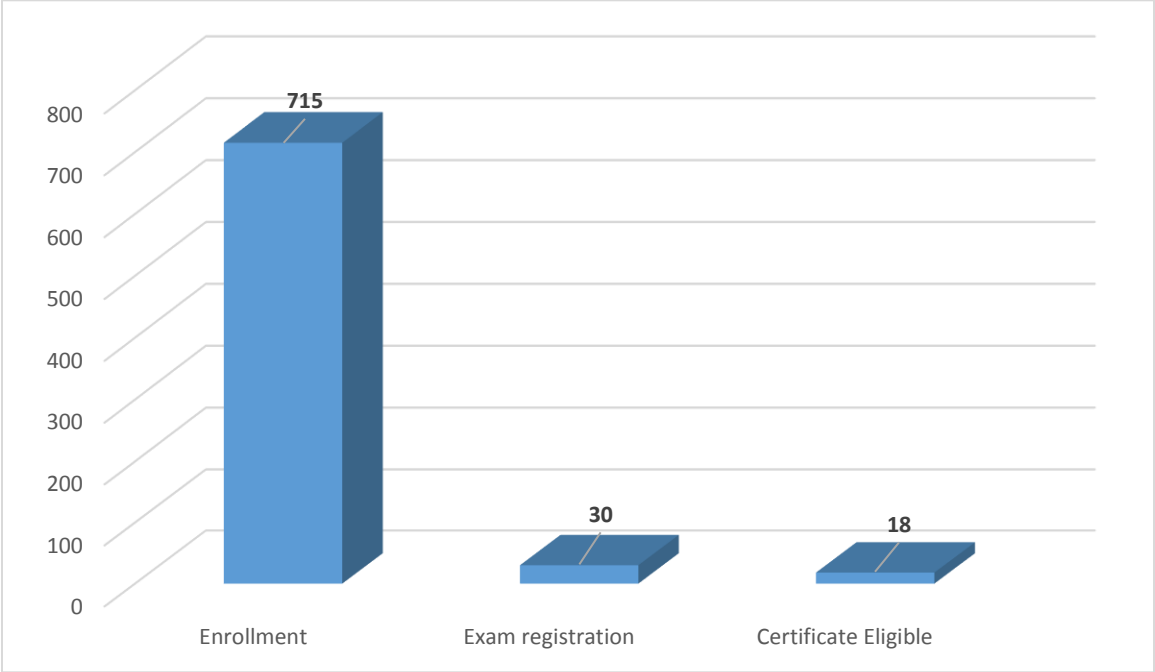
Course Outline:

Design for Sustainability is a design thinking process for widening the boundaries of the objective of design so as to contribute positively to sustainable development. It encompasses four approaches: 1. Selection of resources with low environmental impact; 2. Design of products with low environmental impact; 3. Product-Service System Design for eco-efficiency; 4. Design for social equity and cohesion. This course will discuss these Design approaches, methods and tools along with case examples.

Total nos. of enrollment: 715

Total nos. of Exam registration: 30

Total nos. of Certificate Eligible: 18



Higher Surveying

Prof. Ajay Dashora
Civil Engineering

Type of the course: New, July 2018 run Duration: 12 weeks

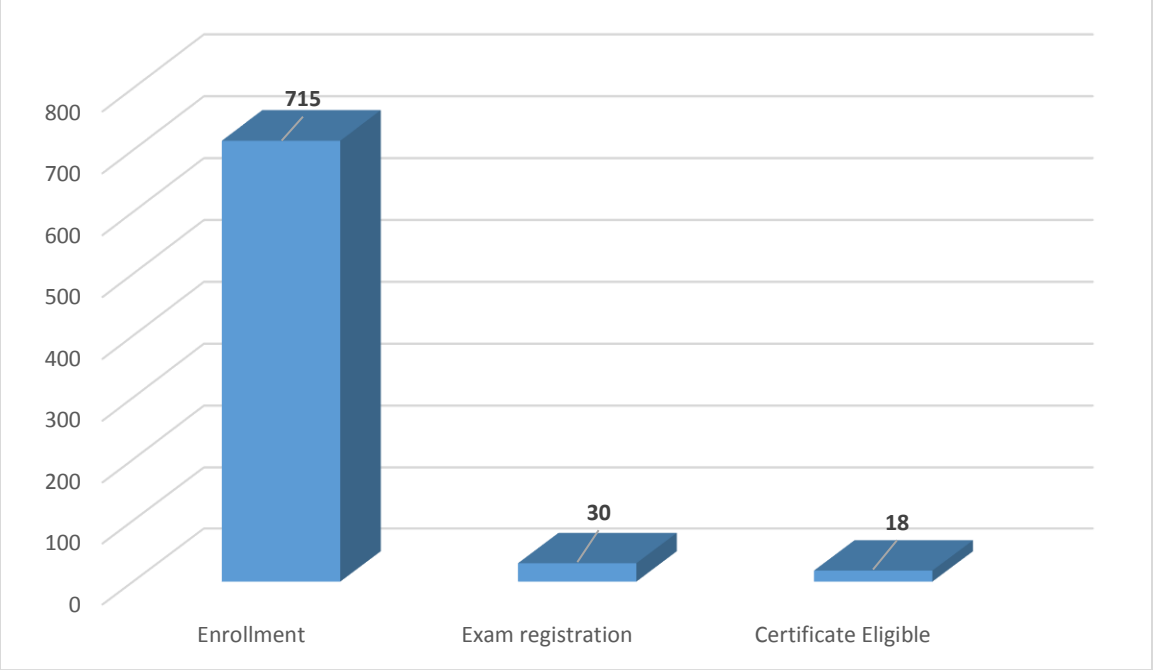
Course Outline:

Conventional survey techniques are all about measuring 2D or 3D coordinates of a point for mapping of a surface. Though accurate, these techniques are time consuming for topographic mapping. With development of various hard and soft technologies in last two decades, advanced mapping techniques have evolved. It gives a paradigm shift as conventional surveys are superseded by advanced surveying techniques, which are not only accurate and flexible but require minimum time to acquire large amount of 3D data. Therefore, these techniques have been extensively used in many areas of engineering by students, researchers, and industries. On the other hand, the fundamental concepts of most of the advanced surveying techniques are not clear to all users. This course on Higher Surveying discusses about the modern techniques of advanced surveying, their fundamental concepts, data acquisition, data processing, and applications.

Total nos. of enrollment: 1812

Total nos. of Exam registration: 45

Total nos. of Certificate Eligible: 8





Embedded Systems-Design Verification and Test

Prof. S. Biswas
Computer Science and Engineering

Prof. A. Sarkar
Computer Science and Engineering

Prof. J. K. Deka
Computer Science and Engineering

Type of the course: New, July 2018 run Duration: 12 weeks

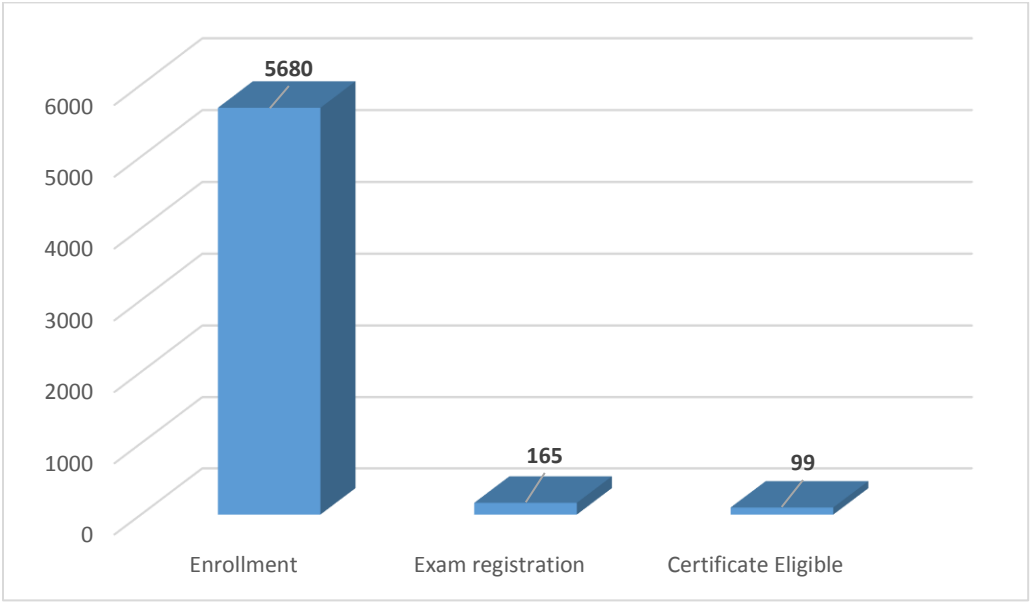
Course Outline:

An embedded system (ES) can be described as a computing system which is part of a larger physical system. Examples of ESs range from a simple elevator controller to a complex avionics control system. Unlike a general purpose computer system, ESs are typically designed for specific functionalities, often with stringent performance objectives and constraints related to real-time accuracy, area, power, cost etc. Their implementations may include both software and hardware components and may necessitate integration with sensors and actuators. The increase in complexity of modern ESs mandates automation in their design. Given a system which we intend to implement, the design process majorly evolves through distinct but often overlapping and iterative phases which include, i. modeling of the intended system behavior, ii. design of appropriate structural representations and implementation methodologies, corresponding to the specified behavior, iii. verification and validation of the correctness and performance related properties that the designed system should satisfy, and iv. testing whether the prototyped / manufactured implementation actually performs the required behaviour. The proposed course will systematically cover all these topics so that the student gains an end-to-end understanding of the overall ES design process.

Total nos. of enrollment: 5680

Total nos. of Exam registration: 165

Total nos. of Certificate Eligible: 99



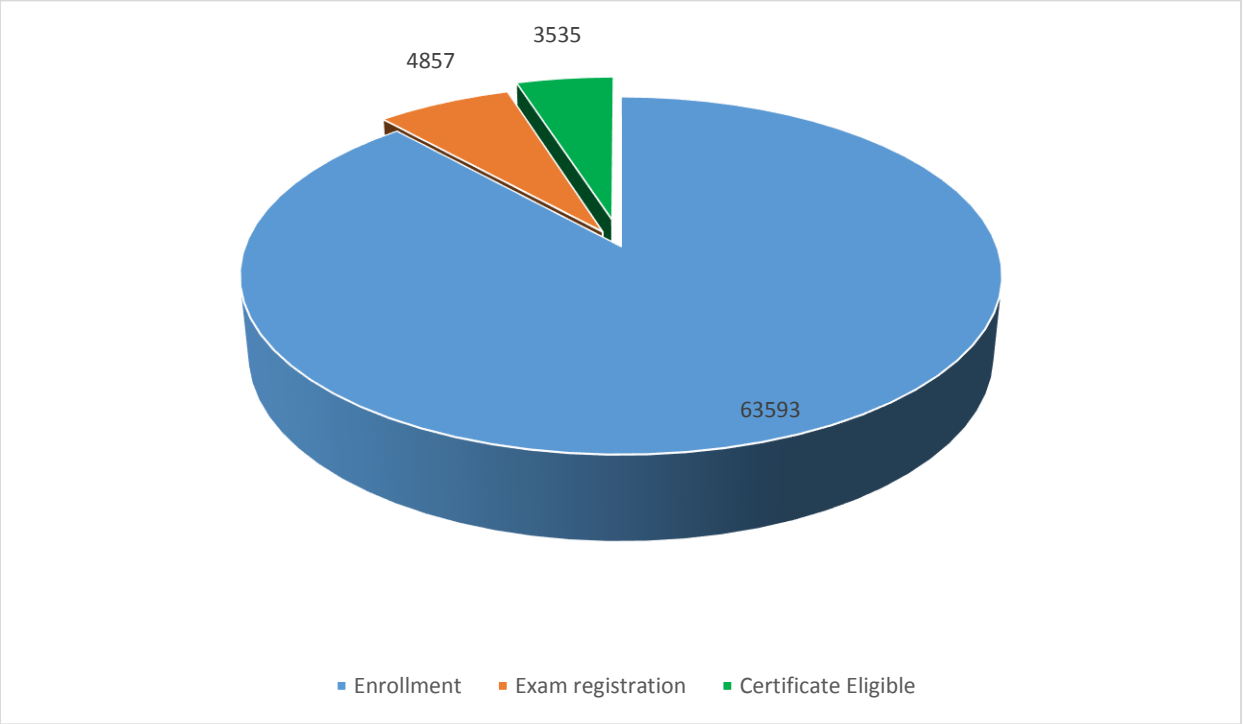
IIT Guwahati contribution in 2018 run Cumulative Data

Total nos. of Course Conducted: 33

Total nos. of Enrollment: 63593

Total nos. of Exam registration: 4857

Total nos. of Certificate Eligible: 3535



IIT Guwahati contribution in 2019 run

Prof. Mamilla Ravi Sankar
Mechanical Engineering

Type of the course: New, Jan 2019 run Duration: 4 weeks

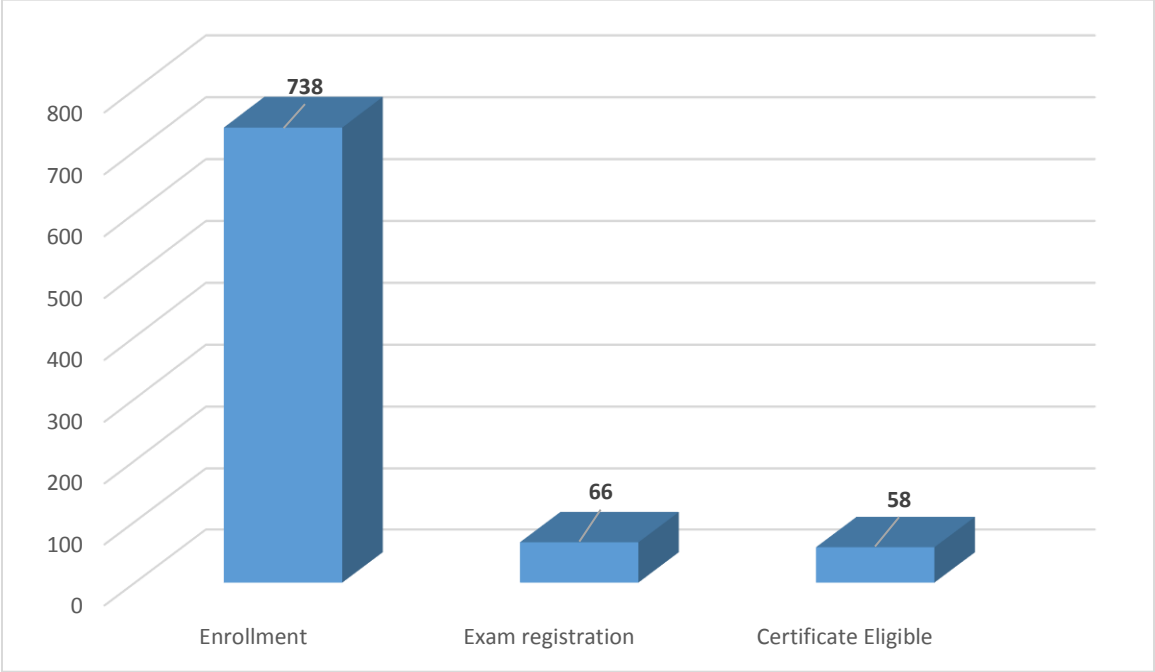
Course Outline:

Micro and Nano finishing is one of the basic courses for the mechanical undergraduate students. This process comes under the subtractive manufacturing processes where in material is removed in micro to nano range. This course gives the basic understanding of the various polymer assisted abrasive micro to nano finishing processes and its physics. The mentioned syllabus is systematic order to understand gradually, what is the importance of surface finish, how the polymers supports the abrasive particles to finish the workpiece surface to nano level. This course mostly deals with abrasive flow finishing process where polymer rheological abrasive medium/fluids are used achieve nano surface roughness. This course also gives emphasis on polymer rheology and its effect on nano finishing.

Total nos. of enrollment: 738

Total nos. of Exam registration: 66

Total nos. of Certificate Eligible: 58



Prof. Saurabh Basu
Physics

Type of the course: New, Jan 2019 run Duration: 4 weeks

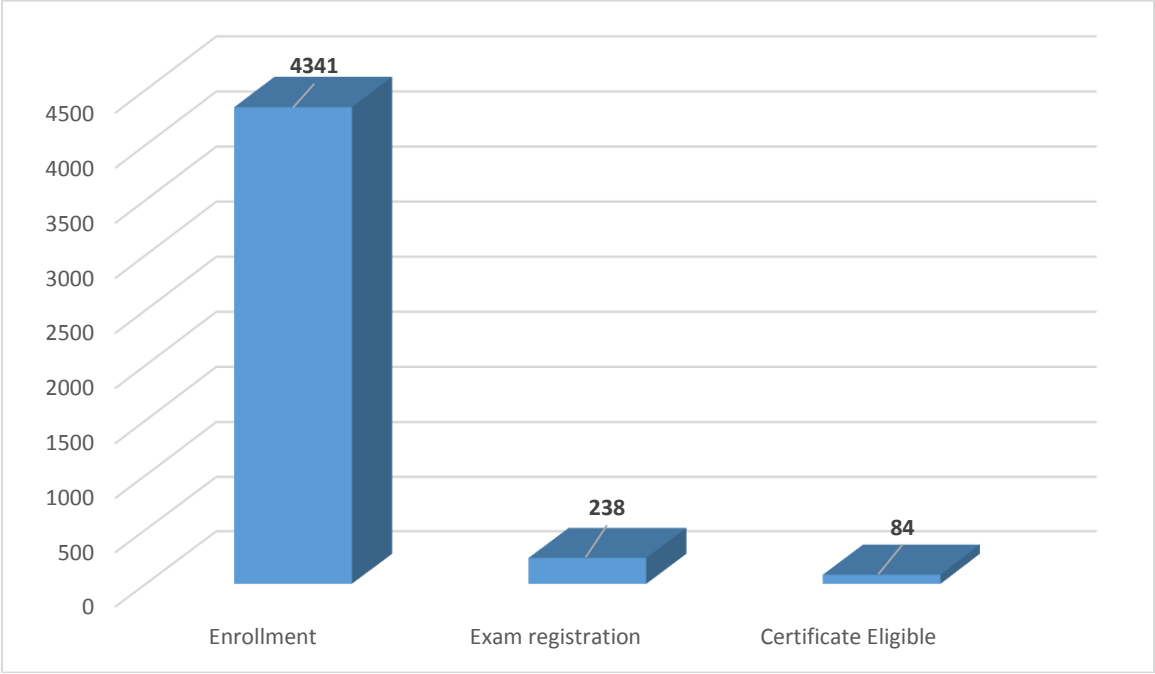
Course Outline:

The course deals with the basics of superconductivity, including Meissner effect, electrodynamic response, -Type-I and type-II superconductors etc. BCS theory, the only microscopic theory of superconductivity is discussed in details with a view to understand superconducting transition temperature and its relation to the pairing gap. Further Ginzburg Landau theory is introduced which is a phenomenological theory that is applicable in general to second order phase transitions. A few experimental methods to explore the superconducting gap are discussed. Unconventional superconductivity is elaborately talk about with regard to the unusual normal phase of the high Tc cup rates and ramification due to the breakdown of Landau's Fermi liquid theory therein is emphasized. Finally, Josephson effect is introduced and its applications to superconducting circuits are studied. Special emphasis is given to DC SQUID which uses Josephson junctions and has a variety of applications, such as sensors, amplifiers, magnetometers etc.

Total nos. of enrollment: 4341

Total nos. of Exam registration: 238

Total nos. of Certificate Eligible: 84



Subsurface Exploration: Importance and Techniques Involved

Prof. Abhishek Kumar
Civil Engineering

Type of the course: New, Jan 2019 run Duration: 8 weeks

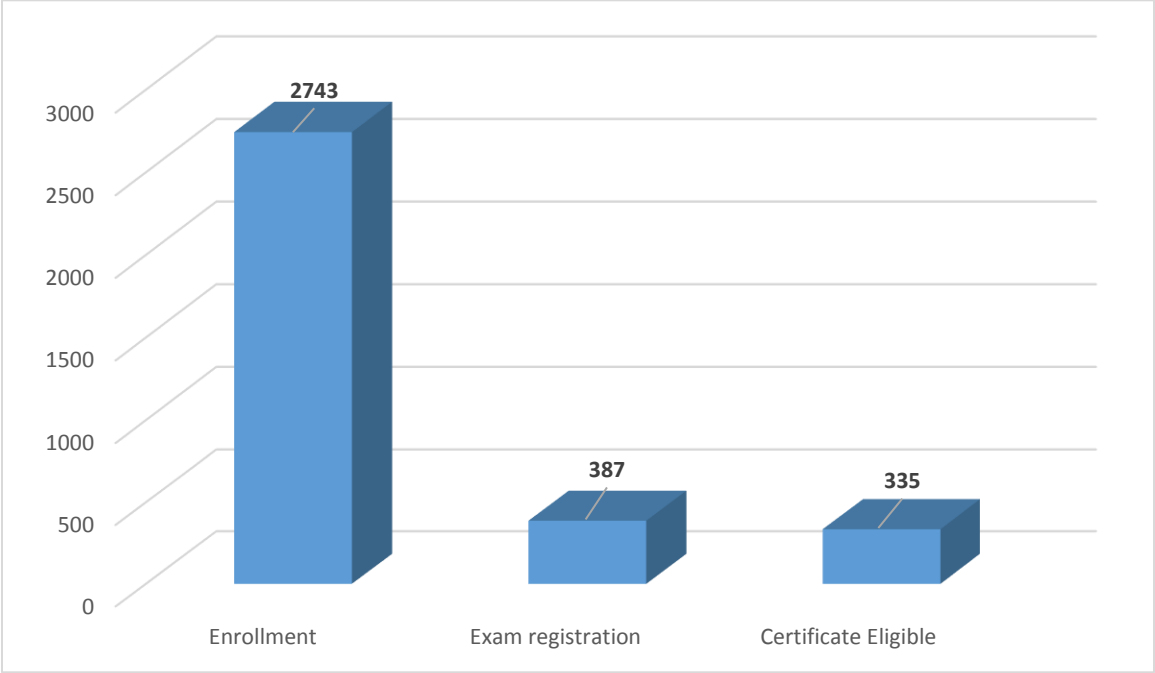
Course Outline:

This course covers the requirement of thorough subsurface investigation, its importance in planning and execution of the project, classification of investigation to be adopted and challenges faced during many of the most complex civil engineering projects across the globe. Detailed discussion on methodologies starting with borehole drilling, rock drilling to advanced methods such as electrical resistivity, geophysical tests, sounding, magnetic anomaly, dilatometer test, pressure meter tests, ground penetrating radar will be covered along with numerical problems at various stages. In addition, testing on piles which is a very hot topic these days, will be covered in the course

Total nos. of enrollment: 2743

Total nos. of Exam registration: 387

Total nos. of Certificate Eligible: 335



Introduction to Modern Indian Drama

Prof. Kiran Keshavamurthy
Humanities and Social Sciences

Type of the course: New, Jan 2019 run Duration: 8 weeks

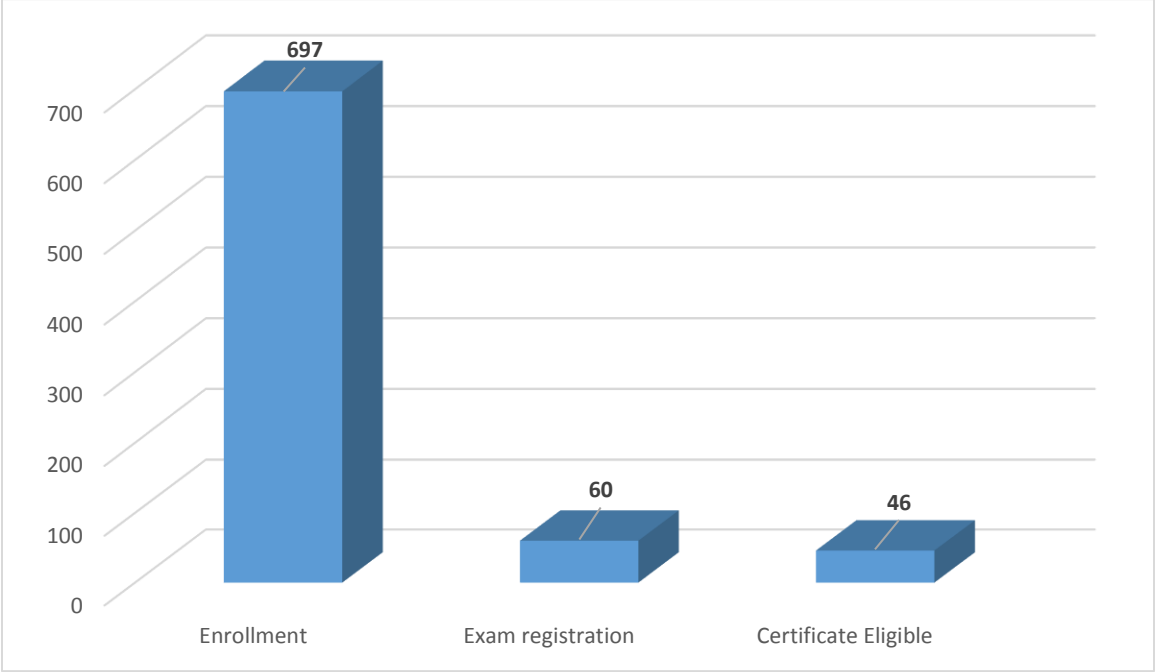
Course Outline:

This course introduces students to the historical and social debates on modern Indian theatre from the latter decades of the 19th century to the mid-20th century. The purpose of the course is to familiarize students with modern Indian performance traditions and the social and political issues in the works of major modern Indian playwrights.

Total nos. of enrollment: 697

Total nos. of Exam registration: 60

Total nos. of Certificate Eligible: 46



Prof. Naveen Kashyap
Humanities and Social Sciences

Type of the course: New, Jan 2019 run Duration: 8 weeks

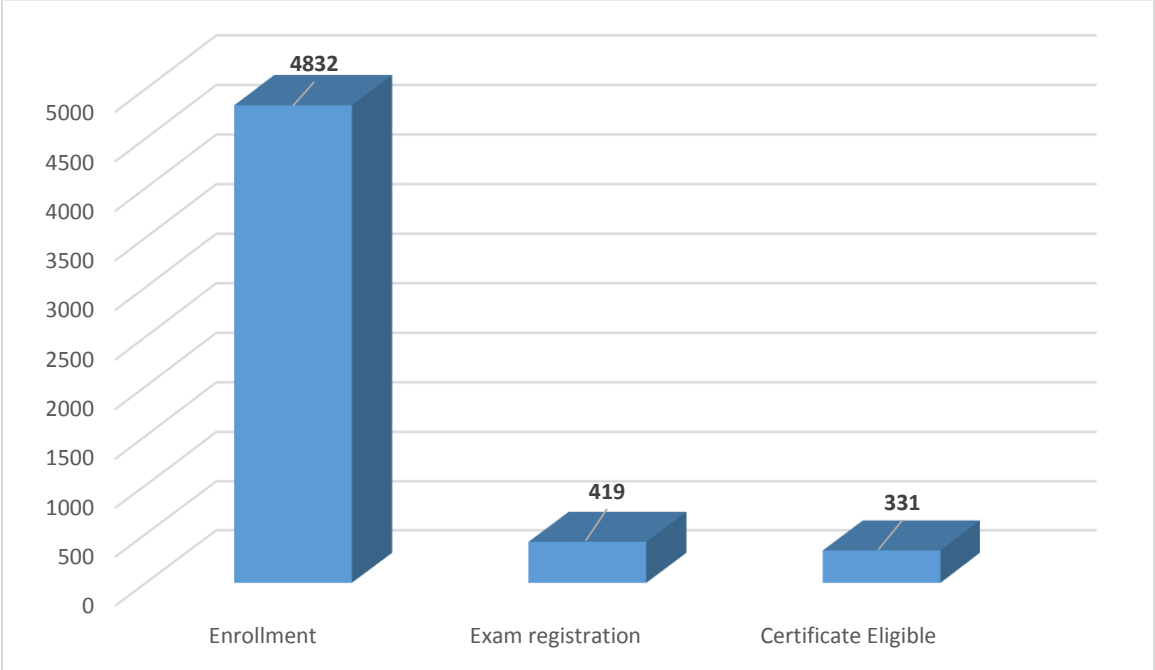
Course Outline:

We as intelligent beings have always wondered why we do what we do. The most interesting knowledge that humans' beings would kill to possess would be the knowledge to control other people. The basic premise of being human is individual difference (we are all different). One science that helps people in understanding other people and scientifically predicting their actions is the science of psychology. In the present course, I will make an attempt to simplify the science of human behavior.

Total nos. of enrollment: 4832

Total nos. of Exam registration: 419

Total nos. of Certificate Eligible: 331



Fundamental of Welding Science and Technology

Prof. Pankaj Biswas
Mechanical Engineering

Type of the course: New, Jan 2019 run Duration: 8 weeks

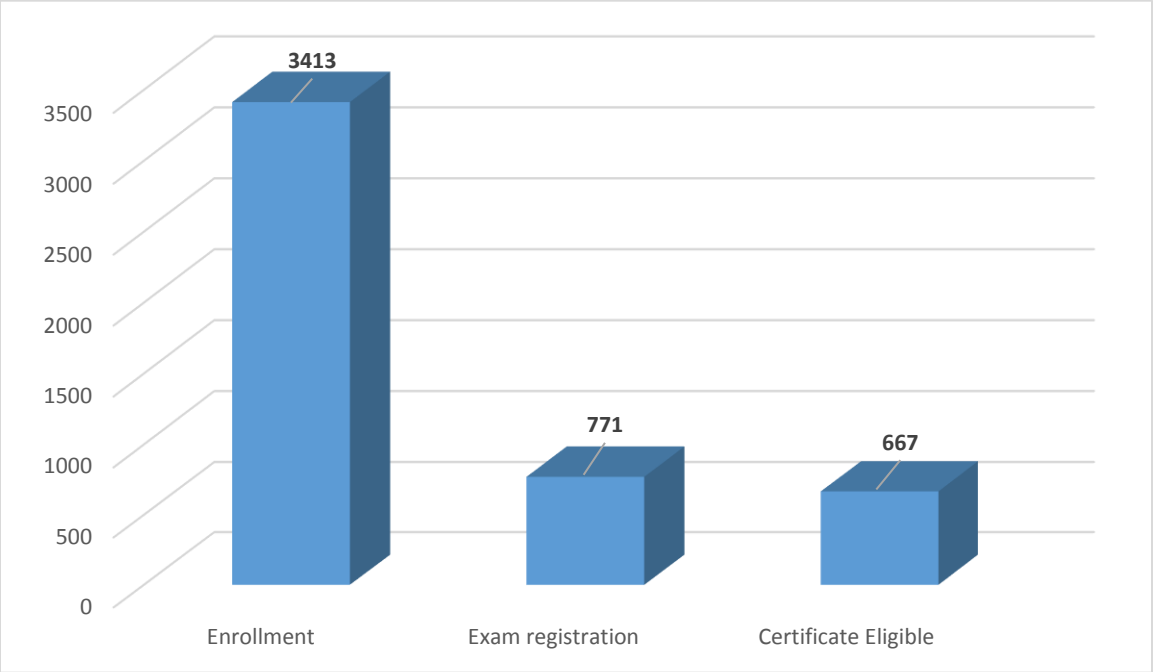
Course Outline:

Dr. Pankaj Biswas going to offer a course on Fundamental of Welding Science and Technology under the MOOCS program of the MHRD. As the name implies in this course he will try to cover the fundamental overview of the traditional/ industrial welding technology especially those welding processes which are widely used in manufacturing industries. This will help the participants to understand and apply this knowledge of welding in practice for various industrial applications. It will also encourage academic participants to increase the research interest in the field of welding. Welding is a joining process which is an unavoidable technology in most of the manufacturing sector. It is such a topic in which you will get the taste of most of the science and engineering subjects. Knowledge of almost all science subjects like physics, chemistry, mathematics and engineering subjects like solid mechanics, thermal science, fluid mechanics etc. are highly essential to understand the area welding technology. It is observed that in manufacturing industry over 30 % expenditure is spent on welding. Welding has significant application in various manufacturing sectors like aerospace, automobile, ship building, railway etc. It plays very important and crucial role in service life of the structure. That's why basic fundamental knowledge of welding is highly essential. The brief overview of the course content can be stated like; this course will cover the classification of welding process, classification of welding joints, industrial relevance of welding, welding symbols, characteristics of traditional welding power sources. It will give the fundamental knowledge of principle and physics involve in various welding processes. It will also cover the importance and applications of different traditional welding techniques. This course will highlight safety precautions to be followed in welding. This course will also cover welding defects & inspection and with their remedies to improve the weld quality.

Total nos. of enrollment: 3413

Total nos. of Exam registration: 771

Total nos. of Certificate Eligible: 667


3413
771
667
3500
3000
2500
2000
1500
1000
500
0
Enrollment
Exam registration
Certificate Eligible

Introduction to Machining and Machining Fluids

Prof. M. Ravi Sankar
Mechanical Engineering

Type of the course: Re-run, Jan 2019 run Duration: 8 weeks

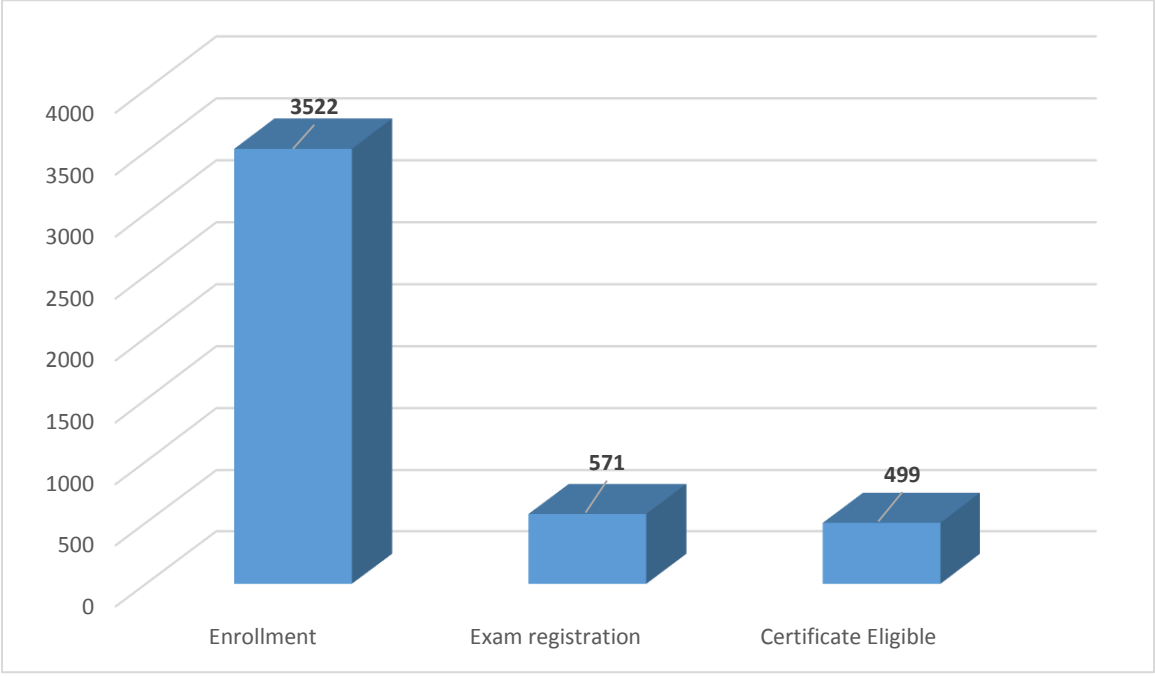
Course Outline:

Machining is one of the basic and very important courses for the mechanical undergraduate students. This process comes under the subtractive manufacturing processes where in material is removed. This course gives the basic understanding of the various machining processes and its physics. The mentioned syllabus is systematic order to understand gradually, importance of machining, machining region mechanism, tool signatures, tool life, multipoint machining processes, cutting fluid, cutting fluid emissions and its effect on human kind. This course also gives emphasis on cutting fluid emissions and its effect on operators, environment and water pollution. How to develop the eco-friendly cutting fluids as an alternative to commercial miner oils. Development of sustainable cutting fluids application techniques to improve the machining performance. This course is systemically arranged and taught in smooth as well as clear way so that students understand easily.

Total nos. of enrollment: 3522

Total nos. of Exam registration: 571

Total nos. of Certificate Eligible: 499



Prof. Sasidhar Gumma
Chemical Engineering

Type of the course: New, Jan 2019 run Duration: 12 weeks

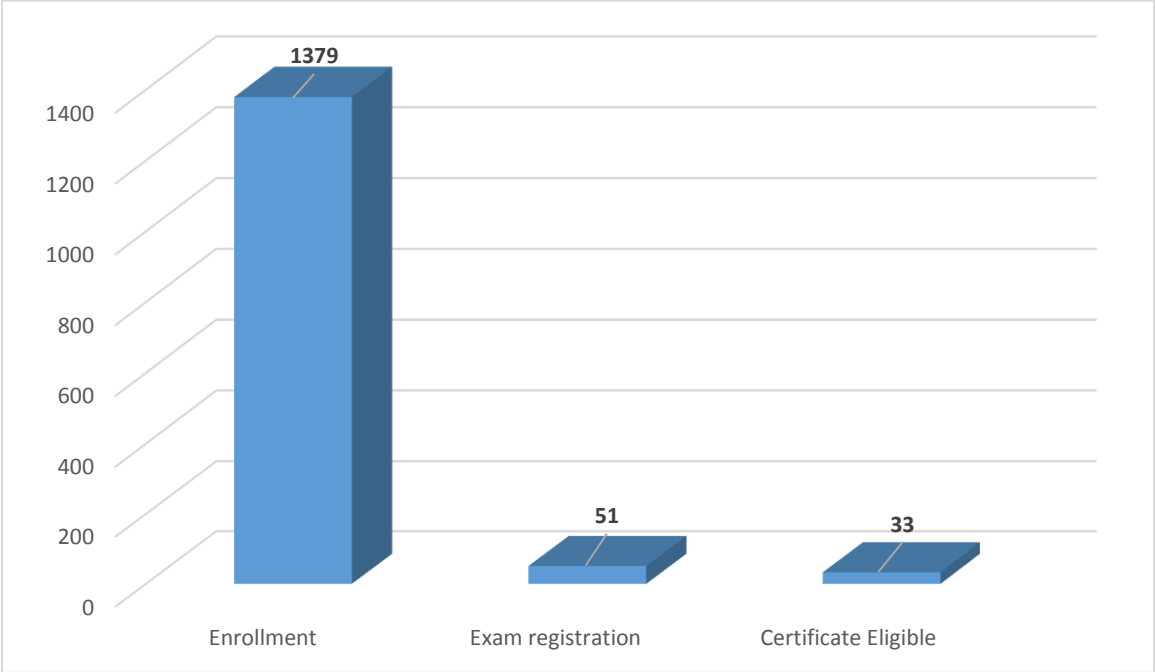
Course Outline:

This course will deal with evaluation and application of the laws of thermodynamics with respect to physical and chemical processes. Real gas behavior, solution thermodynamics, phase and reaction equilibria will be discussed. It will lay foundation for other chemical engineering courses such as mass transfer, chemical reaction engineering etc. It will demonstrate the application of the fundamental concepts of thermodynamics to a wide variety of processes occurring in Chemical Engineering. It will enable the students to develop skills necessary to make appropriate Assumptions in specie Chemical Engineering problems.

Total nos. of enrollment: 1379

Total nos. of Exam registration: 51

Total nos. of Certificate Eligible: 33



Mass Transfer Operations -I

Prof. Bishnupada Mandal
Chemical Engineering

Type of the course: New, Jan 2019 run Duration: 12 weeks

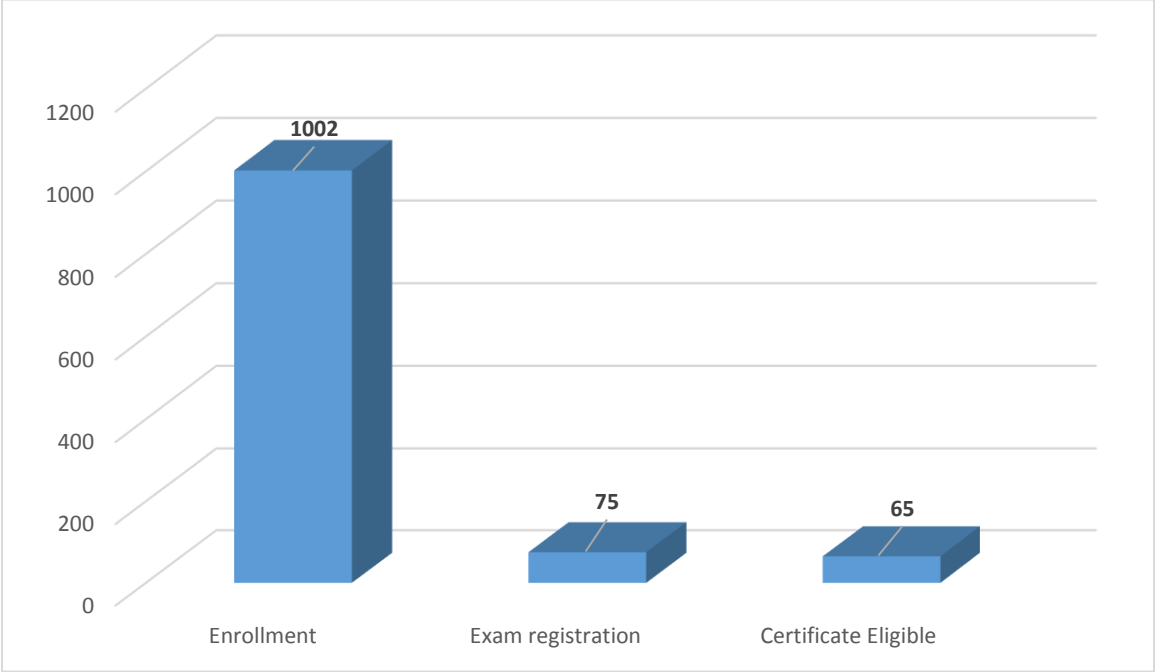
Course Outline:

This course will provide an overview of mass transfer operation at basic to an intermediate level. Coverage will be relatively broad. This course applies the concepts of di-usion and interphase mass transfer to the analysis of di-erend mass transfer operations such as absorption and distillation. The goal is to provide students with the theoretical/analytical background to understand mass transfer operations as well as application and to tackle the sort of complex problems.

Total nos. of enrollment: 1002

Total nos. of Exam registration: 75

Total nos. of Certificate Eligible: 65



Transport Phenomena of Non-Newtonian Fluids

Prof. Nanda Kishore
Chemical Engineering

Type of the course: New, Jan 2019 run Duration: 12 weeks

Course Outline:

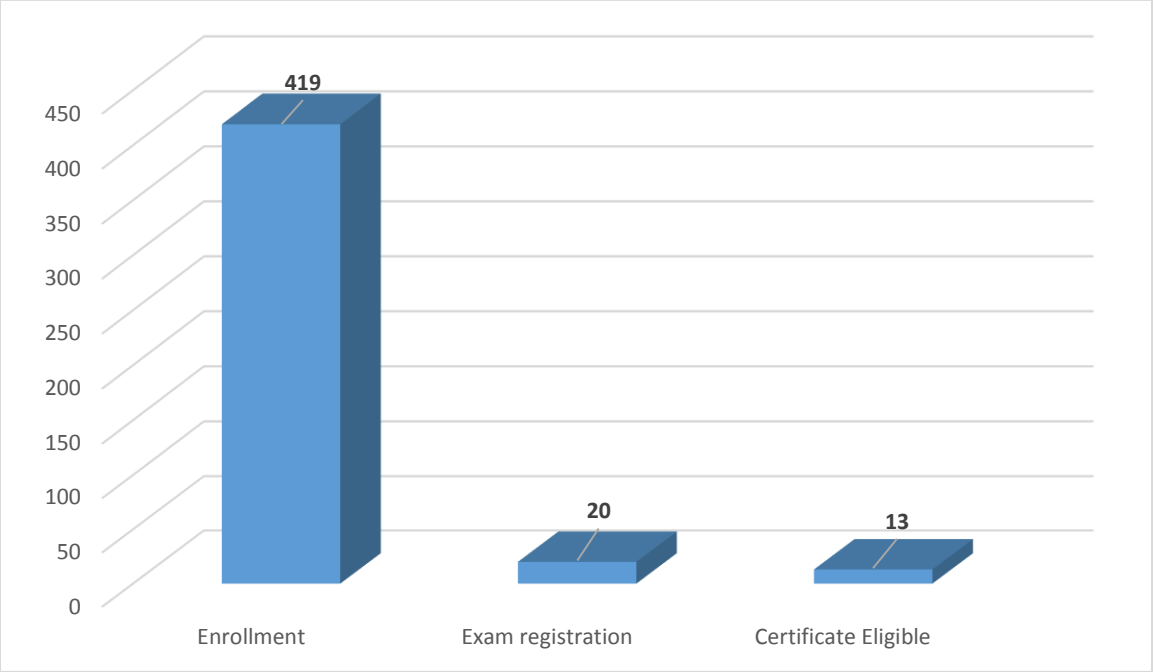
Non-Newtonian fluids are often encountered in our daily life as well as in many industries. Some of the daily-life applications include personal care products such as cosmetics, gels, pastes; food stu-s such as sandwich spreads, ketchup, chocolate, soups, etc. Some of the industrial applications include processing of many polymers, paints and detergents, degassing of polymeric melts and glasses, use of non-Newtonian polymers in enhanced oil recovery, non-Newtonian fluidized beds, wastewater treatment, production of polymeric alloys and ceramics via liquid routes,

Pharmaceutical products wherein the polymer thickening agents are used to enhance their stability for extended shelf-life, pulp and paper industries, etc. Because of aforementioned overwhelming applications, it is required for both undergraduate and postgraduate students to acquire enough academic experience related to the momentum, heat and mass transfer phenomena associated with non-Newtonian fluids.

Total nos. of enrollment: 419

Total nos. of Exam registration: 20

Total nos. of Certificate Eligible: 13



Fluid Flow Operations

Prof. Subrata Kumar Majumder
Chemical Engineering

Type of the course: New, Jan 2019 run Duration: 12 weeks

Course Outline:

This course is structured as a MOOCS course for students or junior engineers studying chemical, mechanical or civil engineering. In this course, e-ort will be made to introduce students /engineers to fluid mechanics by making explanations easy to understand, including recent information and comparing the theories with actual phenomena. The following features will be included in the course

1. Many illustrations, photographs and items of interest will be presented for easy understanding.

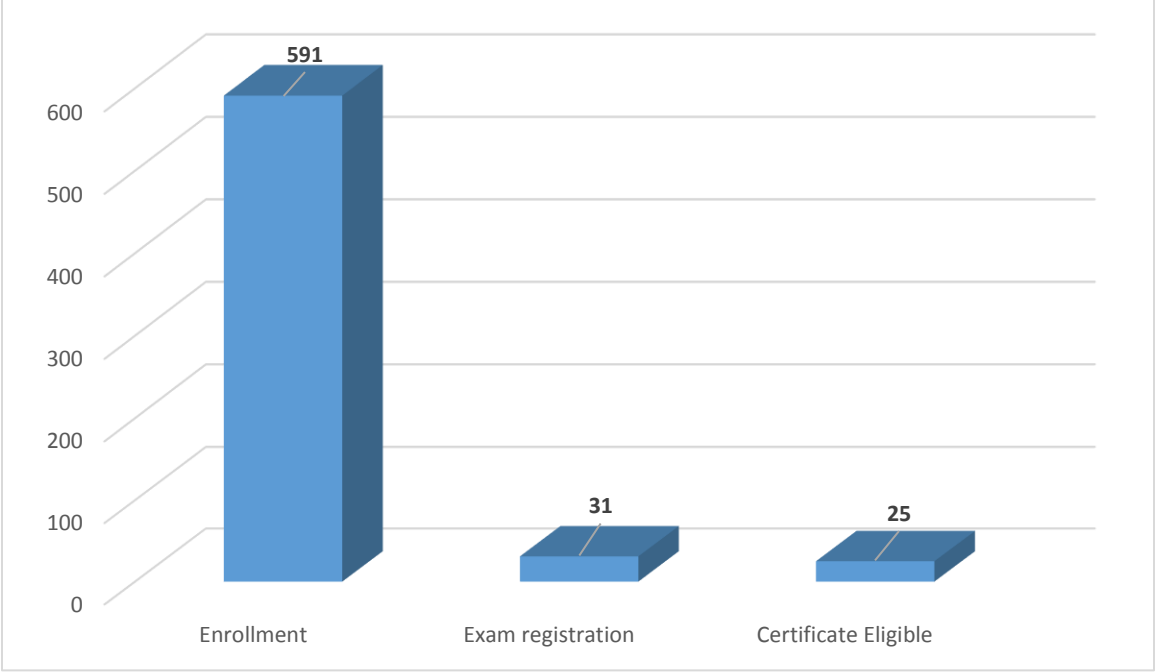
2. Assignments and exercises will be given at the ends of course lecture to test understanding of the chapter topic.

3. Special emphasis will be given on real multiphase flow phenomena with specie applications

Total nos. of enrollment: 591

Total nos. of Exam registration: 31

Total nos. of Certificate Eligible: 25



Prof. Benny George K
Computer Science and Engineering

Type of the course: New, Jan 2019 run Duration: 12 weeks

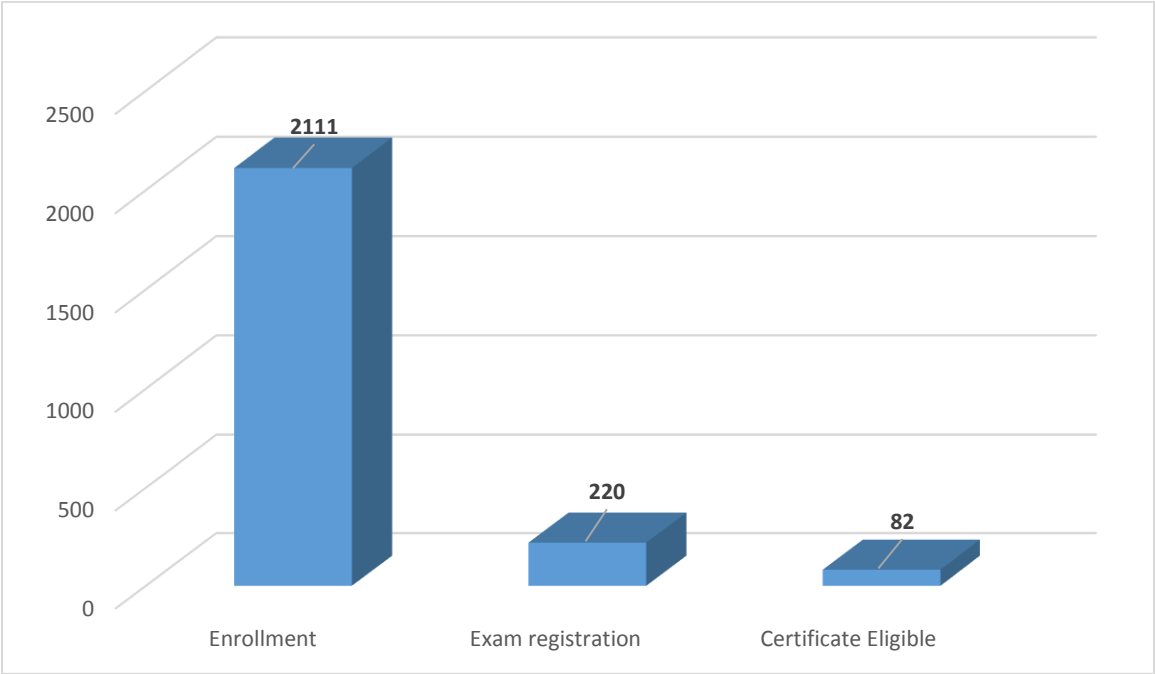
Course Outline:

Algorithms are required to be "correct" and "fast". In a wide variety of applications, these twin objectives are in conflict with each other. Fortunately, neither of these ideals are sacrosanct. Therefore, we can often try to optimize one of these goals by incurring a small penalty on the other. This takes us to the field of Randomized Algorithms. Often, the randomized variants, in addition to being faster than their deterministic counterpart, are simpler to understand and implement. In this course, we will study this tradeoff- between correctness and speed. We will be learning a number of methods to design and analyze randomized algorithms.

Total nos. of enrollment: 2111

Total nos. of Exam registration: 220

Total nos. of Certificate Eligible: 82



Prof. Sajith Gopalan
Computer Science and Engineering

Type of the course: New, Jan 2019 run Duration: 12 weeks

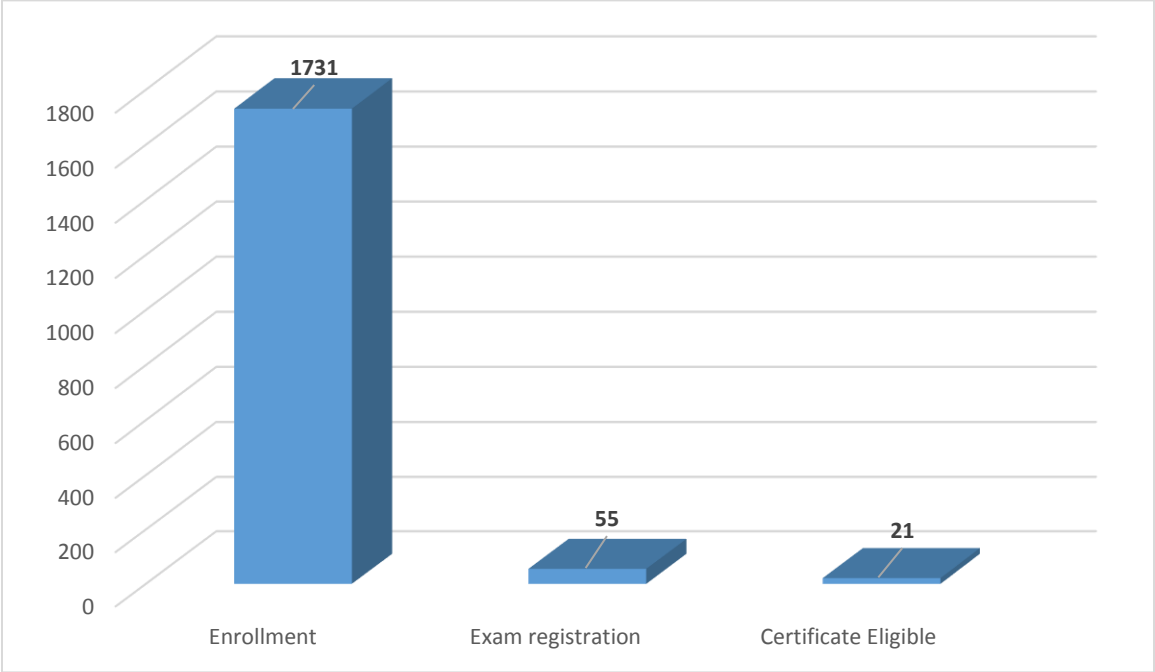
Course Outline:

A conventional algorithm uses a single processing element. A parallel algorithm assumes that there are multiple processors. These processors may communicate with each other using a shared memory or an interconnection network. An algorithm designed for a large number (for example, a polynomial in the problem size) of processors can be simulated on a machine with a small number of processor for a trade o- on time, and therefore is of practical value, while at the same time allowing us to test the limits of parallelism. Many algorithmic design techniques in the parallel setting will be explored. Parallel complexity theory will also be briefly studied.

Total nos. of enrollment: 1737

Total nos. of Exam registration: 55

Total nos. of Certificate Eligible: 21





Computer Organization and Architecture: A Pedagogical Aspect

Prof. S. Biswas
Computer Science and Engineering

Prof. A. Sarkar
Computer Science and Engineering

Prof. J. K. Deka
Computer Science and Engineering

Type of the course: Re-run, Jan 2019 run
Duration: 12 weeks

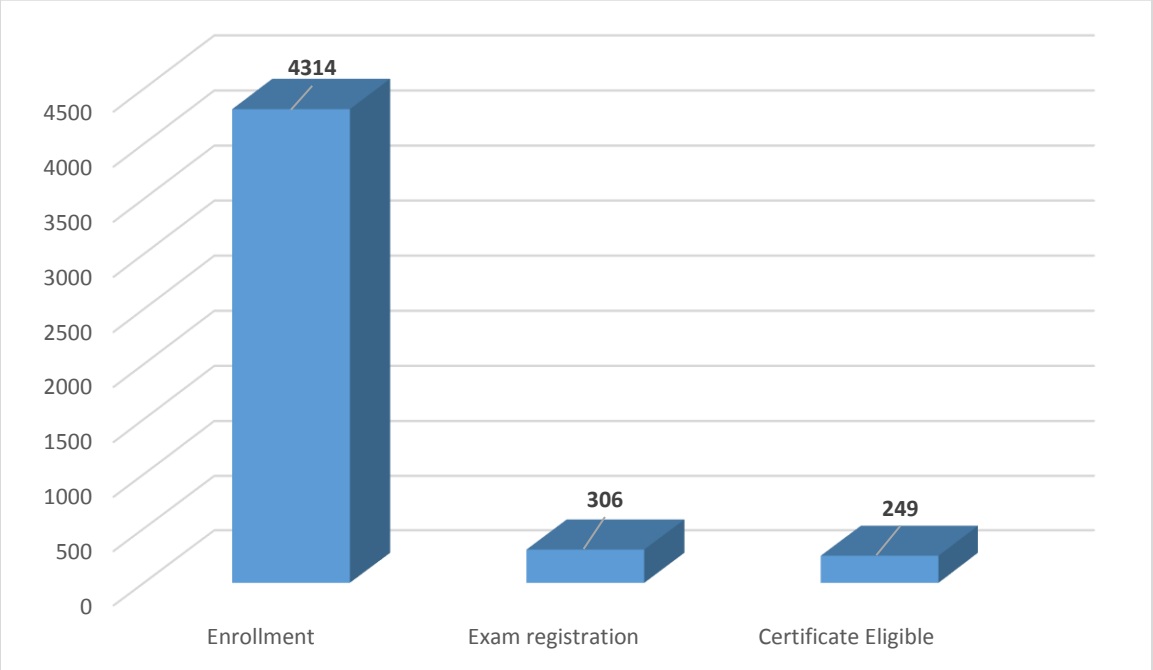
Course Outline:

Computer Organization and Architecture (COA) is a core course in the curricula of Computer Sciences as well as Electronics and Electrical Engineering disciplines at the second-year level in most of the Indian universities and technical institutions. This is the first course in COA and the course would provide students with an understanding of the design of fundamental blocks used for building a computer system and interfacing techniques of these blocks to achieve different configurations of an "entire computer system". This course will be developed and taught with respect to Objectives based on Bloom's Taxonomy. First, we will highlight the main objectives the course is aimed to achieve. Following that, at each module, we will specify the module level objectives and demonstrate how these objectives meet the course level main goals in unison. At the leaf level i.e., the units, we will point the specific objectives of the lecture. Also, it will be demonstrated how the unit level objectives satisfy the parent module level objectives. Further, each module will have a module level problem which needs concepts of all the units therein to solve. Finally, a comprehensive course level problem related to design of "entire computer system" will be discussed which meets all the course level objectives

Total nos. of enrollment: 4314

Total nos. of Exam registration: 306

Total nos. of Certificate Eligible: 249



Prof. Mithilesh Kumar Jha
Humanities and Social Sciences

Type of the course: New, Jan 2019 run Duration: 12 weeks

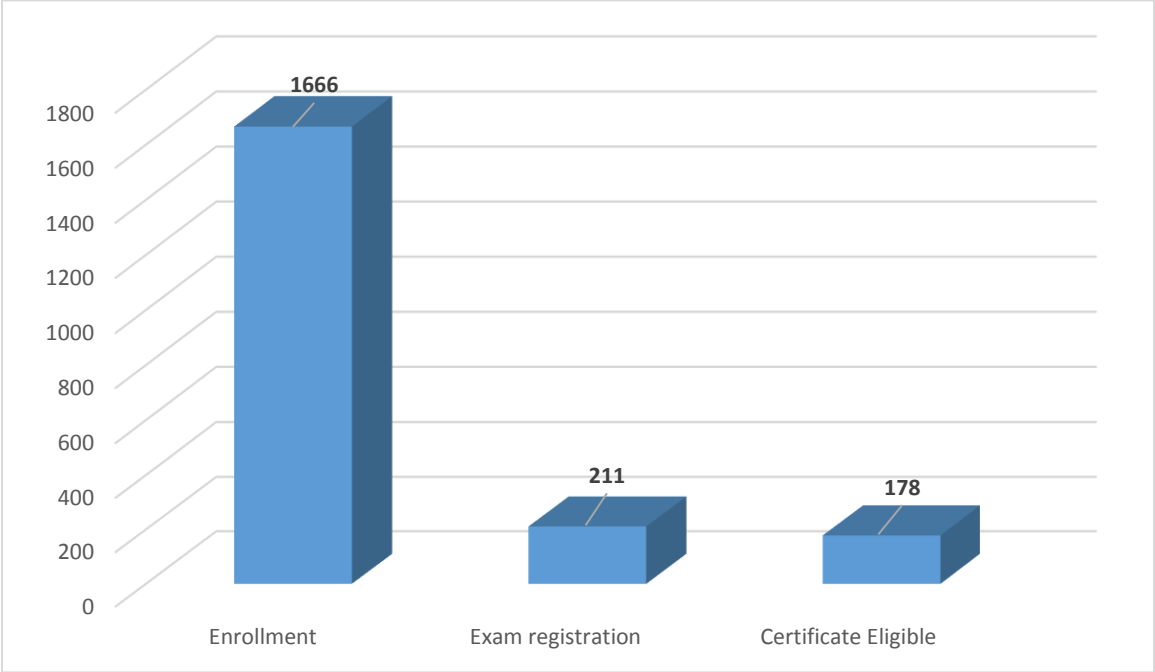
Course Outline:

The major objective of this course is to introduce the students to some of the key concepts and ideas of politics which shape our political discourse. These concepts are essentially contested concepts and yet inevitable for understanding and explaining the politics of any country or society. A clear understanding of these debates or contestations over some of the key concepts and ideas of politics, it is hoped, will help the students develop their own independent views and judgments about politics and democracy in their own societies as well as in the world at large.

Total nos. of enrollment: 1666

Total nos. of Exam registration: 211

Total nos. of Certificate Eligible: 178



Introduction to Cognitive Psychology

Prof. Naveen Kashyap
Humanities and Social Sciences

Type of the course: Re-run, Jan 2019 run Duration: 12 weeks

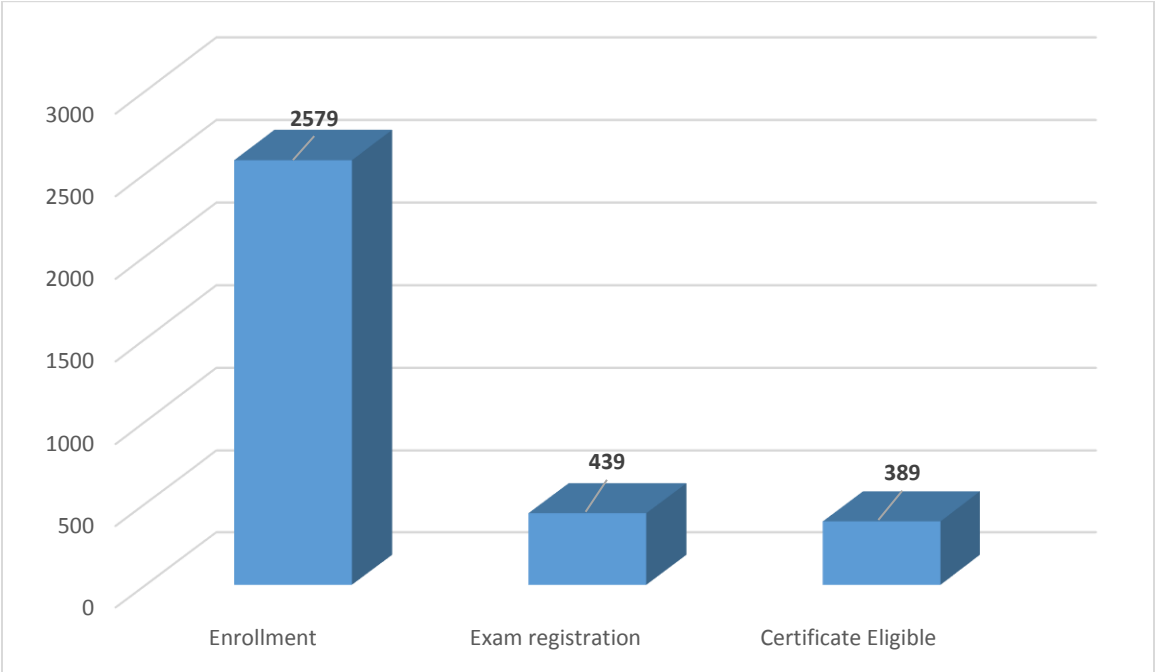
Course Outline:

One of the most puzzling fact for humans over the centuries has been the understanding of human behavior. Understanding and predicting human behavior will help humans in exerting more control over situations. The bases of human behavior are the cognitive processes underlying them. The present course is an attempt to discuss and understand the basic cognitive processes that guide human behavior. The knowledge from the course will be useful in tackling everyday problems and attaining optimal solutions. Additionally, we can use knowledge about human cognitive systems in designing sophisticated Artificial Intelligence (AI) systems that learn from mistakes and make our lives a lot easier to live.

Total nos. of enrollment: 2579

Total nos. of Exam registration: 439

Total nos. of Certificate Eligible: 389



Principles of Mechanical Measurement

Prof. Dipankar N Basu
Mechanical Engineering

Type of the course: New, Jan 2019 run Duration: 12 weeks

Course Outline:

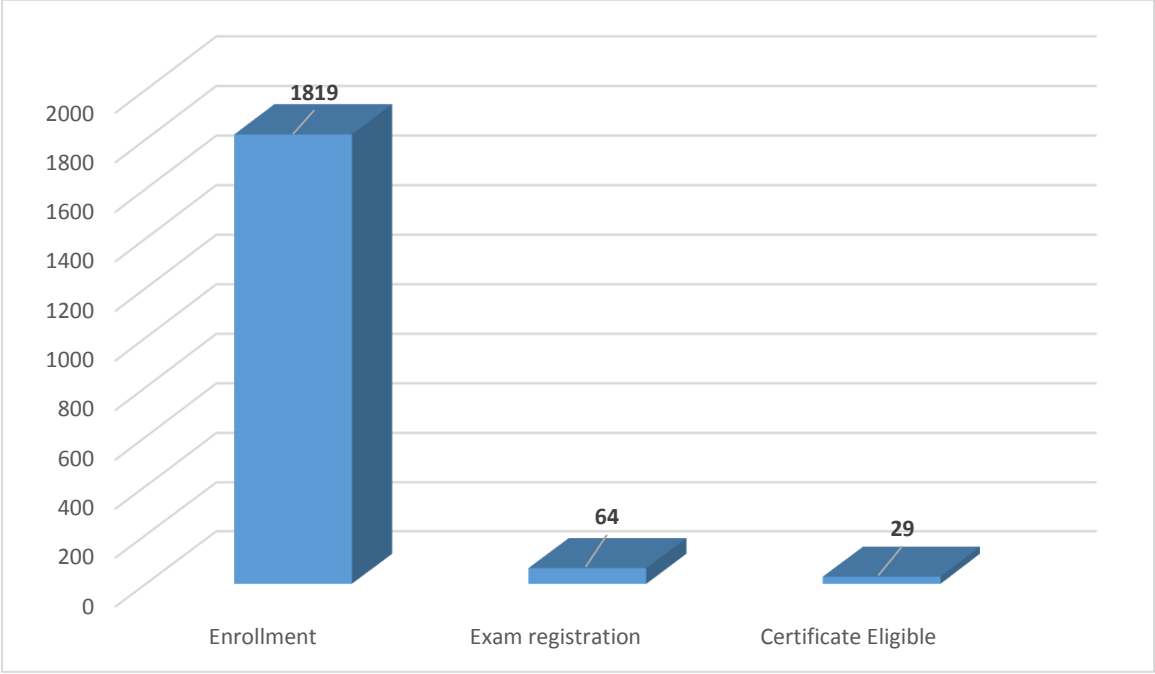
Measurement is always of fundamental significance to the practicing engineers. For the development of any mechanical design procedure, experiments are of paramount interest.

Accordingly, measurement and correct interpretation of the concerned observation are necessary part of any standard engineering task and also R&D. present course will introduce the student to the fundamentals of measurement, discussing about various relevant concepts &terminologies. The mathematical background requirement, categorize& analyze various measurement devices will be prepared and a very pertinent discussion on digitalization will be presenters of scientific interest, such as displacement, motion, stress, force, flow, pressure, temperature etc., will be discussed in detail.

Total nos. of enrollment: 1819

Total nos. of Exam registration: 64

Total nos. of Certificate Eligible: 29




IC Engines and Gas Turbines

Prof. Pranab K. Mondal
Mechanical Engineering

Prof. Vinayak N. Kulkarni
Mechanical Engineering

Type of the course: New, Jan 2019 run Duration: 12 weeks

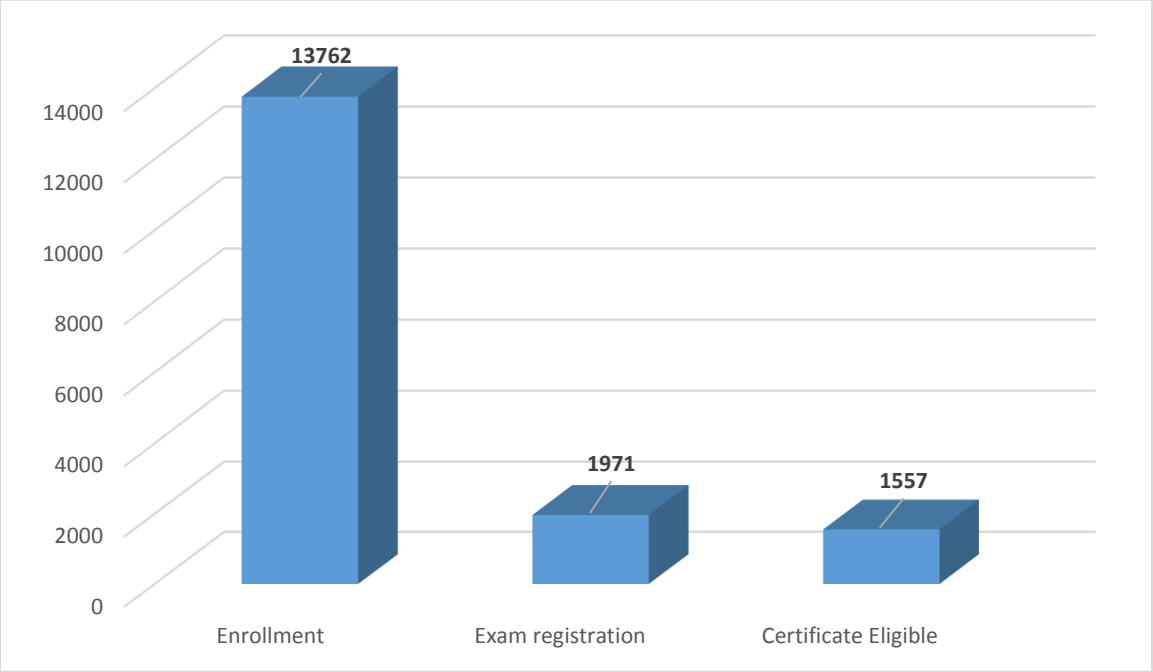
Course Outline:

This course deals with the gas power cycles. One part of the course is on IC engines and it focuses on the thermodynamic cycles for die rent fuels suitable for automobiles. Other part of the course has emphasis on thermodynamic cycle of aircraft engines and the components of the aircraft engine. Thus this course would provide an understanding on electricity generation or transportation application using gas as working medium.

Total nos. of enrollment: 13762

Total nos. of Exam registration: 1971

Total nos. of Certificate Eligible: 1557



Ergonomics Workplace Analysis

Prof. Urmi R Salve
Design

Type of the course: New, July 2019 run Duration: 4 weeks

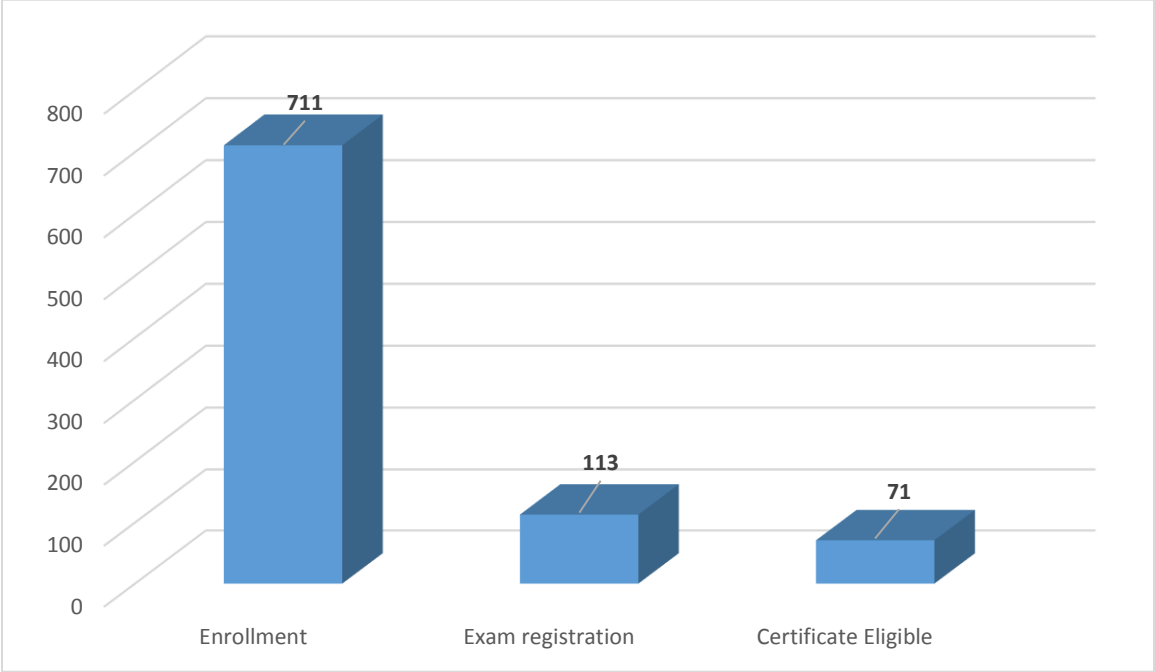
Course Outline:

Ergonomic workplace analysis is a process where the ergonomic risk factors were evaluated using various validated tools and provide the probable recommendation to minimize the risk factors for development of work related musculoskeletal disorders and improve the productive workday to reduce the cost for compensation, absenteeism and employee turnover. In the process of ergonomic workplace analysis, an ergonomist need to evaluate the physical work environment, psychosocial risk factors as well as various generic risk factors which leads to the development of work related musculoskeletal disorders. This course is based on the complete process evaluation of EWA.

Total nos. of enrollment: 711

Total nos. of Exam registration: 113

Total nos. of Certificate Eligible: 71



Ergonomics in Automotive Design

Prof. Sougata Karmakar
Design

Type of the course: New, July 2019 run Duration: 4 weeks

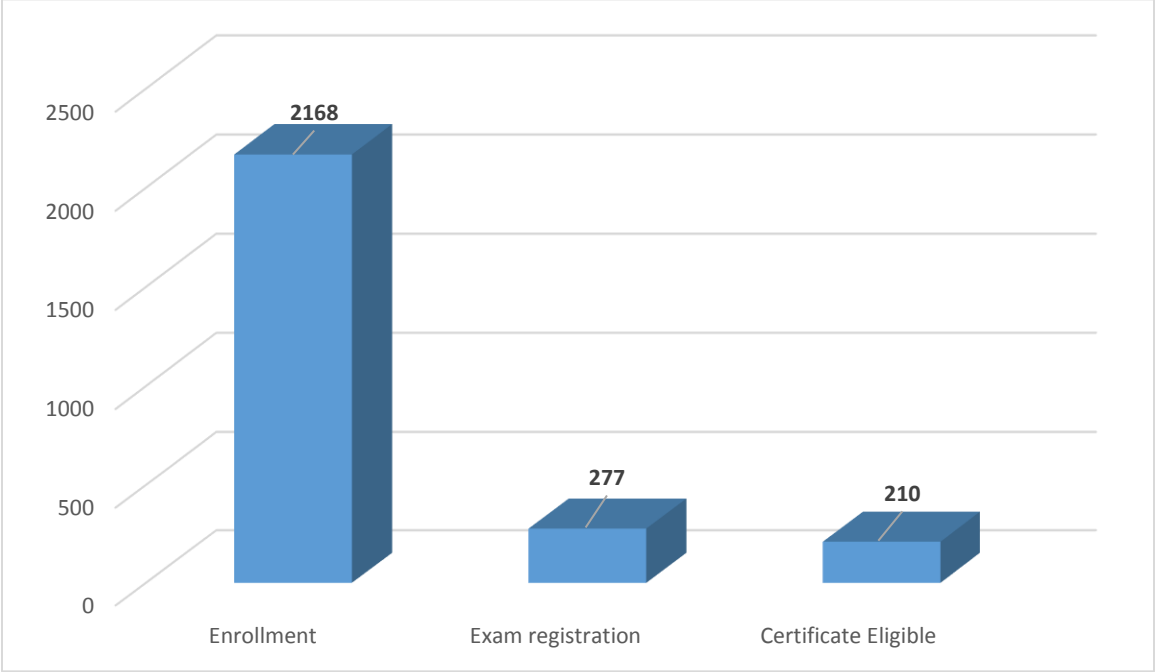
Course Outline:

Knowledge of 'Ergonomics/ Human Factors Engineering' is of utmost necessity for automotive design and engineering to achieve optimal compatibility between occupants and vehicle components in terms of physical, cognitive and environmental aspects. Although good number of Design and Engineering Schools in India are offering courses on Automobile Design, Transportation Design and Automobile Engineering but there is less focus on Automotive Ergonomics due to lack of resources and trained faculty members. The current elective would not only help the students and teachers involved in Automobile Design and Engineering to overcome the aforesaid limitations but also would be beneficial for the engineers and designers engaged in automotive sectors.

Total nos. of enrollment: 2168

Total nos. of Exam registration: 277

Total nos. of Certificate Eligible: 210



Two-Phase flow with phase change in conventional and miniature channels

Prof. Manmohan Pandey
Mechanical Engineering

Type of the course: New, July 2019 run Duration: 4 weeks

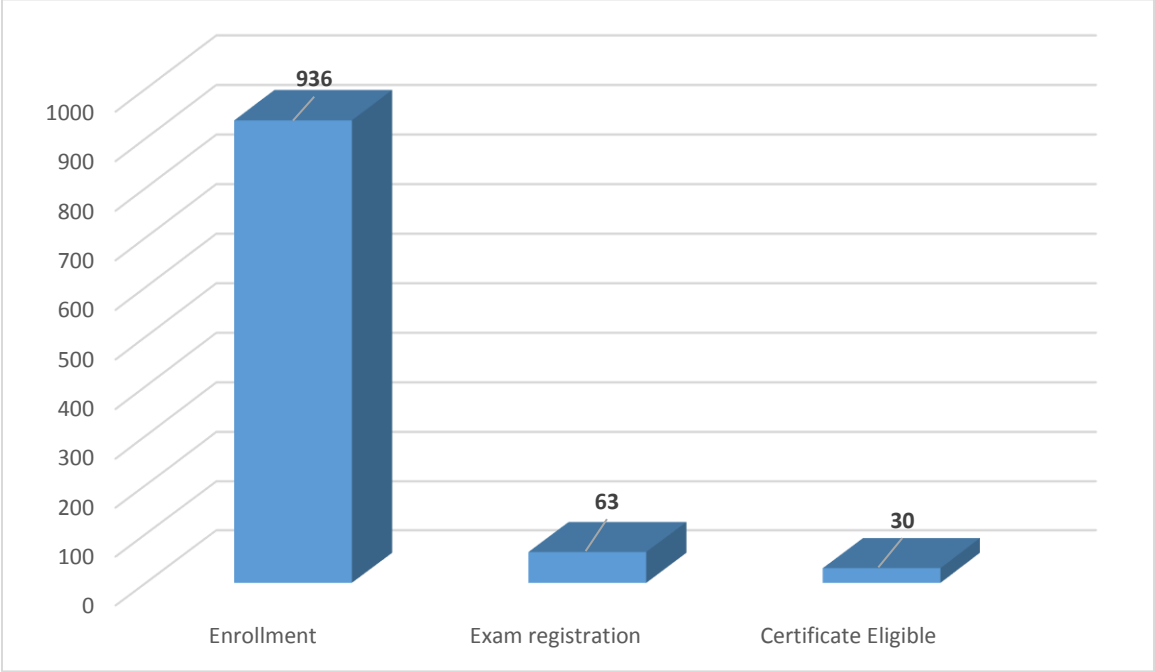
Course Outline:

Gas-liquid flows occur in various industrial applications, such as power generation, refrigeration, oil & gas production, and thermal management of future electronic devices. In this course, one-dimensional models of two-phase flow with and without phase change will be introduced. Methods of pressure drop prediction for adiabatic gas-liquid flow as well as flow boiling will be discussed. Special methods for pressure drop modeling of two-phase flow in miniature channels will also be introduced.

Total nos. of enrollment: 936

Total nos. of Exam registration: 63

Total nos. of Certificate Eligible: 30



Development Research Methods

Prof. Rajshree Bedamatta
Humanities and Social Sciences

Type of the course: New, July 2019 run Duration: 8 weeks

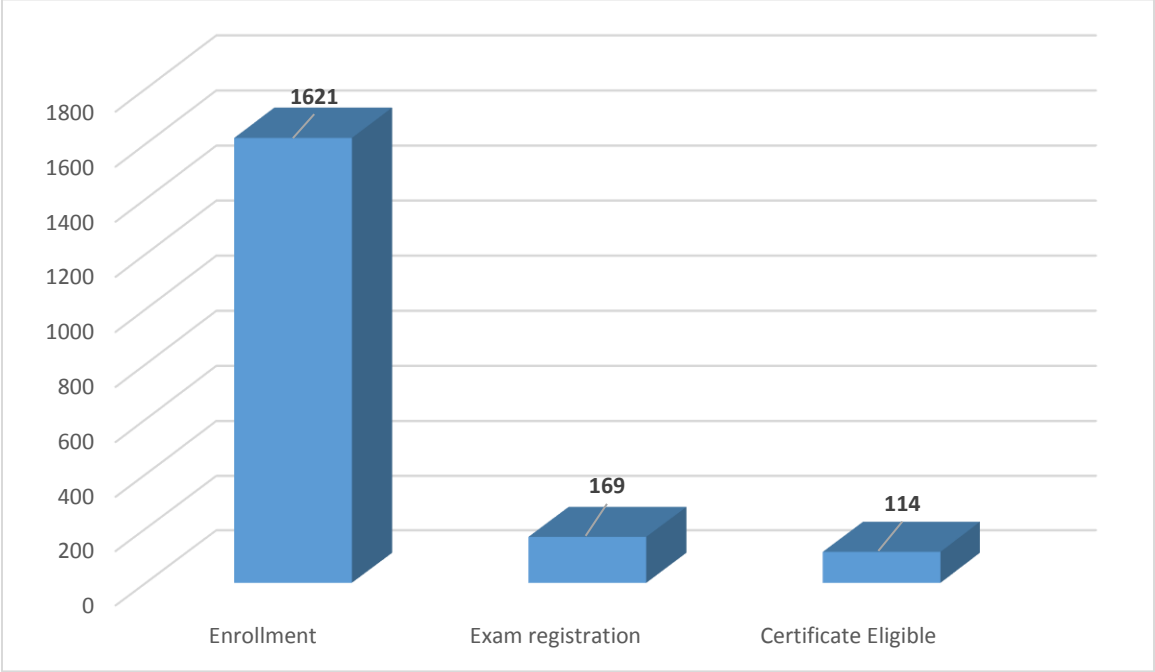
Course Outline:

This course will provide training in some methodological approaches in Development studies and Development research that will equip the students into applying them in their dissertations or project evaluations. Applied and practice oriented issues in development research methods will be taken up by focusing on the differences in qualitative, quantitative and mixed-methods research. Anyone who is interested in development issues and undertaking development research is encouraged to enroll.

Total nos. of enrollment: 1621

Total nos. of Exam registration: 169

Total nos. of Certificate Eligible: 114



Prof. Vinayak N. Kulkarni
Mechanical Engineering

Type of the course: New, July 2019 run Duration: 8 weeks

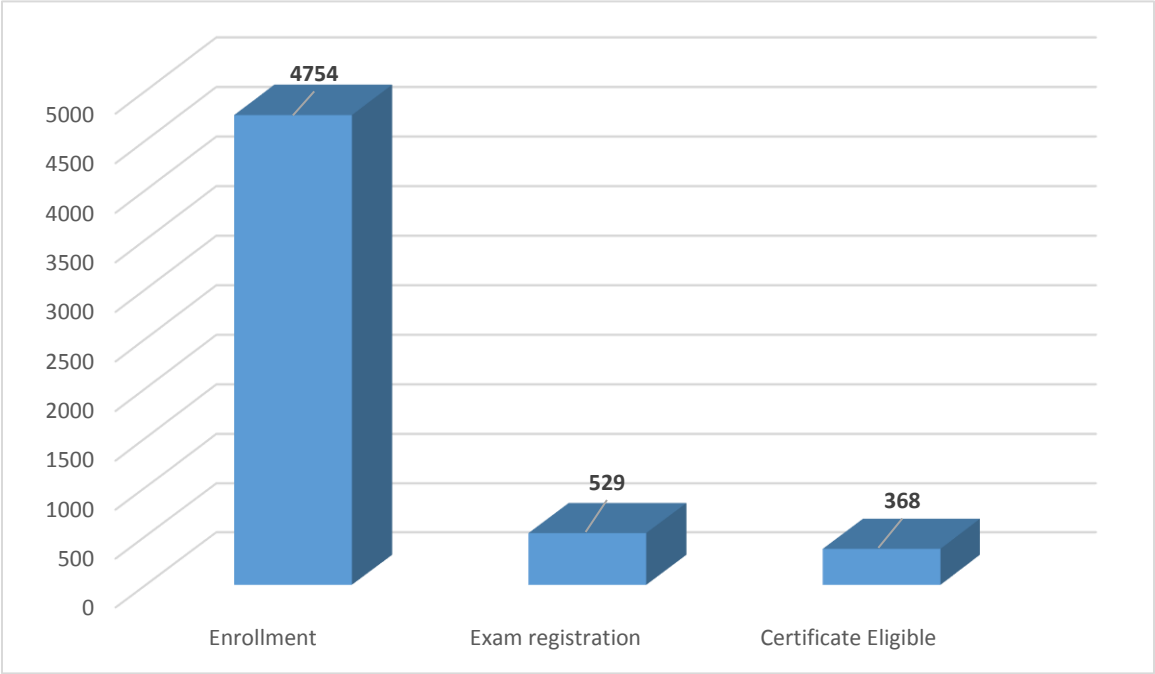
Course Outline:

This course deals with the steam power plants. One part of the course is about simple steam power cycle, reheat, regeneration and superheating. Further actual cycle with component efficiencies would also be discussed. Then each component of the plant is discussed detail. Initially, types of steam generators and their parts highlighted. Then steam turbine, its type, efficiency and arrangements are focused. Thus this course would provide an understanding on electricity generation or transportation application using steam as working medium.

Total nos. of enrollment: 4754

Total nos. of Exam registration: 529

Total nos. of Certificate Eligible: 368



Theoretical Mechanics

Prof. Charudatt Kadolkar
Physics

Type of the course: New, July 2019 run Duration: 8 weeks

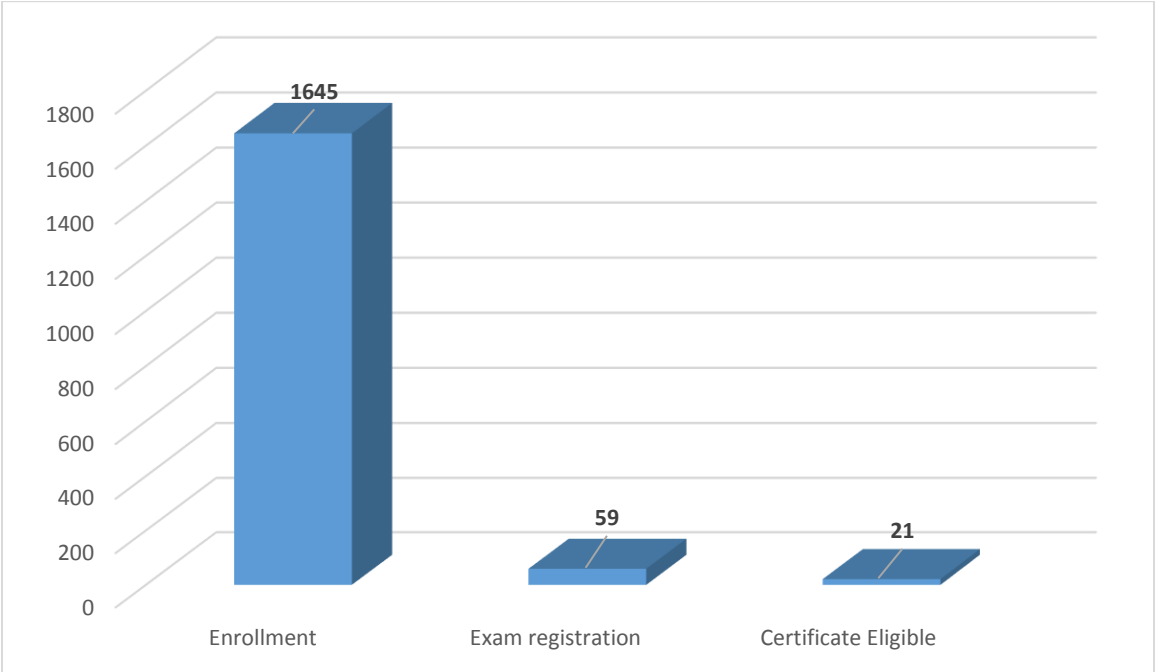
Course Outline:

This course focuses on analytical aspects of classical mechanics and is targeted towards the audience who are interested in pursuing research in Physics. Various formulations of mechanics, like the Lagrangian formulation, the Hamiltonian formulation, the Poisson bracket formulation will be taught in the course. The course also introduces the mechanics of continuous systems and fields.

Total nos. of enrollment: 1645

Total nos. of Exam registration: 59

Total nos. of Certificate Eligible: 21



Prof. Girish S. Setlur
Physics

Type of the course: New, July 2019 run Duration: 8 weeks

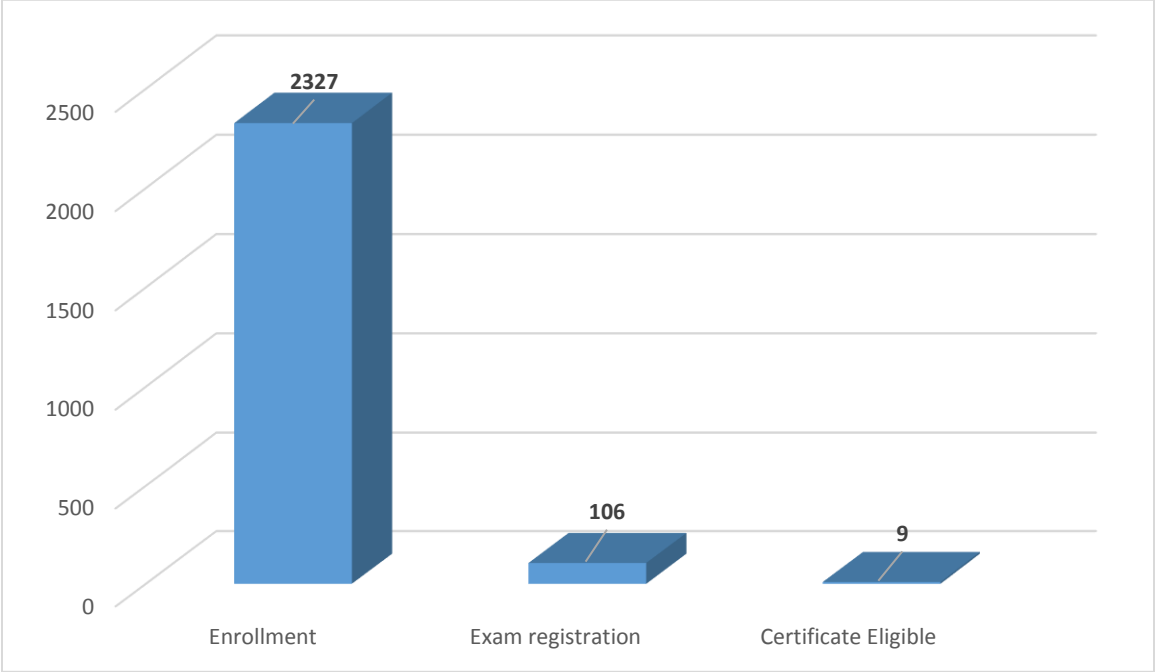
Course Outline:

This is an introductory course in classical and quantum statistical mechanics which deals with the principle of ensembles, Classical, Fermi and Bose ideal gases, Pauli paramagnestim, Debye and Einstein's theory of specific heat and the 1D Ising model.

Total nos. of enrollment: 2327

Total nos. of Exam registration: 106

Total nos. of Certificate Eligible: 09



Numerical Methods and Simulation Techniques for Scientists and Engineers

Prof. Saurabh Basu
Physics

Type of the course: New, July 2019 run Duration: 8 weeks

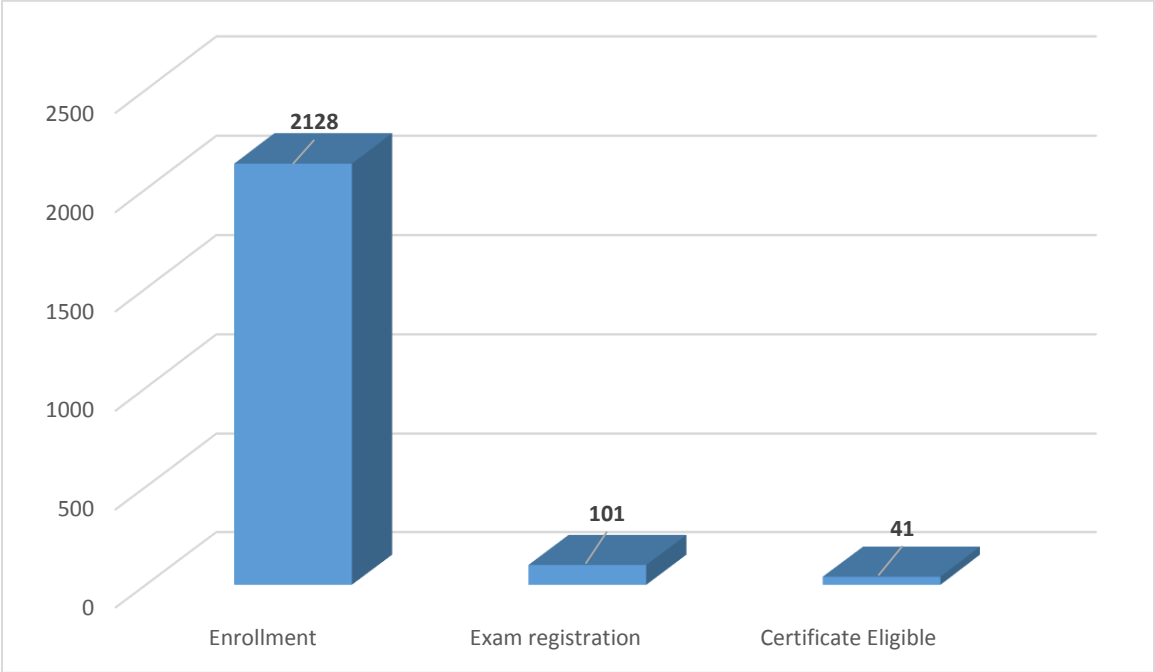
Course Outline:

The course contains very important aspects of modern day course curriculum, namely, numerical methods and simulation techniques that are going to be of utmost importance to both undergraduate and graduate level. Most of the real life problems are unsolvable using known analytic techniques, thus depending on numerical methods is imperative. The course introduces basic numerical methods and the key simulation techniques that are going to be useful to academia and industry alike. Even if the software packages, such as Mathematica, Mat lab etc. are available for most of the numeric computations, yet one should be aware of the techniques that are inbuilt into the software.

Total nos. of enrollment: 2128

Total nos. of Exam registration: 101

Total nos. of Certificate Eligible: 41



Genetic Engineering: Theory and Application

Prof. Vishal Trivedi
Biosciences and Bioengineering

Type of the course: New, July 2019 run Duration: 8 weeks

Course Outline:

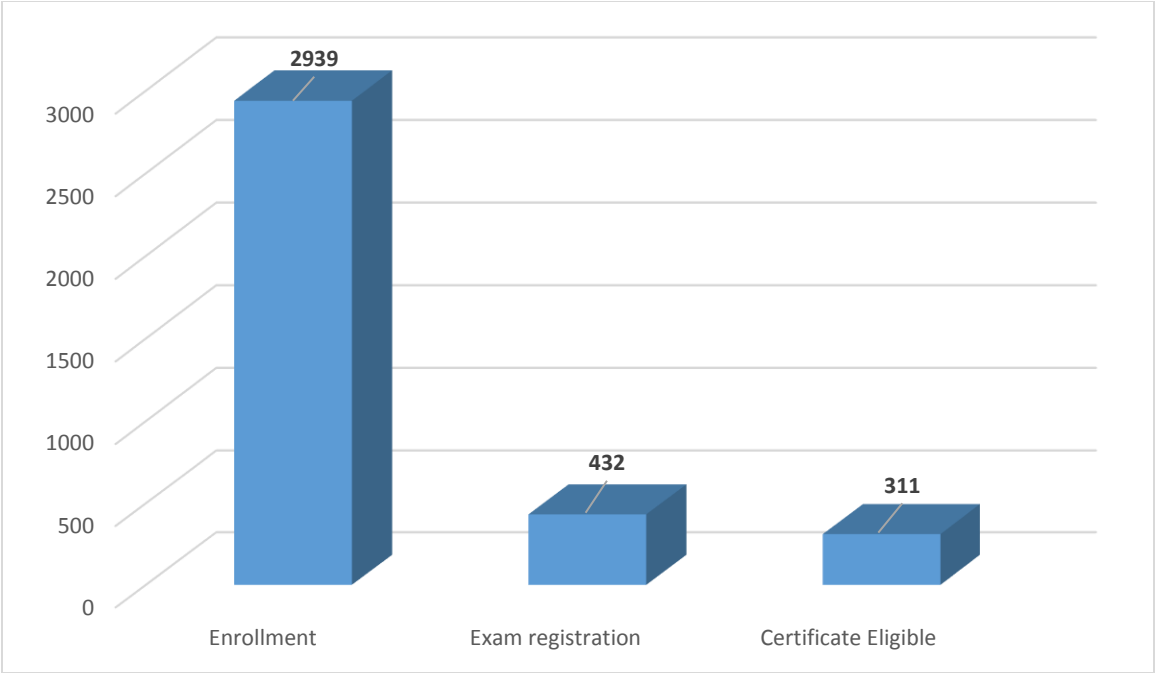
In the current MOOCs course I have put effort to briefly discuss about biotechnology, its scope and impact on human life with several customized products. The Development of technology and generation of product has multiple steps and understanding these steps are being covered in this course with a discussion of biotechnology application at the end. By the end of this course, student will be able to understand following aspects of biotechnology:

1. Basic metabolic pathways and their regulation.
2. Microbial growth kinetics with an emphasis on fermentation
3. Basic molecular biology tools used in biotechnology.
4. Basic methodology for product recovery and analysis.

Total nos. of enrollment: 2939

Total nos. of Exam registration: 432

Total nos. of Certificate Eligible: 311



Natural Gas Engineering

Prof. Pankaj Tiwari
Chemical Engineering

Type of the course: Re-run, July 2019 run Duration: 8 weeks

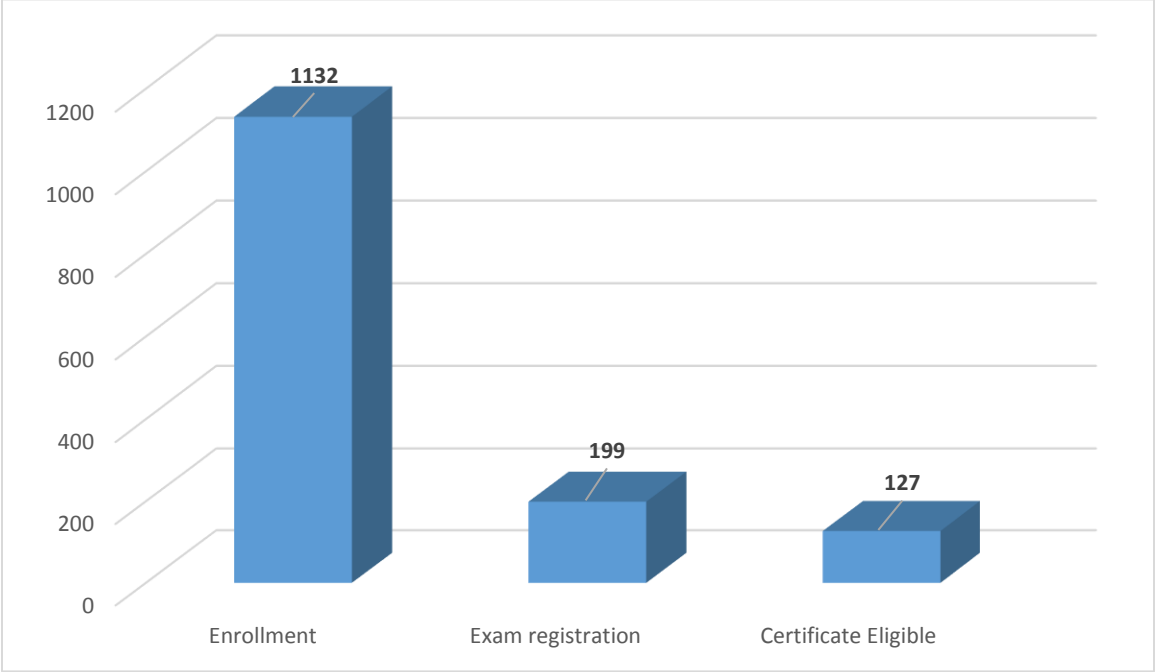
Course Outline:

The field of natural gas engineering is very much important for petroleum engineers specializing in gas processing technology. The course outlines an optimal balance between natural gas production, natural gas processing and gas transportation. An extensive treatise on natural gas engineering, both upstream and gas refining processes with key equipment and facility design will be covered. This course will also highlight the current status of production of natural gas through unconventional sources/technics and the applications of natural gas.

Total nos. of enrollment: 1132

Total nos. of Exam registration: 199

Total nos. of Certificate Eligible: 127



Fluid Mechanics

Prof. Subashisa Dutta
Civil Engineering

Type of the course: New, July 2019 run Duration: 8 weeks

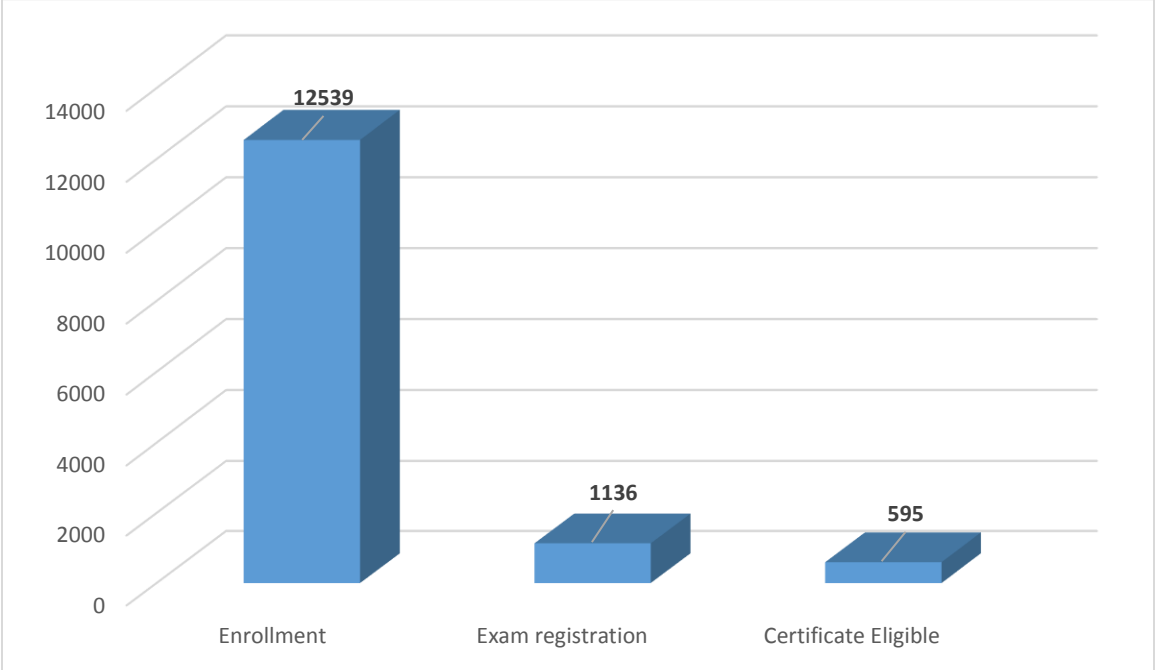
Course Outline:

Fluid Mechanics is an inter-disciplinary course covering the basic principles and its applications in Civil Engineering, Mechanical Engineering and Chemical Engineering. The students will have new problem solving approaches like control volume concept and streamline patterns which are now a days required to solve the real-life complex problems. The visualization of the fluid-flow problems will be demonstrated to enhance student's interest on the subject.

Total nos. of enrollment: 12539

Total nos. of Exam registration: 1136

Total nos. of Certificate Eligible: 595



Remote Sensing and GIS

Prof. Rishikesh Bharti
Civil Engineering

Type of the course: New, July 2019 run Duration: 8 weeks

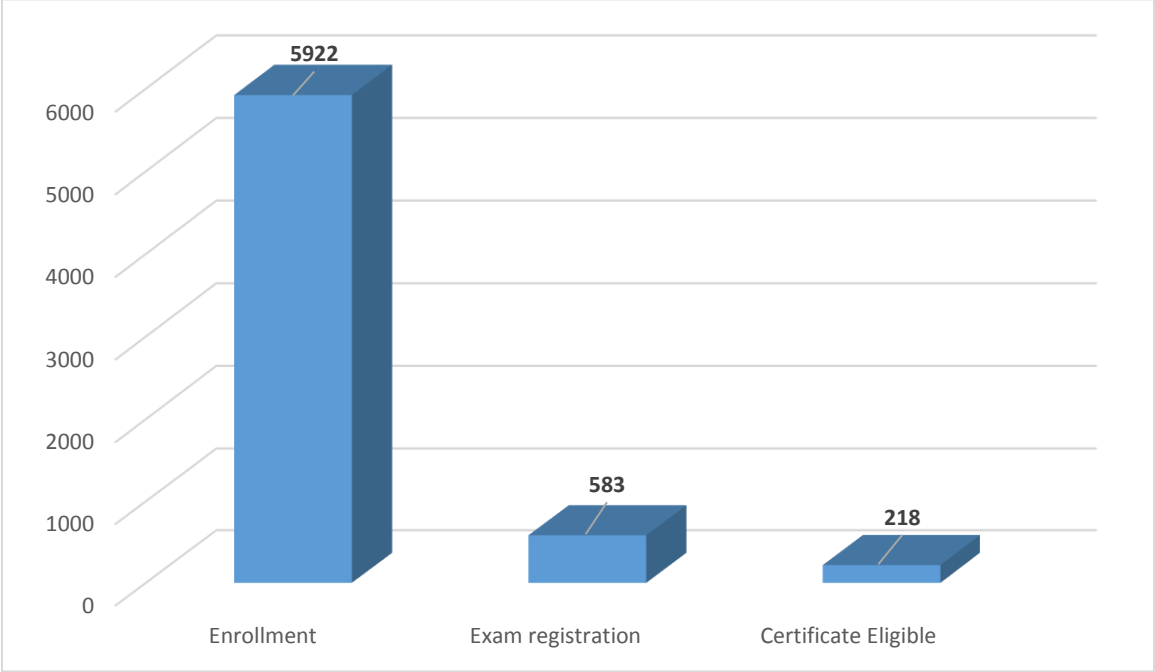
Course Outline:

This course will introduce the students to the state-of-the-art concepts and practices of remote sensing and GIS. It starts with the fundamentals of remote sensing and GIS and subsequently advanced methods will be covered. This course is designed to give comprehensive understanding on the application of remote sensing and GIS in solving the research problems. Upon completion, the participants should be able to use remote sensing (Satellite images and Field data) and GIS in their future research work.

Total nos. of enrollment: 5922

Total nos. of Exam registration: 583

Total nos. of Certificate Eligible: 218



Advanced Computer Architecture

Prof. John Jose
Computer Science and Engineering

Type of the course: New, July 2019 run Duration: 8 weeks

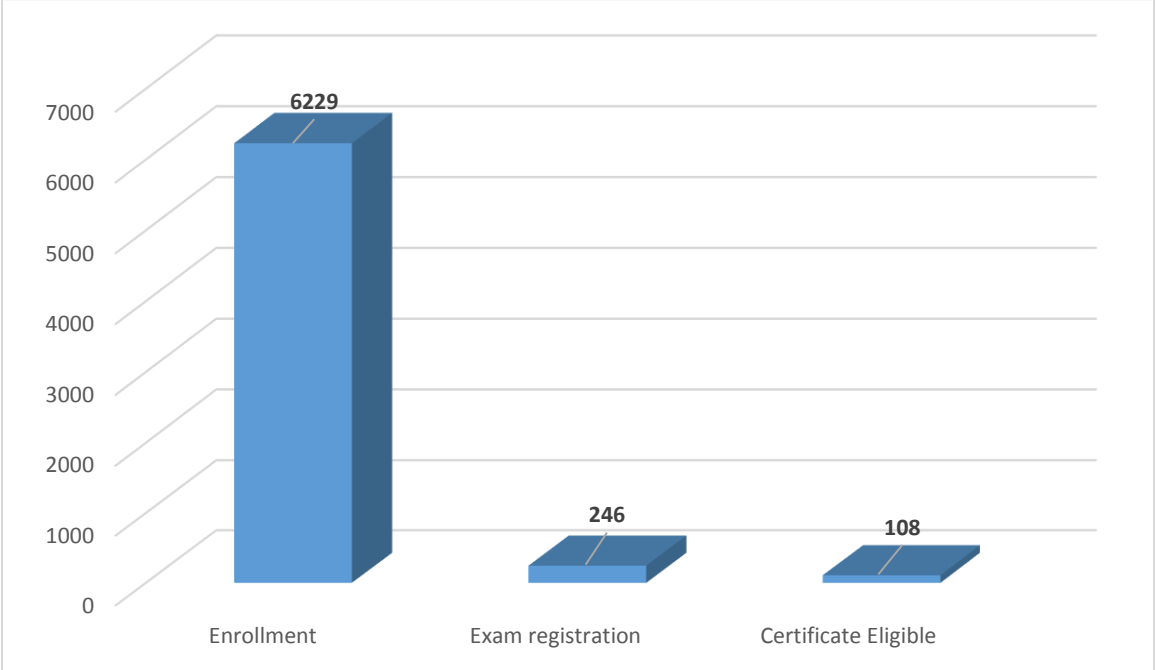
Course Outline:

Applications and handheld devices play a major role in ensuring comfort in our day- today life. These applications run on handheld electronic gadgets with high-end microprocessor support. Modern CPU designers handle challenges imposed by these applications with cost effective architectural enhancements. This course provides a deeper insight into the design of high-end microprocessors that will support the future applications.

Total nos. of enrollment: 6229

Total nos. of Exam registration: 246

Total nos. of Certificate Eligible: 108



Consumer Psychology

Prof. Naveen Kashyap
Humanities and Social Sciences

Type of the course: Re-run, July 2019 run Duration: 8 weeks

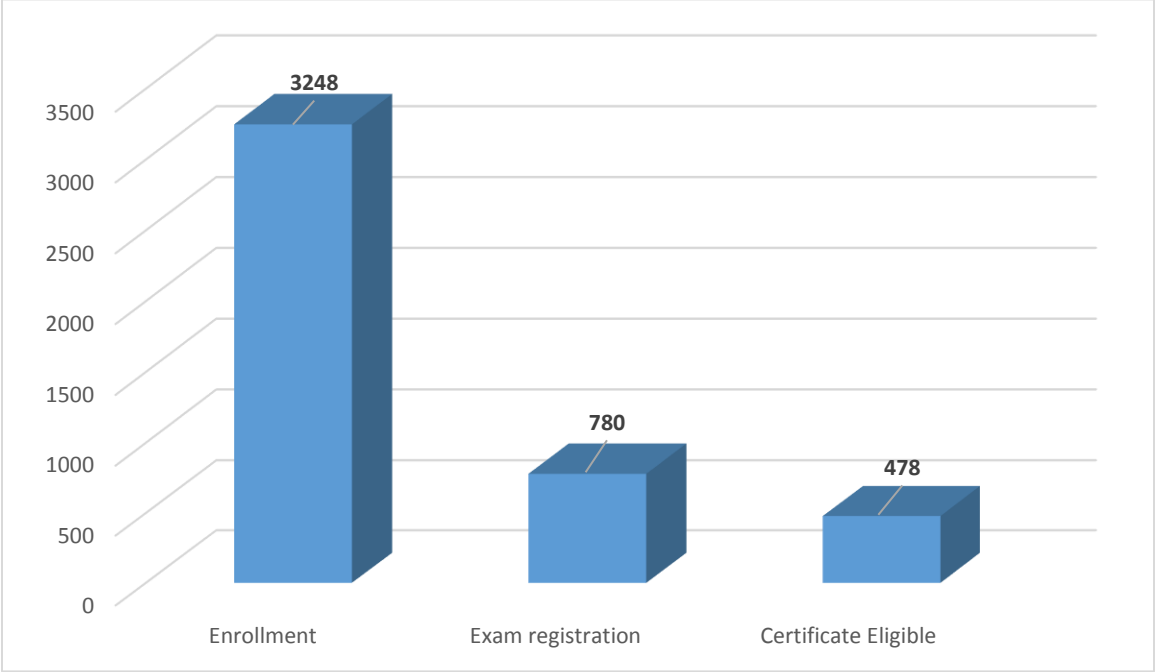
Course Outline:

Human beings have basic needs that they fulfill by making transactions in the market. Transactions mostly in the form of monetary exchange for goods and services are very basic for the survival of the human race. The present course is designed to study how consumers behave on the market and what the consequences of various behavior patterns. Additionally, the present course also looks at various psychological factors that shape the behavior and actions of the consumer in the global market.

Total nos. of enrollment: 3248

Total nos. of Exam registration: 780

Total nos. of Certificate Eligible: 478



The Psychology of Language

Prof. Naveen Kashyap
Humanities and Social Sciences

Type of the course: New, July 2019 run Duration: 8 weeks

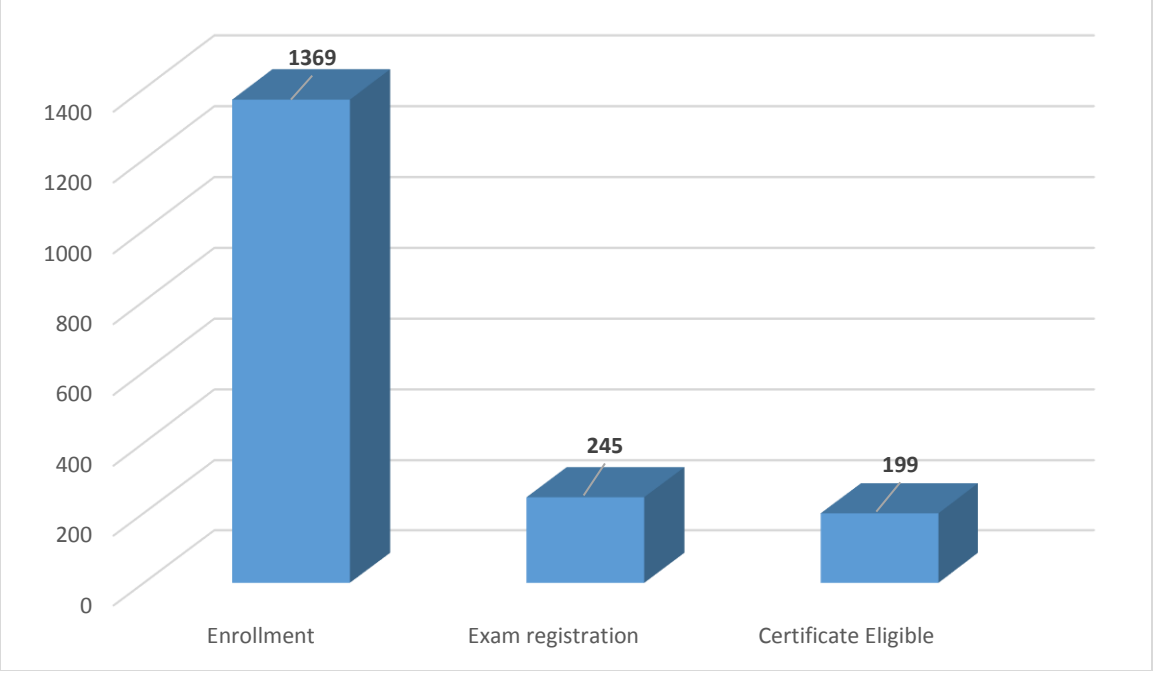
Course Outline:

The very basic form of exchanging information between two living beings is termed as communication. A highly developed form of communication is language, which is used mostly by human beings. The present course will introduce the concept of language and the psychology behind the learning and using of language.

Total nos. of enrollment: 1369

Total nos. of Exam registration: 245

Total nos. of Certificate Eligible: 199



Prof. Chandan Das
Chemical Engineering

Type of the course: New, July 2019 run Duration: 12 weeks

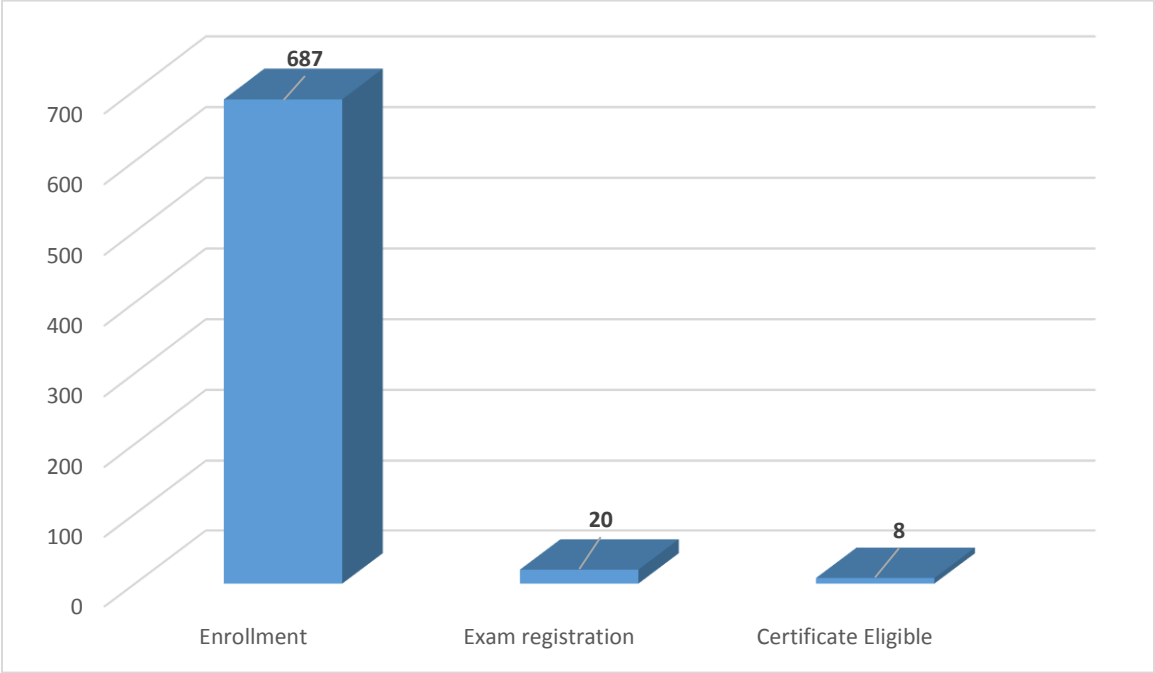
Course Outline:

This course will provide an overview on mass transfer at basic to an intermediate level. This course applies the concepts of diffusion and interphase mass transfer to the analysis of different unit operations such as humidification, drying, adsorption, extraction, leaching, crystallization and membrane processes. The course synthesizes fundamental concepts and analytical skills to understand mass transfer operations and to tackle the sort of complex problems. Information on key topics will be provided in the form of summary of lecture notes, problems and adequate references.

Total nos. of enrollment: 687

Total nos. of Exam registration: 20

Total nos. of Certificate Eligible: 08



Chemical Reaction Engineering-I

Prof. Bishnupada Mandal
Chemical Engineering

Type of the course: New, July 2019 run Duration: 12 weeks

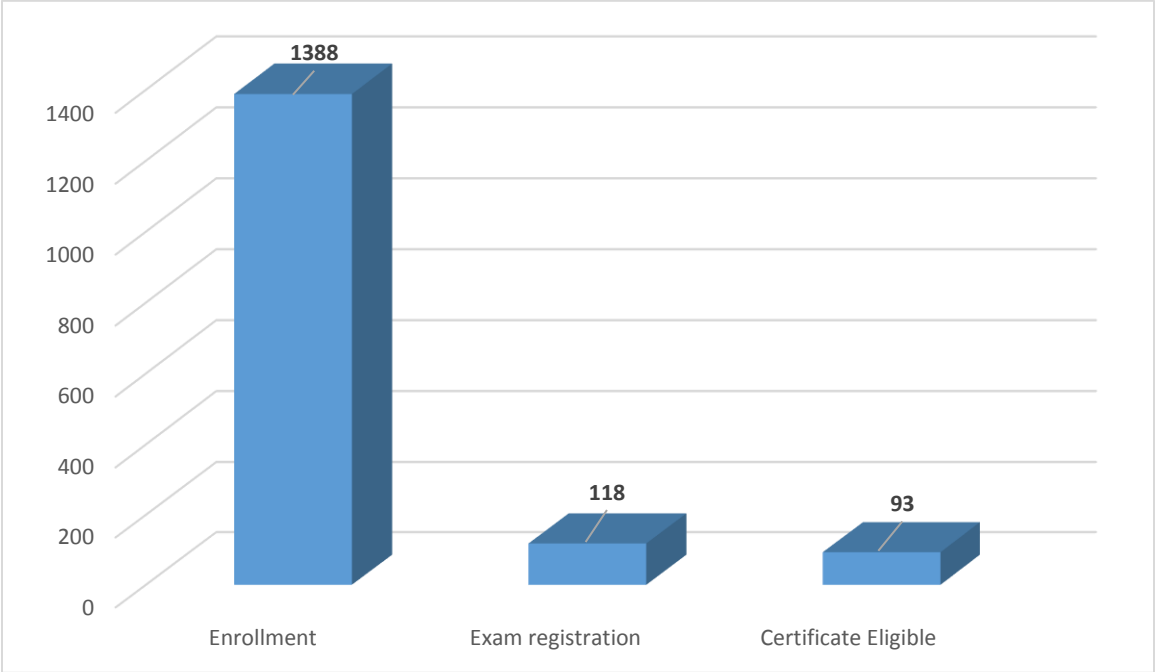
Course Outline:

This course will provide an overview of chemical kinetics and reactor design at basic to an intermediate level. Coverage will be relatively broad. This course applies the concepts of reaction rate, stoichiometry and equilibrium to the analysis of chemical and biological reacting systems such as derivation of rate expressions from reaction mechanisms and equilibrium or steady state assumptions and design of chemical and biochemical reactors via synthesis of chemical kinetics, and mass and energy balances. The goal is to provide students with the theoretical/analytical background to understand chemical kinetics and reactor design and to tackle the short of complex problems.

Total nos. of enrollment: 1388

Total nos. of Exam registration: 118

Total nos. of Certificate Eligible: 93



Prof. Nanda Kishore
Chemical Engineering

Type of the course: New, July 2019 run Duration: 12 weeks

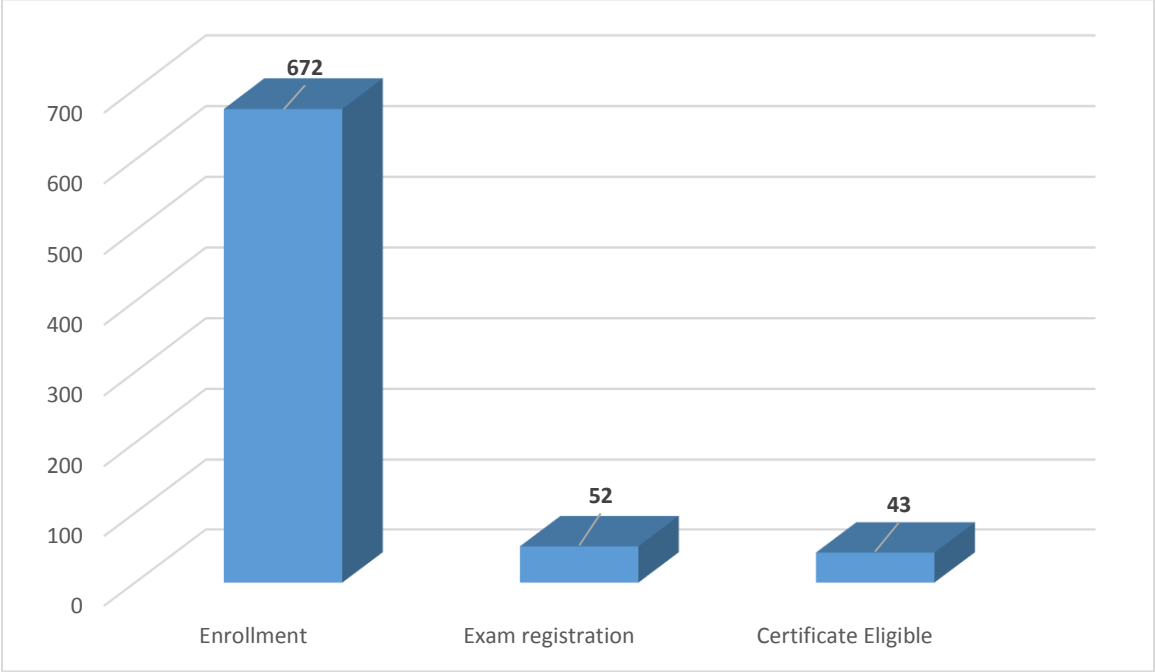
Course Outline:

Chemical engineering consists of several unit operations and unit processes. Before the reaction step, the raw materials should be processed through various unit operations and similarly after the reaction step as well the products are passed through various unit operations either for product separation or for purity. Thus unit operations are very essentially part of the chemical engineering; and hence, basic knowledge about the principles and equipment of solid-solid unit operations and solid-liquid unit operations is mandatory for any professional chemical engineer.

Total nos. of enrollment: 672

Total nos. of Exam registration: 52

Total nos. of Certificate Eligible: 43



Thermal Processing of Foods

Prof. R. Anandalakshmi
Chemical Engineering

Type of the course: New, July 2019 run Duration: 12 weeks

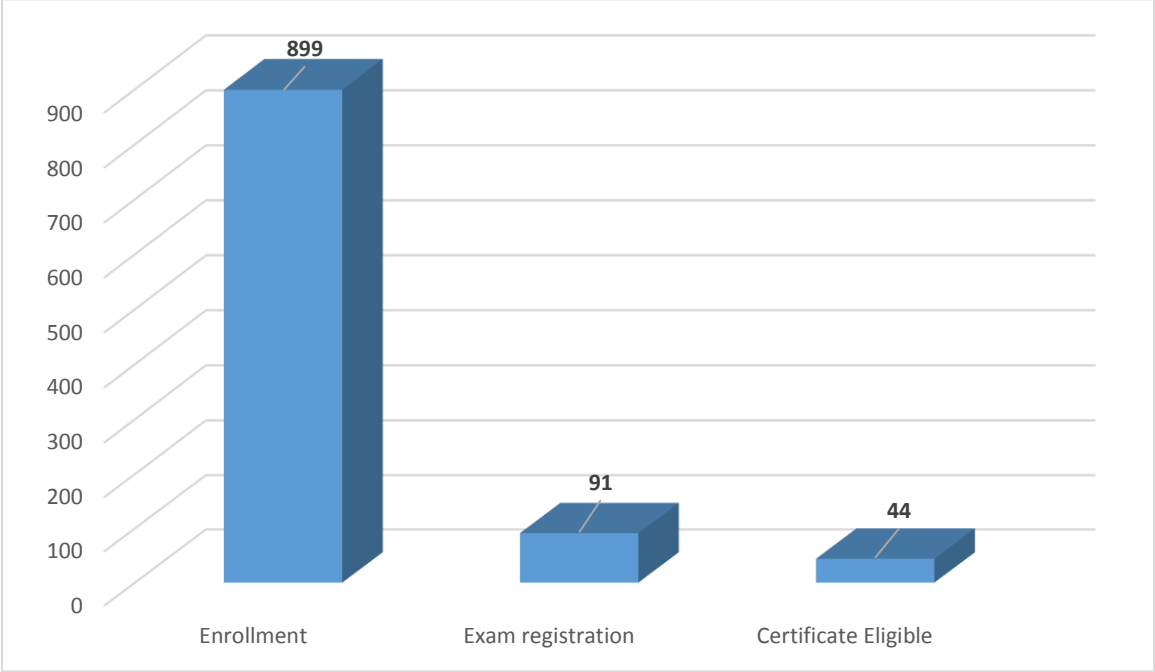
Course Outline:

The Food and Agriculture Organization (FAO) of the United Nations (UN) issued a report on the importance and complexities associated with feeding the projected 9.1 billion world population in 2050. Sustainable production of safe and nutritious foods, development of foods that have a long shelf life and foods that are either ready-to-eat or easy to are of greater importance towards meeting this goal. Understanding "Food Engineering" and "Thermal Processing of Foods" serves as basic requirement means of meeting this goal.

Total nos. of enrollment: 899

Total nos. of Exam registration: 91

Total nos. of Certificate Eligible: 44



Chemical Process Intensification

Prof. S. K. Majumder
Chemical Engineering

Type of the course: New, July 2019 run Duration: 12 weeks

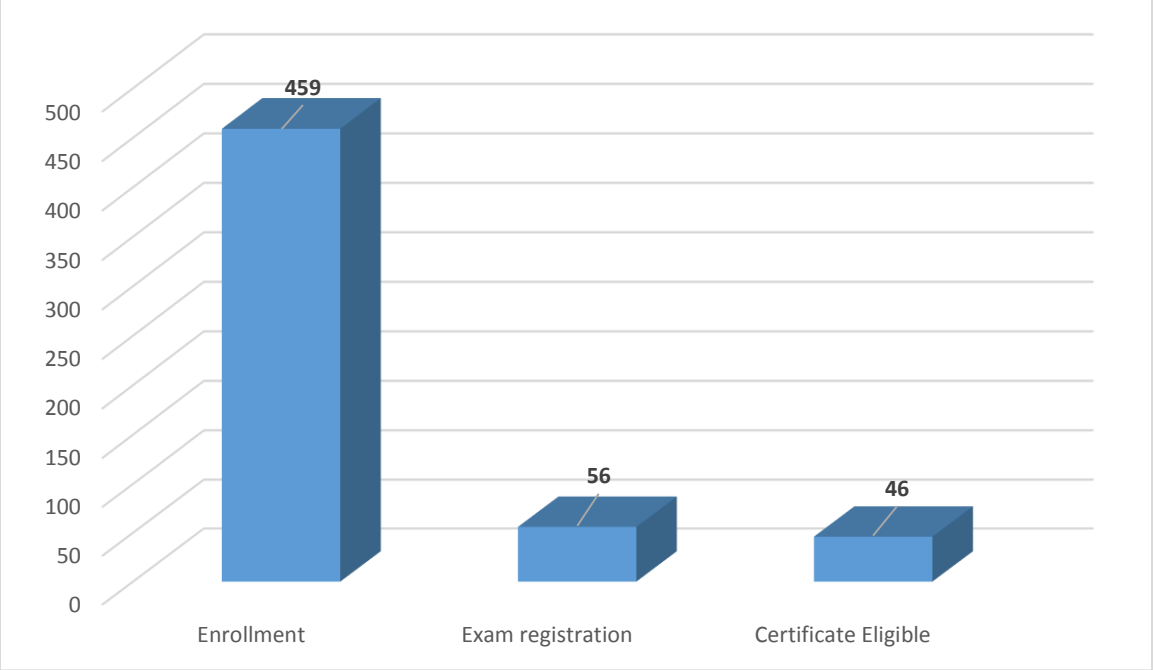
Course Outline:

This course covers the developments in a number of intensified technologies, with particular emphasis on their application in chemical processes. The course is intended to be a useful resource for practicing engineers and chemists alike who are interested in applying intensified reactor and/or separator systems in chemical industries. It will provide a basic knowledge of chemical engineering principles and process intensification for chemists and engineers who may be unfamiliar with these concepts. It will be a valuable tool for chemical engineers who wish to fully apply their background in reaction and separation engineering to the design and implementation of green processing technologies based on process intensification principles. Students on undergraduate and postgraduate degree programmes which cover topics on advanced reactor designs, process intensification, will gain a better understanding of the practical applications in different areas.

Total nos. of enrollment: 459

Total nos. of Exam registration: 56

Total nos. of Certificate Eligible: 46



Thermodynamics: Classical to Statistical

Prof. Sandip Paul
Chemistry

Type of the course: New, July 2019 run Duration: 12 weeks

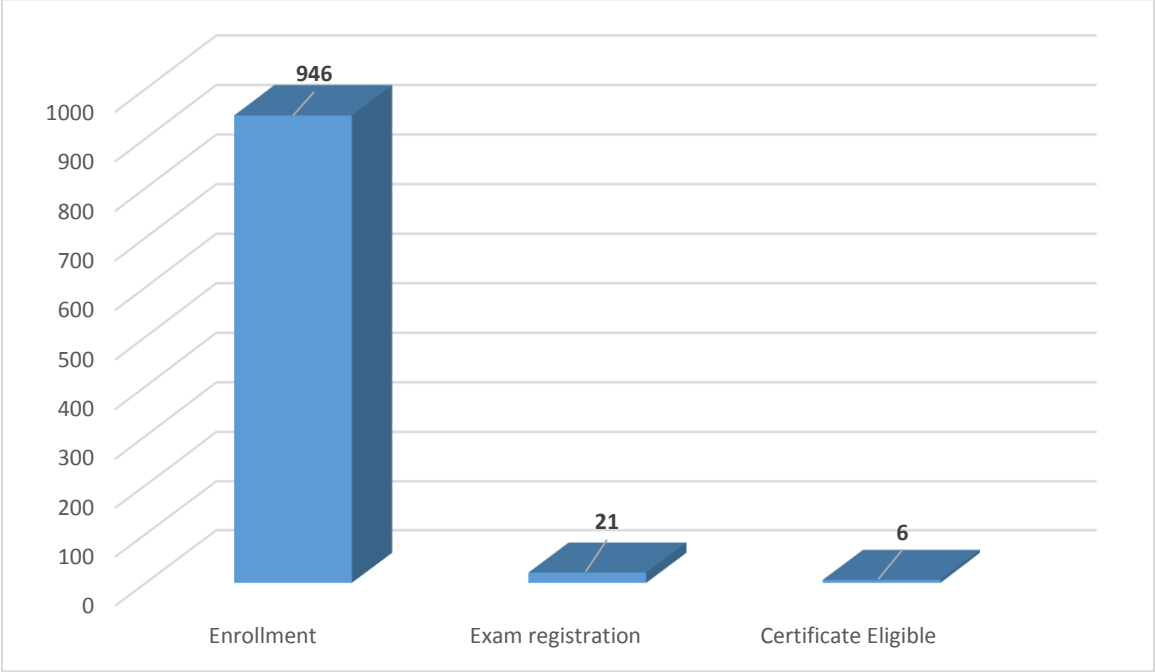
Course Outline:

This course is intended for final year BSc (in Chemistry) as well as for MSc (in Chemistry) and PhD (in Chemistry) students and it is assumed that no previous knowledge of the subject is required. Moreover, this course demonstrates the form physical and statistical basis of thermodynamics by showing how the properties of macroscopic systems are direct consequences of the behaviors of their elementary constituents. Thus this course will give the students a broader spectrum of skills as well as a better understanding of the physical bases.

Total nos. of enrollment: 946

Total nos. of Exam registration: 21

Total nos. of Certificate Eligible: 06



Prof. T. Punniyamurthy
Chemistry

Type of the course: New, July 2019 run Duration: 12 weeks

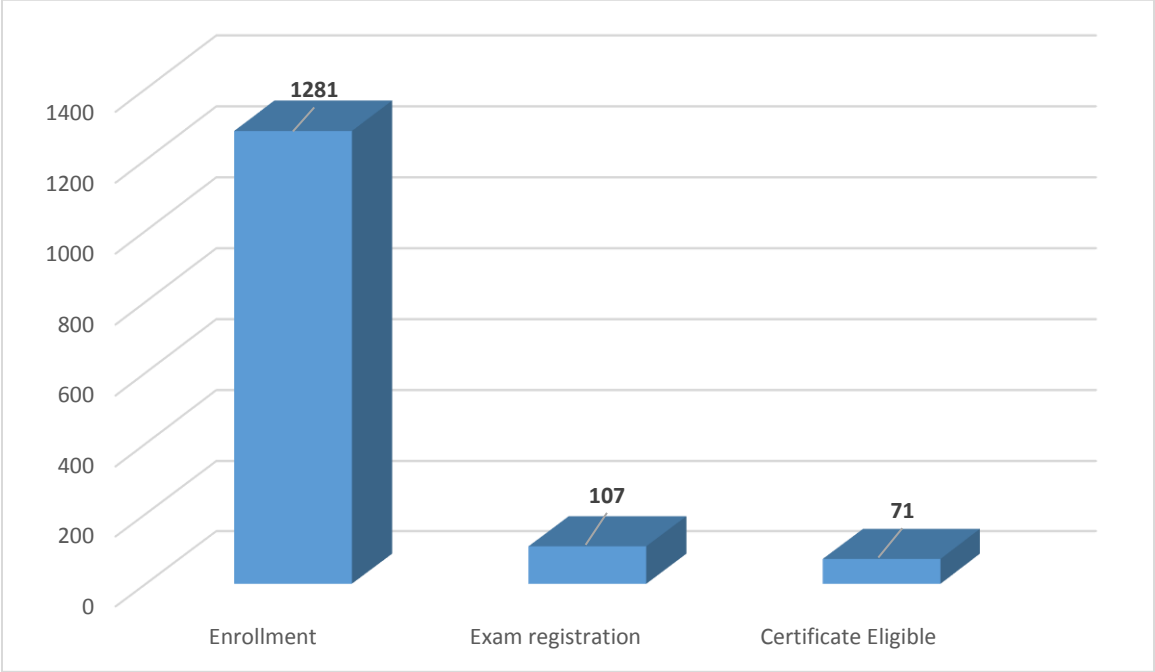
Course Outline:

The course has nine modules starting from the formation of acid-catalyzed carbon-carbon bond formation to application of the modern transition metal catalysis. Students of graduate and post graduate preparing for NET and GATE examination will find this course extremely useful.

Total nos. of enrollment: 1281

Total nos. of Exam registration: 107

Total nos. of Certificate Eligible: 71



Prof. Benny George K
Computer Science and Engineering

Prof. Sajith Gopalan
Computer Science and Engineering

Type of the course: New, July 2019 run

Duration: 12 weeks

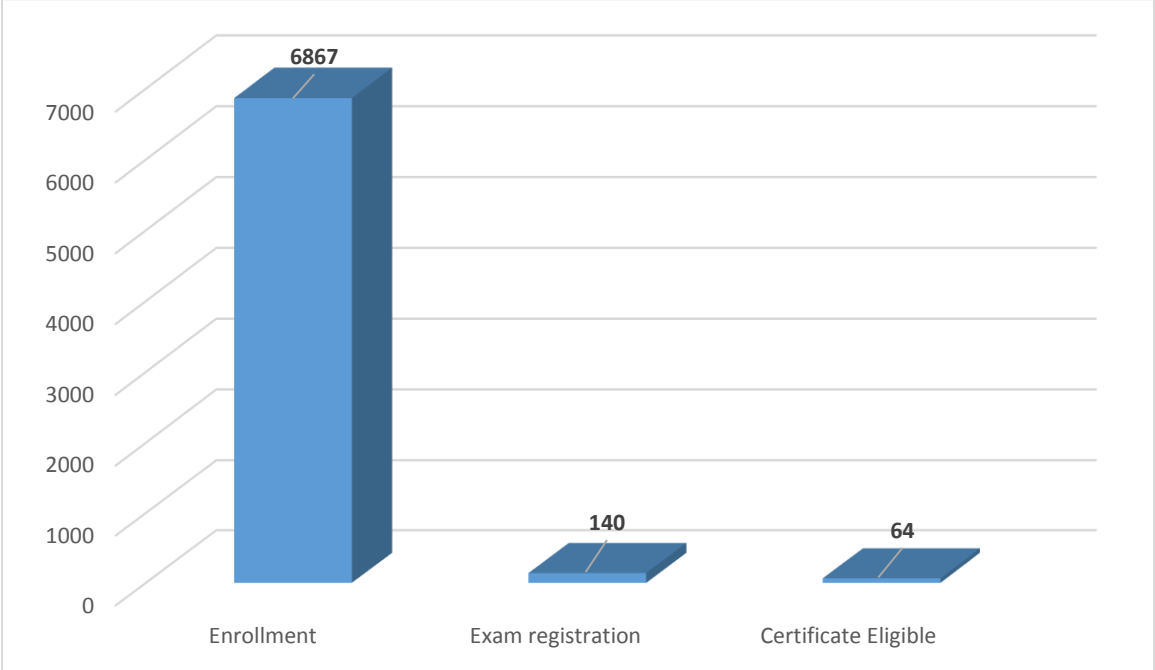
Course Outline:

The course will be an introduction to Discrete Mathematics which comprises of the essentials for a computer science student to go ahead and study any other topics in the subject. The emphasis will be on problem solving as well as proofs. We will be providing motivational illustrations and applications throughout the course. The course doesn't assume any pre-requisites except for high school level arithmetic and algebra.

Total nos. of enrollment: 6867

Total nos. of Exam registration: 140

Total nos. of Certificate Eligible: 64



Prof. Sharmistha Banerjee
Design

Type of the course: Re-run, July 2019 run Duration: 12 weeks

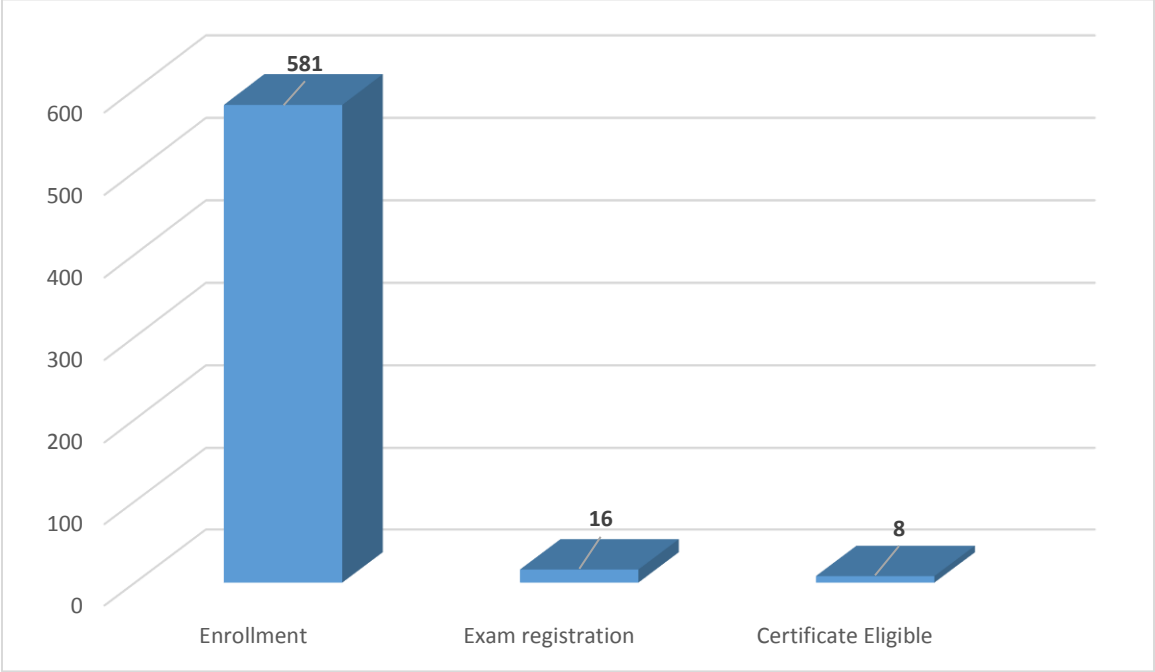
Course Outline:

Design for Sustainability is a design thinking process for widening the boundaries of the objective of design so as to contribute positively to sustainable development. It encompasses four approaches: 1. Selection of resources with low environmental impact; 2. Design of products with low environmental impact; 3. Product-Service System Design for eco-efficiency; 4. Design for social equity and cohesion. This course will discuss these Design approaches, methods and tools along with case examples.

Total nos. of enrollment: 581

Total nos. of Exam registration: 16

Total nos. of Certificate Eligible: 08



Prof. Ratnajit Bhattacharjee
Electronics and Electrical Engineering

Type of the course: New, July 2019 run Duration: 12 weeks

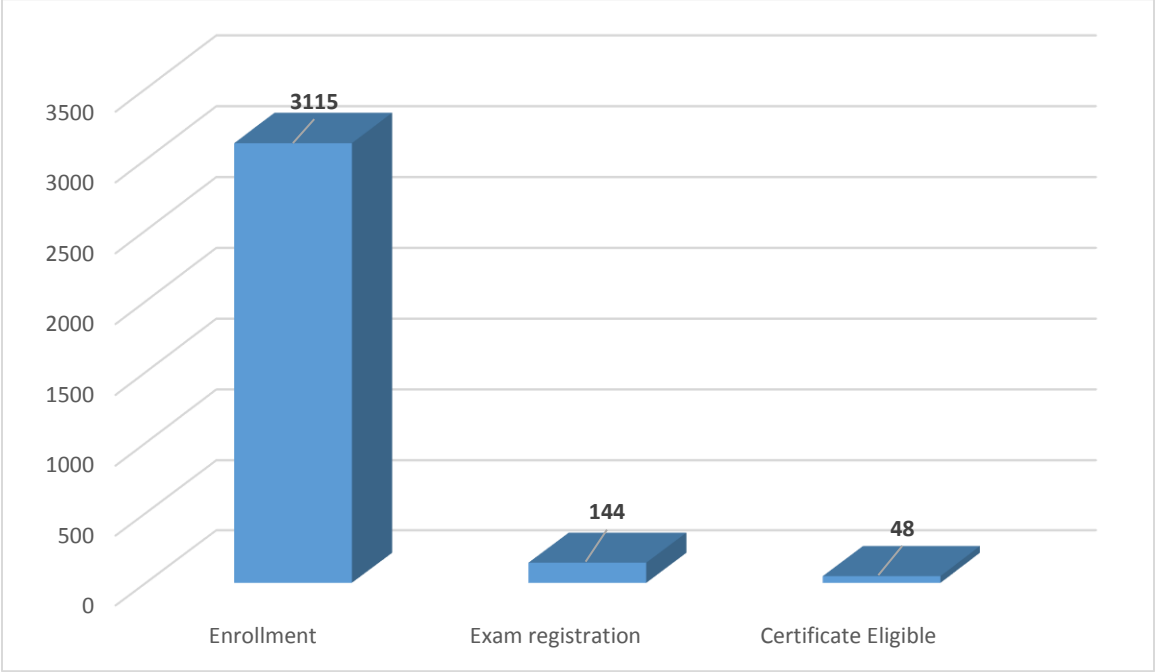
Course Outline:

This course is indented to provide a foundation for microwave engineering to the undergraduate students. Rigorous treatment of the fundamentals of microwave engineering will be provided. Design of different passive and some active microwave circuits/subsystems will be covered in detail. This course will also provide an overview of application of microwave in communication and other areas.

Total nos. of enrollment: 3115

Total nos. of Exam registration: 144

Total nos. of Certificate Eligible: 48



Prof. N. Selvaraju
Mathematics

Prof. Siddhartha P. Chakrabarty
Mathematics

Type of the course: New, July 2019 run Duration: 12 weeks

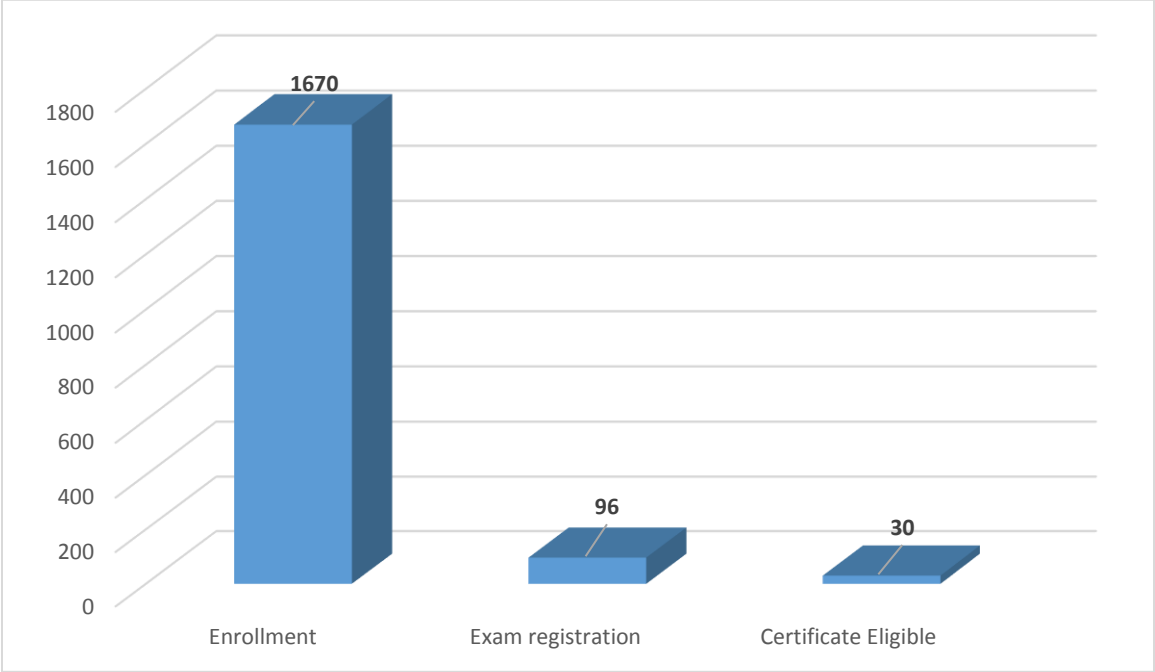
Course Outline:

The course on 'Mathematical Finance' gives an introduction to this interesting and growing area. In particular, the course will cover two Nobel-prize winning frameworks, namely portfolio theory and the option pricing theory.

Total nos. of enrollment: 1670

Total nos. of Exam registration: 96

Total nos. of Certificate Eligible: 30



Applied Thermodynamics for Engineers

Prof. Dipankar N. Basu
Mechanical Engineering

Type of the course: New, July 2019 run Duration: 12 weeks

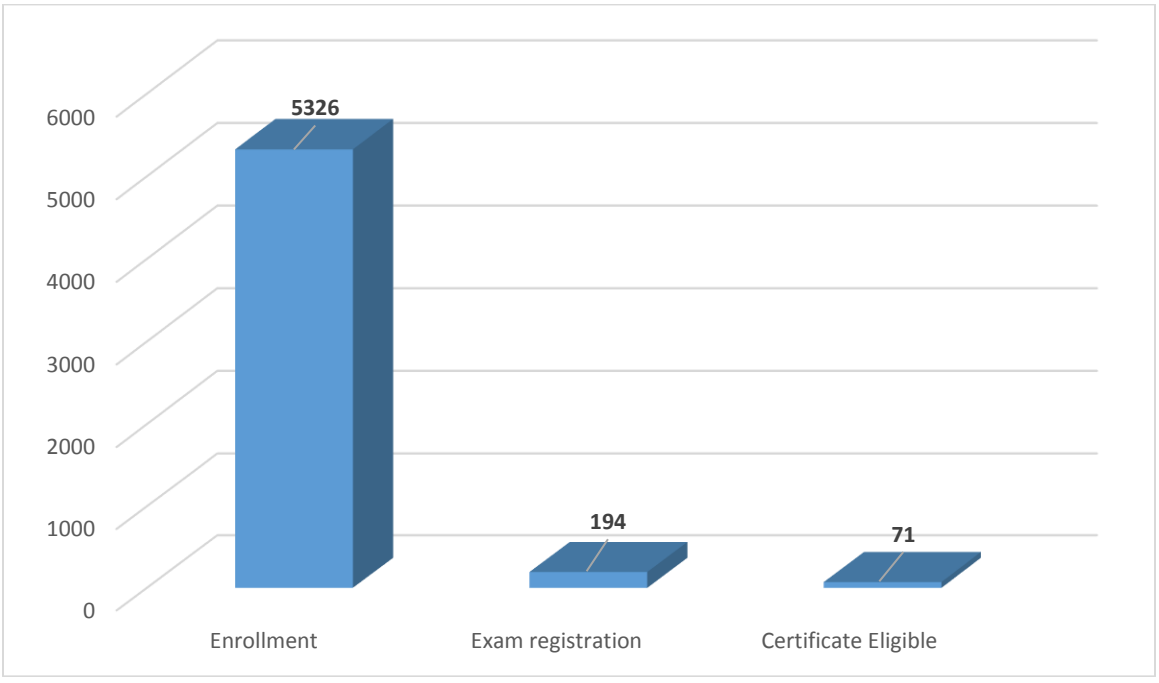
Course Outline:

Thermodynamics is a subject of fundamental interest to Mechanical engineers and therefore is always taught in the 2nd or 3rd semester. Present course can be viewed as the next step, where the thermodynamic principles will be employed to discuss about different power producing & absorbing cycles. Properties of pure substance will be discussed, along with the thermodynamic property relations, thereby enabling the participants to estimate all relevant thermodynamic properties at any particular state point. Subsequently the gas & vapor power cycles will be analyzed, followed by the principles of cogeneration & combined cycles. Then the refrigeration cycles will be introduced, followed by a discussion on the selection of refrigerants. Subsequently the properties of gas mixtures and gas-vapor mixtures will be discussed, leading to psychometric & psychometric processes. The course will be completed with a brief introduction to the chemical equilibrium.

Total nos. of enrollment: 5326

Total nos. of Exam registration: 194

Total nos. of Certificate Eligible: 71



Plastic Working of Metallic Materials

Prof. P. S. Robi
Mechanical Engineering

Type of the course: New, July 2019 run Duration: 12 weeks

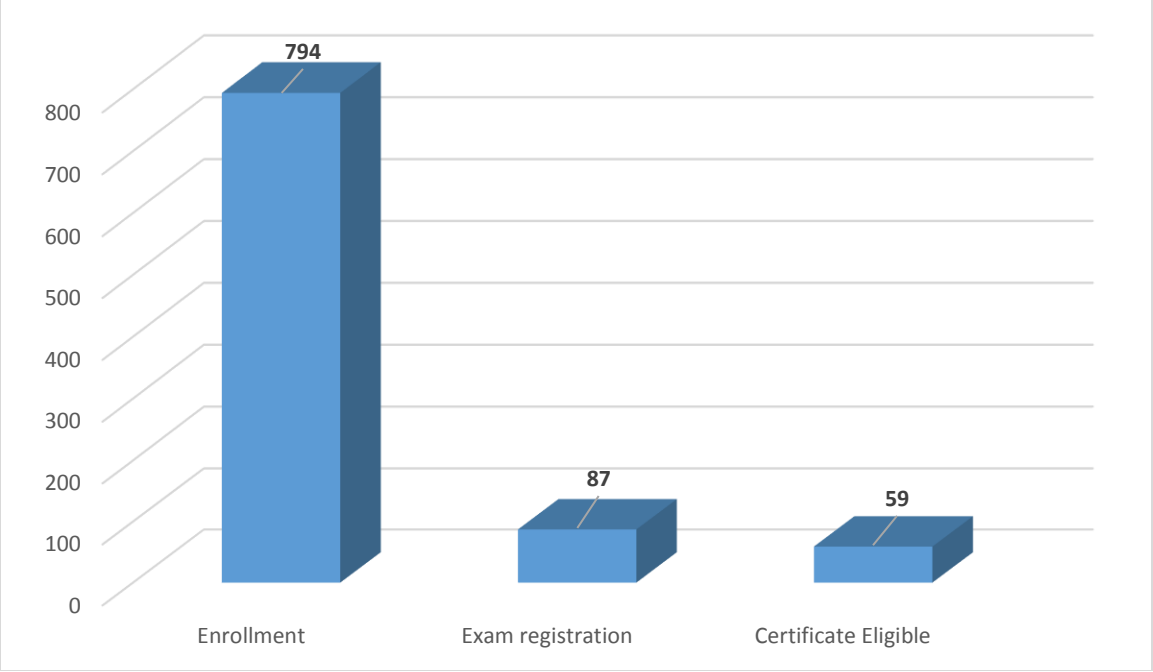
Course Outline:

Plastic working of metallic materials in an important subject area for applications like automobiles, aircraft, defense, construction, domestic use, etc. This course is developed for a variety of audience viz., undergraduate as well as post graduate students of Mechanical Engineering and Metallurgical Engineering, as well as practicing engineers and technocrats. The course begins with the fundamentals of metal working and slowly moves to advanced analysis of metalworking. Most of the conventional metal working processes has been discussed highlighting the equipment's used, the industrial processes and detailed analysis of the particular processes. After attending this course, the participant will be fully conversant with the conventional deformation processing techniques practiced by the present day metal industries.

Total nos. of enrollment: 794

Total nos. of Exam registration: 87

Total nos. of Certificate Eligible: 59



Dynamic Behavior of Materials

Prof. Prasenjit Khanikar
Mechanical Engineering

Type of the course: New, July 2019 run Duration: 12 weeks

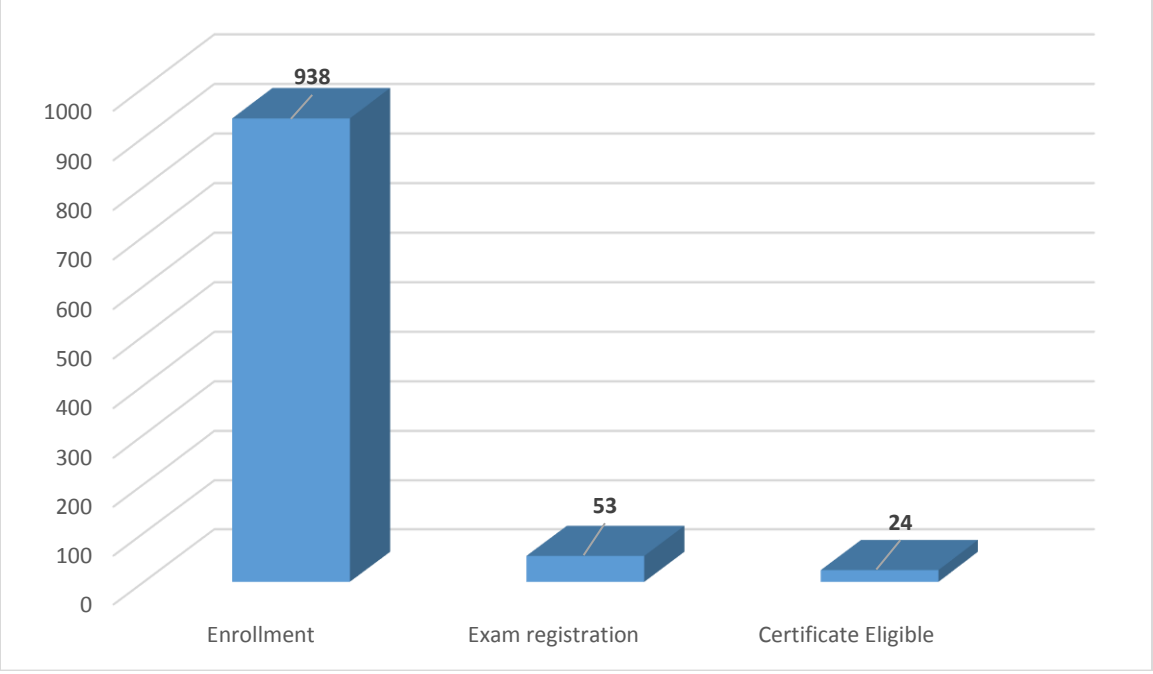
Course Outline:

Study of materials behavior in extreme environments and development of new materials for such environments has become a vital research area for materials scientists and engineers in the 21 st century. Mechanical properties of materials under dynamic loading are considered as an important area of research and development in defense, automotive and aerospace industries. Under dynamic loading conditions, the inertial effects come to play an important role in the deformation behavior of the material. Many materials exhibit strain rate sensitivity at higher strain rates, i.e., flow stress dependence on strain rates. In addition, the failure mechanisms under high strain rate loading conditions are generally different than those occur in low strain rate. Furthermore, the deformation and failure mechanisms are controlled by the microstructure of the materials. This course will be important to mechanical, materials and civil engineers to understand materials behavior for ballistic applications, explosive forming or welding applications, automotive and aerospace applications.

Total nos. of enrollment: 938

Total nos. of Exam registration: 53

Total nos. of Certificate Eligible: 24



Prof. Amaresh Dalal
Mechanical Engineering

Prof. Dipankar N. Basu
Mechanical Engineering

Type of the course: New, July 2019 run Duration: 12 weeks

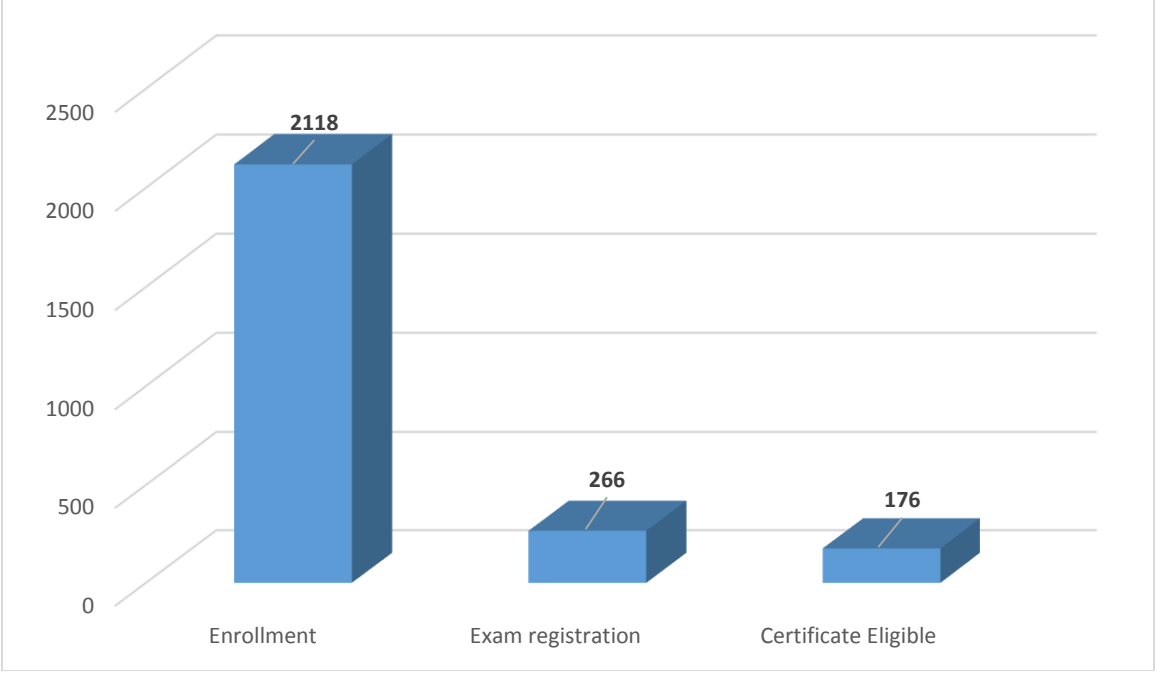
Course Outline:

This is introductory course on conduction and radiation heat transfer. This course emphasizes the fundamental concepts and provides detailed solution methodology. This course will provide students with the tools to model, analyze and solve a wide range of engineering applications involving conduction and radiation heat transfer.

Total nos. of enrollment: 2118

Total nos. of Exam registration: 266

Total nos. of Certificate Eligible: 176



Mathematical Modeling of Manufacturing Processes

Prof. Swarup Bag
Mechanical Engineering

Type of the course: New, July 2019 run Duration: 12 weeks

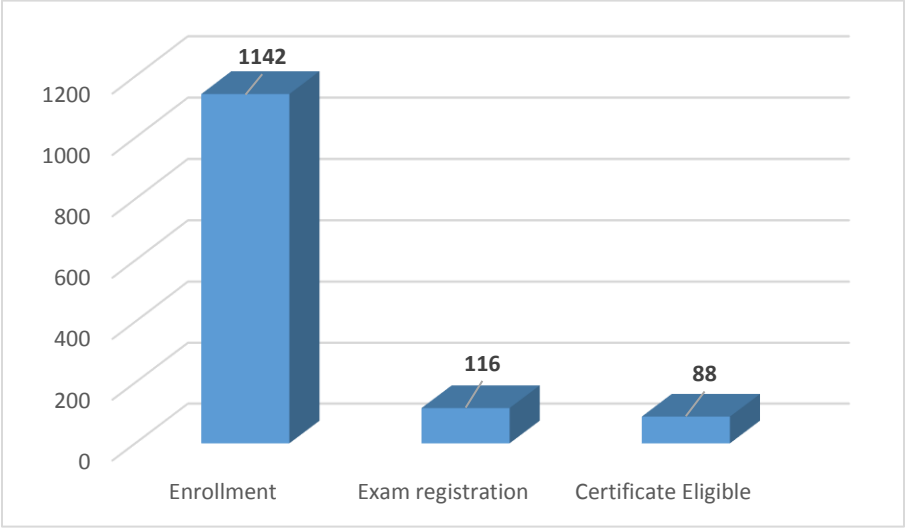
Course Outline:

The understanding of the basic mechanism such as heat and mass transport with associated fluid flow including metallurgical transformation, distortion and residual stress generation in different manufacturing processes is the focus of this course. Understanding the complex interaction not only helps to develop mathematical model, it makes the foundation for analysis, numerical simulation at different scale and experimentation for different types of manufacturing processes. The development of computational models for a manufacturing process relies on mathematical expression of the governing mechanism. It helps to design relevant experiments and drives to find the data to be obtained. Mutual understanding between analytical/numerical and experimental results leads to better insight of the basic manufacturing processes that impact on the improvement of existing process and directs for the development of new process. However, this course is completely different from statistical or data driven modeling approach. This course emphasized on the understanding of the most general to advanced manufacturing processes based on scientific principle. The complex mechanism is presented in a simplified way to understand the subject at elementary level. The broad impact is that the students will be able to develop physics based computational model of manufacturing process using standard commercial package (However, this course does not intend to cover the learning of the commercial software).

Total nos. of enrollment: 1142

Total nos. of Exam registration: 116

Total nos. of Certificate Eligible: 88



Fundamentals of Artificial Intelligence

Prof. Shyamanta M. Hazarika
Mechanical Engineering

Type of the course: New, July 2019 run Duration: 12 weeks

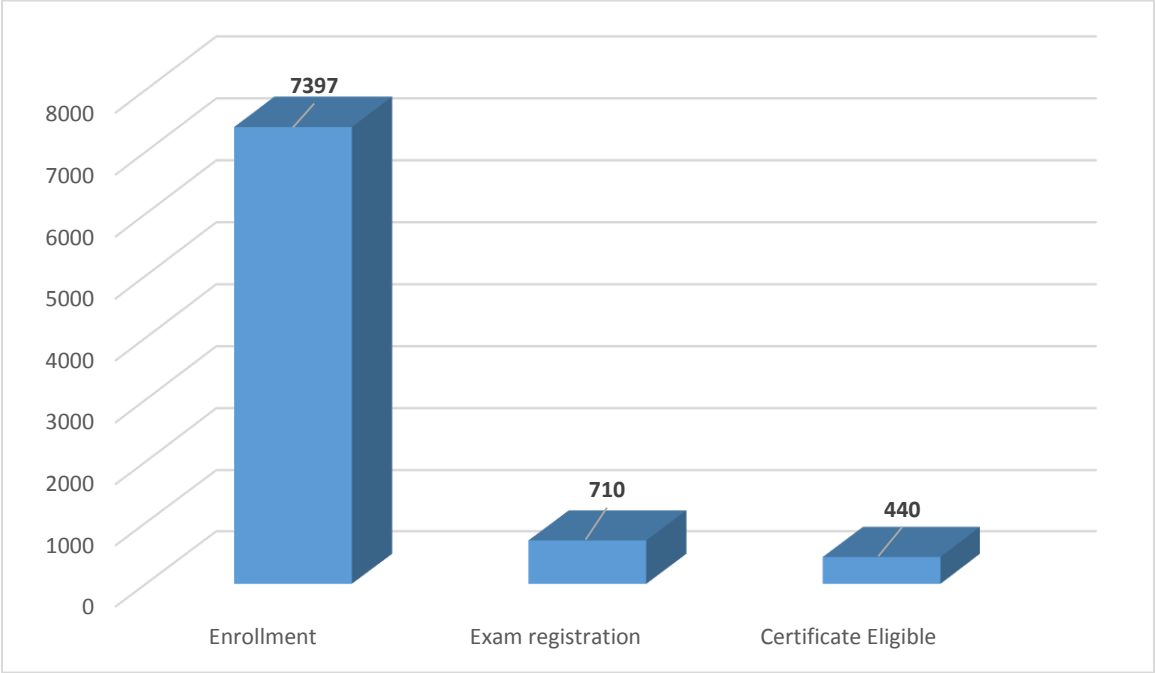
Course Outline:

What does automatic scheduling or autonomous driving have in common with web search, speech recognition, and machine translation? These are complex real-world problems that span across various practices of engineering! Aim of artificial intelligence (AI) is to tackle these problems with rigorous mathematical tools. The objective of this course is to present an overview of the principles and practices of AI to address such complex real-world problems. The course is designed to develop a basic understanding of problem solving, knowledge representation, reasoning and learning methods of AI.

Total nos. of enrollment: 7397

Total nos. of Exam registration: 710

Total nos. of Certificate Eligible: 440



Prof. Vinayak N. Kulkarni
Mechanical Engineering

Type of the course: New, July 2019 run Duration: 12 weeks

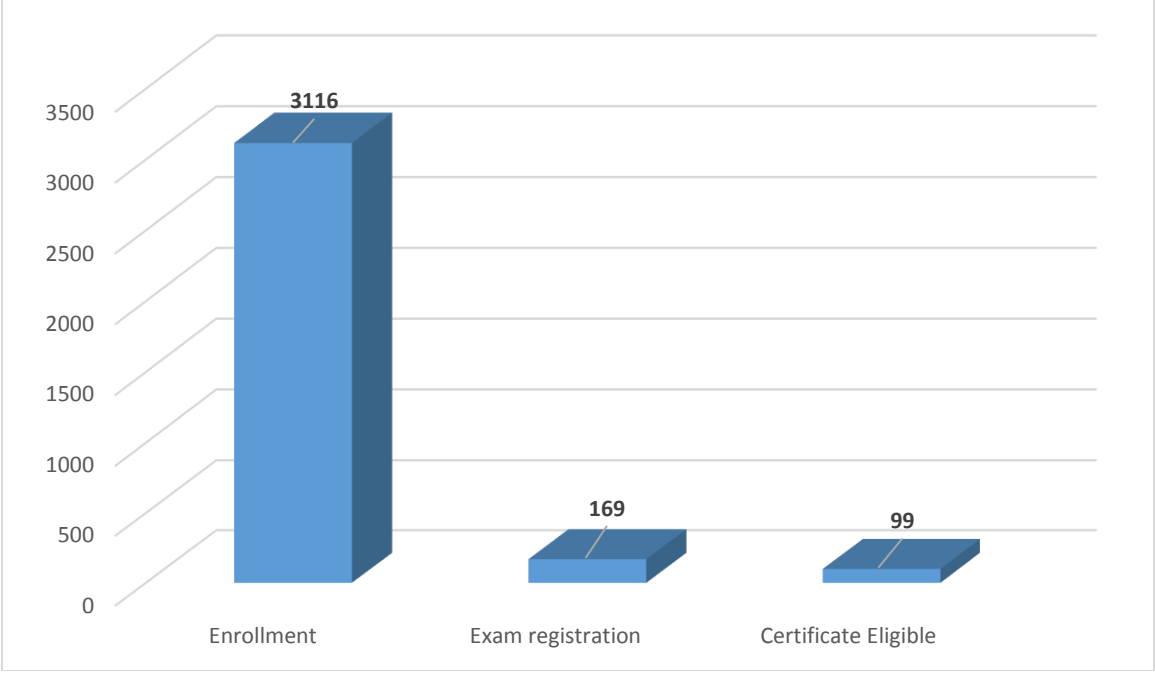
Course Outline:

This course deals with the gas power cycles for aircraft propulsion. Therefore, different types of aircraft engines, their parts and their performance parameters are discussing. Then the cycle analysis and its different attachment for improvisation are also focused. Further, different parts of aircraft engines like compressor, turbines, combustor and nozzle are discussed in detail.

Total nos. of enrollment: 3116

Total nos. of Exam registration: 169

Total nos. of Certificate Eligible: 99



Prof. Subhas Chandra Pan
Chemistry

Type of the course: New, July 2019 run Duration: 12 weeks

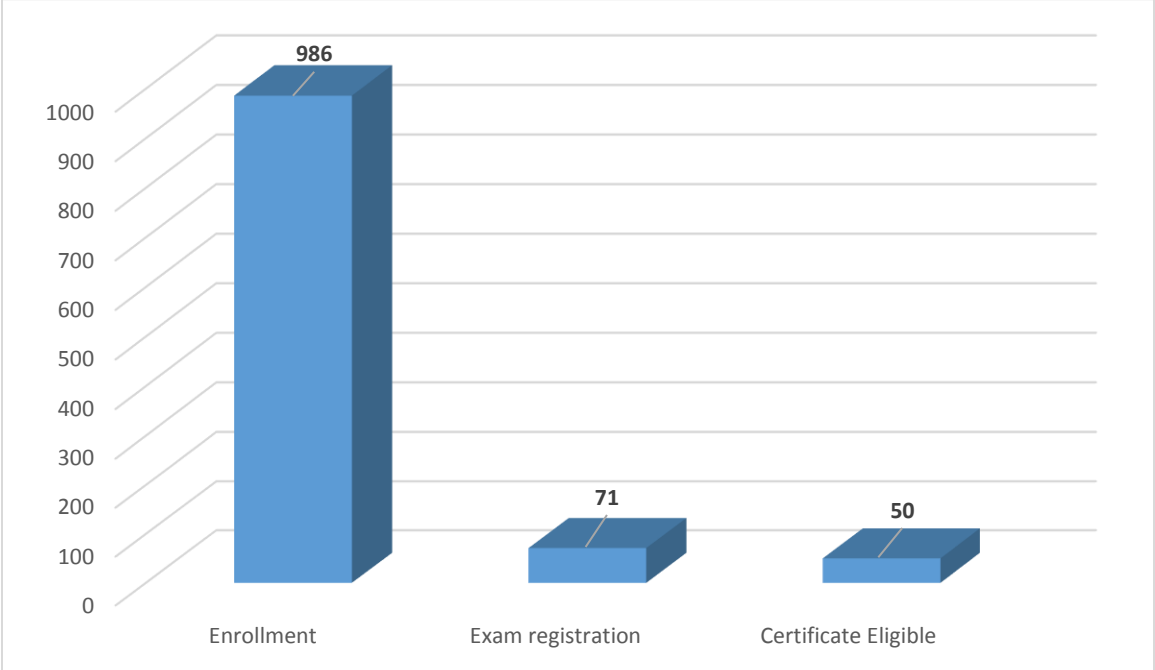
Course Outline:

This course will deal with the various synthetic strategies using organic reagents. Both classical and modern reagents shall be discussed emphasizing on the mechanistic details. This course shall useful to students of undergraduate, post graduate and Ph.D. Students preparing for NET and GATE examination will find this course extremely useful.

Total nos. of enrollment: 986

Total nos. of Exam registration: 71

Total nos. of Certificate Eligible: 50



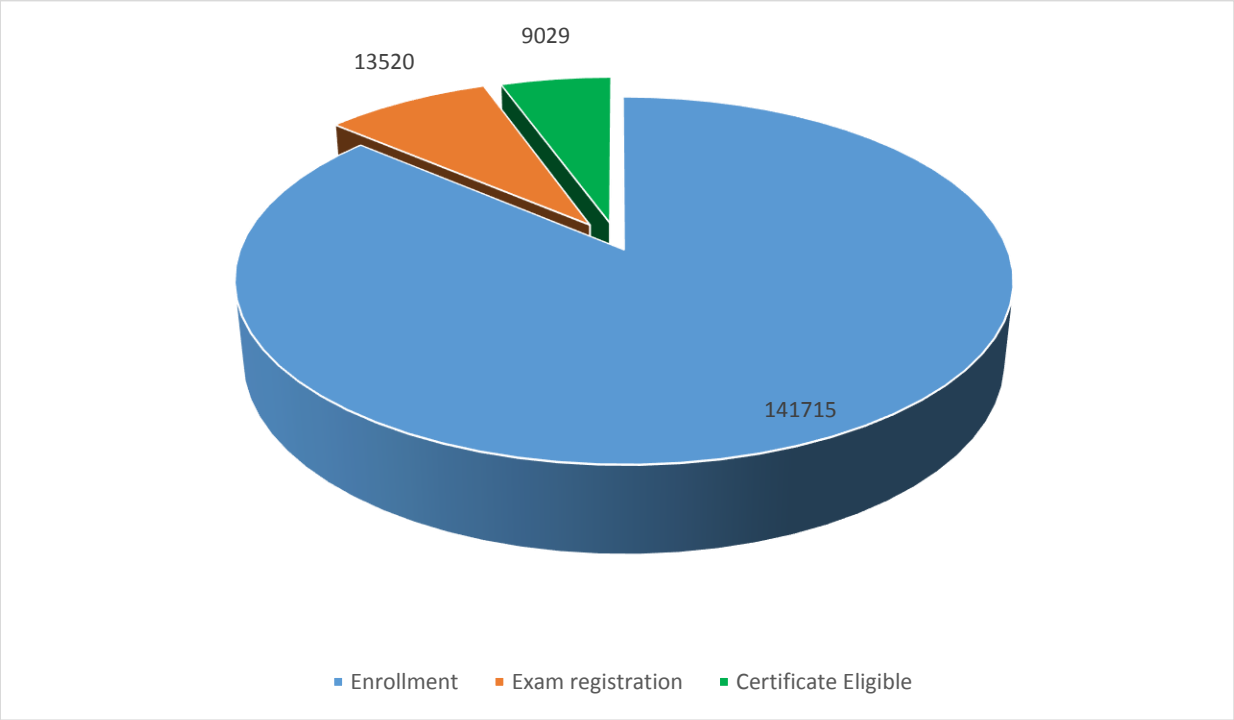
IIT Guwahati contribution in 2019 run_ Cumulative Data

Total nos. of Course Conducted: 52

Total nos. of Enrollment: 141715

Total nos. of Exam registration: 13520

Total nos. of Certificate Eligible: 9029



IIT Guwahati contribution in 2020 run

Prof. Prakash Kotecha
Chemical Engineering

Type of the course: New, Jan 2020 run Duration: 8 weeks

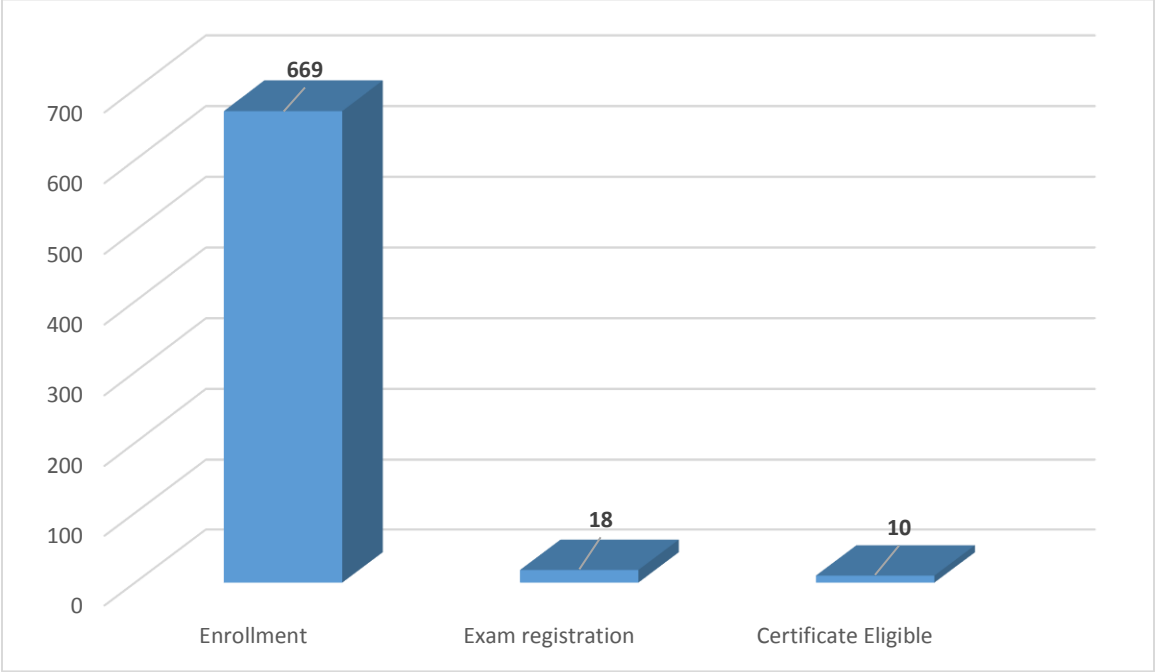
Course Outline:

Optimization problems are frequently encountered in almost all disciplines of science and engineering. This course will familiarize the audience with both mathematical and computational intelligence algorithms to solve combinatorial optimization problems. The course is designed so as to enable the participants to quickly use state-of-the-art tools to solve optimization problems. A unique feature of this course will be discussion of a realistic case study to thoroughly understand various aspects of optimization.

Total nos. of enrollment: 669

Total nos. of Exam registration: 18

Total nos. of Certificate Eligible: 10



User-Centric Computing for Human-Computer Interaction

Prof. Samit Bhattacharya
Computer Science and Engineering

Type of the course: New, Jan 2020 run Duration: 8 weeks

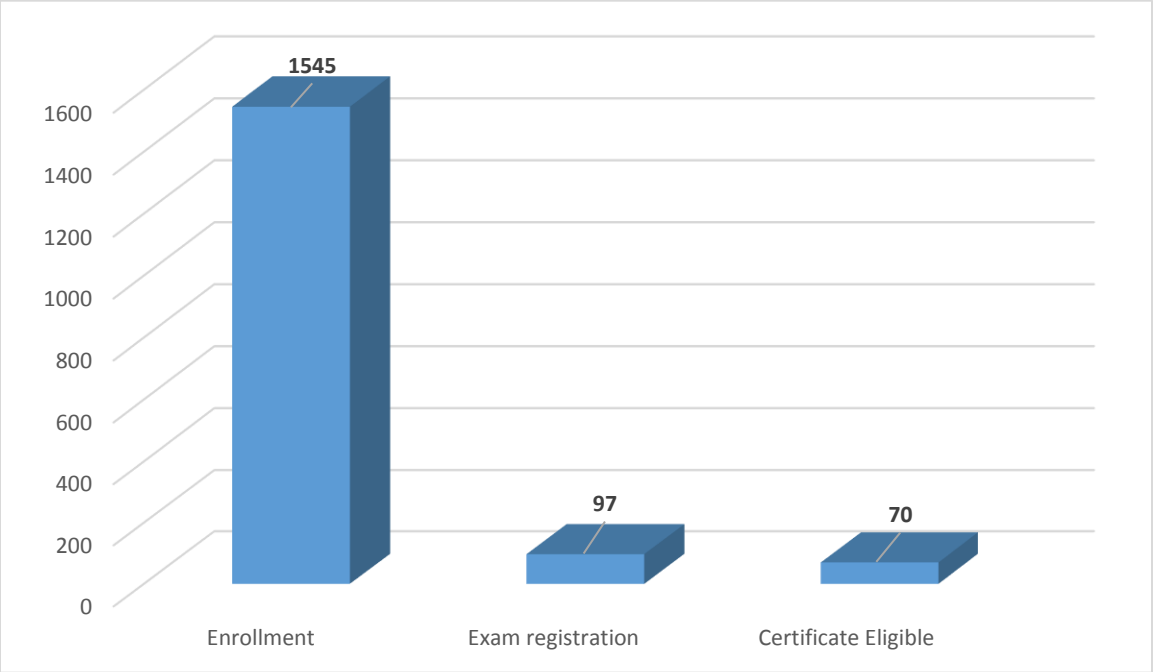
Course Outline:

Human-computer interaction is an emerging field of study at present, due to the proliferation of large number of consumer electronic products. The key issue in this field is to make the products usable to lay-persons. In order to do that, we need to take care of the (creative) design aspects (the look-and-feel of the interface) and also the system design aspect (both software and hardware). The field is interdisciplinary with inputs required from various other fields. However, the computer science and engineering plays the central role in the design of such systems (as per SIGCHI of ACM). In this course, we will introduce the engineering and computational issues in the design of human-computer interfaces for laypersons. The topics covered in the course includes the engineering life cycles for design of interactive systems, computational design framework (as part of the life cycle), components of the framework including the computational models of users and systems, and evaluation of such systems (with or without users).

Total nos. of enrollment: 1545

Total nos. of Exam registration: 97

Total nos. of Certificate Eligible: 70



Prof. Vipul Dutta
Humanities and Social Sciences

Type of the course: New, Jan 2020 run Duration: 8 weeks

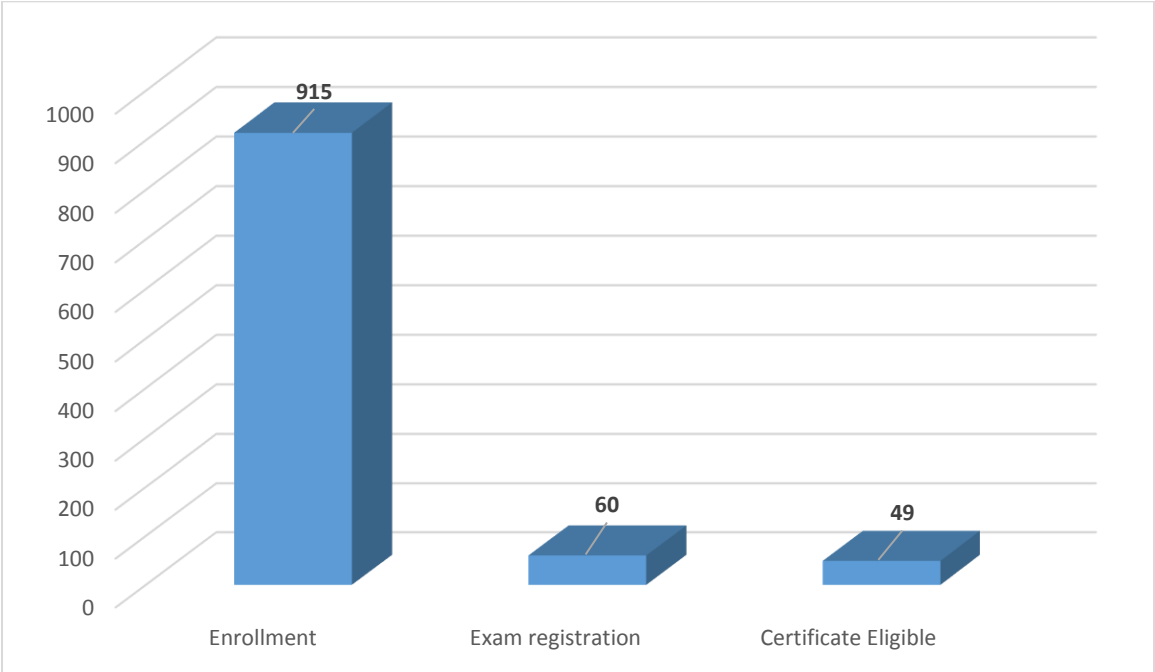
Course Outline:

This course will familiarise students with the modern history of the evolution of businesses in the Indian subcontinent during the twentieth century. It will discuss case studies of businesses and industries to highlight the multi-faceted history of entrepreneurship in India at the turn of the twentieth century ranging from post-Independence banking history to liberal reforms of the 1990s. It will examine the history of major Indian industrial houses as well as the use of financial diplomacy as an instrument of India's foreign policy after 1947. The course will highlight the historical nature of policies that shaped Indian business cultures in the wider socio-political landscape.

Total nos. of enrollment: 915

Total nos. of Exam registration: 60

Total nos. of Certificate Eligible: 49



Computational Fluid Dynamics for Incompressible Flows

Prof. Amaresh Dalal
Mechanical Engineering

Type of the course: New, Jan 2020 run Duration: 12 weeks

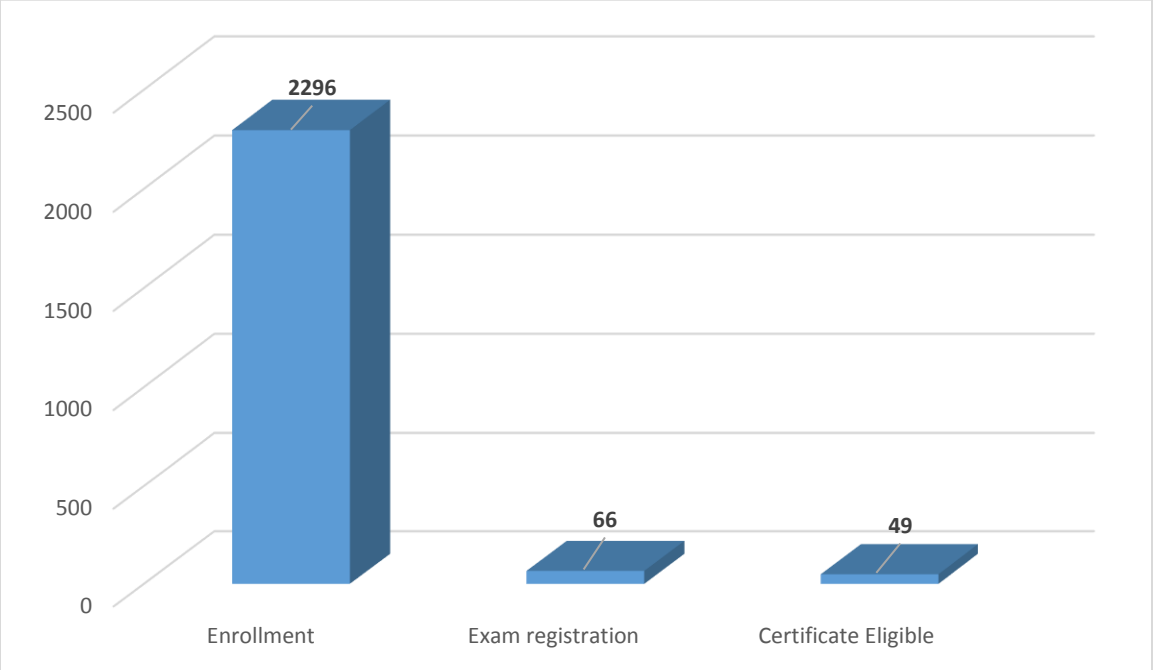
Course Outline:

This is introductory course on computational fluid dynamics (CFD). This course will primarily cover the basics of computational fluid dynamics starting from classification of partial differential equations, linear solvers, finite difference method and finite volume method for discretizing Laplace equation, convective-diffusive equation & Navier-Stokes equations. The course will help faculty members, students and researchers in the field to get an overview of the concepts in CFD.

Total nos. of enrollment: 2296

Total nos. of Exam registration: 66

Total nos. of Certificate Eligible: 49



Prof. Kaustubha Mohanty
Chemical Engineering

Type of the course: New, Jan 2020 run Duration: 12 weeks

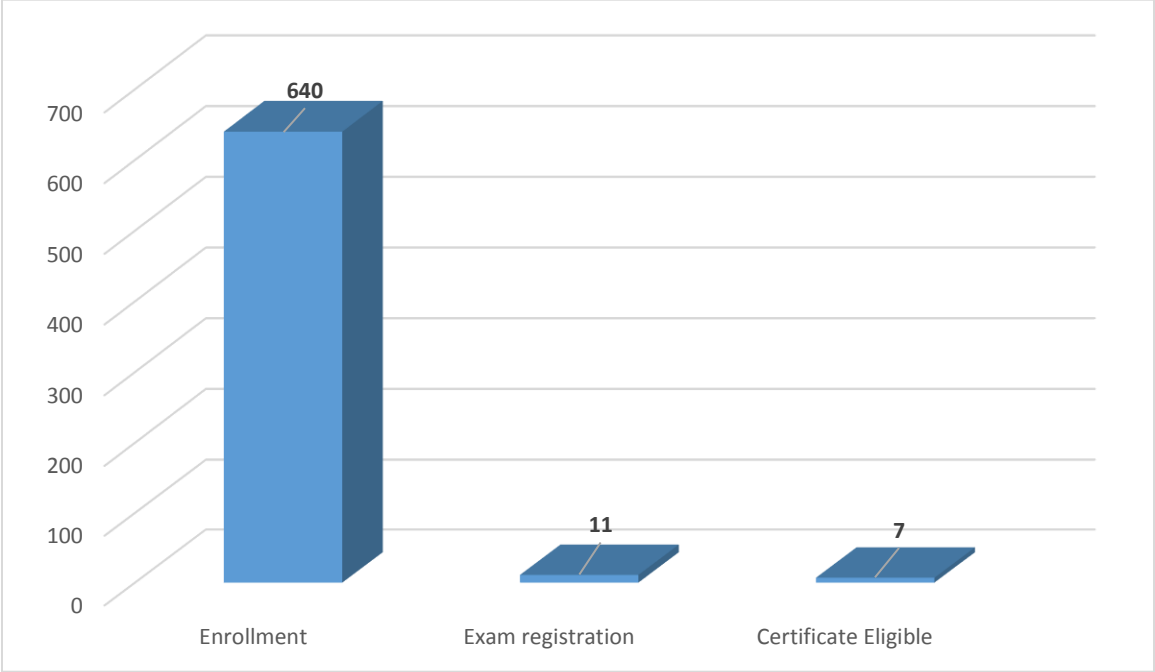
Course Outline:

This course will provide an insight to the membrane based separations that is an integral part of the down-stream processing of various industries. The course begins with introducing the development of membranes and discussing the basics which is followed by detail discussion on membrane materials and their properties. This course then deals with various methods of membrane preparations and their characterization. How separations (transport mechanism) takes places using membranes has been covered extensively. Further, principles of various membrane processes such as reverse osmosis, microfiltration, ultrafiltration, dialysis, liquid membrane, pervaporation etc. has been covered along with their applications in different industries. The course will enable students to develop necessary skills to design appropriate membrane based separation technique as per the need.

Total nos. of enrollment: 640

Total nos. of Exam registration: 11

Total nos. of Certificate Eligible: 7



Essentials of Biomolecules: Nucleic Acids and Peptides

Prof. Lal Mohan Kundu
Chemistry

Type of the course: New, Jan 2020 run Duration: 12 weeks

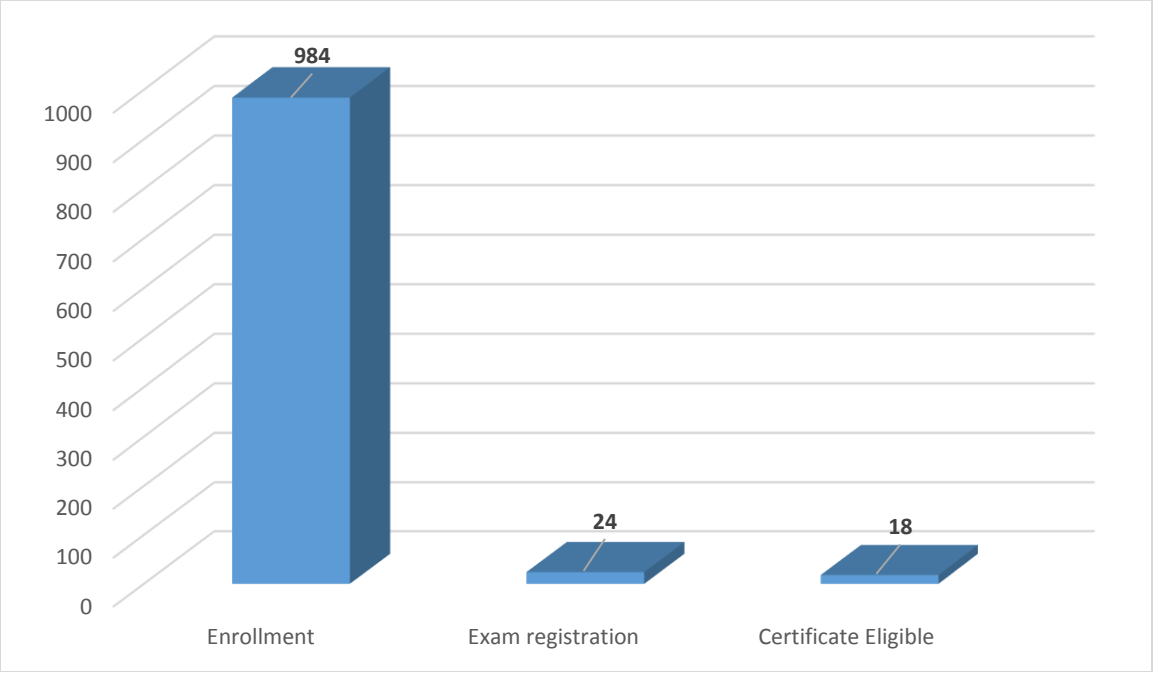
Course Outline:

The proposed course aims to provide essentials of chemistry and biology of two very important class of biomolecules: nucleic acids (DNA/RNA) and proteins. The course allows to decipher: how structural features are translated into biological functions; how highly organized and selective chemical reactions are adopted that allows DNA to replicate or dictates step-wise synthesis of specific sequence of proteins; how organic chemistry tools in combination with enzymes were ingeniously applied to determine sequences of DNA and proteins and how chemical modifications could be done to mimic similar biological properties. The course also includes modern techniques, development of biomolecular probes as high-throughput detection of biomolecules, single nucleotide polymorphisms and disease diagnosis.
Overall, the course falls within the domain of organic chemistry and chemical biology.

Total nos. of enrollment: 984

Total nos. of Exam registration: 24

Total nos. of Certificate Eligible: 18



Advanced Thermodynamics

Prof. Nanda Kishore
Chemical Engineering

Type of the course: New, Jan 2020 run Duration: 12 weeks

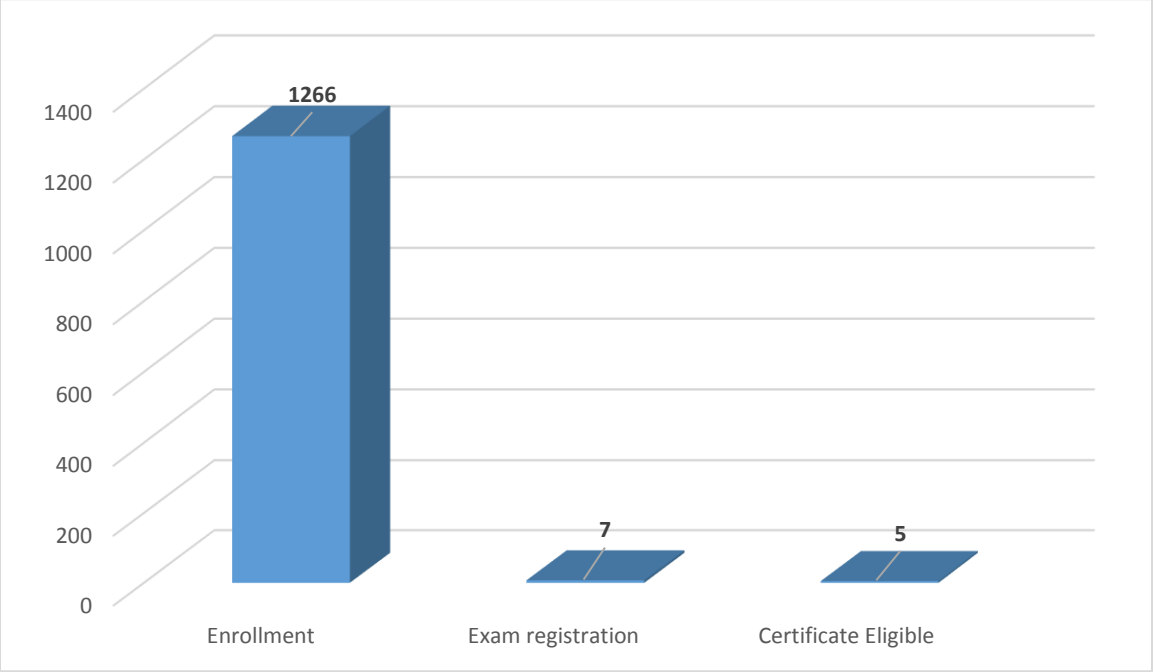
Course Outline:

In any chemical process, often one encounter interaction between phases where transfer of species takes place from one phase to other. That is there exist several situations of vapor-liquid, liquid-liquid, vapor-liquid-liquid, solid-liquid equilibria in chemical engineering processes. Often these situations are dealt with assumption of ideal behavior and binary systems but in reality non-ideality and multicomponent mixtures exists and accordingly one has to deal with such situations. This course offers step-by-step understanding of required thermodynamic properties to handle such equilibrium cases and explore possible ways of solving problems associated with non-ideality in VLE, LLE, VLLE and SLE for multicomponent mixtures.

Total nos. of enrollment: 1266

Total nos. of Exam registration: 07

Total nos. of Certificate Eligible: 05



Prof. Prabin Kumar Bora
Electronics and Electrical Engineering

Type of the course: New, Jan 2020 run Duration: 12 weeks

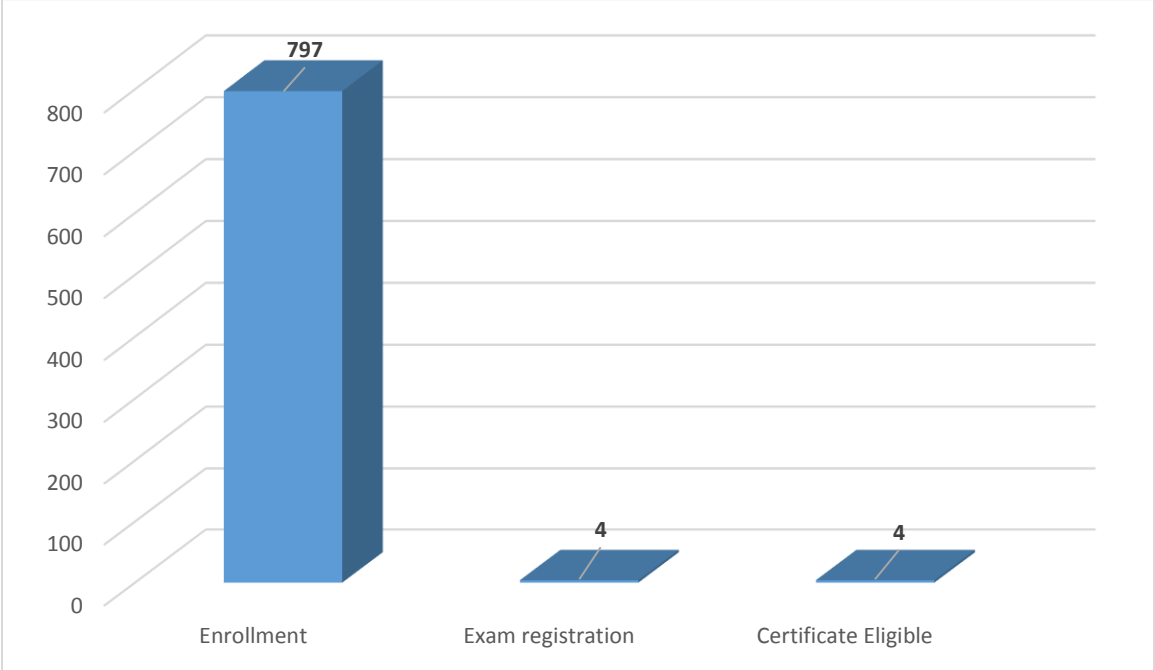
Course Outline:

Many practical signals are random in nature or modelled as random processes. Statistical Signal Processing involves processing these signals and forms the backbone of modern communication and signal processing systems. This course will the three broad components of statistical signal processing: random signal modelling, estimation theory and detection theory.

Total nos. of enrollment: 797

Total nos. of Exam registration: 4

Total nos. of Certificate Eligible: 4



Experimental Methods in Fluid Mechanics

Prof. Pranab K. Mondal
Mechanical Engineering

Type of the course: New, Jan 2020 run Duration: 12 weeks

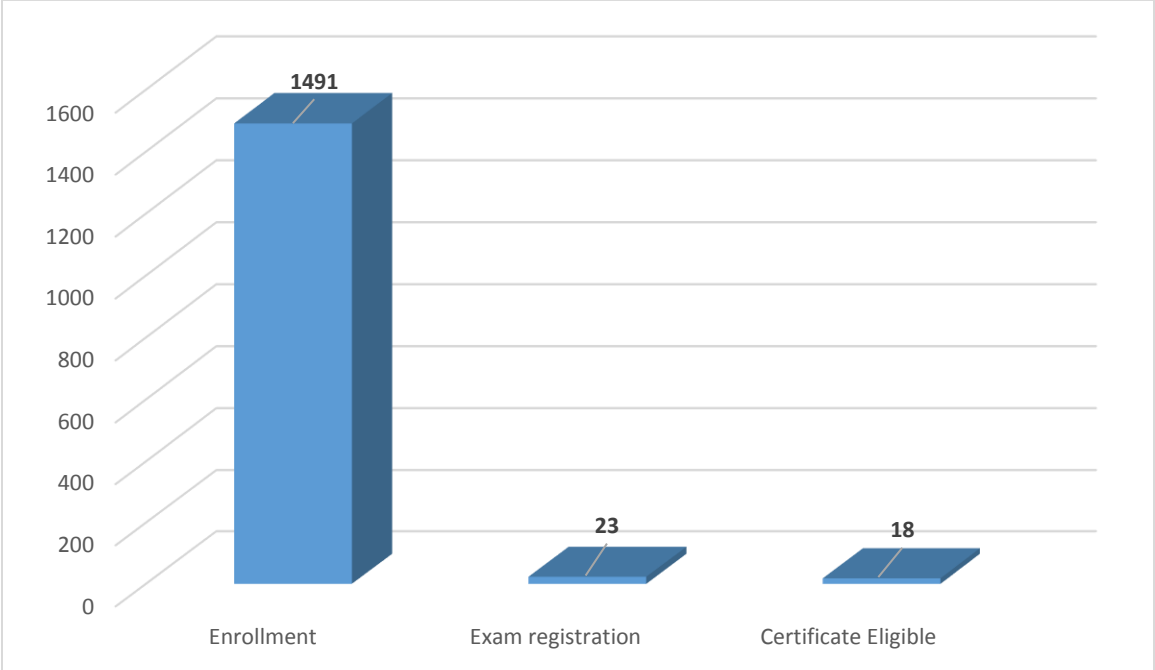
Course Outline:

This course deals with the experimental techniques in Fluid Mechanics. One part of the course focuses on different techniques and challenges associated with the measurement of flow features. Other part of the course has emphasis on the statistical analysis of experimental data. Thus, this course would provide an understanding on several experimental methods in Fluid Mechanics and would unveil hypotheses concerning with the cause-and-effect relationships. It represents the most valid approach to the solution of theoretical advancement in the field.

Total nos. of enrollment: 1491

Total nos. of Exam registration: 23

Total nos. of Certificate Eligible: 18



Microprocessors and Interfacing

Prof. Shaik Rafi Ahmed
Computer Science and Engineering

Type of the course: New, Jan 2020 run Duration: 12 weeks

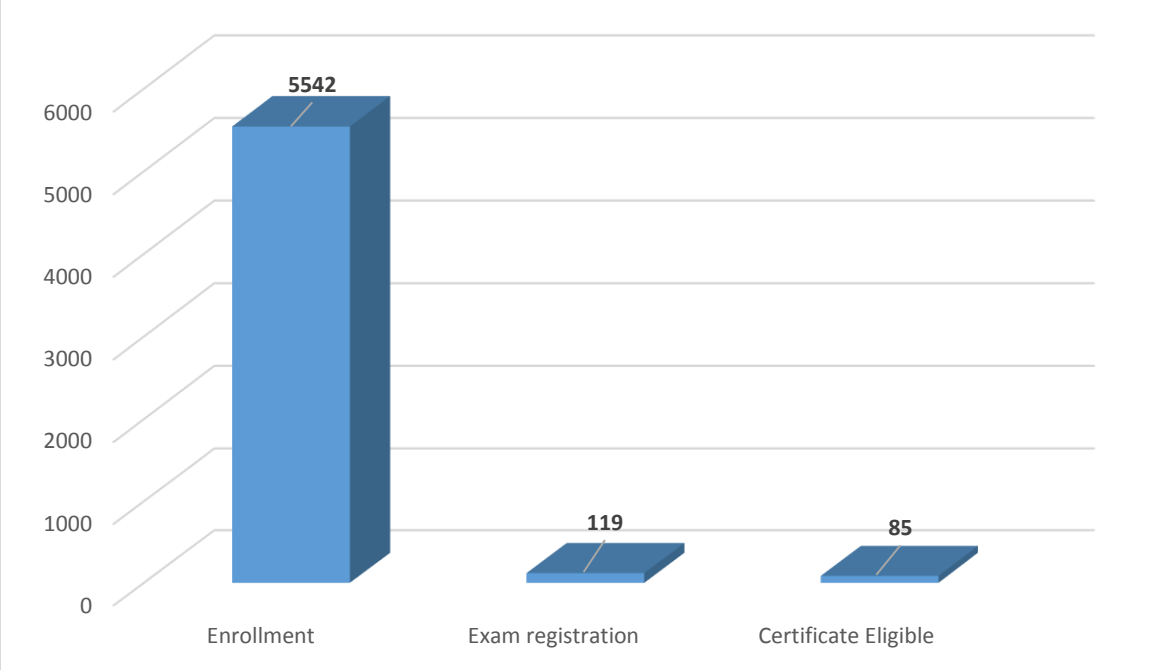
Course Outline:

Initially, an overview of 8086 microprocessor will be covered. Comparison with 8-bit processor will be discussed. Later, the detailed architecture 0f 8086 will be discussed. The 8086 instructions will be covered with examples. Simple to complex programs using 8086 assembly language will be discussed. A peripheral device 8255 will be discussed in detail. Then, the interfacing of 8086 with several peripherals such as key board, display, stepper motor will be covered.

Total nos. of enrollment: 5542

Total nos. of Exam registration: 119

Total nos. of Certificate Eligible: 85



Basic Principles and Calculations in Chemical Engineering

Prof. Subrata Kumar Majumdar
Chemical Engineering

Type of the course: New, Jan 2020 run Duration: 12 weeks

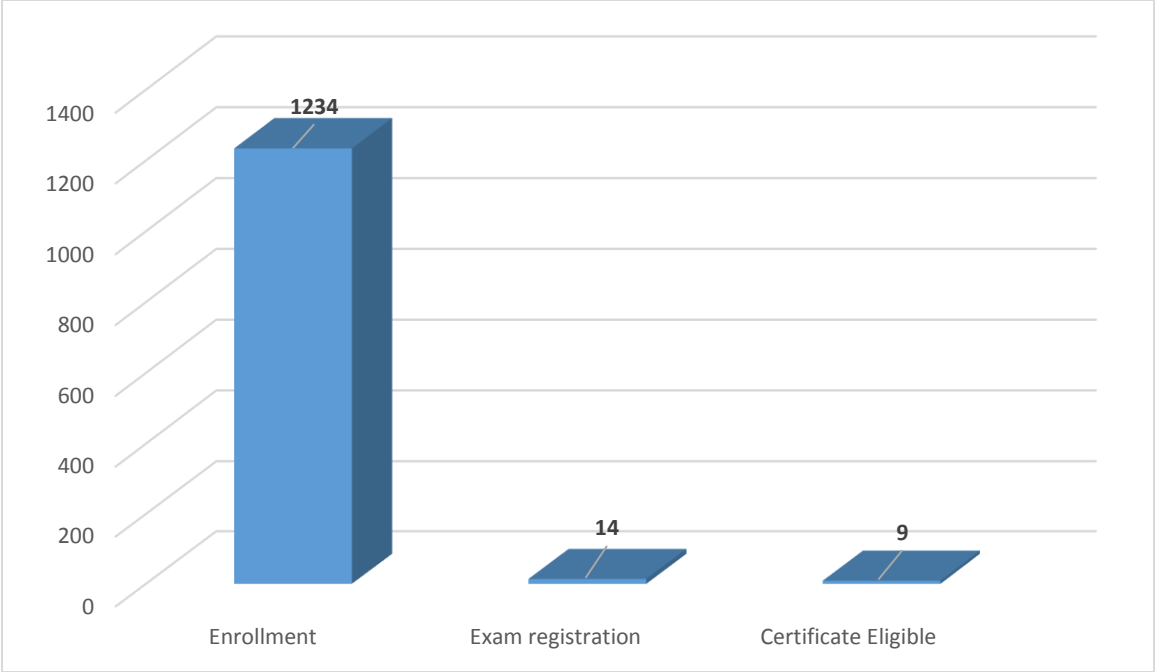
Course Outline:

The Objective of the course is to introduce chemical engineering students to the basic principles and calculation techniques used in the chemical industries and to acquaint them with the fundamentals of the material and energy balances as applied to chemical engineering. The course is mainly intended for graduate chemical engineers. It will expose them to problems in material and energy balances that arise in relation to the problems involving chemical reactors. It also will introduce them to numerical methods used to solve the problems with simple software packages. The course will introduce in simple language and ample of examples so that it will encourage learners to get used to the course.

Total nos. of enrollment: 1234

Total nos. of Exam registration: 14

Total nos. of Certificate Eligible: 09



Introduction to Abrasive Machining and Finishing Processes

Prof. Mamilla Ravi Sankar
Mechanical Engineering

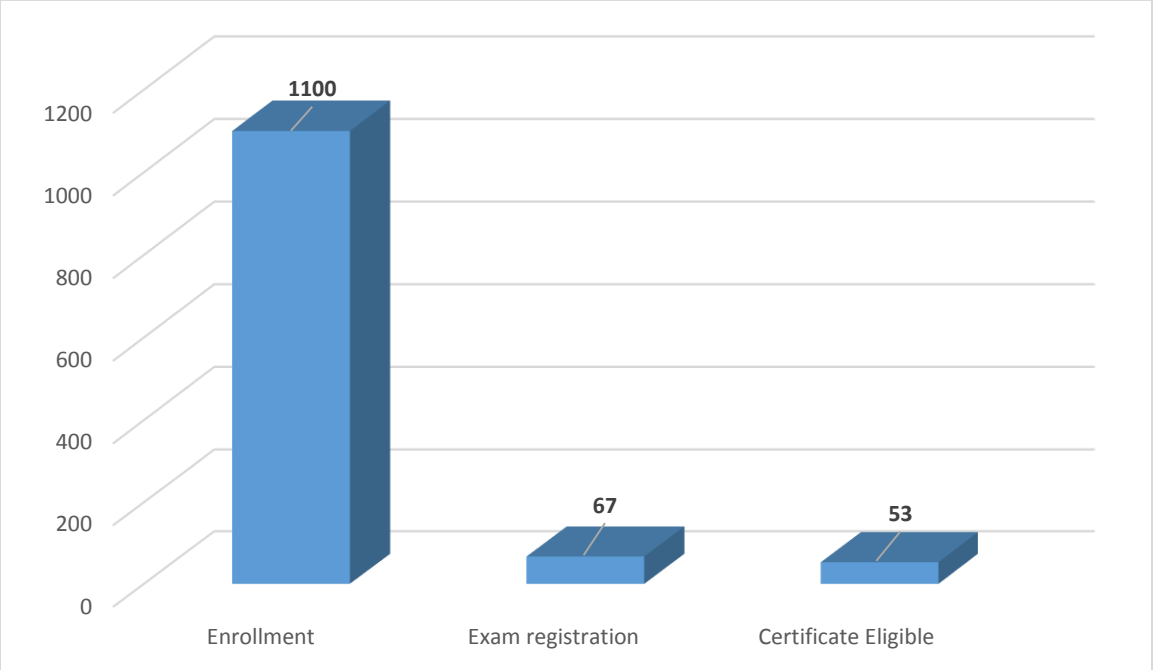
Type of the course: Re-run, Jan 2020 run Duration: 8 weeks

Course Outline:
This course will define the areas of application of traditional as well as non-traditional abrasive finishing processes in the manufacturing industry. The lectures will introduce the basic principles of material removal by use of abrasives particles and material removal mechanism of different abrasive process. The effects of various input parameters on the outputs as well as the use of cutting fluids in various finishing process will be discuss. A variety of numerical problems and MCQs, discussions will also be included.

Total nos. of enrollment: 1100

Total nos. of Exam registration: 67

Total nos. of Certificate Eligible: 53



An Introduction to Cardiovascular Fluid Mechanics

Prof. Raghvendra Gupta
Chemical Engineering

Type of the course: Re-run, Jan 2020 run Duration: 4 weeks

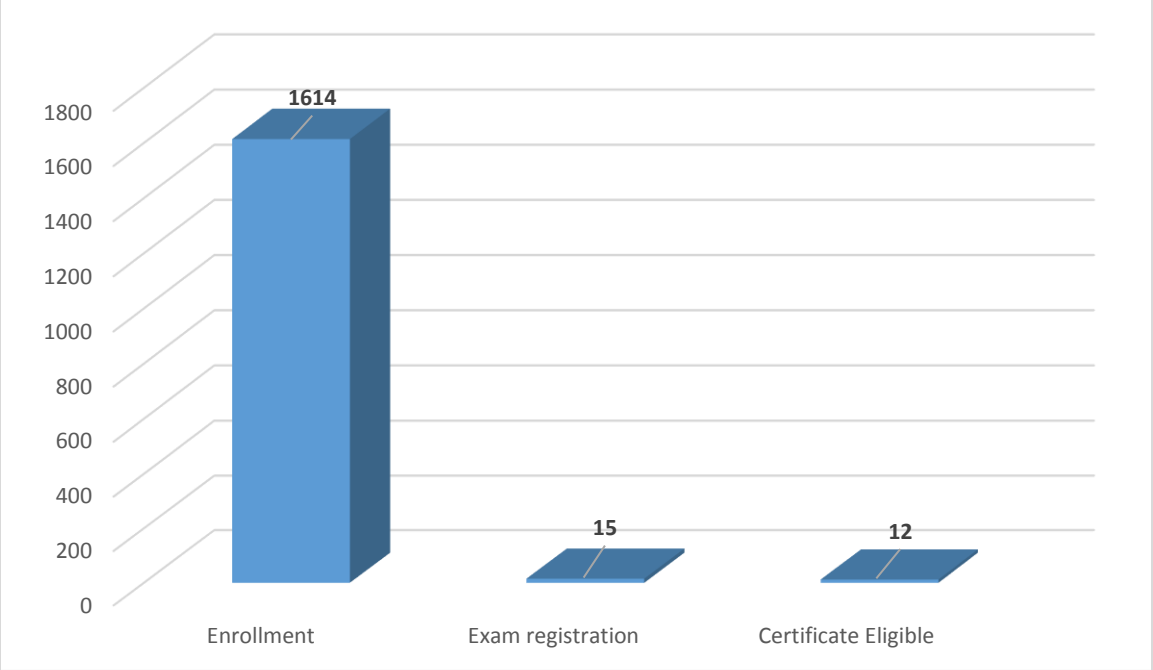
Course Outline:

This course aims to provide an overview of the important problems in human circulatory system. The course would provide introduction to cardiovascular systems and important fluid flow problems in large arteries. The goal is to provide students with the necessary background to apply the knowledge of fluid mechanics to analyse the flow behavior in biological systems in general and human circulatory system in particular. It is hoped that with this course, the students would be able to develop a perspective towards the design and development of diagnostics and medical device development.

Total nos. of enrollment: 1614

Total nos. of Exam registration: 15

Total nos. of Certificate Eligible: 12



Prof. Supradip Das
Design

Prof. Debayan Dhar
Design

Prof. Swati Pal
Design

Type of the course: Re-run, Jan 2020 run

Duration: 4 weeks

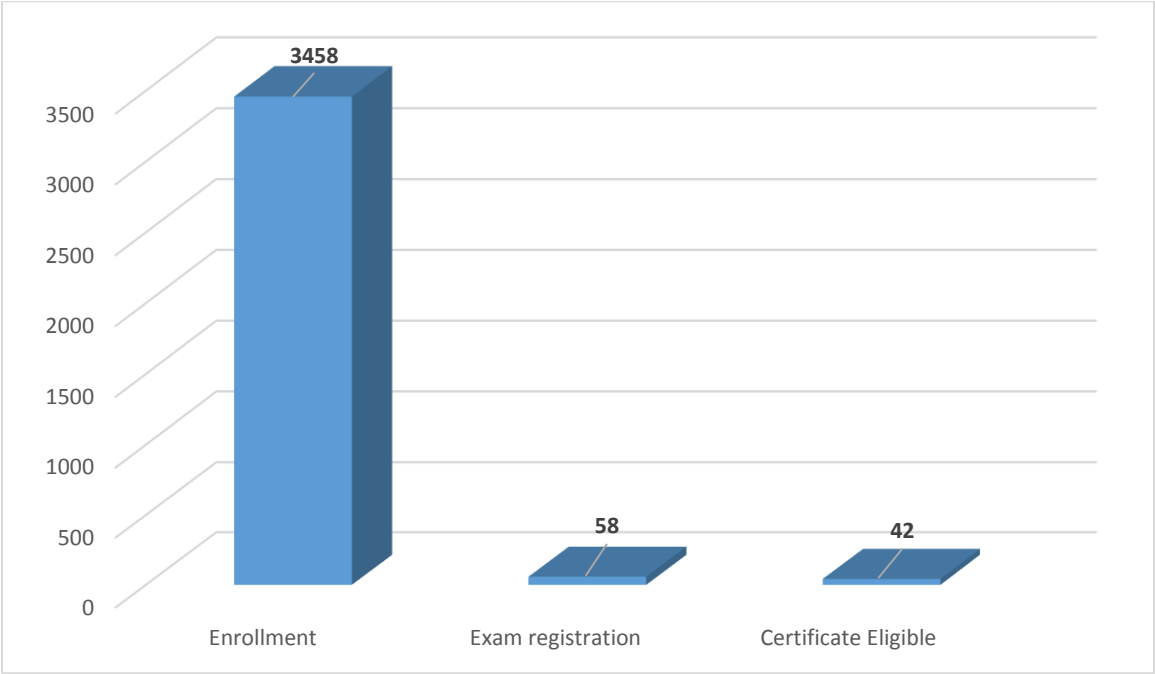
Course Outline:

Product Design and Innovation course is intended to introduce overall awareness of the product design process. This course will give an understanding of methods, tools and techniques applied in product design. This course includes overview of innovation, product design process, user study, need/problem identification, development of design brief, understanding competitive benchmarking, aspects of human factors in product design, tools for creative concept generation, prototyping/model making and evaluation techniques for user-product interaction. This course will be explained with lectures including case studies and hands-on exercises. This will help students to generate creative ideas in to product design, considering human factors aspects.

Total nos. of enrollment: 3458

Total nos. of Exam registration: 58

Total nos. of Certificate Eligible: 42



Prof. Saurabh Basu
Physics

Type of the course: Re-run, Jan 2020 run Duration: 4 weeks

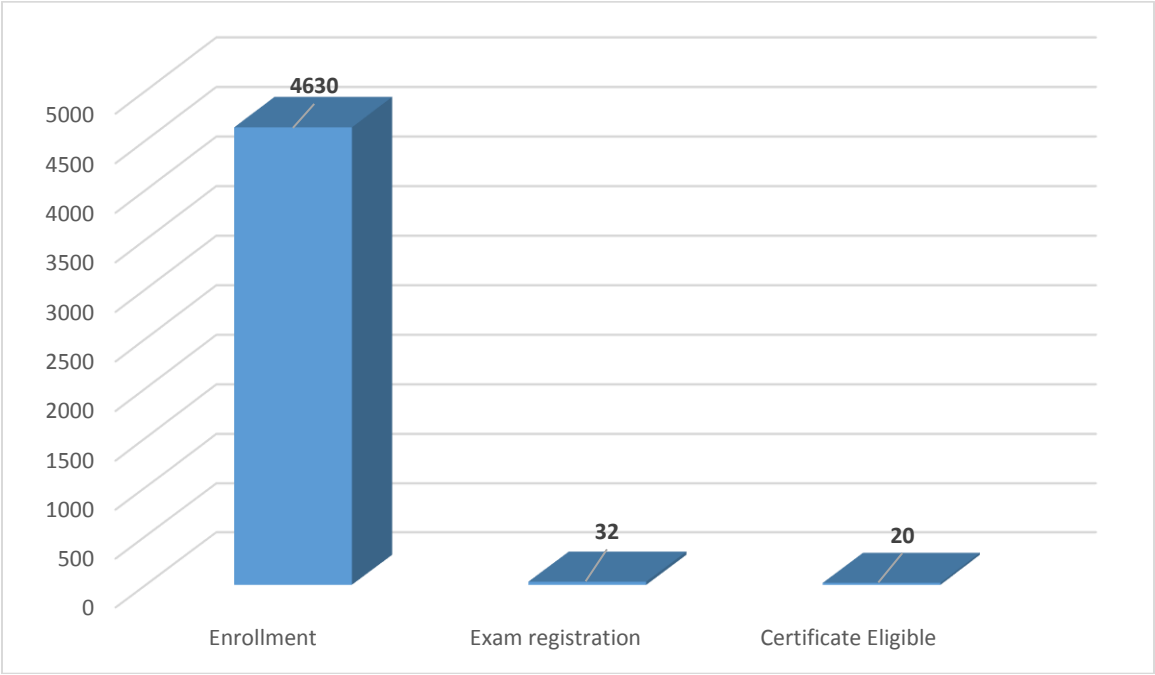
Course Outline:

The course mainly concerns with the electrodynamic response of the conventional superconductors, both at low and high frequencies. Besides, the course aims to introduce state of the art topics like, Josephson junctions, SQUID etc. More over the course provides introduction to the modern superconducting materials, such as the High-Tc CuO_2 based superconductors, Carbon based and Iron superconductors. Especially with the prospects of realizing room temperature superconductivity discovered in nanostructures by scientists at IISc Bangalore, the course will gain importance among interested audience.

Total nos. of enrollment: 4630

Total nos. of Exam registration: 32

Total nos. of Certificate Eligible: 20



Prof. Naveen Kashyap
Humanities and Social Sciences

Type of the course: Re-run, Jan 2020 run Duration: 8 weeks

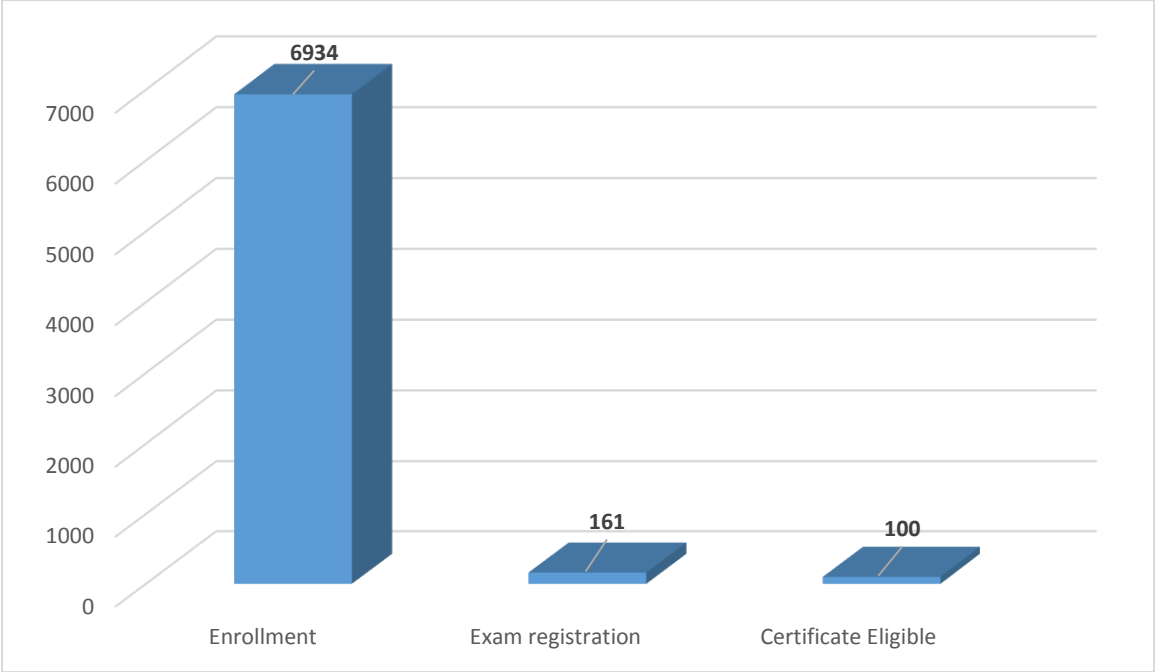
Course Outline:

We as intelligent beings have always wondered why we do what we do. The most interesting knowledge that humans beings would kill to possess would be the knowledge to control other people. The basic premise of being human is individual difference (we are all different). One science that helps people in understanding other people and scientifically predicting their actions is the science of psychology. In the present course, I will make an attempt to simplify the science of human behavior.

Total nos. of enrollment: 6934

Total nos. of Exam registration: 161

Total nos. of Certificate Eligible: 100



Fundamental of Welding Science and Technology

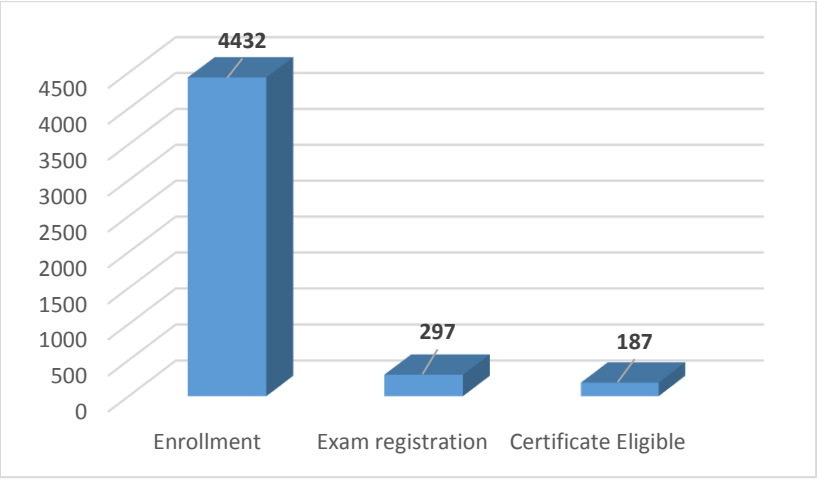
Prof. Pankaj Biswas
Mechanical Engineering

Type of the course: Re-run, Jan 2020 run Duration: 8 weeks

Course Outline:

As the name implies in this course he will try to cover the fundamental overview of the traditional/ industrial welding technology espeacially those welding processes which are widely used in manufacturing industries. This will help the participants to understand and apply this knowledge of welding in practice for various industrial applications. It will also encourage academic participants to increase the research interest in the field of welding. Welding is a joining process which is an unavoidable technology in most of the manufacturing sector. It is such a topic in which you will get the taste of most of the science and engineering subjects. Knowledge of almost all science subjects like physics, chemistry, mathematics and engineering subjects like solid mechanics, thermal science, fluid mechanics etc. are highly essential to understand the area welding technology. It is observed that in manufacturing industry over 30 % expenditure is spent on welding. Welding has significant application in various manufacturing sectors like aerospace, automobile, ship building, railway etc. It plays very important and crucial role in service life of the structure. That's why basic fundamental knowledge of welding is highly essential. The brief overview of the course content can be stated like; this course will cover the classification of welding process, classification of welding joints, industrial relevance of welding, welding symbols, characteristics of traditional welding power sources. It will give the fundamental knowledge of principle and physics involve in various welding processes. It will also cover the importance and applications of different traditional welding techniques. This course will highlight safety precautions to be followed in welding. This course will also cover welding defects & inspection and with their remedies to improve the weld quality.

Total nos. of enrollment: 4432
Total nos. of Exam registration: 297
Total nos. of Certificate Eligible: 187



Multiphase Flows

Prof. Rajesh Kumar Upadhyay
Chemical Engineering

Type of the course: Re-run, Jan 2020 run Duration: 8 weeks

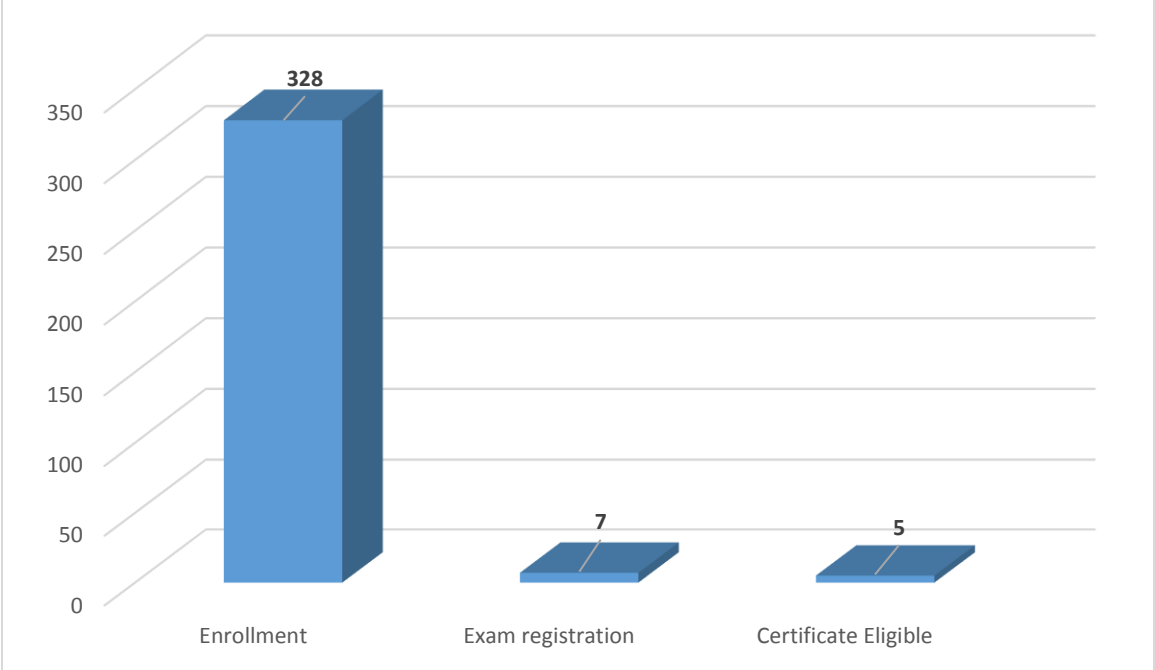
Course Outline:

Multiphase flow reactors are critically important many industries like, chemical, petroleum, petrochemicals, food, pharmaceuticals etc. The performances of these reactors largely depend on the interactions of different phases involved. In this course basic of Multiphase flow along with different flow regime map and pressure drop, and volume fraction calculation will be covered. Further, the interaction between different phases at different scales will be discussed. Modelling methods used for multiphase flow reactors will be covered. Finally, different type of multiphase flow reactors will be introduced and their functioning, advantage and disadvantages and challenges along with future direction of research will be discussed.

Total nos. of enrollment: 328

Total nos. of Exam registration: 07

Total nos. of Certificate Eligible: 05



Economic Growth and Development

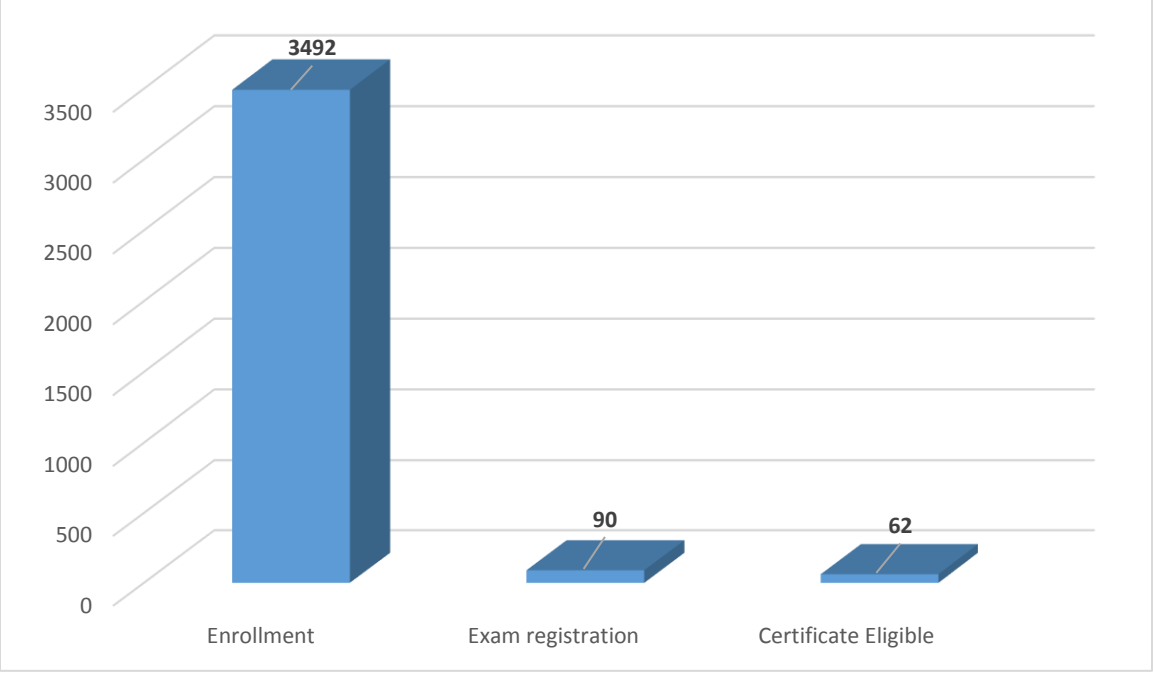
Prof. Rajshree Bedamatta
Humanities and Social Sciences

Type of the course: Re-run, Jan 2020 run Duration: 8 weeks

Course Outline:

This course engages the student with the much debated theories of growth versus development. The decades following liberalization and globalization have been a period of very high levels of economic inequality. With the focus on issues surrounding inequality, this course will introduce students to the major ideas and theories surrounding the often used and misused concepts of economic growth and economic development. With the help of major concepts used in growth and development economics, a student taking this course will be able to participate in the debate and understand the nuances surrounding the issue of economic development.

Total nos. of enrollment: 3492
Total nos. of Exam registration: 90
Total nos. of Certificate Eligible: 62



Multi-Core Computer Architecture – Storage and Interconnects

Prof. John Jose
Computer Science and Engineering

Type of the course: Re-run, Jan 2020 run Duration: 8 weeks

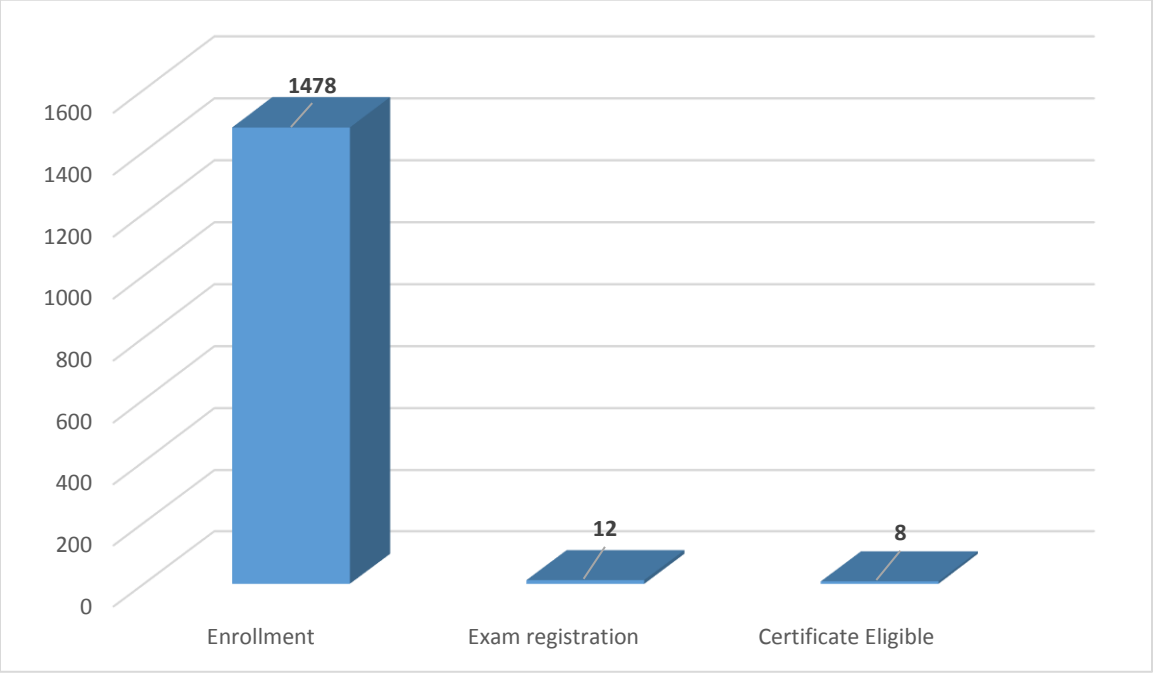
Course Outline:

We are in the era of multi-core systems where even the simplest of handheld devices like a smart phone houses many processors in a single chip. The core counts are ever increasing from 8 to 10 in smart phones to over 100s in super computers. This course will introduce the students to the world of multi-core computer architectures. With the unprecedented growth of data science, on-chip storage systems and inter-core communication framework are getting equal attention as that of processors. This course will focus on delivering an in-depth exposure in memory-subsystems and interconnects of Tiled Chip Multi-Core Processors with few introductory sessions on advanced superscalar processors. The course concludes with pointers to current research standings and on-going research directions for motivating the students to explore further.

Total nos. of enrollment: 1478

Total nos. of Exam registration: 12

Total nos. of Certificate Eligible: 08



Introduction to Modern Indian Drama

Prof. Kiran Keshavamurthy
Humanities and Social Sciences

Type of the course: Re-run, Jan 2020 run Duration: 8 weeks

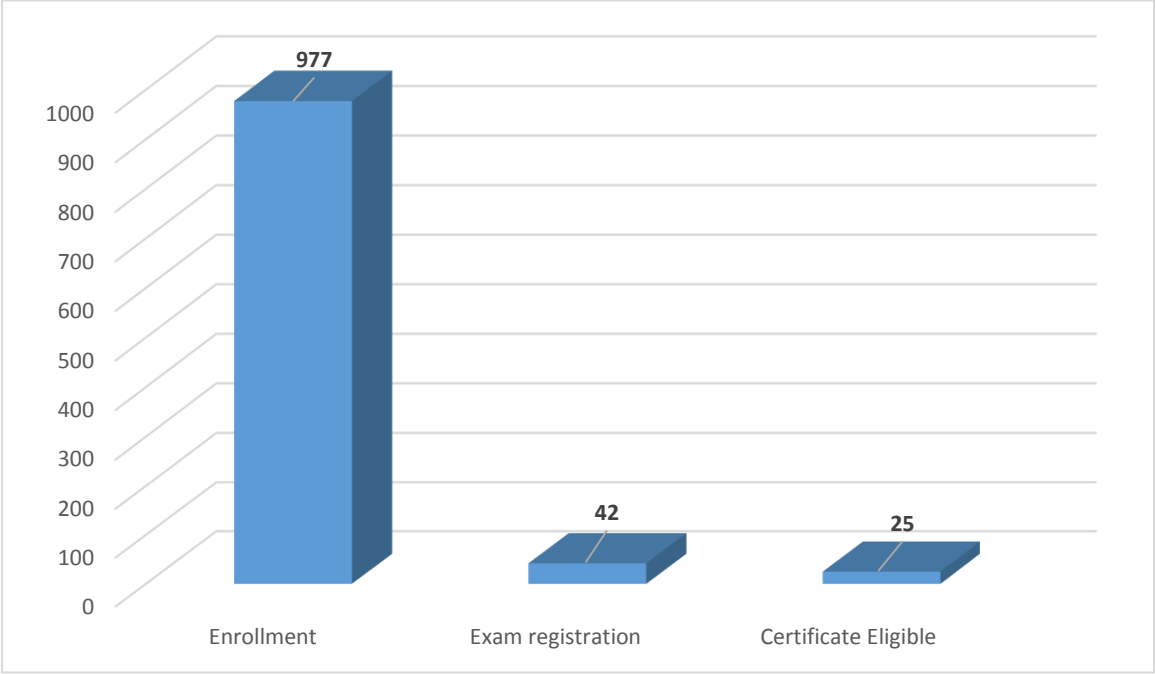
Course Outline:

This course introduces students to the historical and social debates on modern Indian Theatre from the latter decades of the 19th century to the mid-20th century. The purpose of the course is to familiarize students with modern Indian performance traditions and the social and political issues in the works of major modern Indian playwrights.

Total nos. of enrollment: 977

Total nos. of Exam registration: 42

Total nos. of Certificate Eligible: 25



Prof. Uday S. Dixit
Mechanical Engineering

Type of the course: Re-run, Jan 2020 run Duration: 8 weeks

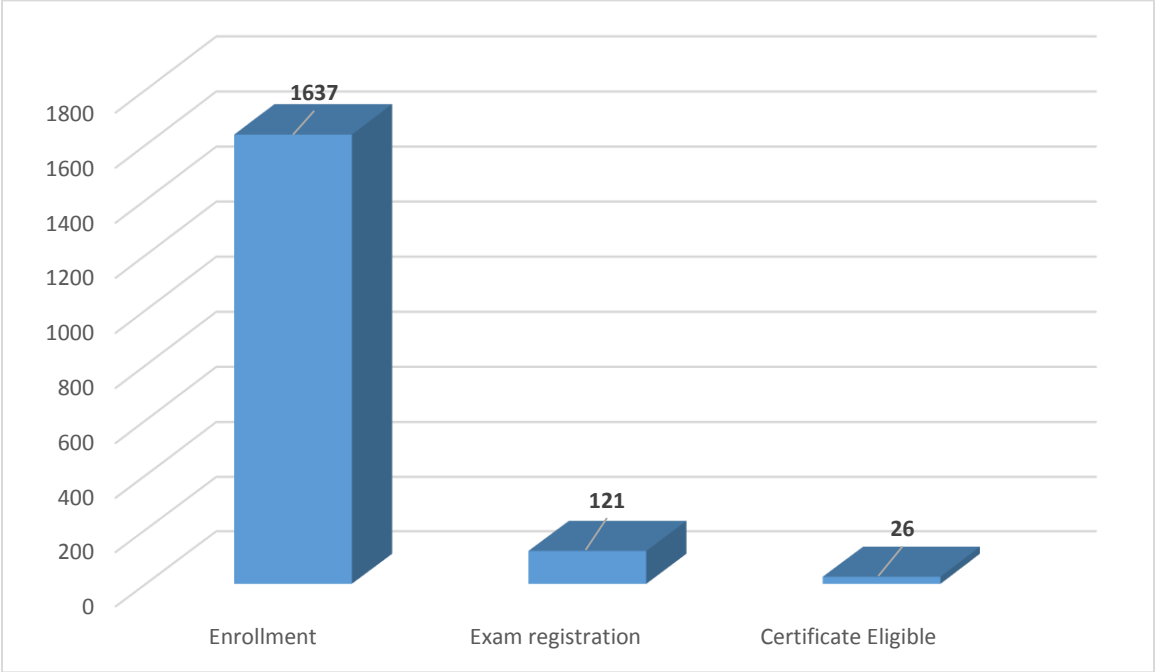
Course Outline:

In this course an attempt is made to standardize the course material and to emphasize on the fundamental mechanics of machining process using analytical approach. The changing of raw material into a final product involves various machining and finishing processes. In the last decade, a lot of development has taken place in the area of non-traditional machining and many non-traditional machining processes have become very popular in industries. However, the importance of traditional machining processes like turning, milling, shaping, drilling, and grinding still continues. The course is developed with a view to disseminate knowledge in the area of traditional machining processes. Also, newer technology like CNC is included. This course aims at bringing the students up-to-date with the latest technological developments and research trends in the field of conventional machining processes.

Total nos. of enrollment: 1637

Total nos. of Exam registration: 121

Total nos. of Certificate Eligible: 26



Higher Surveying

Prof. Ajay Dashora
Civil Engineering

Type of the course: Re-run, Jan 2020 run Duration: 12 weeks

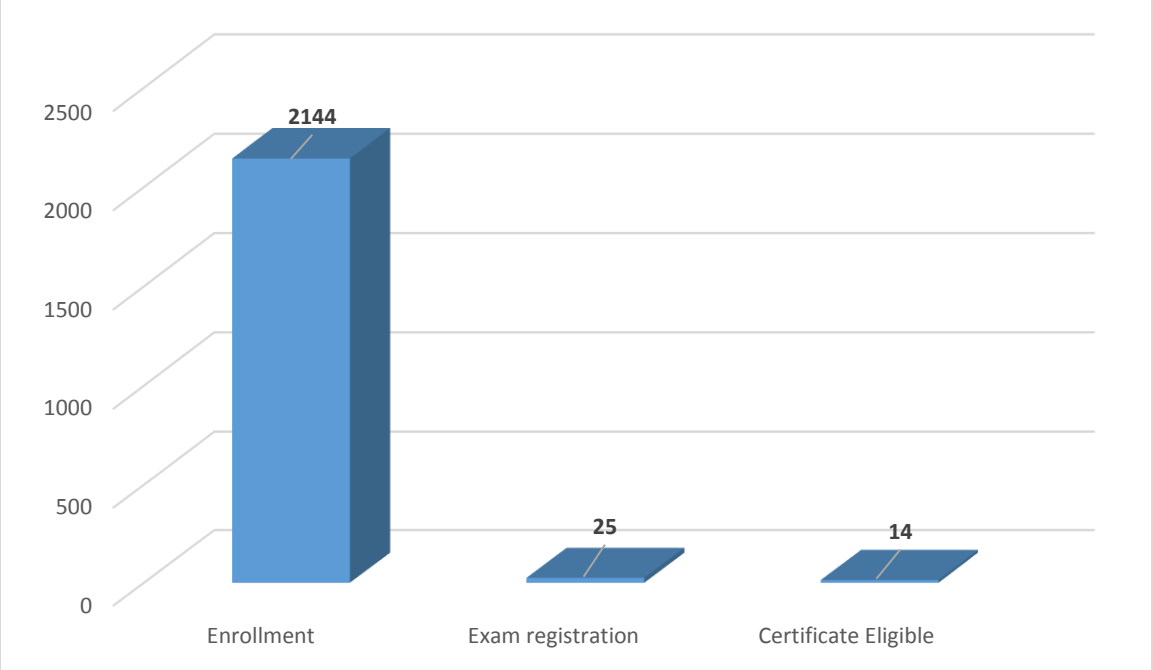
Course Outline:

Conventional survey techniques are all about measuring 2D or 3D coordinates of a point for mapping of a surface. Though accurate, these techniques are time consuming for topographic mapping. With development of various hard and soft technologies in last two decades, advanced mapping techniques have evolved. It gives a paradigm shift as conventional surveys are superseded by advanced surveying techniques, which are not only accurate and flexible but require minimum time to acquire large amount of 3D data. Therefore, these techniques have been extensively used in many areas of engineering by students, researchers, and industries. On the other hand, the fundamental concepts of most of the advanced surveying techniques are not clear to all users. This course on Higher Surveying discusses about the modern techniques of advanced surveying, their fundamental concepts, data acquisition, data processing, and applications.

Total nos. of enrollment: 2144

Total nos. of Exam registration: 25

Total nos. of Certificate Eligible: 14



Prof. Benny George K
Computer Science and Engineering

Type of the course: Re-run, Jan 2020 run Duration: 12 weeks

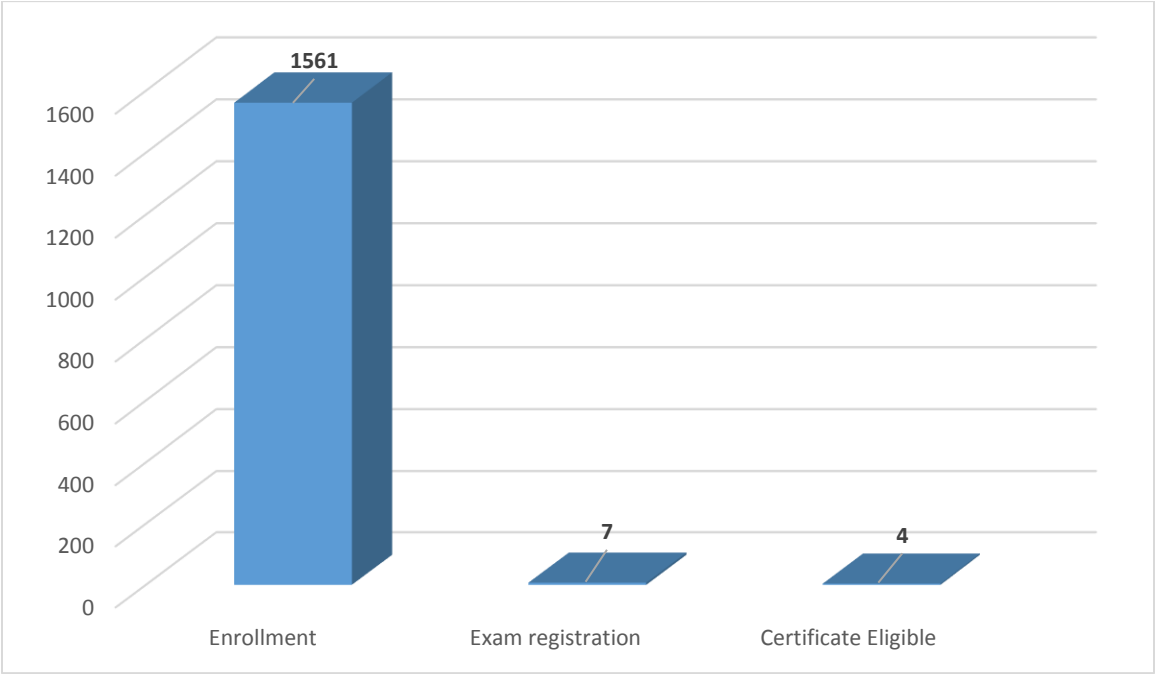
Course Outline:

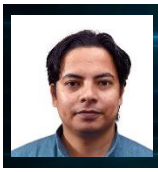
Algorithms are required to be "correct" and "fast". In a wide variety of applications, these twin objectives are in conflict with each other. Fortunately, neither of these ideals are sacrosanct. Therefore we can often try to optimize one of these goals by incurring a small penalty on the other. This takes us to the field of Randomized Algorithms. Often, the randomized variants, in addition to being faster than their deterministic counterpart, are simpler to understand and implement. In this course, we will study this tradeoff- between correctness and speed. We will be learning a number of methods to design and analyze randomized algorithms.

Total nos. of enrollment: 1561

Total nos. of Exam registration: 07

Total nos. of Certificate Eligible: 04





Introduction to Modern Indian Political Thought

Prof. Mithilesh Kumar Jha
Humanities and Social Sciences

Type of the course: Re-run, Jan 2020 run Duration: 12 weeks

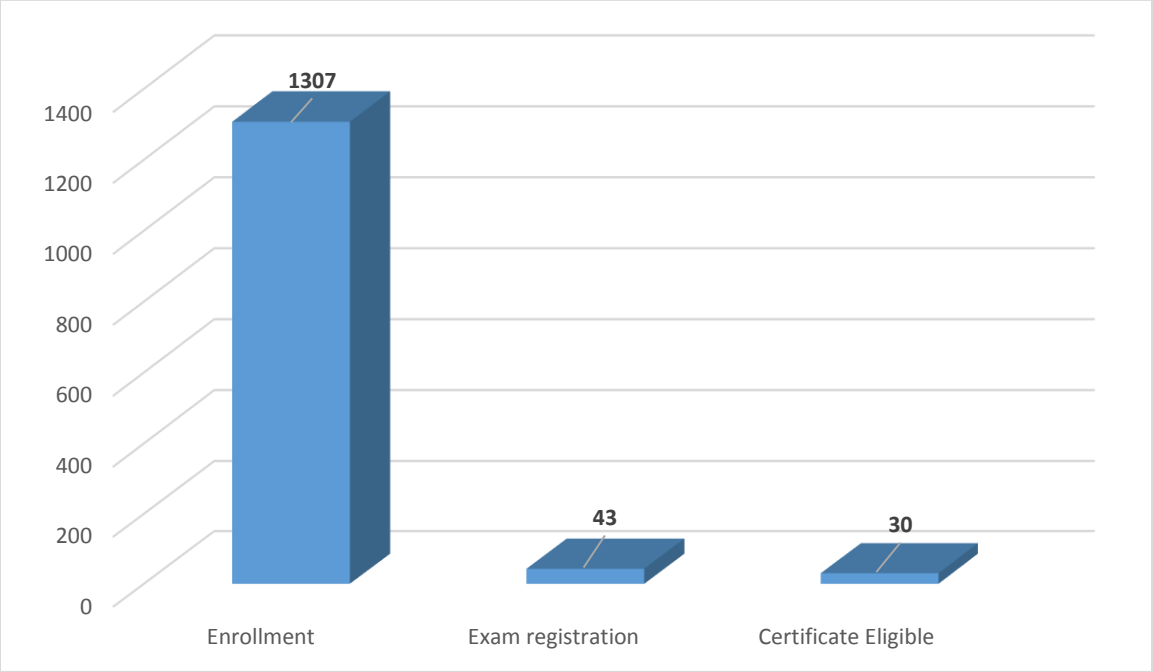
Course Outline:

Modern Indian political thought is one of the fascinating areas of scholarly debates and discussions in contemporary India. It also signifies a shift away from excessive reliance upon Eurocentric views, methods and concepts to study and interpret Indian society and its politics. The major objective of this course is to introduce the students to some of the key modern Indian thinkers and their ideas which helped in shaping the society and politics of modern India.

Total nos. of enrollment: 1307

Total nos. of Exam registration: 43

Total nos. of Certificate Eligible: 30



Prof. Naveen Kashyap
Humanities and Social Sciences

Type of the course: Re-run, Jan 2020 run Duration: 12 weeks

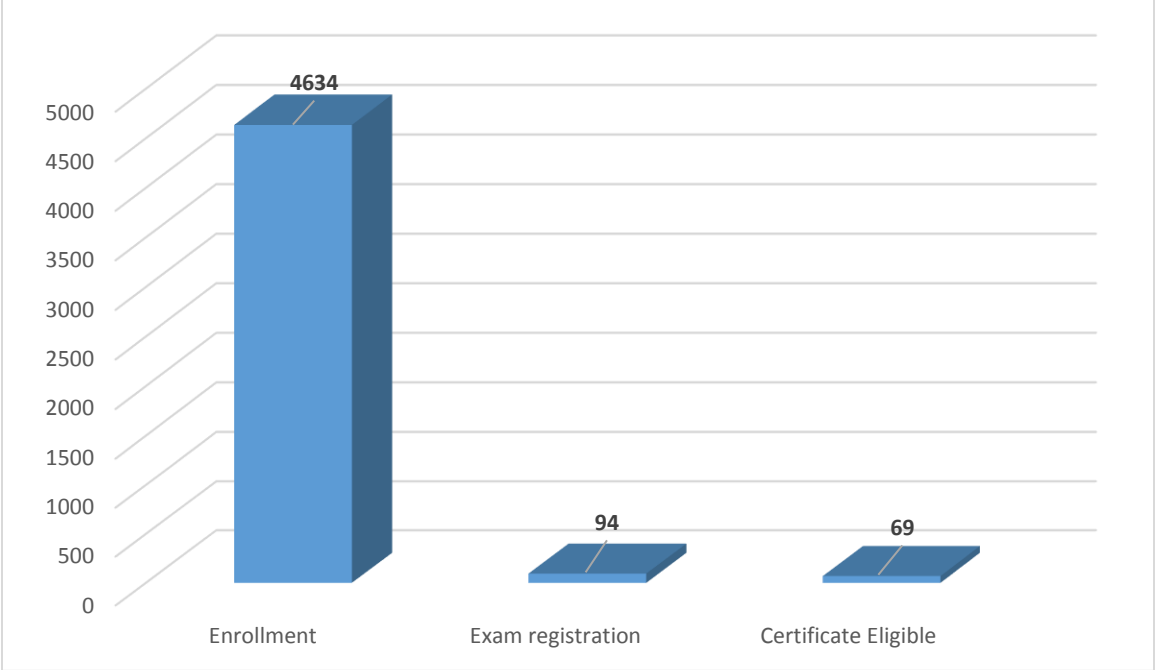
Course Outline:

One of the most puzzling fact for humans over the centuries has been the understanding of human behavior. Understanding and predicting human behavior will help humans in exerting more control over situations. The bases of human behavior are the cognitive processes underlying them. The present course is an attempt to discuss and understand the basic cognitive processes that guide human behavior. The knowledge from the course will be useful in tackling everyday problems and attaining optimal solutions. Additionally, we can use knowledge about human cognitive systems in designing sophisticated Artificial Intelligence (AI) systems that learn from mistakes and make our lives a lot easier to live.

Total nos. of enrollment: 4634

Total nos. of Exam registration: 94

Total nos. of Certificate Eligible: 69



Prof. Pranab K. Mondal
Mechanical Engineering

Prof. Vinayak N. Kulkarni
Mechanical Engineering

Type of the course: Re-run, Jan 2020 run Duration: 12 weeks

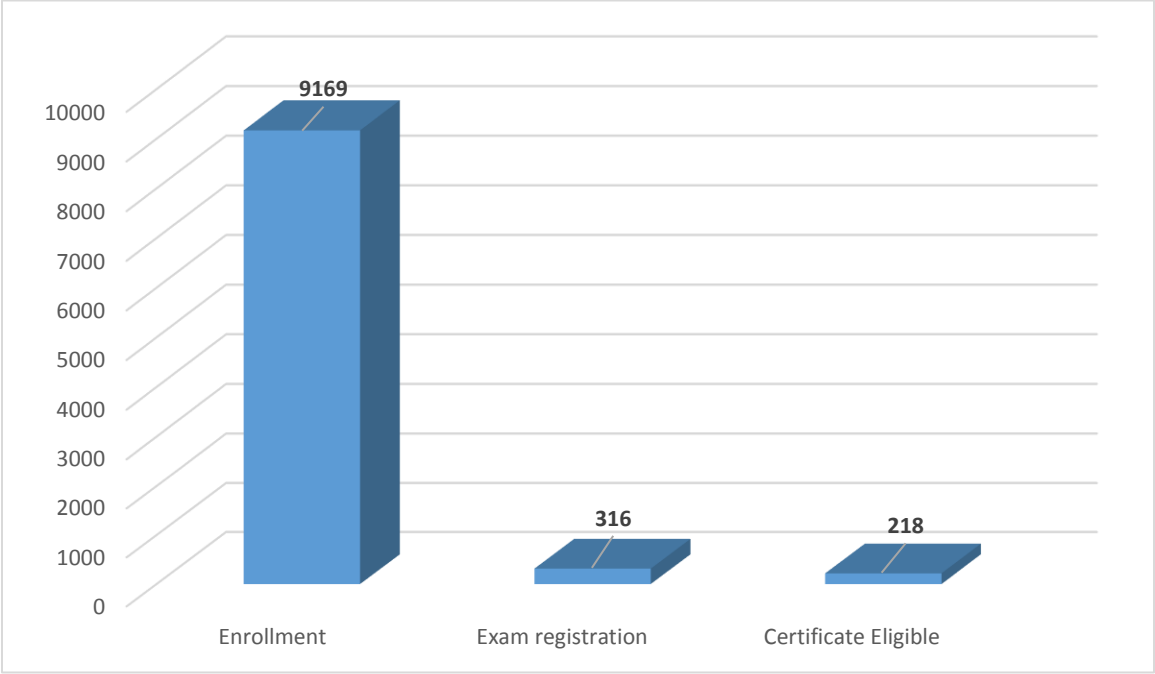
Course Outline:

This course deals with the gas power cycles. One part of the course is on IC engines and it focuses on the thermodynamic cycles for die rent fuels suitable for automobiles. Other part of the course has emphasis on thermodynamic cycle of aircraft engines and the components of the aircraft engine. Thus this course would provide an understanding on electricity generation or transportation application using gas as working medium.

Total nos. of enrollment: 9169

Total nos. of Exam registration: 316

Total nos. of Certificate Eligible: 218



Mass Transfer Operations - I

Prof. Bishnupada Mandal
Chemical Engineering

Type of the course: Re-run, Jan 2020 run Duration: 12 weeks

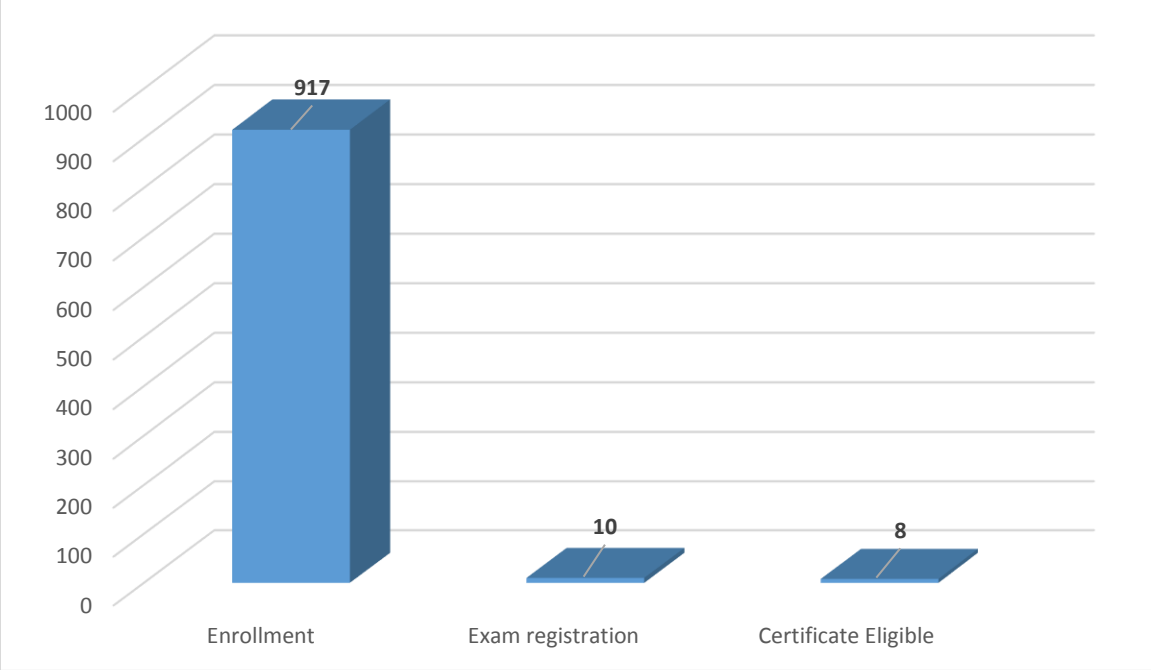
Course Outline:

This course will provide an overview of mass transfer operation at basic to an intermediate level. Coverage will be relatively broad. This course applies the concepts of di-usion and interphase mass transfer to the analysis of di-erend mass transfer operations such as absorption and distillation. The goal is to provide students with the theoretical/analytical background to understand mass transfer operations as well as application and to tackle the sort of complex problems.

Total nos. of enrollment: 917

Total nos. of Exam registration: 10

Total nos. of Certificate Eligible: 08



Fundamentals of Nuclear Power Generation

Prof. Dipankar N. Basu
Mechanical Engineering

Type of the course: Re-run, Jan 2020 run Duration: 12 weeks

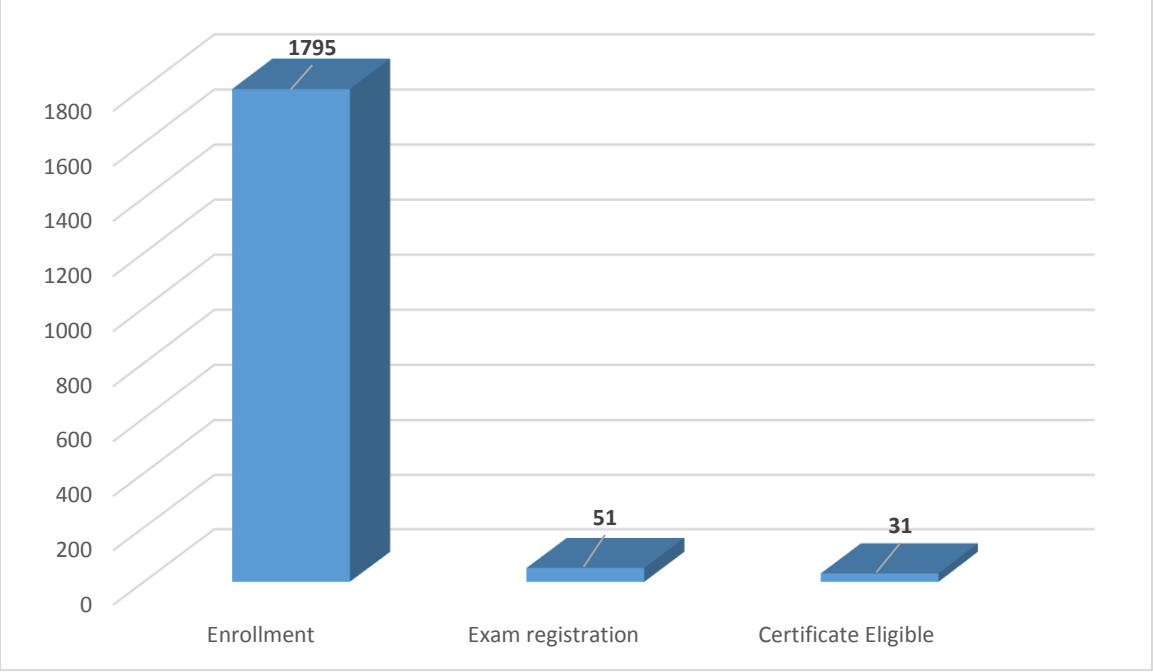
Course Outline:

The depleting stock of fossil fuels and global concern over the preservation of environment has projected nuclear energy as a very relevant option, particularly considering the near-zero emission and huge resource availability. From technological point of view, nuclear power production is quite different from the conventional thermal plants and therefore it is the need of the hour to grasp the essentials at an early level. Present course introduces the students to the fundaments of nuclear power generation. Starting from the atomic structure, students will be gradually familiarized with different concepts, finally leading to the design of different reactors. Important topics such as nuclear waste management, biological impact of radiation and safety issues pertinent to handling nuclear fuels will also be discussed.

Total nos. of enrollment: 1795

Total nos. of Exam registration: 51

Total nos. of Certificate Eligible: 31



Introduction to Political Theory

Prof. Mithilesh Kumar Jha
Humanities and Social Sciences

Type of the course: Re-run, Jan 2020 run Duration: 12 weeks

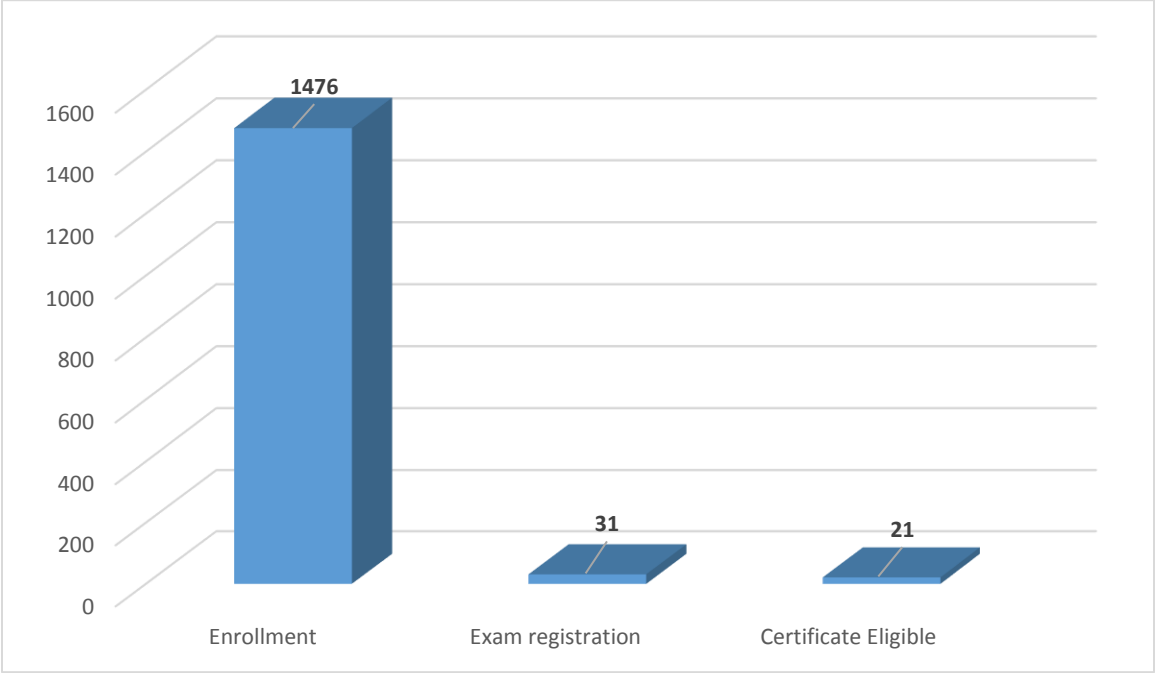
Course Outline:

The major objective of this course is to introduce the students to some of the key concepts and ideas of politics which shape our political discourse. These concepts are essentially contested concepts and yet inevitable for understanding and explaining the politics of any country or society. A clear understanding of these debates or contestations over some of the key concepts and ideas of politics, it is hoped, will help the students develop their own independent views and judgments about politics and democracy in their own societies as well as in the world at large.

Total nos. of enrollment: 1476

Total nos. of Exam registration: 31

Total nos. of Certificate Eligible: 21



Prof. Vishal Trivedi
Bioscience and Bioengineering

Type of the course: New, July 2020 run Duration: 8 weeks

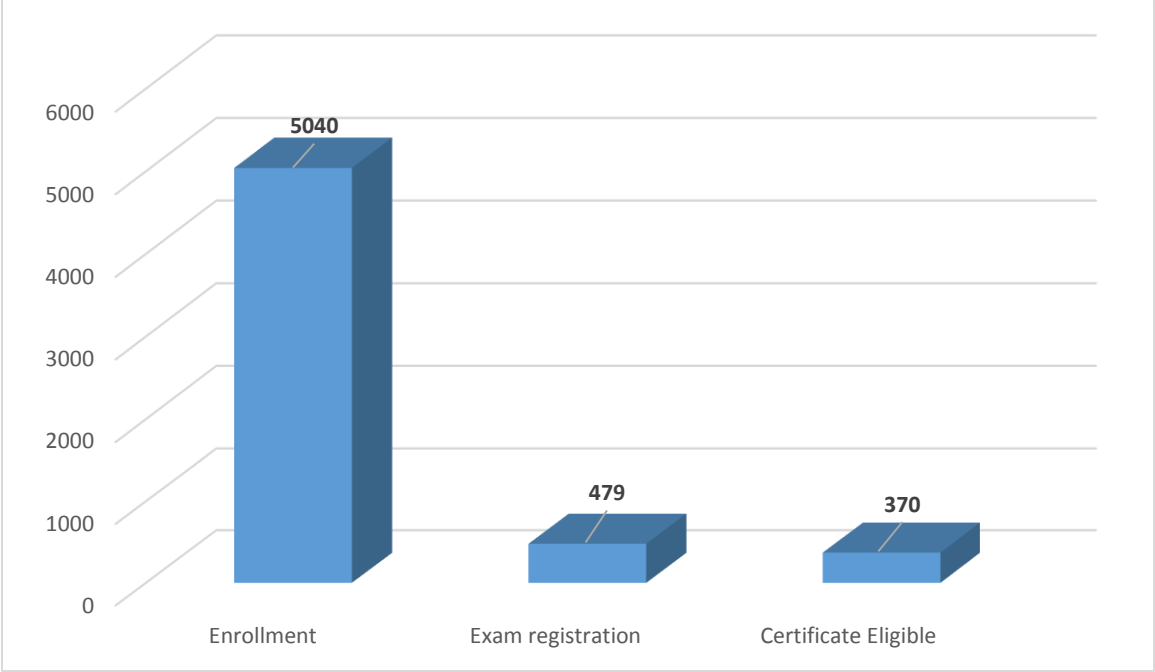
Course Outline:

In the current MOOCs course I have put effort to briefly discuss different analytical techniques and their potential in solving the scientific problems. We are taking several scientific problems or questions which can be solved by using these techniques. By the end of this course, student will be able to understand: 1. Basics of Good Lab practices. 2. Understanding different analytical techniques and their applications. 3. Specific Scientific questions and their solutions. 4. Designing new experiments.

Total nos. of enrollment: 5040

Total nos. of Exam registration: 479

Total nos. of Certificate Eligible: 370



Prof. Subashisa Dutta
Civil Engineering

Type of the course: New, July 2020 run Duration: 8 weeks

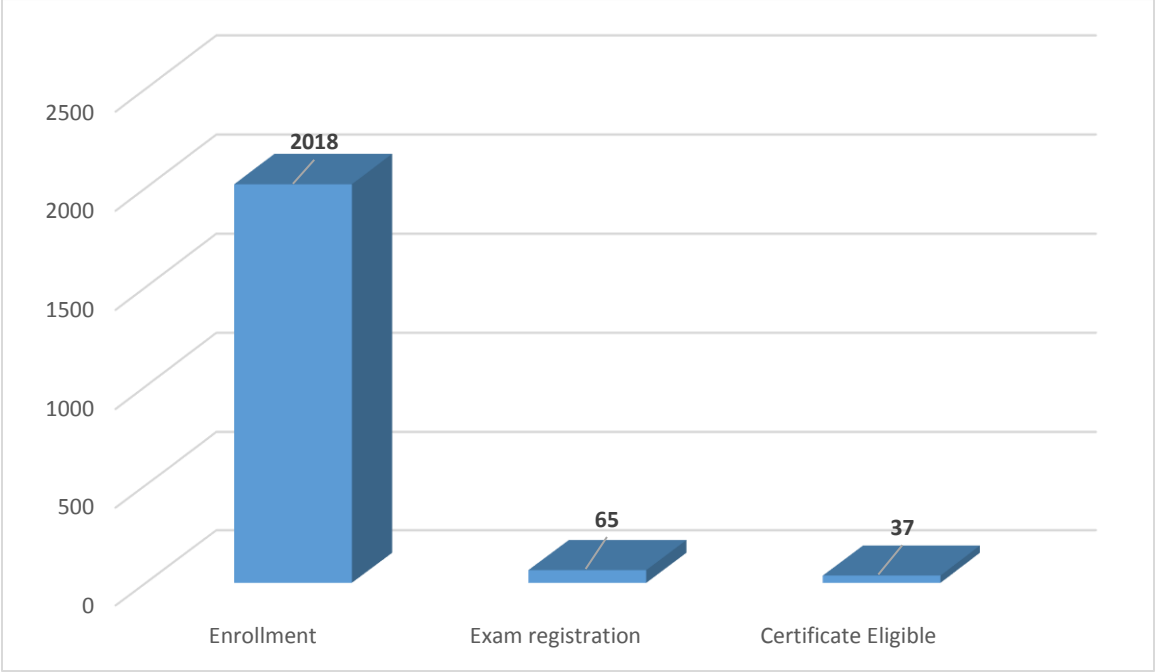
Course Outline:

In the last few decades, water demand in the globe has increased in many folds. Rivers, one of the major source of water demand for domestic, agricultural and industrial uses, are often not utilised properly for long term sustainability. Therefore, it is a challenging task for engineers for understanding water, sediment and energy transport processes in rivers in both spatial and temporal scales. This course will address how to understand and model hydro-fluvial processes and designing of advanced river intervention structures.

Total nos. of enrollment: 2018

Total nos. of Exam registration: 65

Total nos. of Certificate Eligible: 37



Prof. Samit Bhattacharya
Computer Science and Engineering

Type of the course: New, July 2020 run Duration: 8 weeks

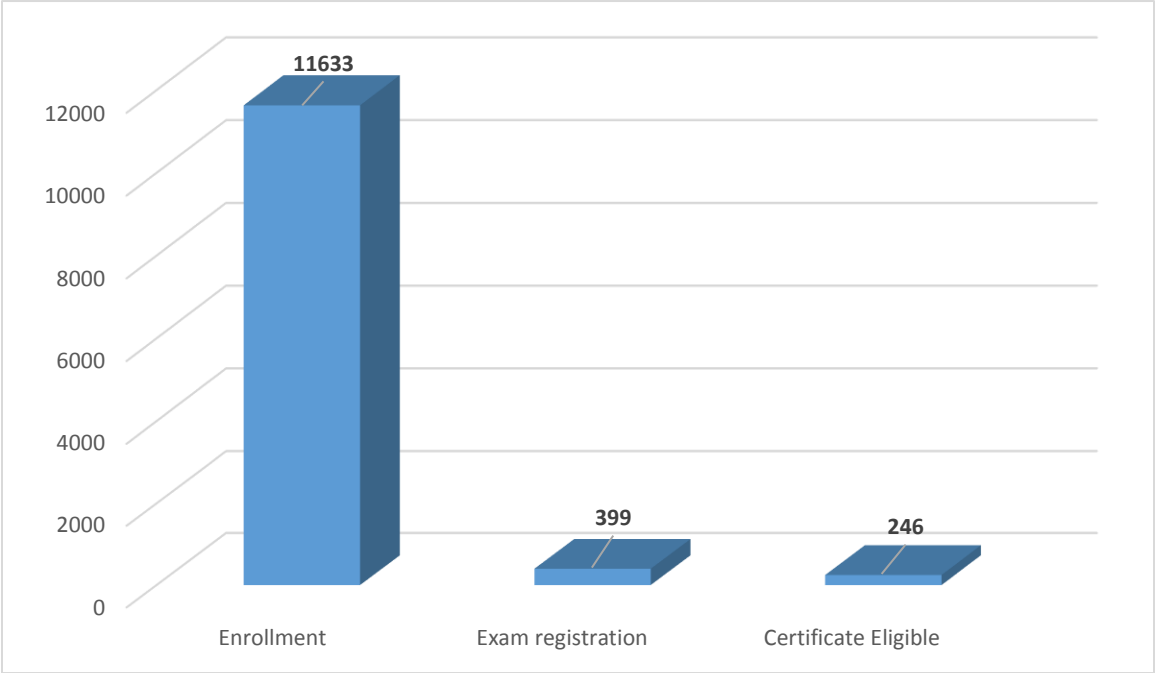
Course Outline:

Computer graphics is one of the fundamental aspects of any computing system. Its primary role is to render the digital content (0's and 1's) in a human-comprehensible form on the computer screen. The rendering follows a series of stages, collectively known as the graphics pipeline. In this course, we will introduce the pipeline and its stages. The topics covered include various object representation techniques followed by the pipeline stages of modeling transformation, 3D to 2D viewing transformation, clipping and hidden surface removal and scan conversion (rendering). We shall follow the stages of the 3D graphics pipeline. In order to complete the coverage, we shall also briefly introduce the present day graphics hardware (I/O devices, GPU) and the widely popular open GL graphics library.

Total nos. of enrollment: 11633

Total nos. of Exam registration: 399

Total nos. of Certificate Eligible: 246



Prof. Niranjan Sahoo
Mechanical Engineering

Type of the course: New, July 2020 run Duration: 8 weeks

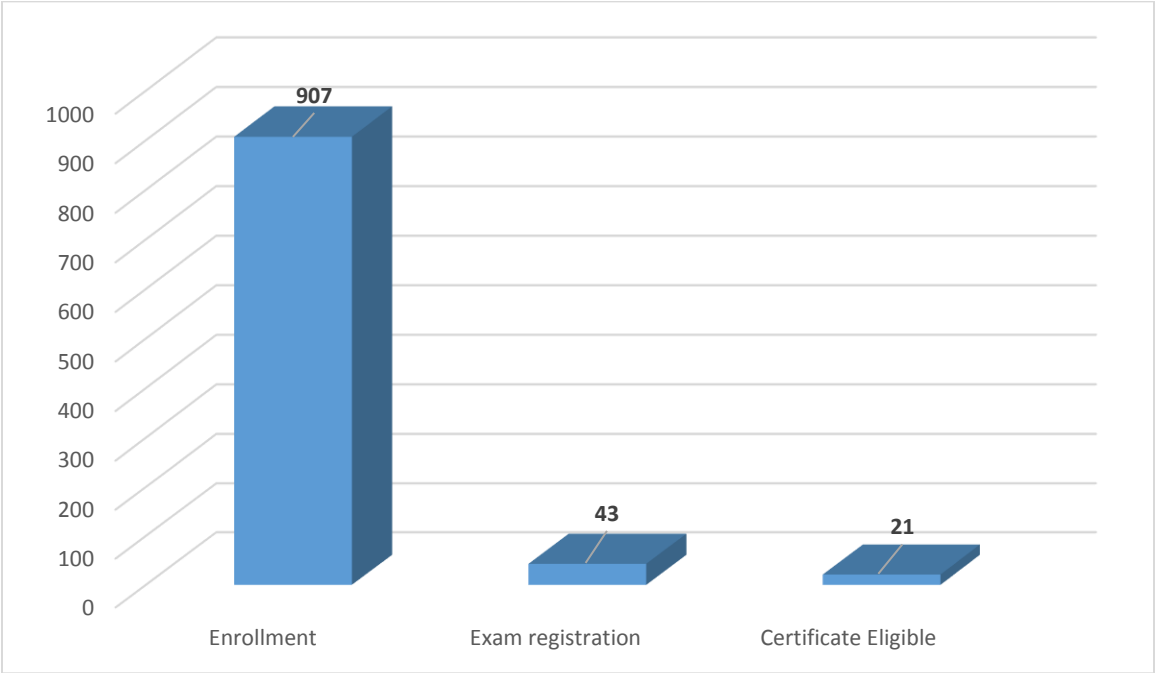
Course Outline:

Gas Dynamics is a subject of fundamental interest to Mechanical and Aerospace engineers that provides a link between fundamental subjects i.e. "Fluid Mechanics and Thermodynamics". It pertains the basic theory of compressible flow, formation of shock waves and expansion waves, nozzle flows.

Total nos. of enrollment: 907

Total nos. of Exam registration: 43

Total nos. of Certificate Eligible: 21



Municipal Solid Waste Management

Prof. Ajay Kalamdhad
Civil Engineering

Type of the course: New, July 2020 run Duration: 12 weeks

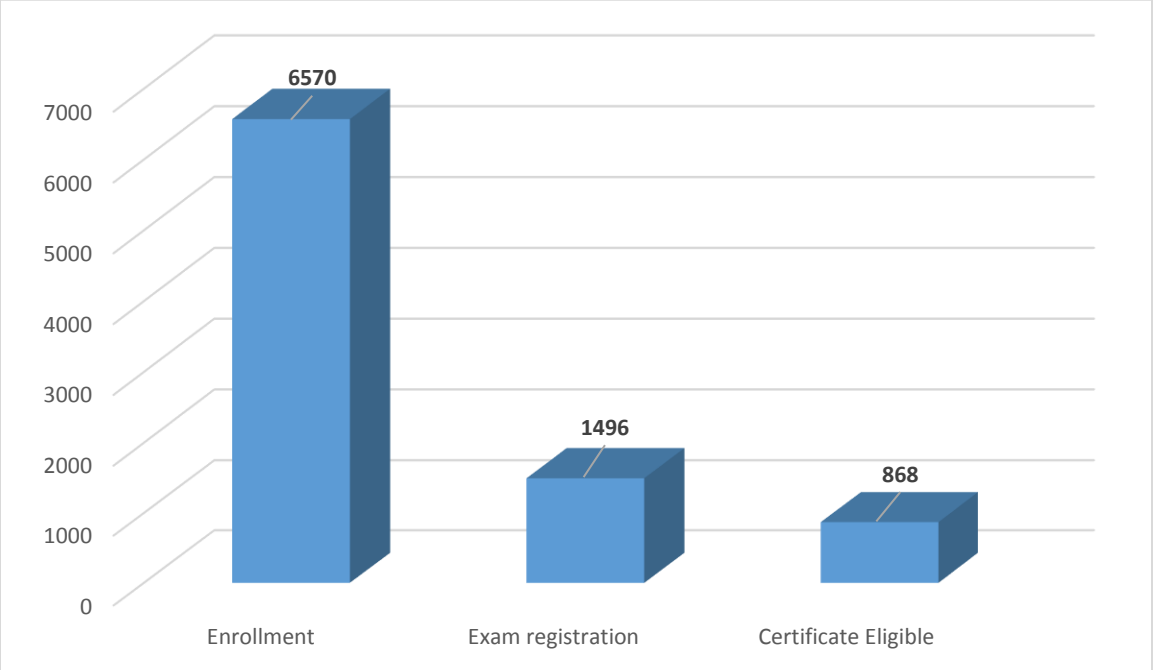
Course Outline:

The problems affiliated with solid waste management (SWM) in today's sprawling civilized and urbanized society are intricate because of the quantity and varied nature of wastes, the funding restriction for public disposal, interference of technology (energy and raw materials), and complex infrastructure development network in urban cities. As a result, if SWM is to achieve in consummate approach, the fundamentals aspects need to be identified. Thus, there is dire need to group the activities from the generation to the disposal point. The six different functional elements (generation, handing and separations, storage and processing at source, collection, the transformation of wastes, transfer and transport, and final disposal) for the engineering comparison and treatment need to be understood in detail. The understanding of the functional element is important because it helps in evaluating the impacts of projected changes and technological developments. Solid waste management is an essential part of every society, but it is also one of the most neglected one. An in-depth understanding of the subject is required to tackle the current solid waste management crisis effectively. This course attempts to familiarize various steps involved in solid waste management.

Total nos. of enrollment: 6570

Total nos. of Exam registration: 1496

Total nos. of Certificate Eligible: 868



Prof. Mithilesh Kumar Jha
Humanities and Social Sciences

Type of the course: New, July 2020 run Duration: 12 weeks

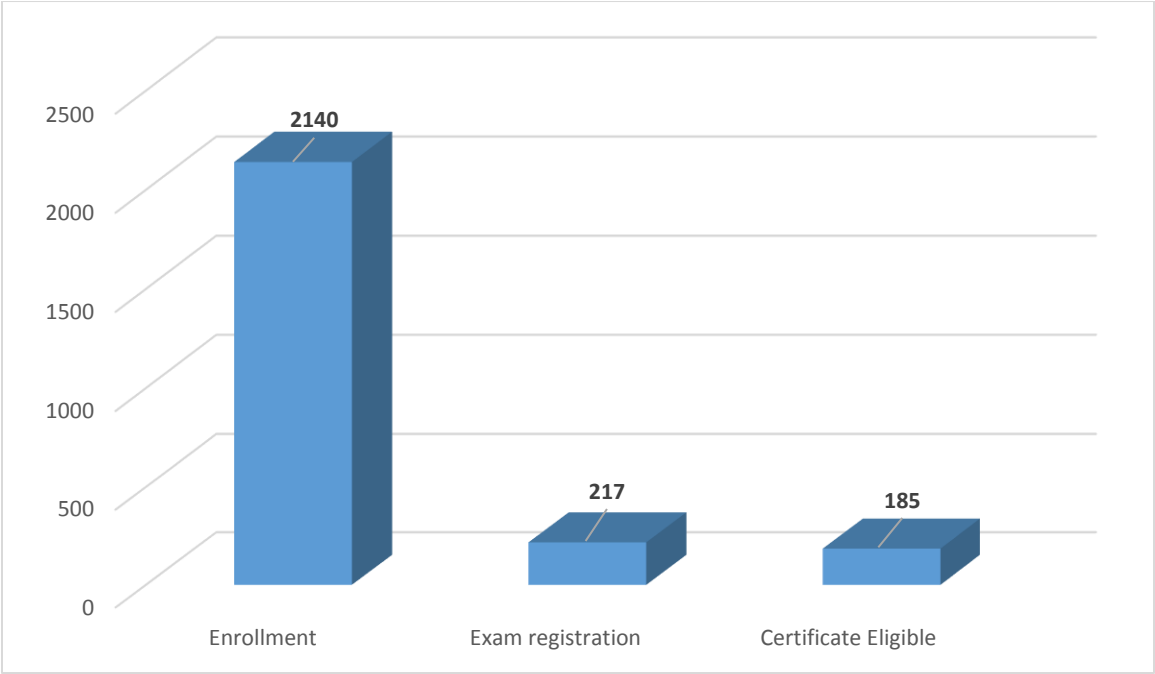
Course Outline:

One of the major objectives of this course is to introduce the students to the key debates and ideas in Western political thought. It is hoped that familiarity with the ideas or concepts of some major western political thinkers will help the students to understand different perspectives and approaches to state, politics, government, sovereignty, citizenship and so on. It is also hoped that this course will enable the student to make sense of and interpret the major developments and key debates in the political debates and discussions in any contemporary society and polity.

Total nos. of enrollment: 2140

Total nos. of Exam registration: 217

Total nos. of Certificate Eligible: 185



Mathematical Portfolio Theory

Prof. Siddhartha Pratim Chakrabarty
Mathematics

Type of the course: New, July 2020 run Duration: 12 weeks

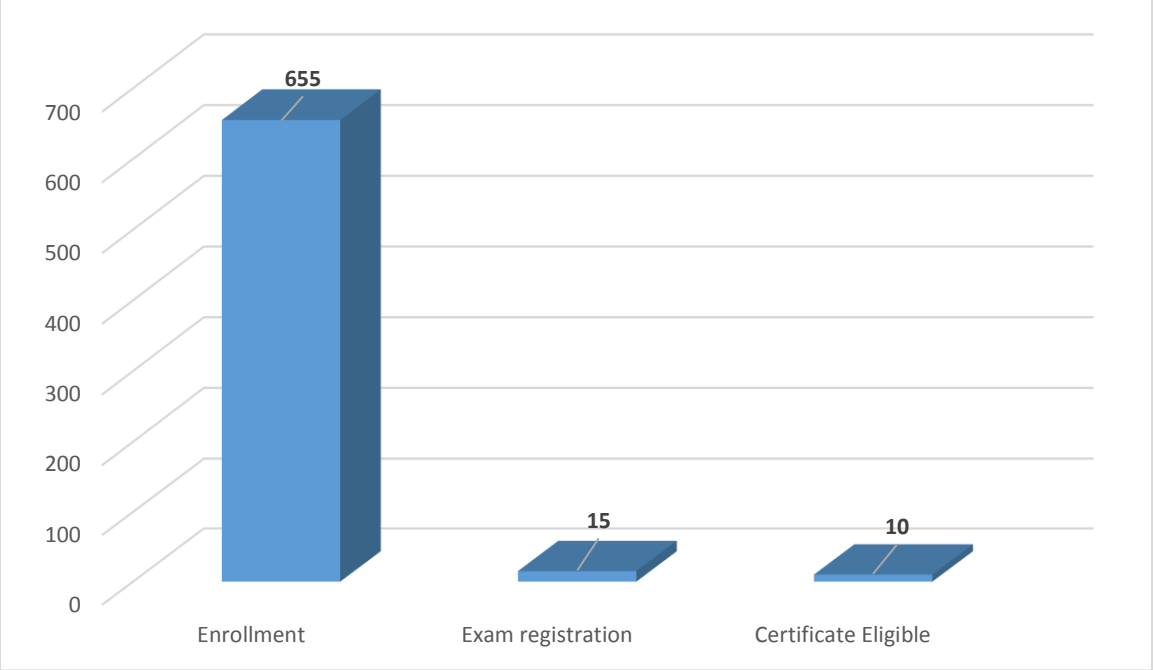
Course Outline:

This course will give an introduction to the mathematical approaches used for design and analysis of financial portfolios. It would be useful to participants who want to get a basic insight into mathematical portfolio theory, as well as those who are looking at a career in finance industry, particularly as asset managers.

Total nos. of enrollment: 655

Total nos. of Exam registration: 15

Total nos. of Certificate Eligible: 10



Prof. Atanu Banerjee
Mechanical Engineering

Prof. Arup Nandy
Mechanical Engineering

Type of the course: New, July 2020 run Duration: 12 weeks

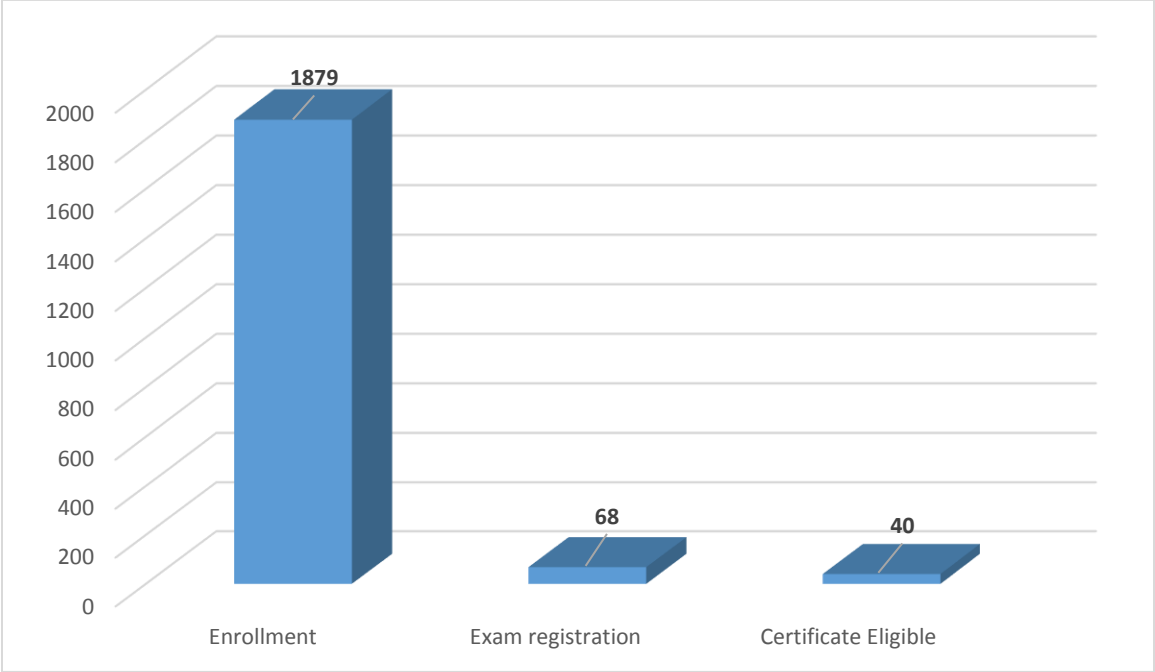
Course Outline:

Finite Element Method (FEM) is one of the most popular numerical method to boundary and initial value problems. One distinct feature of FEM is that it can be generalized to the domains of any arbitrary geometry. Theory of FEM is developed on Variational methods. In this course, finite element formulations will be derived from the governing partial differential equation of different physical systems based on Variational methods. It will start with one-dimensional Bar, Beam, Truss, Frame elements; and will be extended to two-dimensional structural, and thermal problems. The framework of standard master element in both 1D and 2D will be followed, so that transformation for any arbitrary geometry is well understood. Two dimensional formulation will be represented in Tensorial framework, after building necessary background in Tensor calculus. Most importantly for every element, the basic code for computer implementation will be provided and explained with step-by-step clarification. We will also elaborately present how to prepare a generalized FEM code with first hand implementation.

Total nos. of enrollment: 1879

Total nos. of Exam registration: 68

Total nos. of Certificate Eligible: 40



Computational Continuum Mechanics

Prof. Sachin Singh Gautam
Mechanical Engineering

Type of the course: New, July 2020 run Duration: 12 weeks

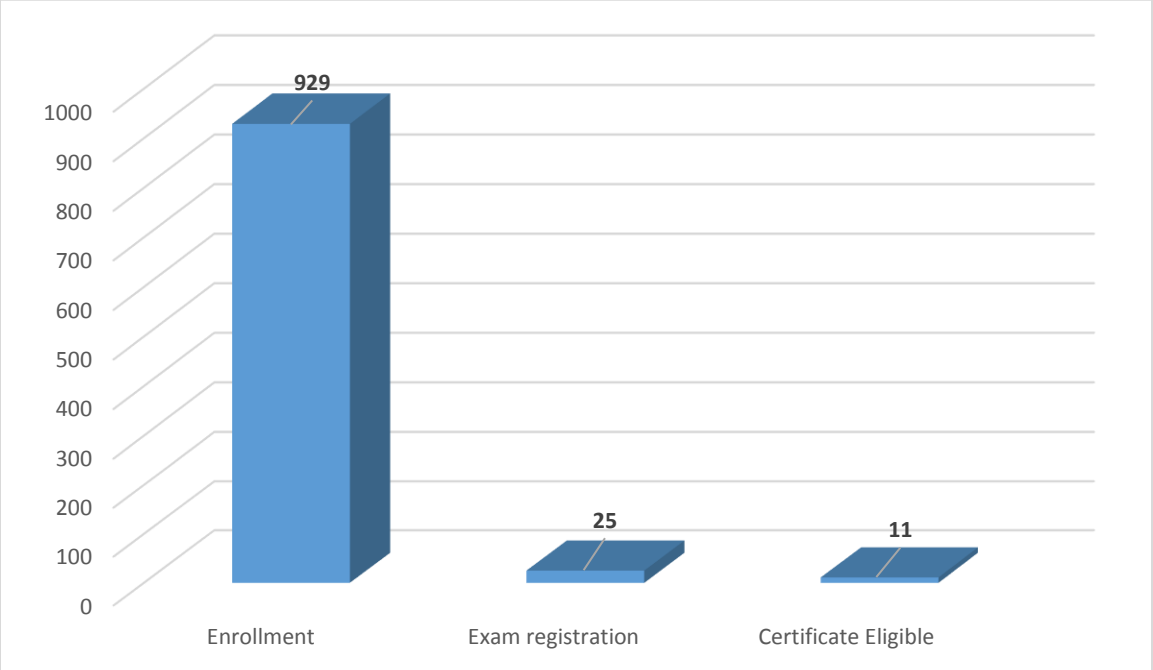
Course Outline:

Continuum mechanics as a full-fledged course is a very interesting but a challenging subject. Usually, its application within the nonlinear finite element codes is not clear to the student. Computational continuum mechanics tries to bridge this gap. Hence, it can be treated as an applied version of continuum mechanics course. It assumes no prior exposure to continuum mechanics. The course starts with sufficient introduction to tensors, kinematics, and kinetics. Then, the course applies these concepts to set up the constitutive relations for nonlinear finite element analysis of a simple hyperelastic material. This is followed by the linearization of the weak form of the equilibrium equations followed by discretization to obtain the finite element equations, in particular, the tangent matrices and residual vectors is discussed. Finally, the Newton-Raphson solution procedure is discussed along with line search and arc length methods to enhance the solution procedure.

Total nos. of enrollment: 929

Total nos. of Exam registration: 25

Total nos. of Certificate Eligible: 11



Automation in Manufacturing

Prof. Shrikrishna N. Joshi
Mechanical Engineering

Type of the course: New, July 2020 run Duration: 12 weeks

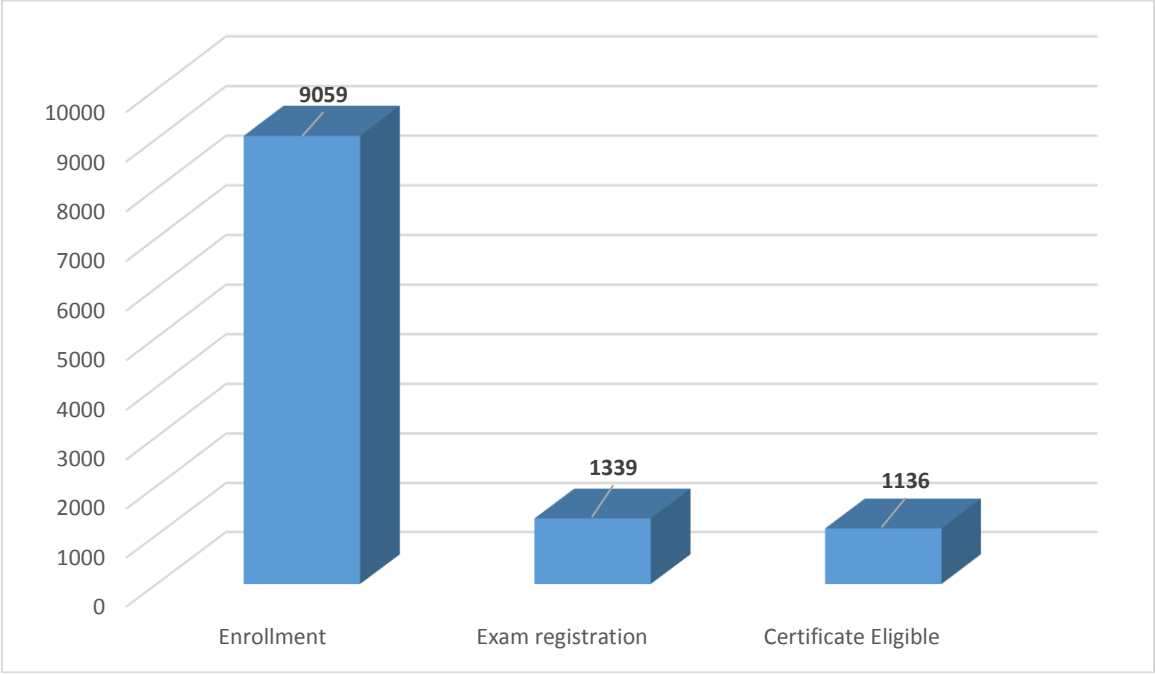
Course Outline:

Manufacturing industry contributes a major share in the GDP of our country. Application of automated systems is certainly improving the productivity of the manufacturing industry. In view of this, a course on "Automation in Manufacturing" is designed with the primary focus on the design and development of automated systems in the manufacturing. Initially the course introduces various automated systems being used in the manufacturing industry. Then the building blocks of a typical automated system are described. It presents a study on the principle of operation and construction details of sensors/transducers, actuators, drives and mechanisms, hydraulic and pneumatic systems. It also covers up the microprocessor technology, programming and CNC technology. The contents are lucidly presented with real-life examples. Case studies based on manufacturing industry applications are presented.

Total nos. of enrollment: 9059

Total nos. of Exam registration: 1339

Total nos. of Certificate Eligible: 1136



Fundamentals of Convective Heat Transfer

Prof. Amaresh Dalal
Mechanical Engineering

Type of the course: New, July 2020 run Duration: 12 weeks

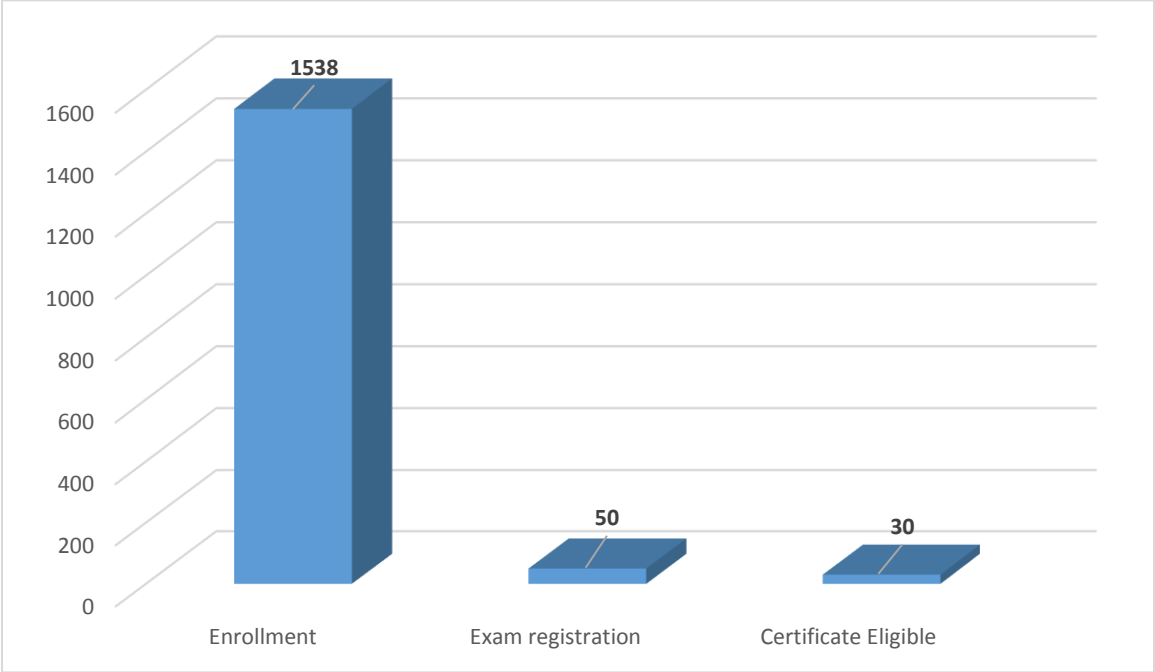
Course Outline:

Convective heat transfer is one of the most important areas of engineering sciences. It is major mode of heat transfer during flowing fluid and it is the most common mode of heat transfer used in industry. This course will cover the preliminary concepts, forced convection and natural convection for external flows and internal flows, turbulent flows and phase change heat transfer. Numerical solution of the governing equations will also be covered. This course is more analytical. The course will help faculty members, students and researchers in the field to get indepth concepts in convective heat transfer.

Total nos. of enrollment: 1538

Total nos. of Exam registration: 50

Total nos. of Certificate Eligible: 30



Solar Energy Engineering and Technology

Prof. Pankaj Kalita
Energy

Type of the course: New, July 2020 run Duration: 12 weeks

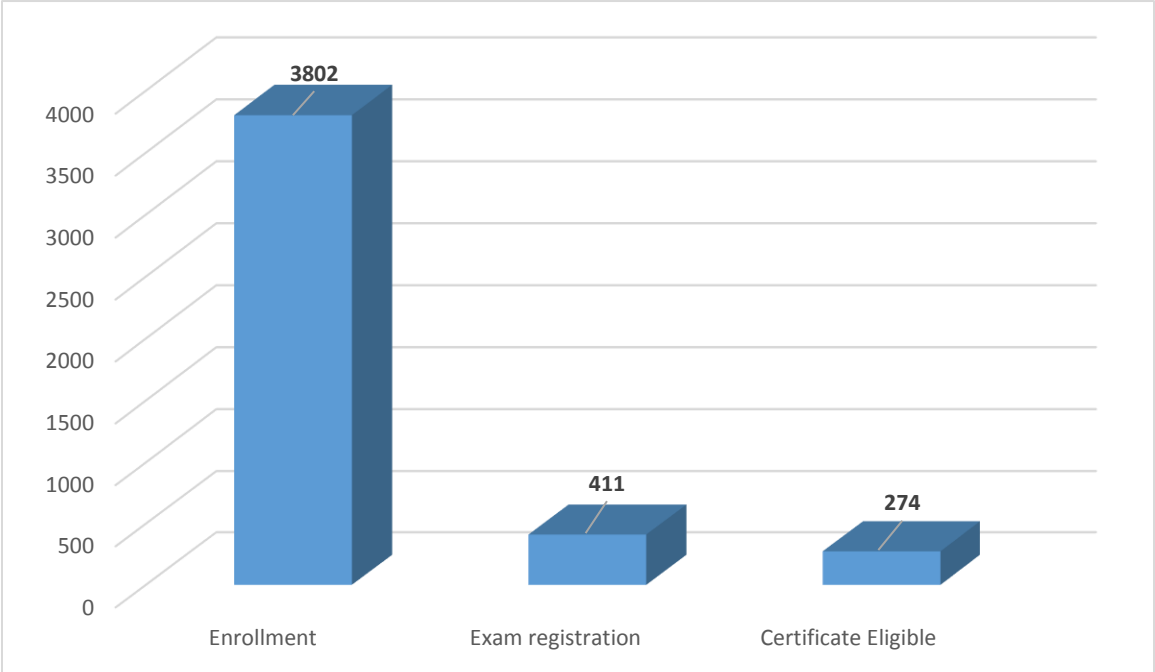
Course Outline:

The course content is designed to provide comprehensive knowledge on solar radiation, analysis of solar radiation data, fundamentals of the solar thermal and photovoltaic system along with storage of energy required for effective design of efficient solar energy conversion devices. The concepts will be illustrated with practical examples, schematics and block diagrams wherever required. A sufficient number of numerical problems with solutions will be discussed in the course. This course is specifically designed for undergraduate and postgraduate students of Energy Engineering and Technology. Further, the course will be very much useful for students and researchers from varied academic backgrounds for the synthesis of novel energy conversion devices and processes.

Total nos. of enrollment: 3802

Total nos. of Exam registration: 411

Total nos. of Certificate Eligible: 274



Theoretical Mechanics

Prof. Charudatt Kadolkar
Physics

Type of the course: 20 Hrs. Re-run + 10 Hrs New, July 2020 run
Duration: 12 weeks

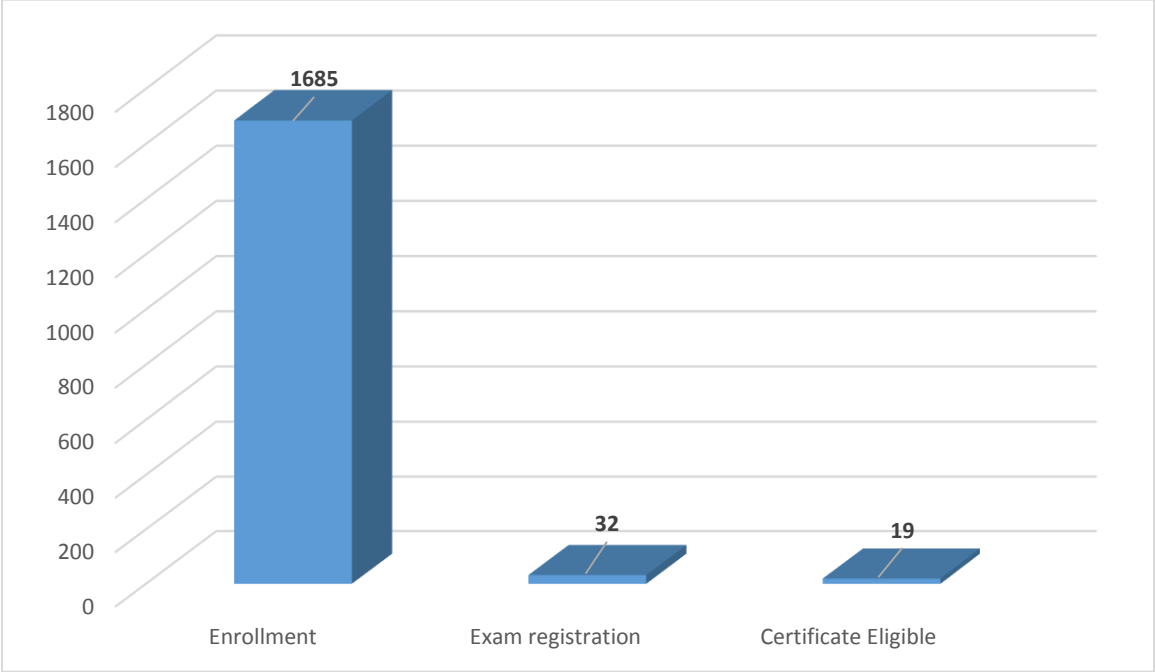
Course Outline:

This course focuses on analytical aspects of classical mechanics and is targeted towards the audience who are interested in pursuing research in Physics. Various formulations of mechanics, like the Lagrangian formulation, the Hamiltonian formulation, the Poisson bracket formulation will be taught in the course. The course also introduces the mechanics of continuous systems and fields.

Total nos. of enrollment: 1685

Total nos. of Exam registration: 32

Total nos. of Certificate Eligible: 19



Prof. R. Anandalakshmi
Chemical Engineering

Type of the course: Re-run, July 2020 run Duration: 12 weeks

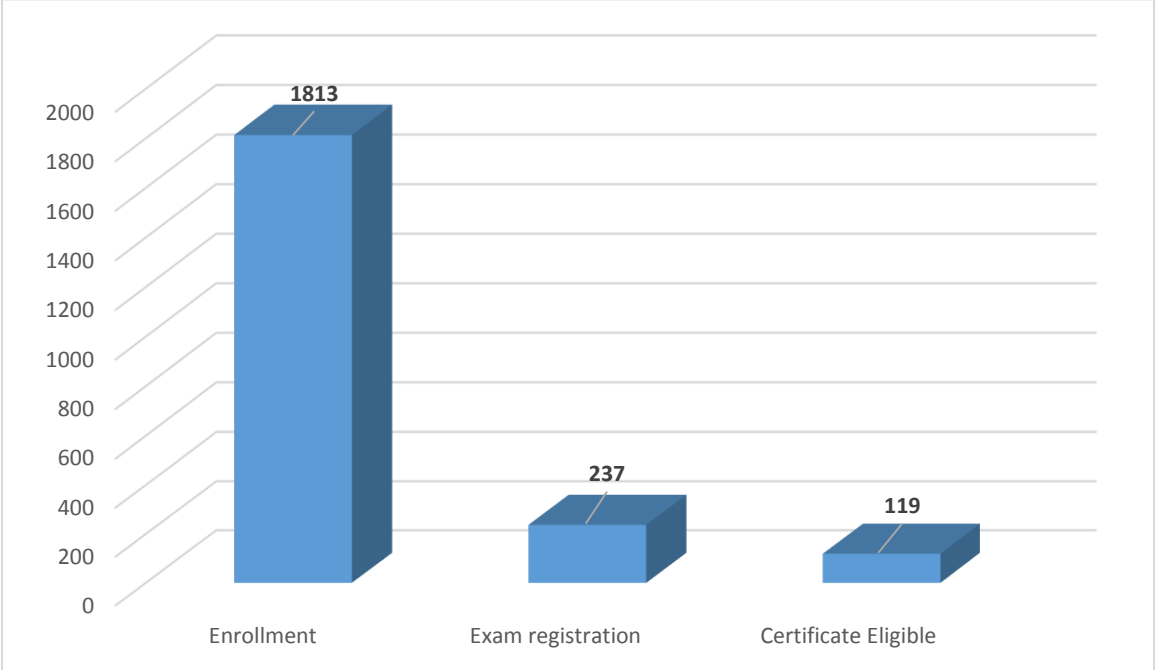
Course Outline:

The Food and Agriculture Organization (FAO) of the United Nations (UN) issued a report on the importance and complexities associated with feeding the projected 9.1 billion world population in 2050. Sustainable production of safe and nutritious foods, development of foods that have a long shelf life and foods that are either ready-to-eat or easy to are of greater importance towards meeting this goal. Understanding "Food Engineering" and "Thermal Processing of Foods" serves as basic requirement means of meeting this goal.

Total nos. of enrollment: 1813

Total nos. of Exam registration: 237

Total nos. of Certificate Eligible: 119



Genetic Engineering: Theory and Application

Prof. Vishal Trivedi
Bioscience and Bioengineering

Type of the course: Re-run, July 2020 run Duration: 12 weeks

Course Outline:

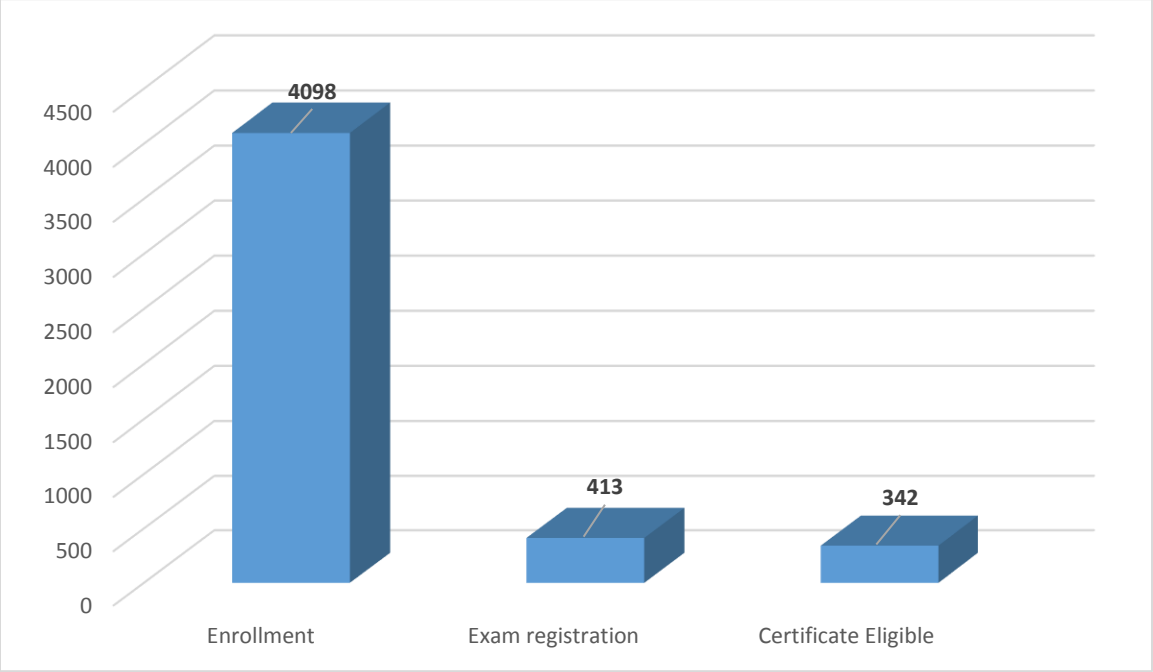
In the current MOOCs course I have put effort to briefly discuss about biotechnology, its scope and impact on human life with several customized products. The Development of technology and generation of product has multiple steps and understanding these steps are being covered in this course with a discussion of biotechnology application at the end. By the end of this course, student will be able to understand following aspects of biotechnology:

1. Basic metabolic pathways and their regulation.
2. Microbial growth kinetics with an emphasis on fermentation
3. Basic molecular biology tools used in biotechnology.
4. Basic methodology for product recovery and analysis.

Total nos. of enrollment: 4098

Total nos. of Exam registration: 413

Total nos. of Certificate Eligible: 342



Prof. S. K. Majumder
Chemical Engineering

Type of the course: Re-run, July 2020 run Duration: 12 weeks

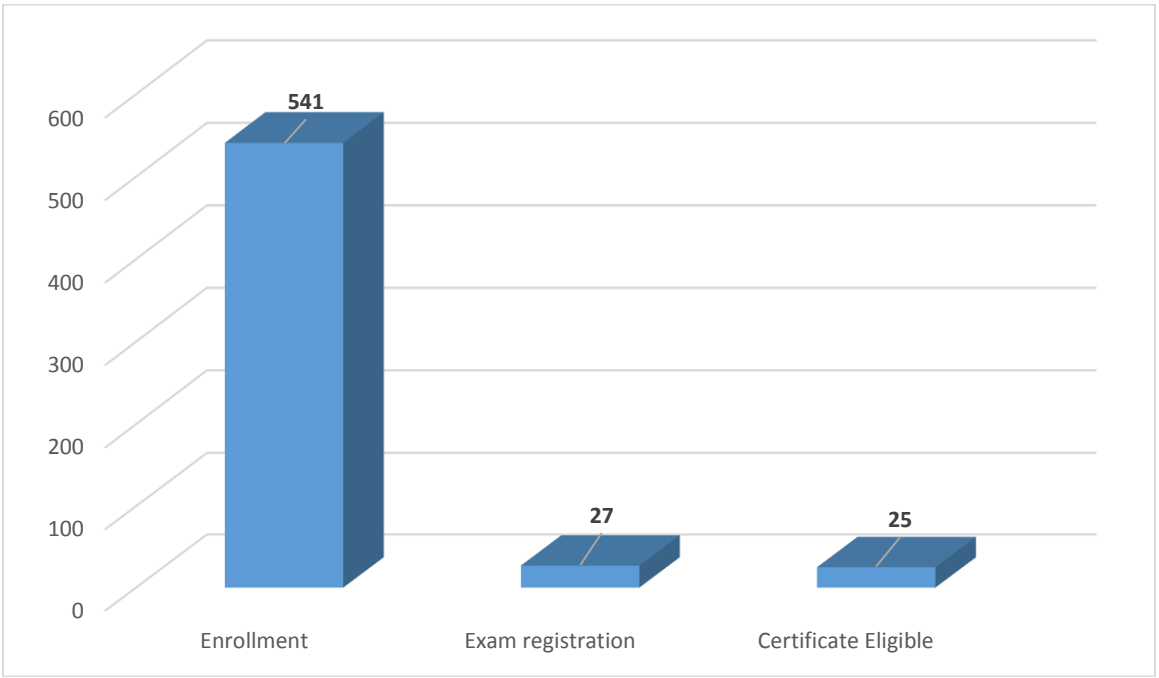
Course Outline:

This course covers the developments in a number of intensified technologies, with particular emphasis on their application in chemical processes. The course is intended to be a useful resource for practicing engineers and chemists alike who are interested in applying intensified reactor and/or separator systems in chemical industries. It will provide a basic knowledge of chemical engineering principles and process intensification for chemists and engineers who may be unfamiliar with these concepts. It will be a valuable tool for chemical engineers who wish to fully apply their background in reaction and separation engineering to the design and implementation of green processing technologies based on process intensification principles. Students on undergraduate and postgraduate degree programmes which cover topics on advanced reactor designs, process intensification, will gain a better understanding of the practical applications in different areas.

Total nos. of enrollment: 541

Total nos. of Exam registration: 27

Total nos. of Certificate Eligible: 25



Chemical Reaction Engineering-I

Prof. Bishnupada Mandal
Chemical Engineering

Type of the course: Re-run, July 2020 run Duration: 12 weeks

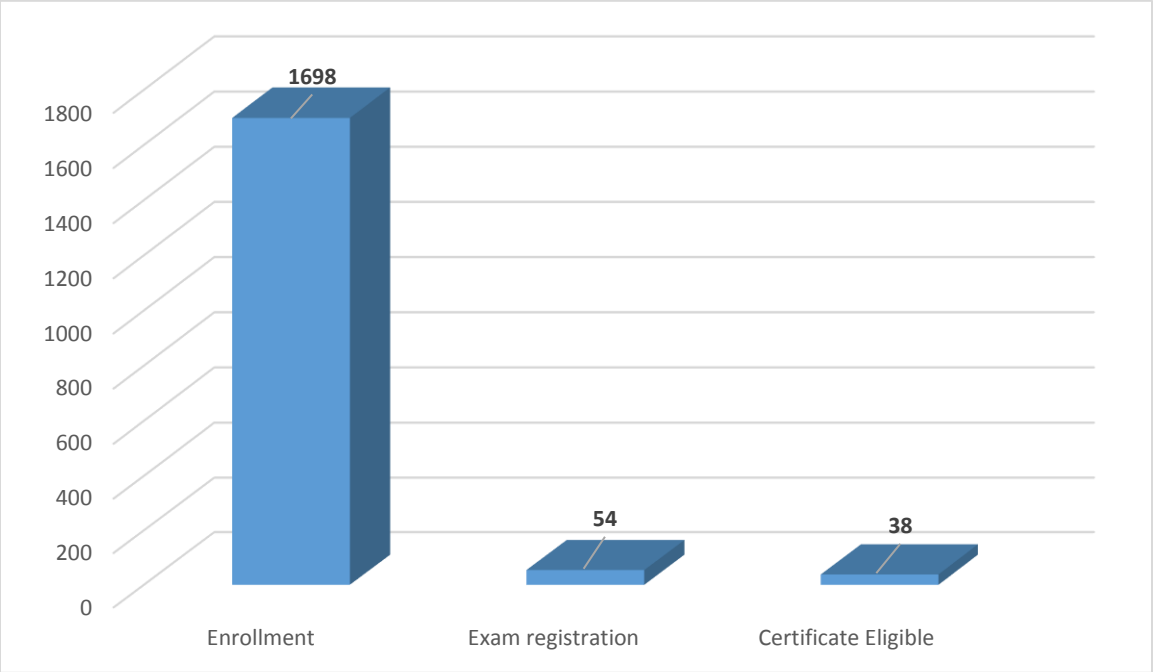
Course Outline:

This course will provide an overview of chemical kinetics and reactor design at basic to an intermediate level. Coverage will be relatively broad. This course applies the concepts of reaction rate, stoichiometry and equilibrium to the analysis of chemical and biological reacting systems such as derivation of rate expressions from reaction mechanisms and equilibrium or steady state assumptions and design of chemical and biochemical reactors via synthesis of chemical kinetics, and mass and energy balances. The goal is to provide students with the theoretical/analytical background to understand chemical kinetics and reactor design and to tackle the short of complex problems.

Total nos. of enrollment: 1698

Total nos. of Exam registration: 54

Total nos. of Certificate Eligible: 38



Prof. Sharmistha Banerjee
Design

Type of the course: Re-run, July 2020 run

Duration: 12 weeks

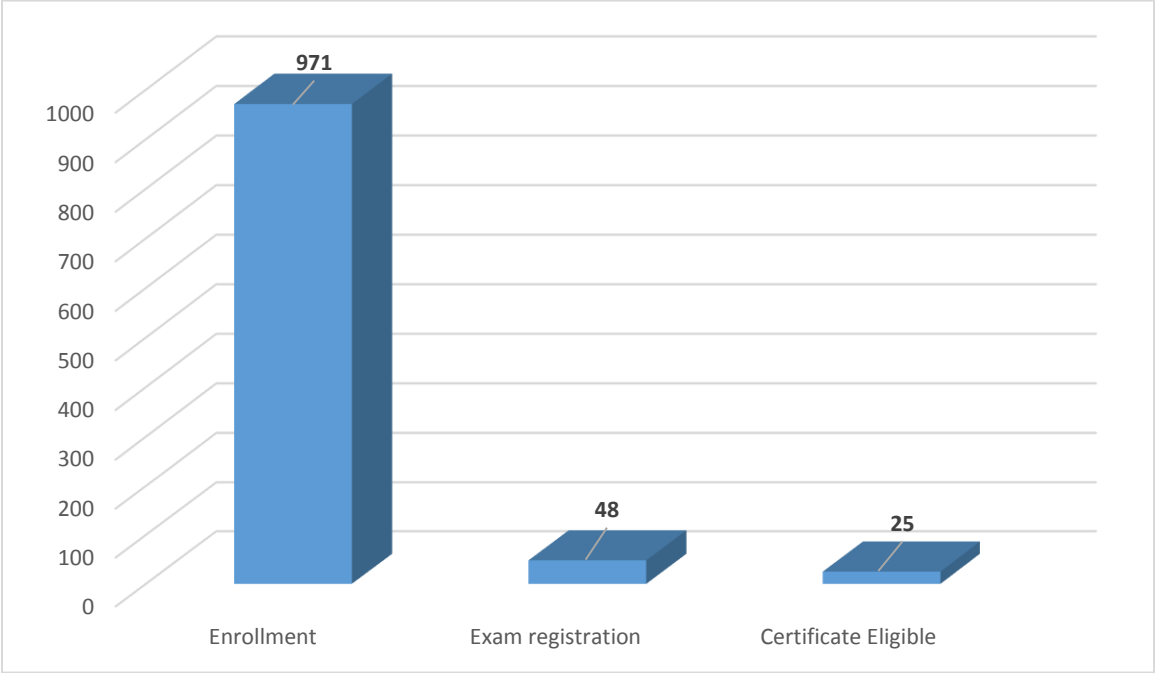
Course Outline:

Design for Sustainability is a design thinking process for widening the boundaries of the objective of design so as to contribute positively to sustainable development. It encompasses four approaches: 1. Selection of resources with low environmental impact; 2. Design of products with low environmental impact; 3. Product-Service System Design for eco-efficiency; 4. Design for social equity and cohesion. This course will discuss these Design approaches, methods and tools along with case examples.

Total nos. of enrollment: 971

Total nos. of Exam registration: 48

Total nos. of Certificate Eligible: 25



Prof. S. K. Majumder
Chemical Engineering

Type of the course: Re-run, July 2020 run Duration: 12 weeks

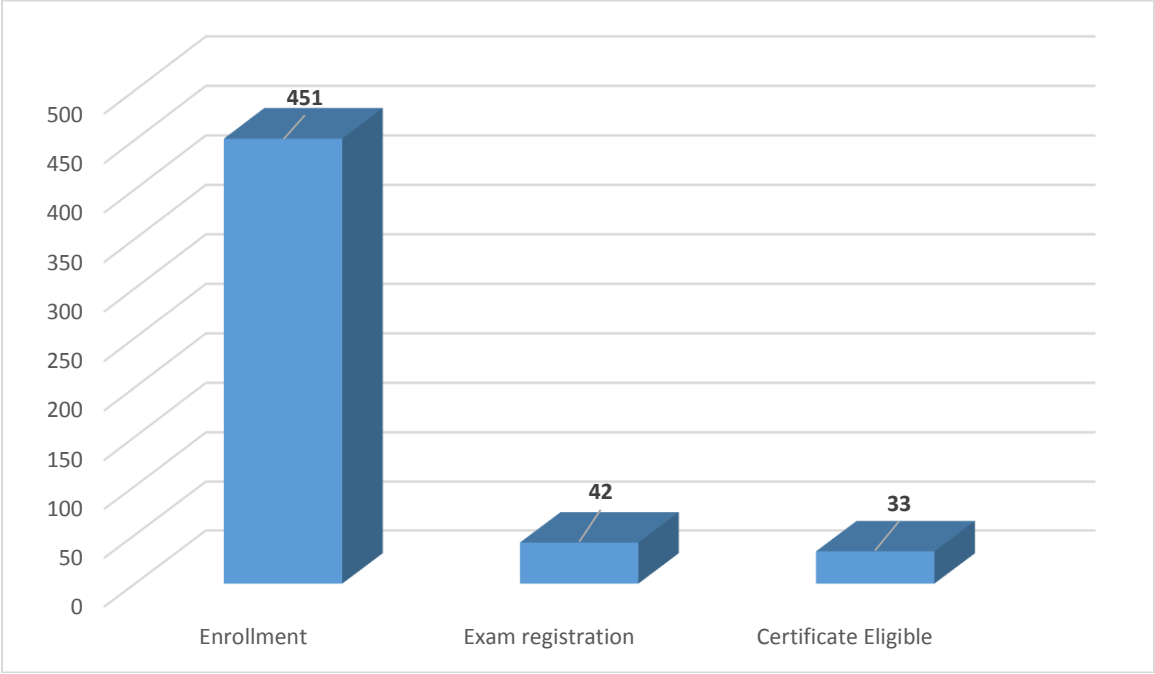
Course Outline:

This course is intended for learners who find themselves involved ranging from pure academic interest to direct industrial necessity in problems concerning the fluidized state. This course mainly covers the basic principles of fluidization phenomena and introduces the learner to the fundamental and practical aspects of basic fluidization operations for industrial application. This course may also be useful for who are doing research in multiphase system in chemical, metallurgical, and mining engineering programs.

Total nos. of enrollment: 451

Total nos. of Exam registration: 42

Total nos. of Certificate Eligible: 33



Prof. Nanda Kishore
Chemical Engineering

Type of the course: Re-run, July 2020 run Duration: 12 weeks

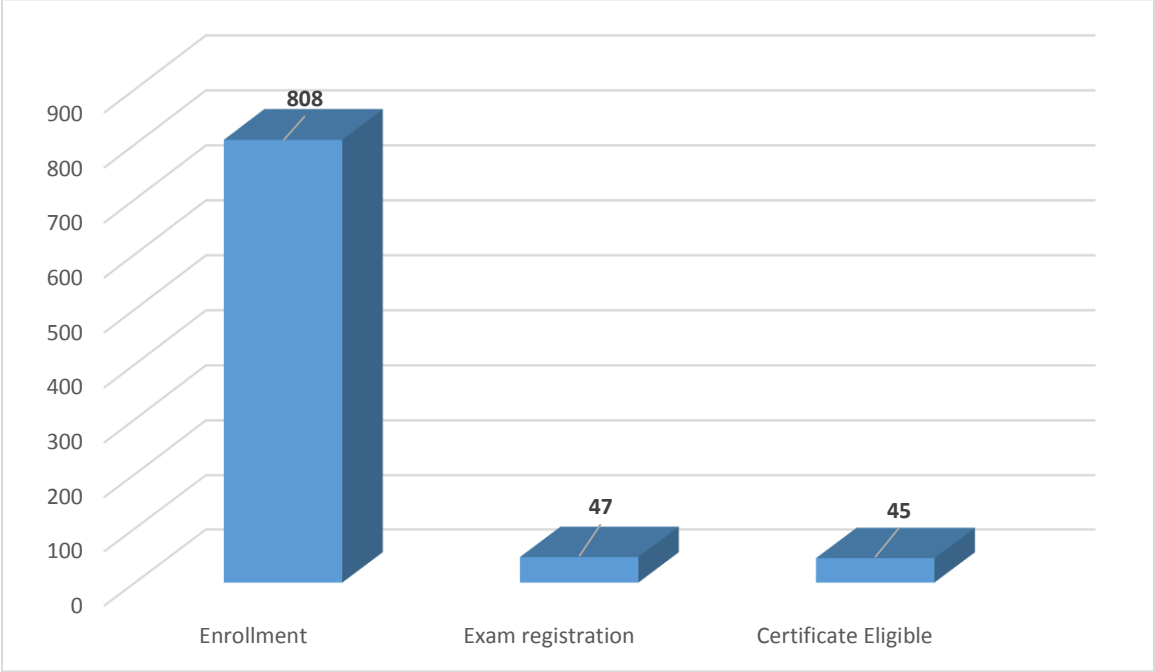
Course Outline:

Chemical engineering consists of several unit operations and unit processes. Before the reaction step, the raw materials should be processed through various unit operations and similarly after the reaction step as well the products are passed through various unit operations either for product separation or for purity. Thus unit operations are very essentially part of the chemical engineering; and hence, basic knowledge about the principles and equipment of solid-solid unit operations and solid-liquid unit operations is mandatory for any professional chemical engineer.

Total nos. of enrollment: 808

Total nos. of Exam registration: 47

Total nos. of Certificate Eligible: 45



Prof. T. Punniyamurthy
Chemistry

Type of the course: Re-run, July 2020 run Duration: 12 weeks

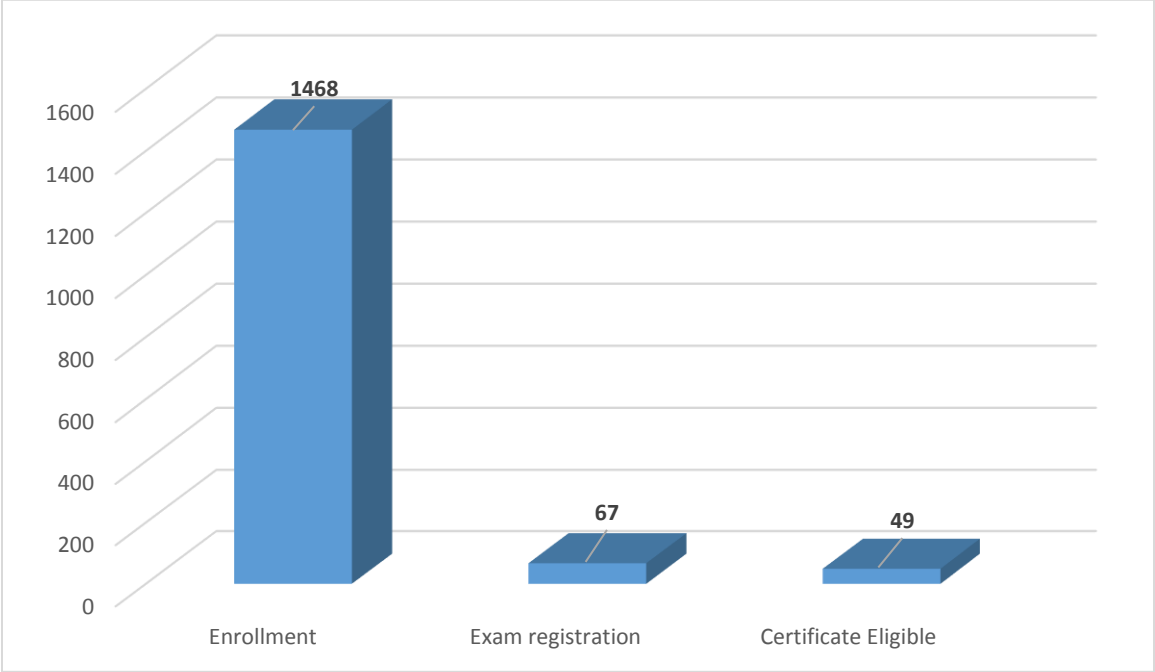
Course Outline:

The course has nine modules starting from the formation of acid-catalyzed carbon-carbon bond formation to application of the modern transition metal catalysis. Students of graduate and post graduate preparing for NET and GATE examination will find this course extremely useful.

Total nos. of enrollment: 1468

Total nos. of Exam registration: 67

Total nos. of Certificate Eligible: 49



Prof. Subhas Chandra Pan
Chemistry

Type of the course: Re-run, July 2020 run Duration: 12 weeks

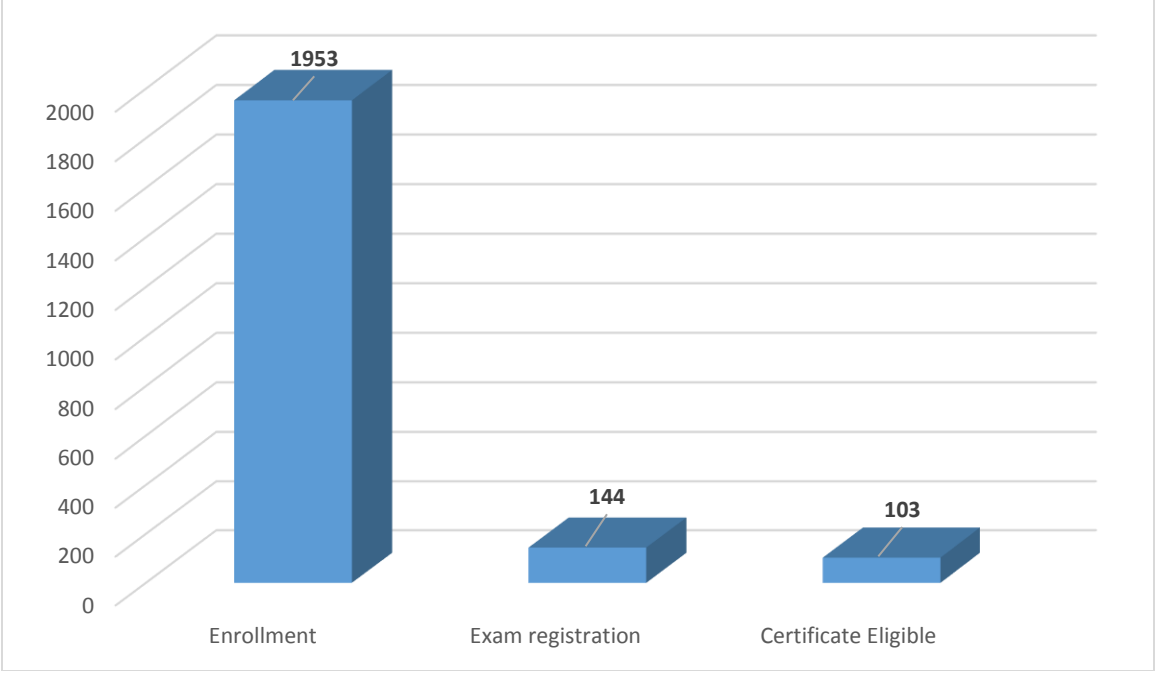
Course Outline:

This course will deal with the various synthetic strategies using organic reagents. Both classical and modern reagents shall be discussed emphasizing on the mechanistic details. This course shall useful to students of undergraduate, post graduate and Ph.D. Students preparing for NET and GATE examination will find this course extremely useful.

Total nos. of enrollment: 1953

Total nos. of Exam registration: 144

Total nos. of Certificate Eligible: 103



Prof. Ratnajit Bhattacharjee
Electronics and Electrical Engineering

Type of the course: Re-run, July 2020 run Duration: 12 weeks

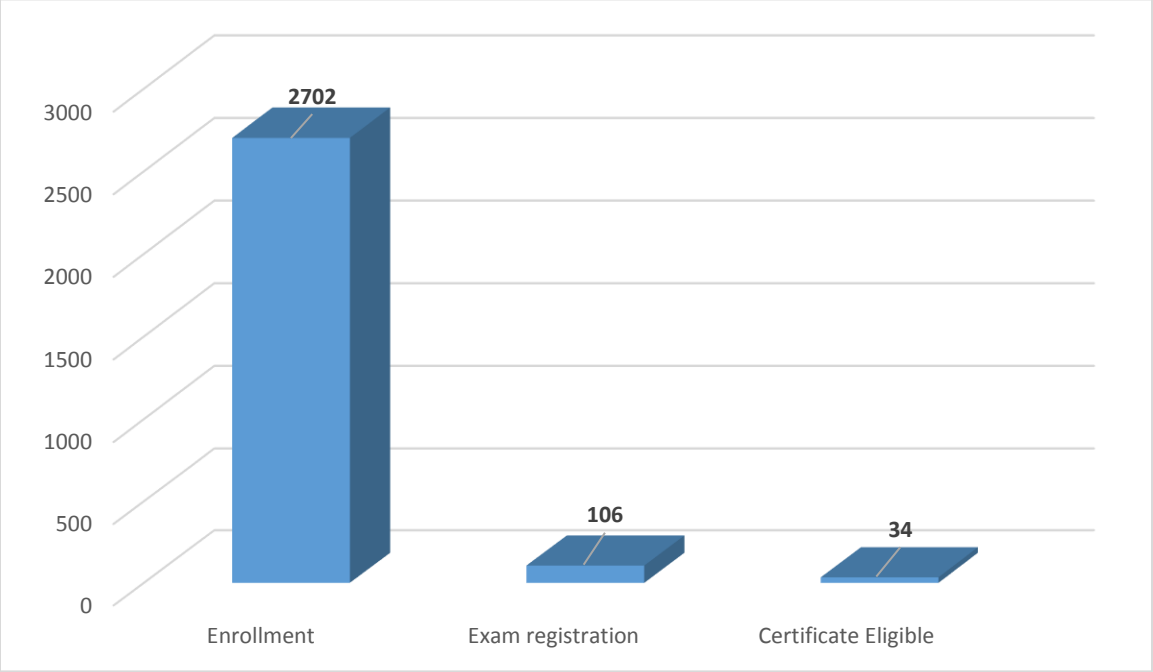
Course Outline:

This course is indented to provide a foundation for microwave engineering to the undergraduate students. Rigorous treatment of the fundamentals of microwave engineering will be provided. Design of different passive and some active microwave circuits/subsystems will be covered in detail. This course will also provide an overview of application of microwave in communication and other areas.

Total nos. of enrollment: 2702

Total nos. of Exam registration: 106

Total nos. of Certificate Eligible: 34



Prof. Ngamjahao Kipgen
Humanities and Social Sciences

Type of the course: Re-run, July 2020 run Duration: 12 weeks

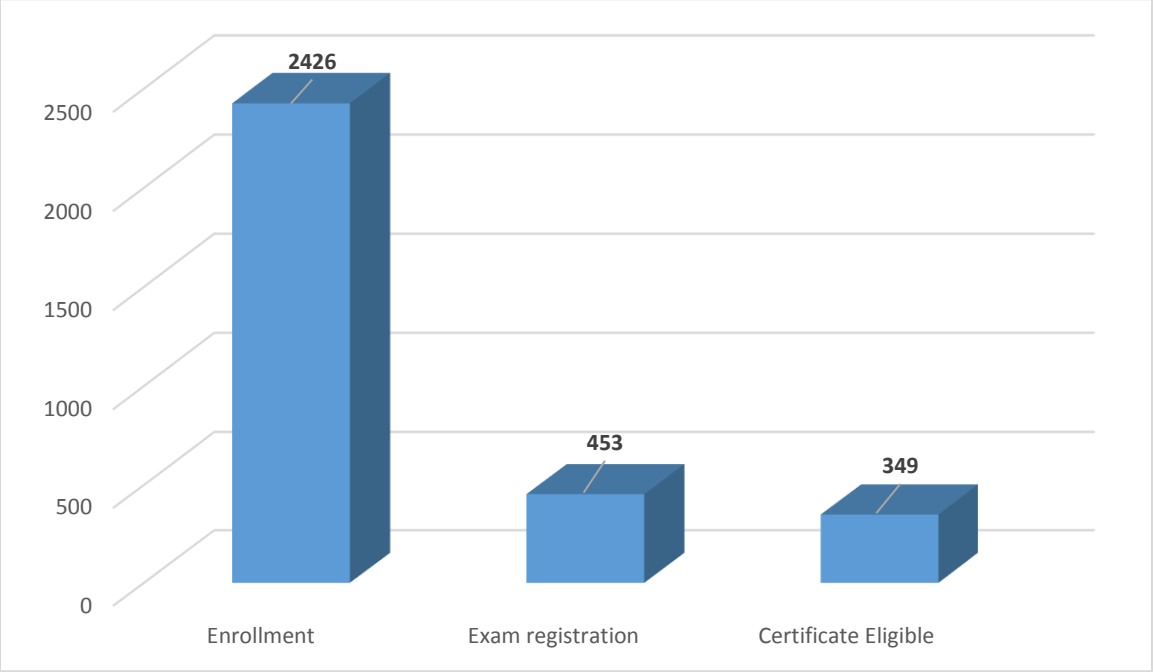
Course Outline:

The course focuses on the ecology of human societies human-environment relationships, with reference to cultural ecology and issues surrounding sustainable development. The ecology of human societies is about connections between ecological and human social, cultural, and organizational processes. Based on selected works of ecological anthropologists, this course focuses on the dynamic relationships between human cultures and their ecological environments. It uses basic concepts of anthropology, including the concept of culture as a dynamic system of learned behaviors and beliefs, to better understand how human beings adapt to and change their physical and social surroundings.

Total nos. of enrollment: 2426

Total nos. of Exam registration: 453

Total nos. of Certificate Eligible: 349



Prof. Sambit Mallick
Humanities and Social Sciences

Type of the course: Re-run, July 2020 run Duration: 12 weeks

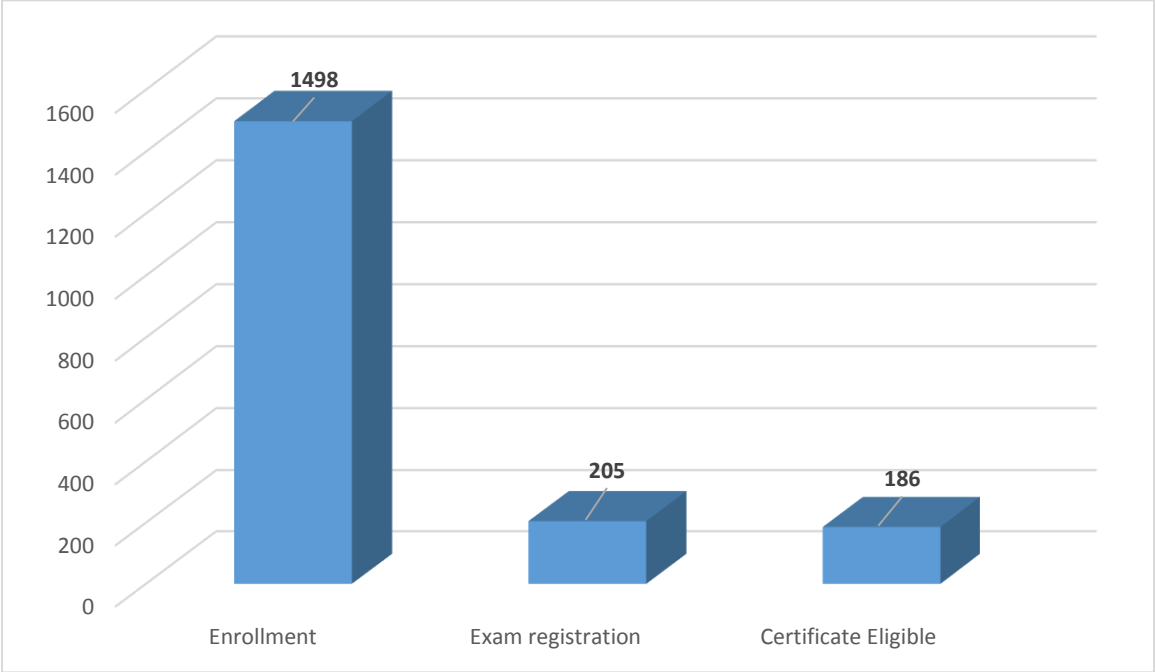
Course Outline:

The objective of the course is to enable students to understand science as a socio-cultural product in specific socio-historical contexts. The course exposes students to philosophical, historical and sociological perspectives to look at science as a practice deeply embedded in culture and society. It emphasizes the dynamic nature of the relations between wider cultural practices on one hand and scientific practices on the other. The attempt is to equip students with an understanding indispensable for an in-depth study of science-technology-society dynamics.

Total nos. of enrollment: 1498

Total nos. of Exam registration: 205

Total nos. of Certificate Eligible: 186



Prof. Sambit Mallik
Humanities and Social Sciences

Type of the course: Re-run, July 2020 run Duration: 12 weeks

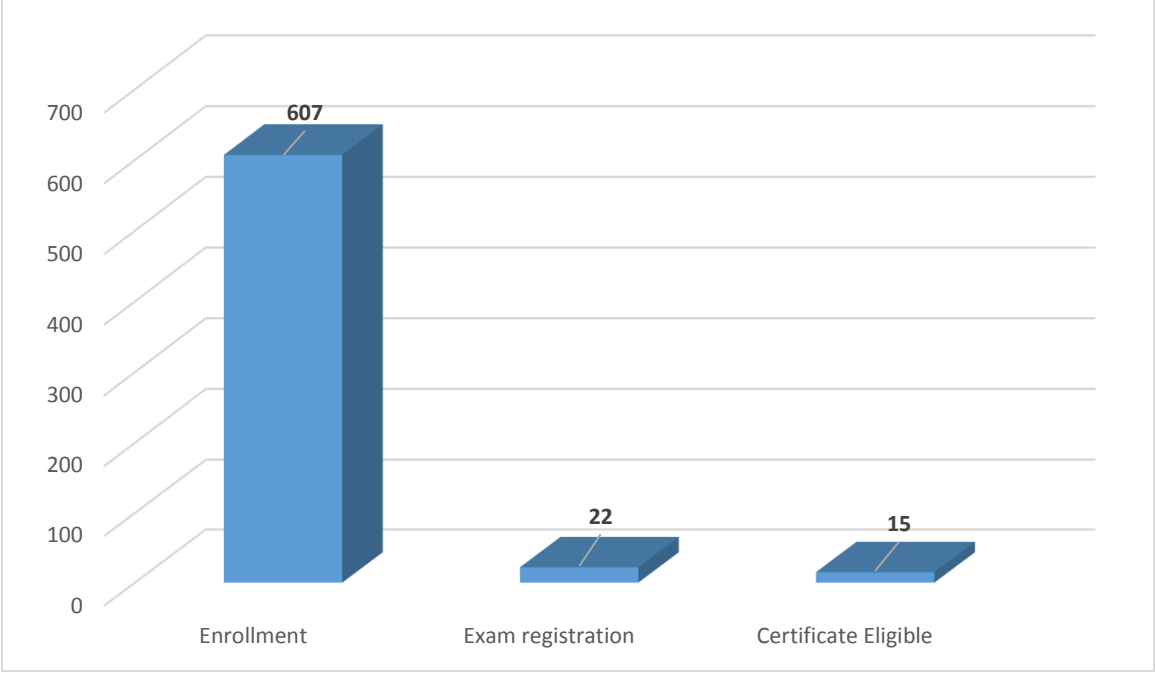
Course Outline:

The objective of the course is to enable students to understand modernity as a socio-cultural product in specific socio-historical contexts. The course exposes students to theoretical perspectives to look at modernity and its constituents as a practice deeply embedded in culture and society. It familiarizes students with encountering problems in their everyday life from more rationalist perspectives. It attempts to critically engage with and interrogate the multiple views on modernity.

Total nos. of enrollment: 607

Total nos. of Exam registration: 22

Total nos. of Certificate Eligible: 15



Prof. N. Selvaraju
Mathematics

Prof. Siddhartha P. Chakrabarty
Mathematics

Type of the course: Re-run, July 2020 run

Duration: 12 weeks

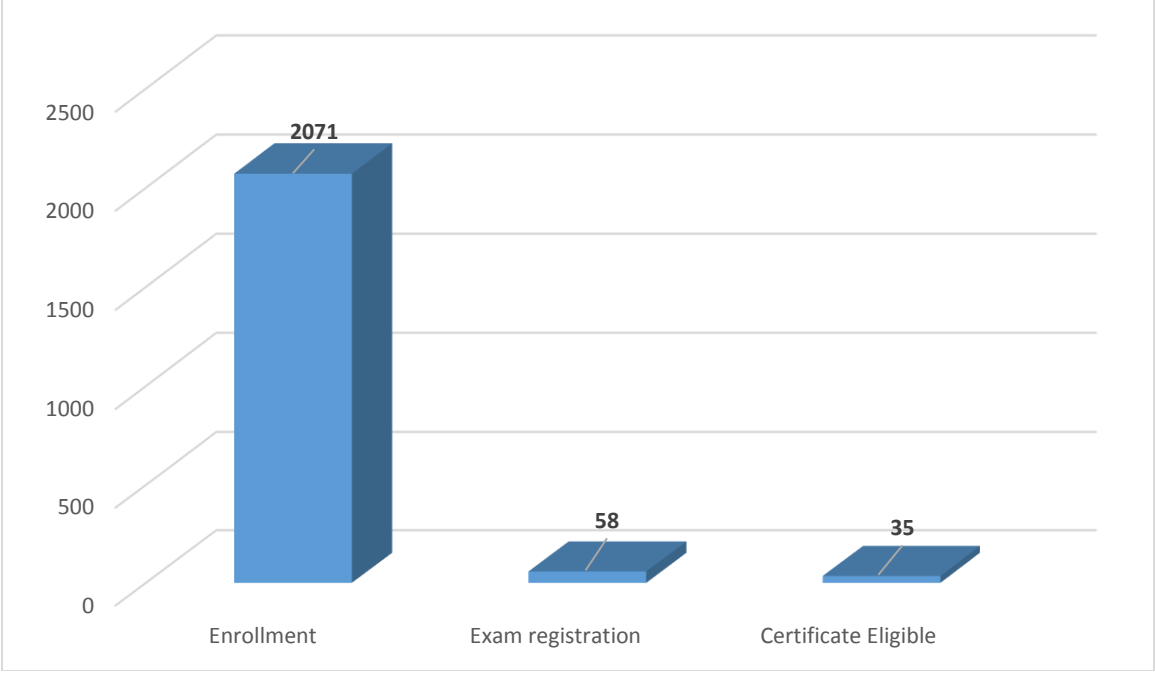
Course Outline:

The course on 'Mathematical Finance' gives an introduction to this interesting and growing area. In particular, the course will cover two Nobel-prize winning frameworks, namely portfolio theory and the option pricing theory.

Total nos. of enrollment: 2071

Total nos. of Exam registration: 58

Total nos. of Certificate Eligible: 35



Aircraft Propulsion

Prof. Vinayak N. Kulkarni
Mechanical Engineering

Type of the course: Re-run, July 2020 run Duration: 12 weeks

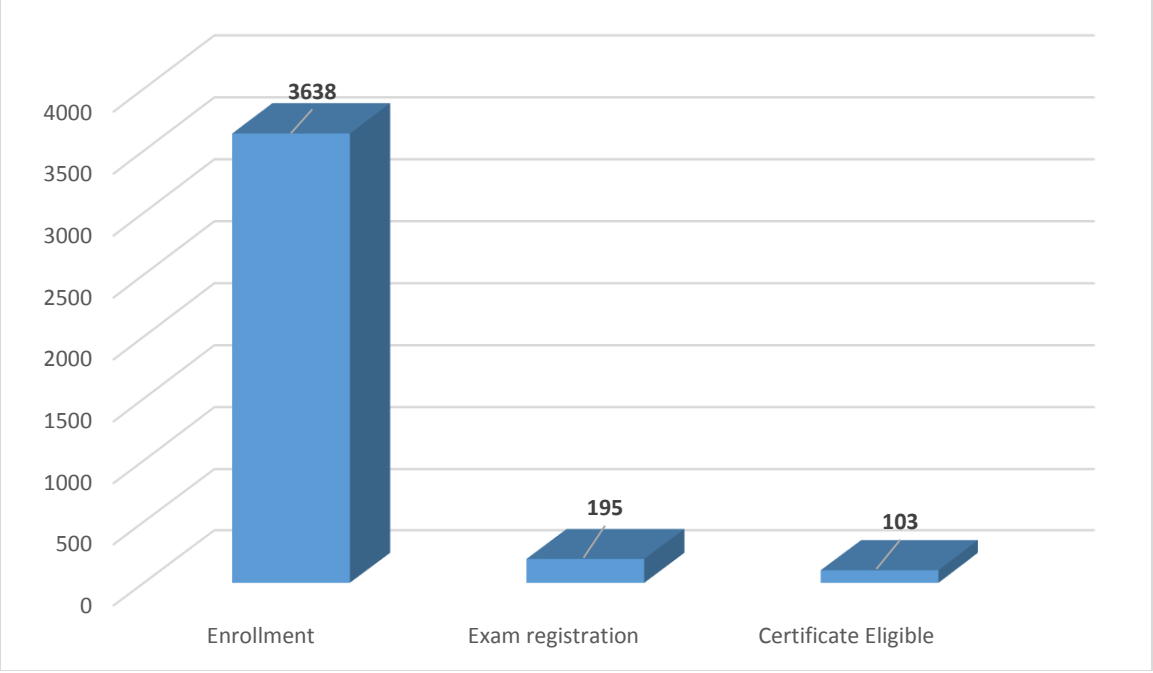
Course Outline:

This course deals with the gas power cycles for aircraft propulsion. Therefore, different types of aircraft engines, their parts and their performance parameters are discussing. Then the cycle analysis and its different attachment for improvisation are also focused. Further, different parts of aircraft engines like compressor, turbines, combustor and nozzle are discussed in detail.

Total nos. of enrollment: 3638

Total nos. of Exam registration: 195

Total nos. of Certificate Eligible: 103



Dynamic Behavior of Materials

Prof. Prasenjit Khanikar
Mechanical Engineering

Type of the course: Re-run, July 2020 run Duration: 12 weeks

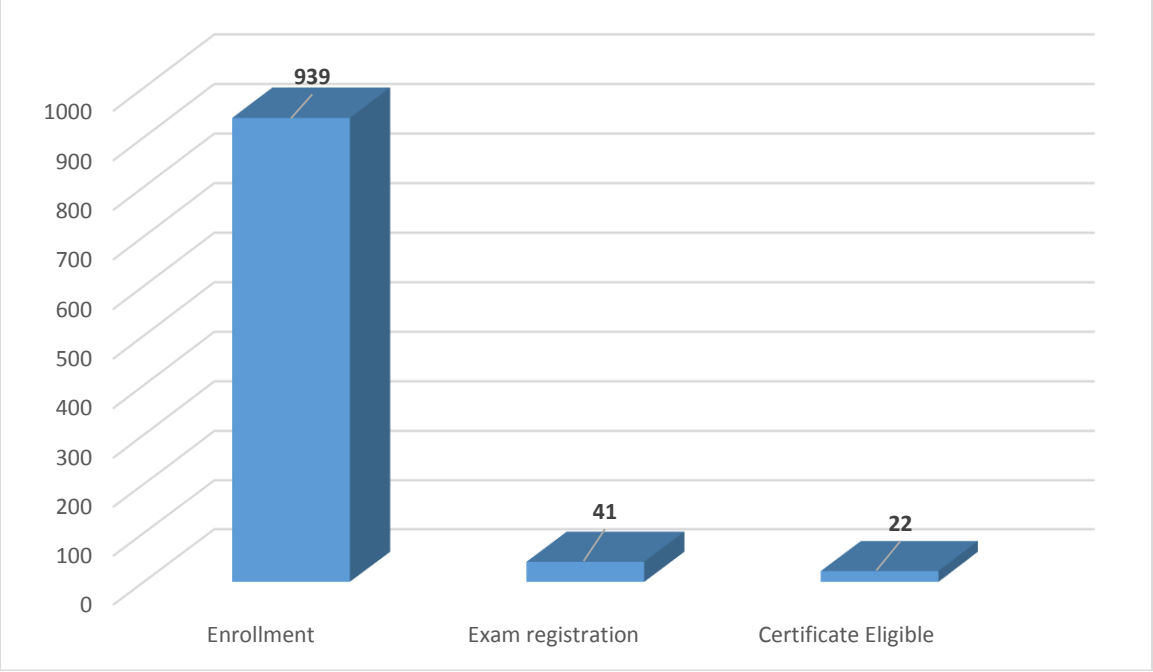
Course Outline:

Study of materials behavior in extreme environments and development of new materials for such environments has become a vital research area for materials scientists and engineers in the 21 st century. Mechanical properties of materials under dynamic loading are considered as an important area of research and development in defense, automotive and aerospace industries. Under dynamic loading conditions, the inertial effects come to play an important role in the deformation behavior of the material. Many materials exhibit strain rate sensitivity at higher strain rates, i.e., flow stress dependence on strain rates. In addition, the failure mechanisms under high strain rate loading conditions are generally different than those occur in low strain rate. Furthermore, the deformation and failure mechanisms are controlled by the microstructure of the materials. This course will be important to mechanical, materials and civil engineers to understand materials behavior for ballistic applications, explosive forming or welding applications, automotive and aerospace applications.

Total nos. of enrollment: 939

Total nos. of Exam registration: 41

Total nos. of Certificate Eligible: 22



Fundamentals of Artificial Intelligence

Prof. Shyamanta M. Hazarika
Mechanical Engineering

Type of the course: Re-run, July 2020 run Duration: 12 weeks

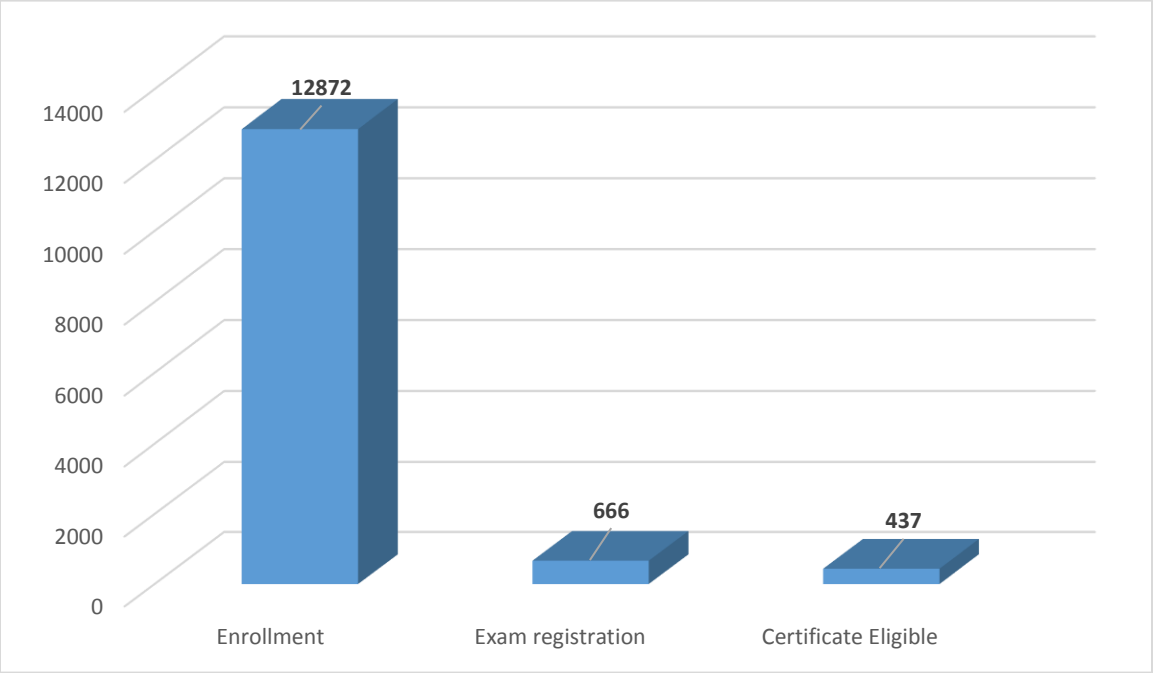
Course Outline:

What does automatic scheduling or autonomous driving have in common with web search, speech recognition, and machine translation? These are complex real-world problems that span across various practices of engineering! Aim of artificial intelligence (AI) is to tackle these problems with rigorous mathematical tools. The objective of this course is to present an overview of the principles and practices of AI to address such complex real-world problems. The course is designed to develop a basic understanding of problem solving, knowledge representation, reasoning and learning methods of AI.

Total nos. of enrollment: 12872

Total nos. of Exam registration: 666

Total nos. of Certificate Eligible: 437



Prof. Amaresh Dalal
Mechanical Engineering

Prof. Dipankar N. Basu
Mechanical Engineering

Type of the course: Re-run, July 2020 run

Duration: 12 weeks

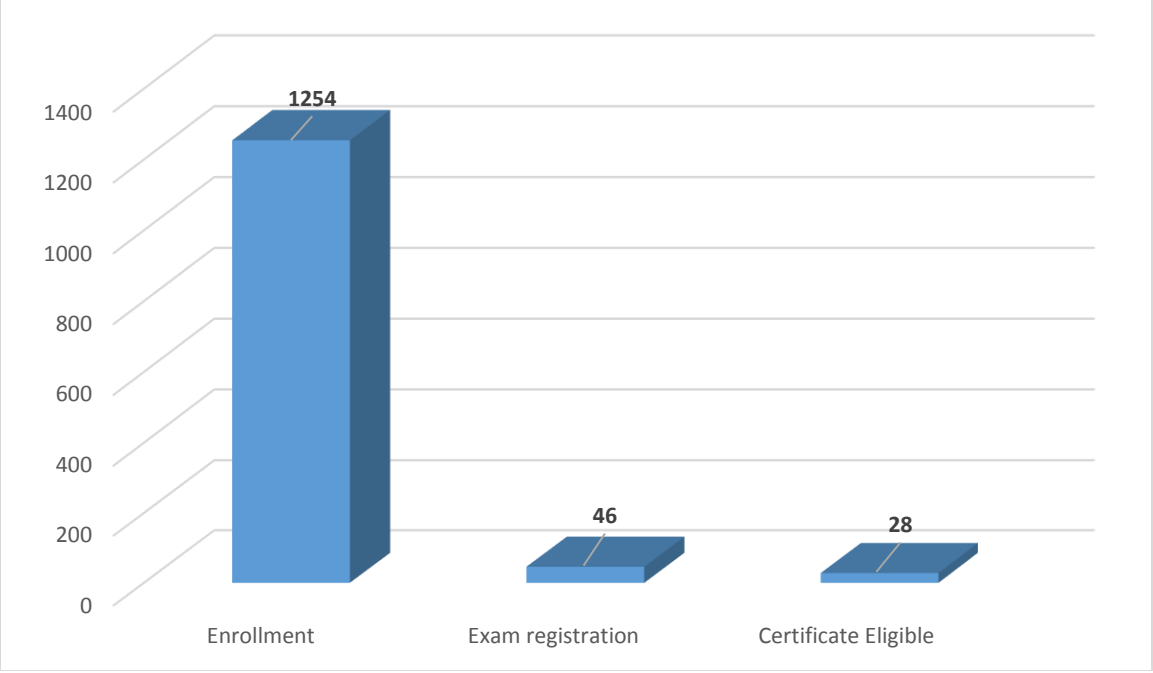
Course Outline:

This is introductory course on conduction and radiation heat transfer. This course emphasizes the fundamental concepts and provides detailed solution methodology. This course will provide students with the tools to model, analyze and solve a wide range of engineering applications involving conduction and radiation heat transfer.

Total nos. of enrollment: 1254

Total nos. of Exam registration: 46

Total nos. of Certificate Eligible: 28



Mathematical Modeling of Manufacturing Processes

Prof. Swarup Bag
Mechanical Engineering

Type of the course: Re-run, July 2020 run Duration: 12 weeks

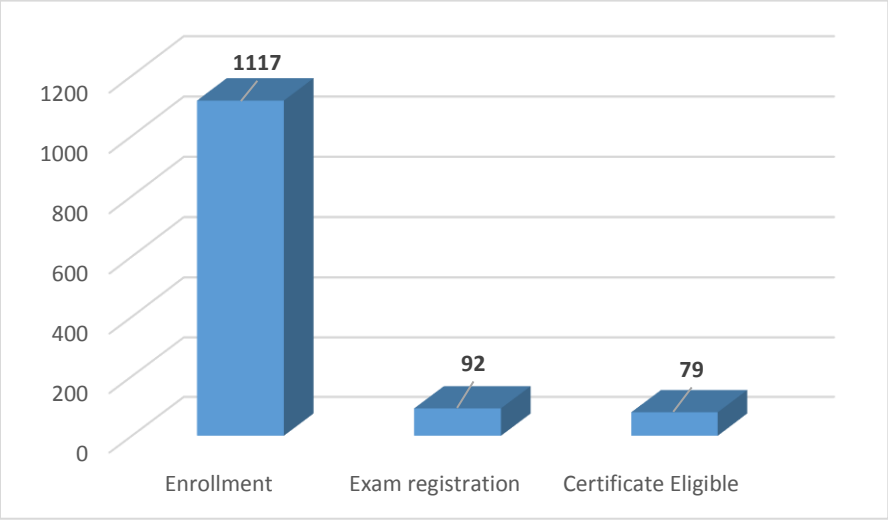
Course Outline:

The understanding of the basic mechanism such as heat and mass transport with associated fluid flow including metallurgical transformation, distortion and residual stress generation in different manufacturing processes is the focus of this course. Understanding the complex interaction not only helps to develop mathematical model, it makes the foundation for analysis, numerical simulation at different scale and experimentation for different types of manufacturing processes. The development of computational models for a manufacturing process relies on mathematical expression of the governing mechanism. It helps to design relevant experiments and drives to find the data to be obtained. Mutual understanding between analytical/numerical and experimental results leads to better insight of the basic manufacturing processes that impact on the improvement of existing process and directs for the development of new process. However, this course is completely different from statistical or data driven modeling approach. This course emphasized on the understanding of the most general to advanced manufacturing processes based on scientific principle. The complex mechanism is presented in a simplified way to understand the subject at elementary level. The broad impact is that the students will be able to develop physics based computational model of manufacturing process using standard commercial package (However, this course does not intend to cover the learning of the commercial software).

Total nos. of enrollment: 1117

Total nos. of Exam registration: 92

Total nos. of Certificate Eligible: 79



Ergonomics Workplace Analysis

Prof. Urmi R Salve
Design

Type of the course: Re-run, July 2020 run Duration: 4 weeks

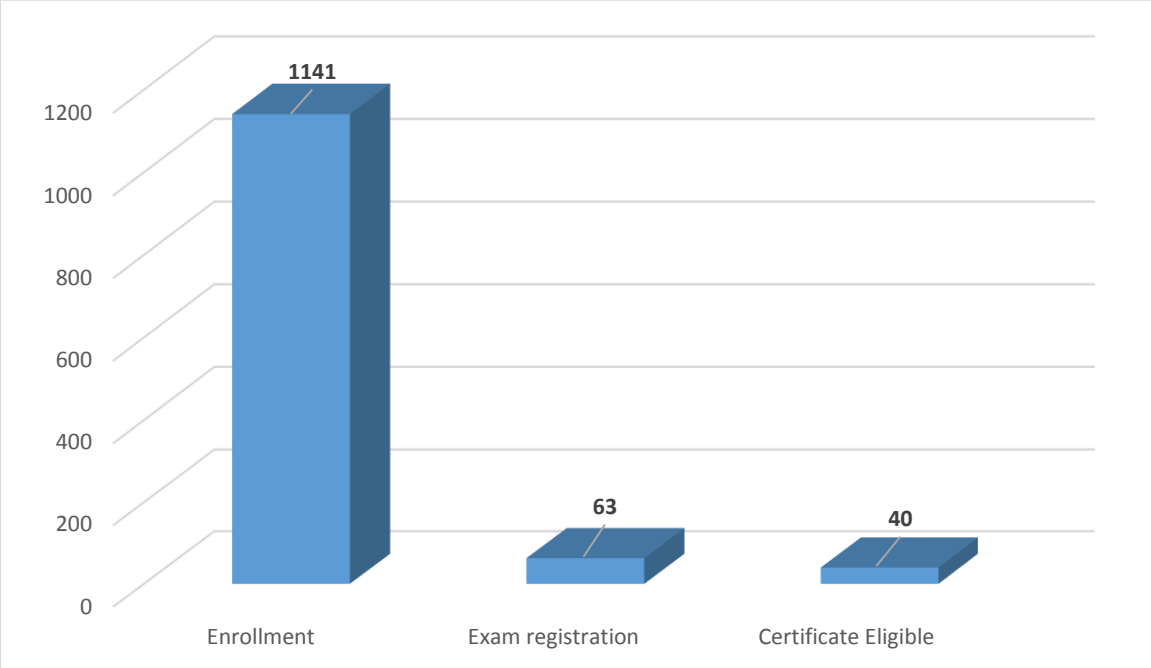
Course Outline:

Ergonomic workplace analysis is a process where the ergonomic risk factors were evaluated using various validated tools and provide the probable recommendation to minimize the risk factors for development of work related musculoskeletal disorders and improve the productive workday to reduce the cost for compensation, absenteeism and employee turnover. In the process of ergonomic workplace analysis, an ergonomist need to evaluate the physical work environment, psychosocial risk factors as well as various generic risk factors which leads to the development of work related musculoskeletal disorders. This course is based on the complete process evaluation of EWA.

Total nos. of enrollment: 1141

Total nos. of Exam registration: 63

Total nos. of Certificate Eligible: 40



Introduction to Polymer Physics

Prof. Amit Kumar
Chemical Engineering

Type of the course: Re-run, July 2020 run Duration: 8 weeks

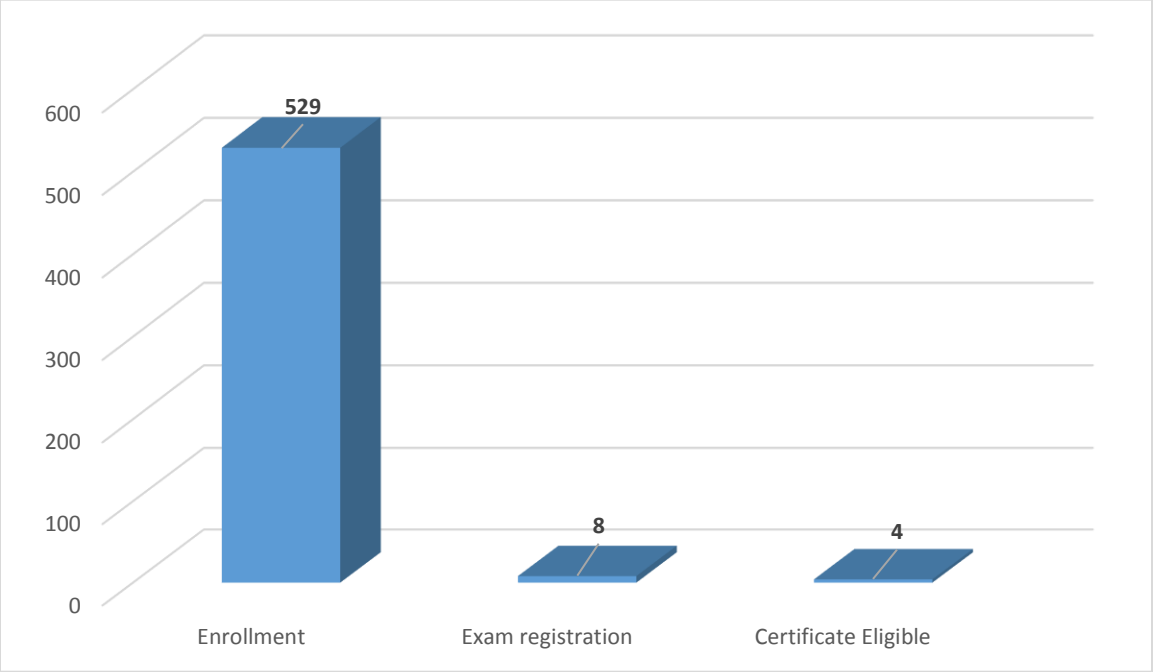
Course Outline:

Polymer physics is important to understand the structure-property relation in polymers. An understanding of the structural features and interactions responsible for polymer properties can aid in tuning the desirable properties. This introductory course will discuss the models for ideal polymer chains, and thermodynamics of polymer solutions and blends, focusing on miscibility. The course will also cover the different methods to measure polymer molar mass, which has a strong effect on polymer properties. The physics of branching and network formation will be introduced with reference to branched polymers, dendrimers and cross-linked polymers. The course will also discuss mechanical properties of polymers with focus on viscoelasticity and rubber elasticity. Finally, a brief introduction to polymer dynamics will be provided.

Total nos. of enrollment: 529

Total nos. of Exam registration: 08

Total nos. of Certificate Eligible: 04



Natural Gas Engineering

Prof. Pankaj Tiwari
Chemical Engineering

Type of the course: Re-run, July 2020 run Duration: 8 weeks

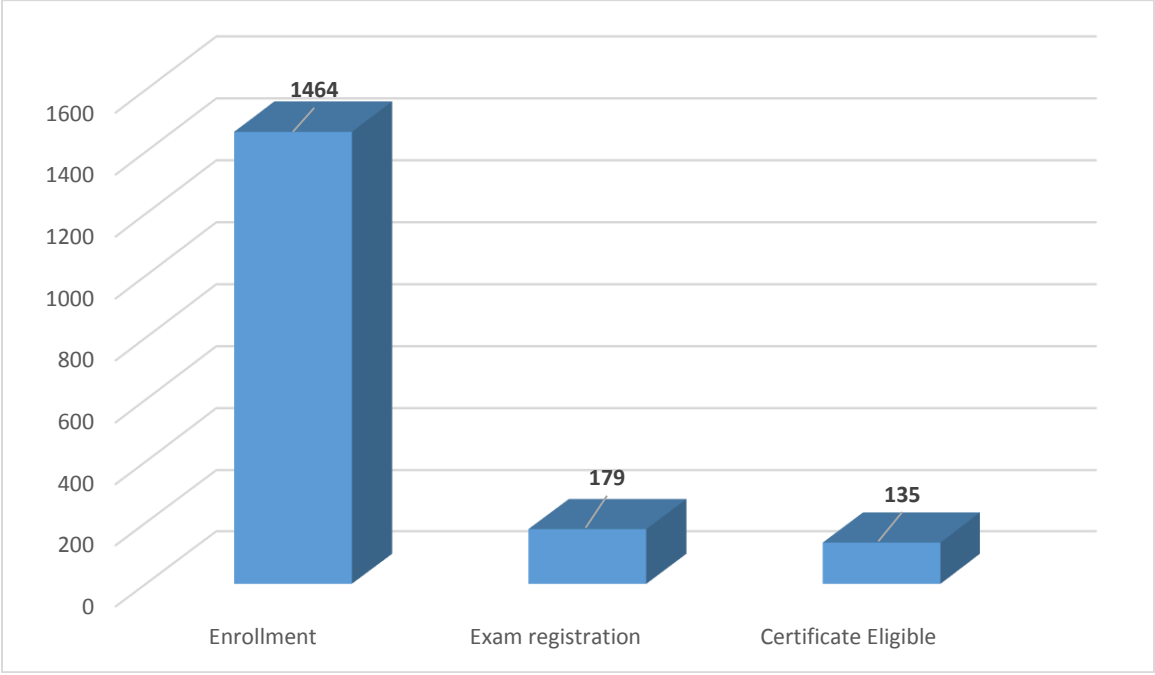
Course Outline:

The field of natural gas engineering is very much important for petroleum engineers specializing in gas processing technology. The course outlines an optimal balance between natural gas production, natural gas processing and gas transportation. An extensive treatise on natural gas engineering, both upstream and gas refining processes with key equipment and facility design will be covered. This course will also highlight the current status of production of natural gas through unconventional sources/technics and the applications of natural gas.

Total nos. of enrollment: 1464

Total nos. of Exam registration: 179

Total nos. of Certificate Eligible: 135



Prof. Subashisa Dutta
Civil Engineering

Type of the course: Re-run, July 2020 run Duration: 8 weeks

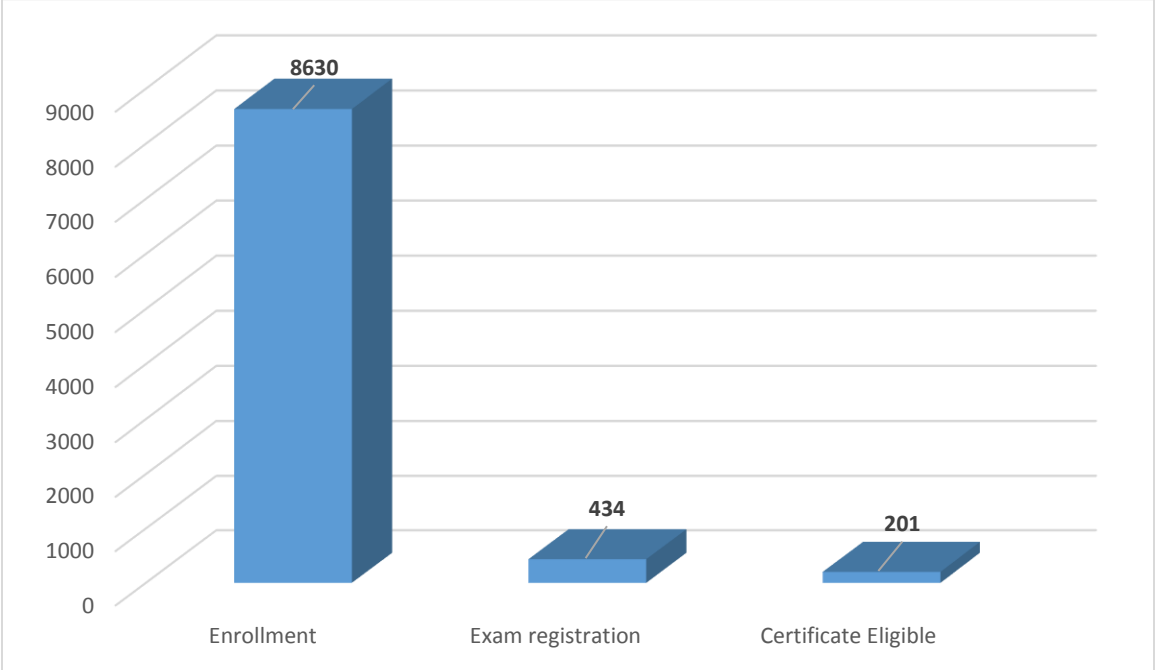
Course Outline:

Fluid Mechanics is an inter-disciplinary course covering the basic principles and its applications in Civil Engineering, Mechanical Engineering and Chemical Engineering.The students will have new problem solving approaches like control volume concept and streamline patterns which are now a days required to solve the real-life complex problems. The visualization of the fluid-flow problems will be demonstrated to enhance student's interest on the subject.

Total nos. of enrollment: 8630

Total nos. of Exam registration: 434

Total nos. of Certificate Eligible: 201



Prof. Rishikesh Bharti
Civil Engineering

Type of the course: Re-run, July 2020 run Duration: 8 weeks

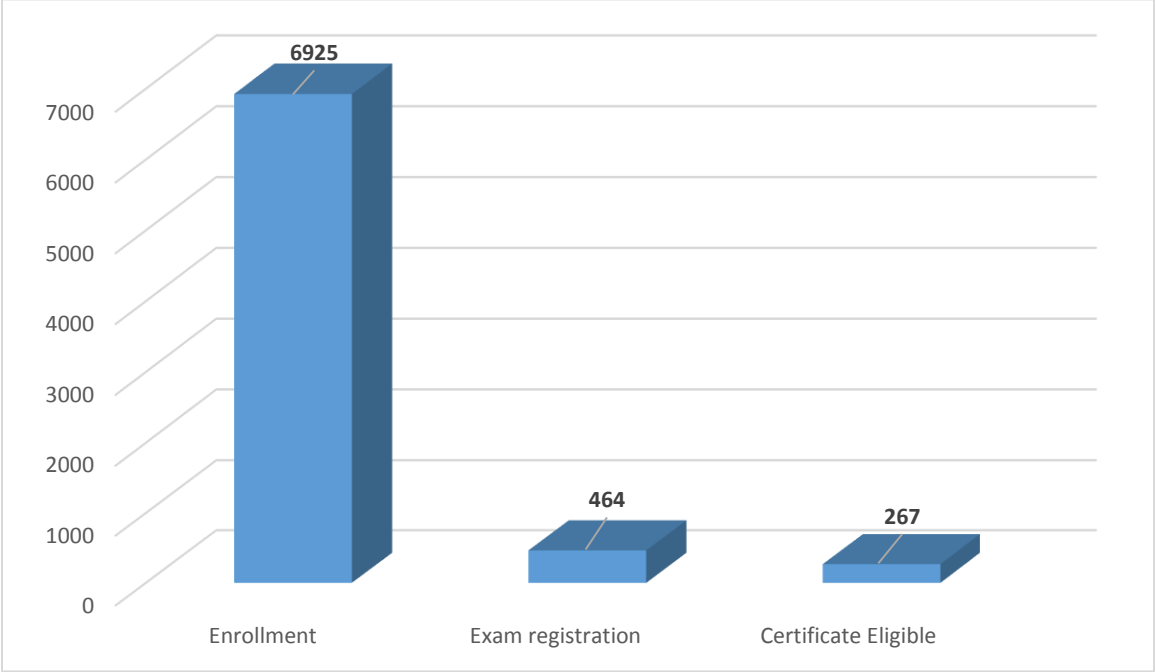
Course Outline:

This course will introduce the students to the state-of-the-art concepts and practices of remote sensing and GIS. It starts with the fundamentals of remote sensing and GIS and subsequently advanced methods will be covered. This course is designed to give comprehensive understanding on the application of remote sensing and GIS in solving the research problems. Upon completion, the participants should be able to use remote sensing (Satellite images and Field data) and GIS in their future research work.

Total nos. of enrollment: 6925

Total nos. of Exam registration: 464

Total nos. of Certificate Eligible: 267



Prof. Naveen Kashyap
Humanities and Social Sciences

Type of the course: Re-run, July 2020 run Duration: 8 weeks

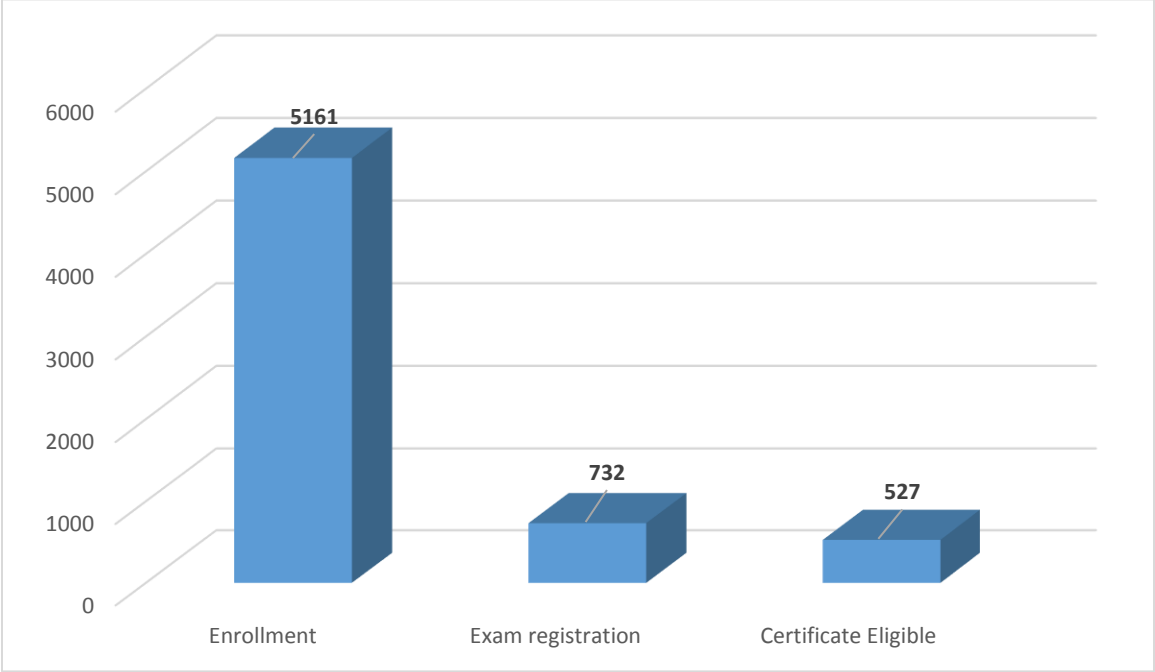
Course Outline:

Human beings have basic needs that they fulfill by making transactions in the market. Transactions mostly in the form of monetary exchange for goods and services are very basic for the survival of the human race. The present course is designed to study how consumers behave on the market and what the consequences of various behavior patterns. Additionally, the present course also looks at various psychological factors that shape the behavior and actions of the consumer in the global market.

Total nos. of enrollment: 5161

Total nos. of Exam registration: 732

Total nos. of Certificate Eligible: 527



Prof. Rajshree Bedamatta
Humanities and Social Sciences

Type of the course: Re-run, July 2020 run Duration: 8 weeks

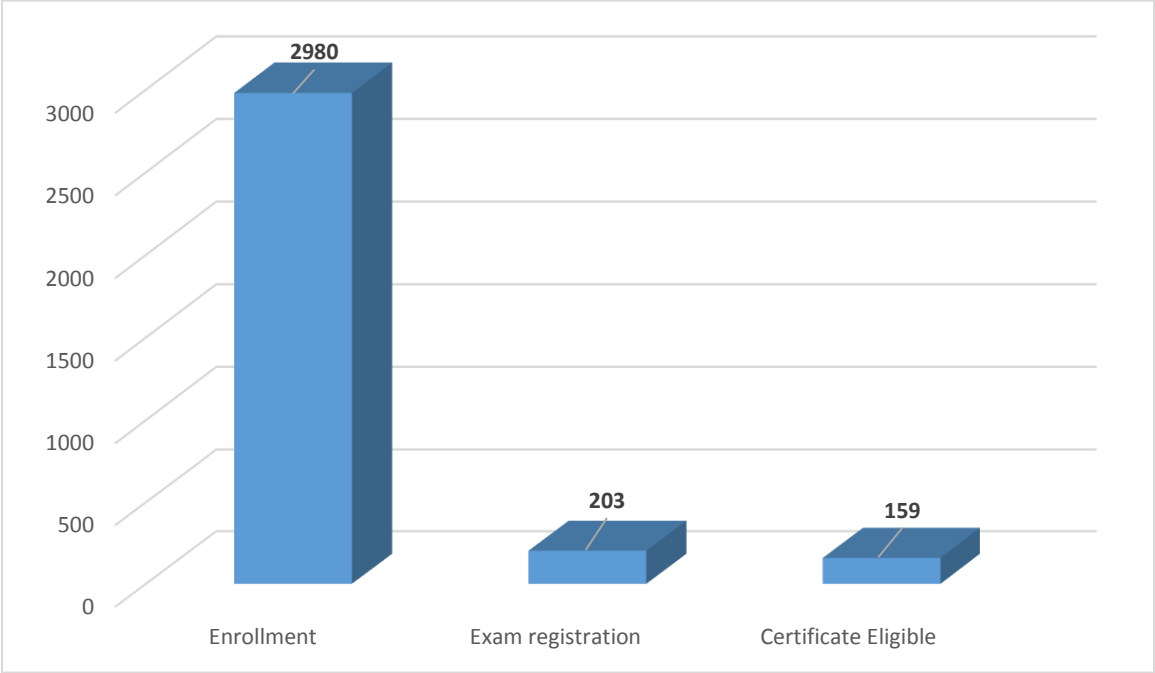
Course Outline:

This course will provide training in some methodological approaches in Development studies and Development research that will equip the students into applying them in their dissertations or project evaluations. Applied and practice oriented issues in development research methods will be taken up by focusing on the differences in qualitative, quantitative and mixed-methods research. Anyone who is interested in development issues and undertaking development research is encouraged to enroll.

Total nos. of enrollment: 2980

Total nos. of Exam registration: 203

Total nos. of Certificate Eligible: 159



Prof. Naveen Kashyap
Humanities and Social Sciences

Type of the course: Re-run, July 2020 run Duration: 8 weeks

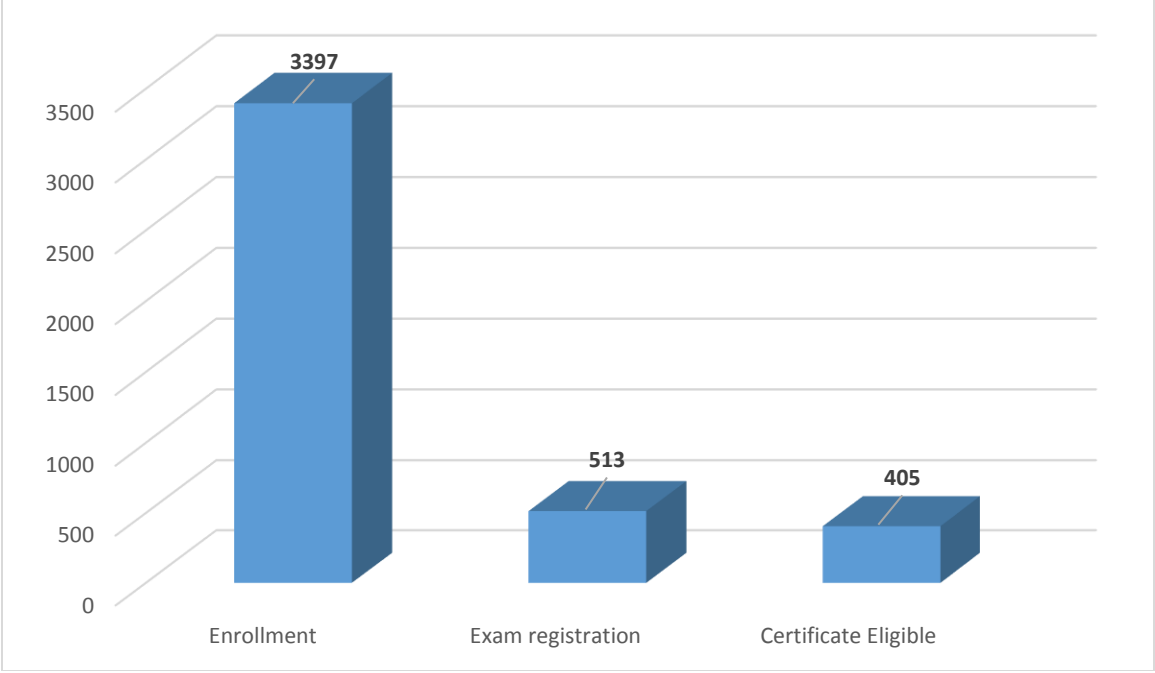
Course Outline:

The very basic form of exchanging information between two living beings is termed as communication. A highly developed form of communication is language, which is used mostly by human beings. The present course will introduce the concept of language and the psychology behind the learning and using of language.

Total nos. of enrollment: 3397

Total nos. of Exam registration: 513

Total nos. of Certificate Eligible: 405



Advanced Machining Processes

Prof. Manas Das
Mechanical Engineering

Type of the course: Re-run, July 2020 run Duration: 8 weeks

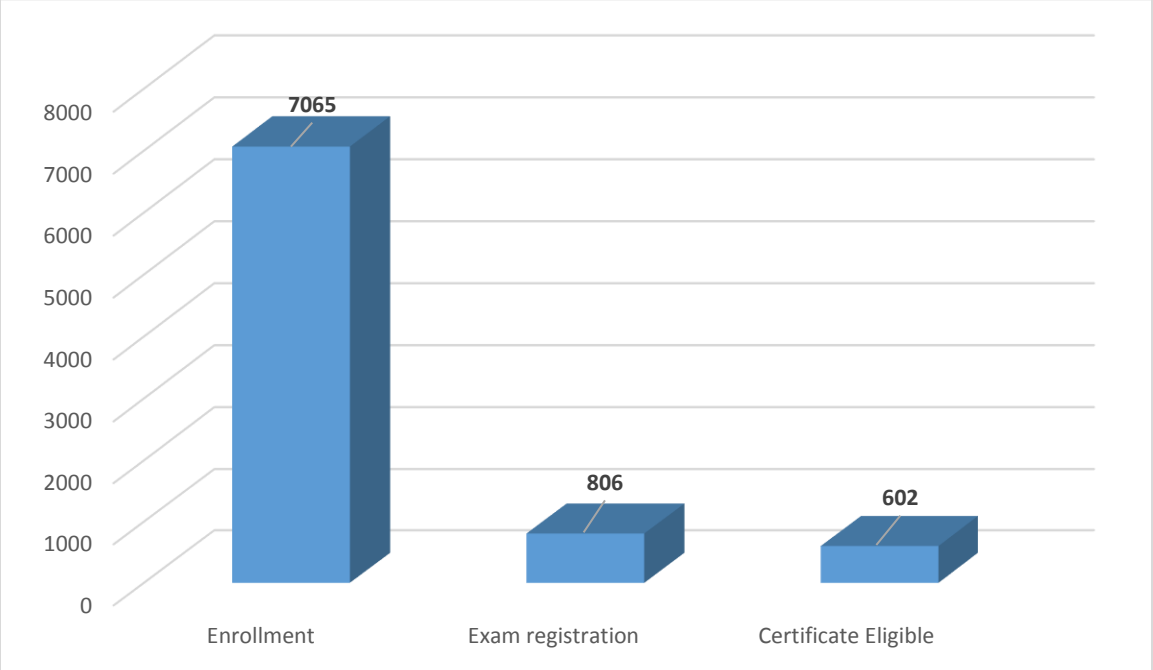
Course Outline:

There is a need for machine tools and processes which can accurately and easily machine the most difficult-to-machine materials and work pieces with intricate and accurate shapes. In order to meet these challenges, a number of newer material removal processes have now been developed to the level of commercial utilization. These newer methods are also called unconventional in the sense that conventional tools are not employed for metal cutting. Instead, energy in its direct form is used to remove the material from the work piece. This course aims at bringing the students up-to-date with the latest technological developments and research trends in the field of unconventional / nontraditional / modern machining processes.

Total nos. of enrollment: 7065

Total nos. of Exam registration: 806

Total nos. of Certificate Eligible: 602



Advances in Welding and Joining Technologies

Prof. Swarup Bag
Mechanical Engineering

Type of the course: Re-run, July 2020 run Duration: 8 weeks

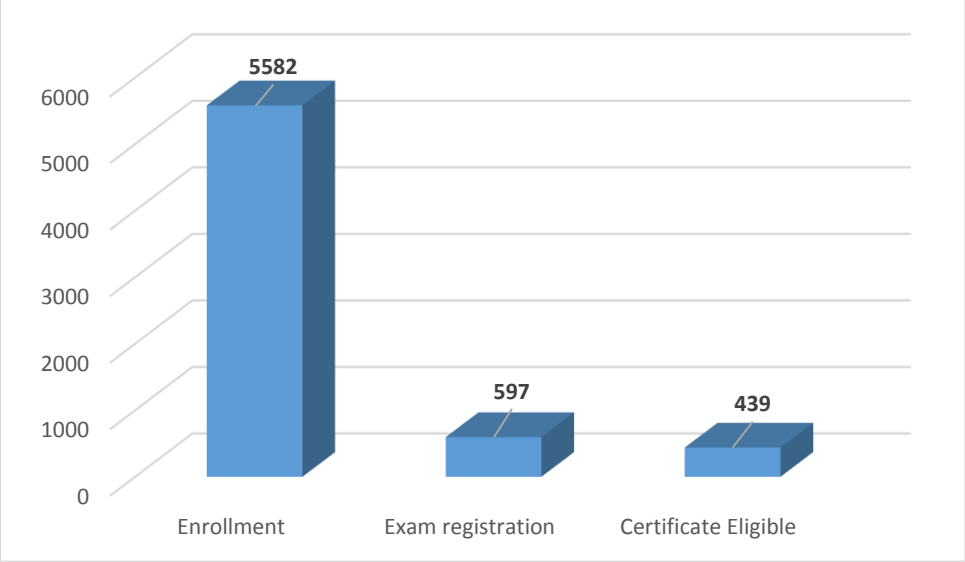
Course Outline:

The progress of several welding and joining processes is ever increasing with the development of new materials and their application in modern technologies. The microjoining and nanojoining is even more challenging area with the development of miniature components. This course is primarily designed from fundamental understanding to the most recent advances in welding and joining technologies. The syllabus is oriented to the advancement of the joining technologies which is different from conventional welding and joining processes. The modules cover almost all the direction of joining technologies and it is blended with fundamental development to the recent technologies. Audience will be able to develop fundamental understanding on different perspective and recent development in this field through the lectures and reinforce their knowledge by solving assignments. This course is presented in a lucid andThe progress of several welding and joining processes is ever increasing with the development of new materials and their application in modern technologies. The microjoining and nanojoining is even more challenging area with the development of miniature components. This course is primarily designed from fundamental understanding to the most recent advances in welding and joining technologies. The syllabus is oriented to the advancement of the joining technologies which is different from conventional welding and joining processes. The modules cover almost all the direction of joining technologies and it is blended with fundamental development to the recent technologies. Audience will be able to develop fundamental understanding on different perspective and recent development in this field through the lectures and reinforce their knowledge by solving assignments. This course is presented in a lucid and simplified way to make it enjoyable to the beginners.

Total nos. of enrollment: 5582

Total nos. of Exam registration: 597

Total nos. of Certificate Eligible: 439



Principle of Hydraulic Machines and System Design

Prof. Pranab K. Mondal
Mechanical Engineering

Type of the course: Re-run, July 2020 run Duration: 8 weeks

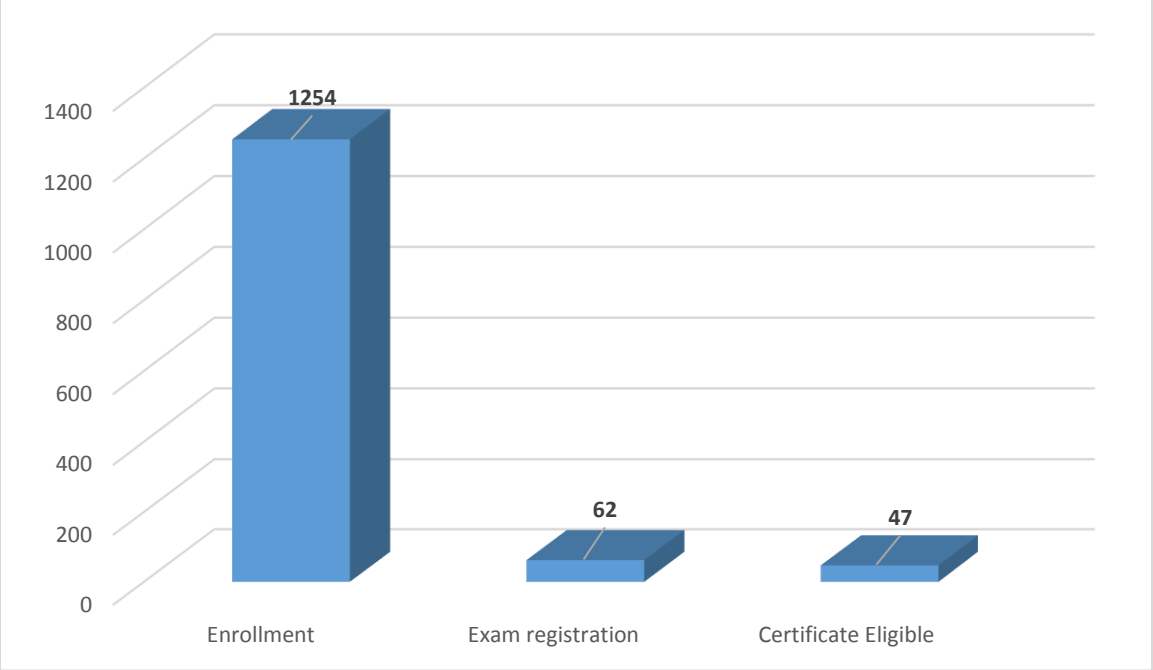
Course Outline:

Principle of operation of hydraulic machines and their system design is important from the perspective of their huge applications in different industries. Present course introduces the students to the fundamentals of hydraulic machines. Starting from the operational principle, students will be gradually familiarized with different concepts like velocity triangle, net head developed, finally leading to the design of their system. Important topics such as design of pumping system of two dissimilar pumps, which find practical relevance as well, will also be discussed.

Total nos. of enrollment: 1254

Total nos. of Exam registration: 62

Total nos. of Certificate Eligible: 47



Steam Power Engineering

Prof. Vinayak N. Kulkarni
Mechanical Engineering

Type of the course: Re-run, July 2020 run Duration: 8 weeks

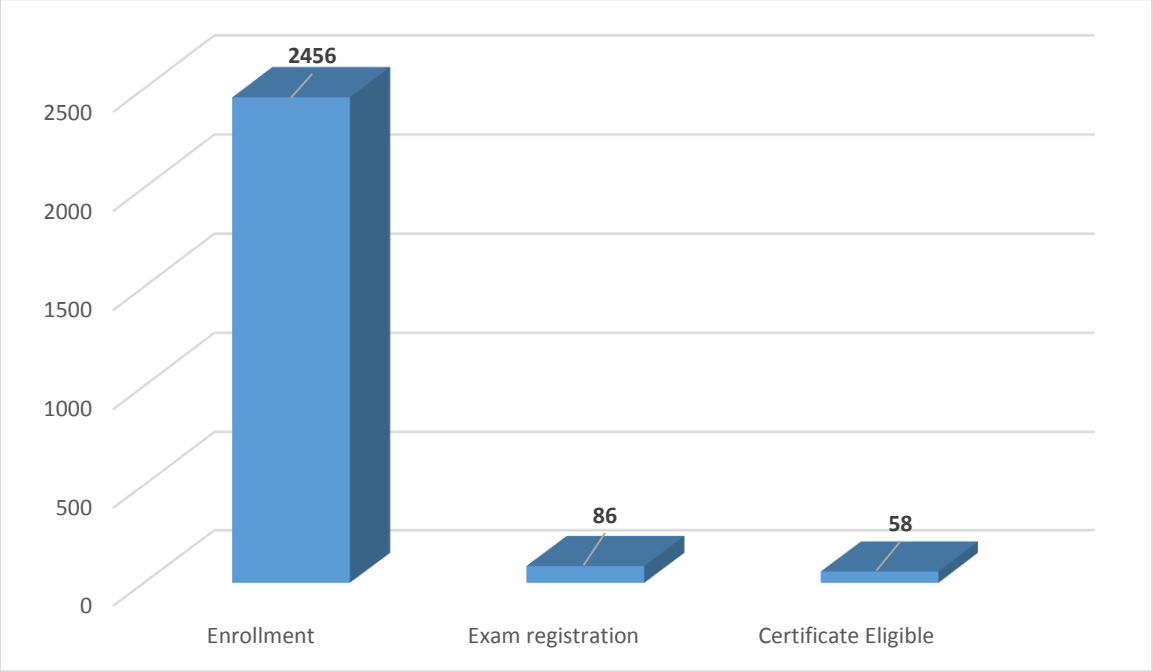
Course Outline:

This course deals with the steam power plants. One part of the course is about simple steam power cycle, reheat, regeneration and superheating. Further actual cycle with component efficiencies would also be discussed. Then each component of the plant is discussed detail. Initially, types of steam generators and their parts highlighted. Then steam turbine, its type, efficiency and arrangements are focused. Thus this course would provide an understanding on electricity generation or transportation application using steam as working medium.

Total nos. of enrollment: 2456

Total nos. of Exam registration: 86

Total nos. of Certificate Eligible: 58



Numerical Methods and Simulation Techniques for Scientists and Engineers

Prof. Saurabh Basu
Physics

Type of the course: Re-run, July 2020 run Duration: 8 weeks

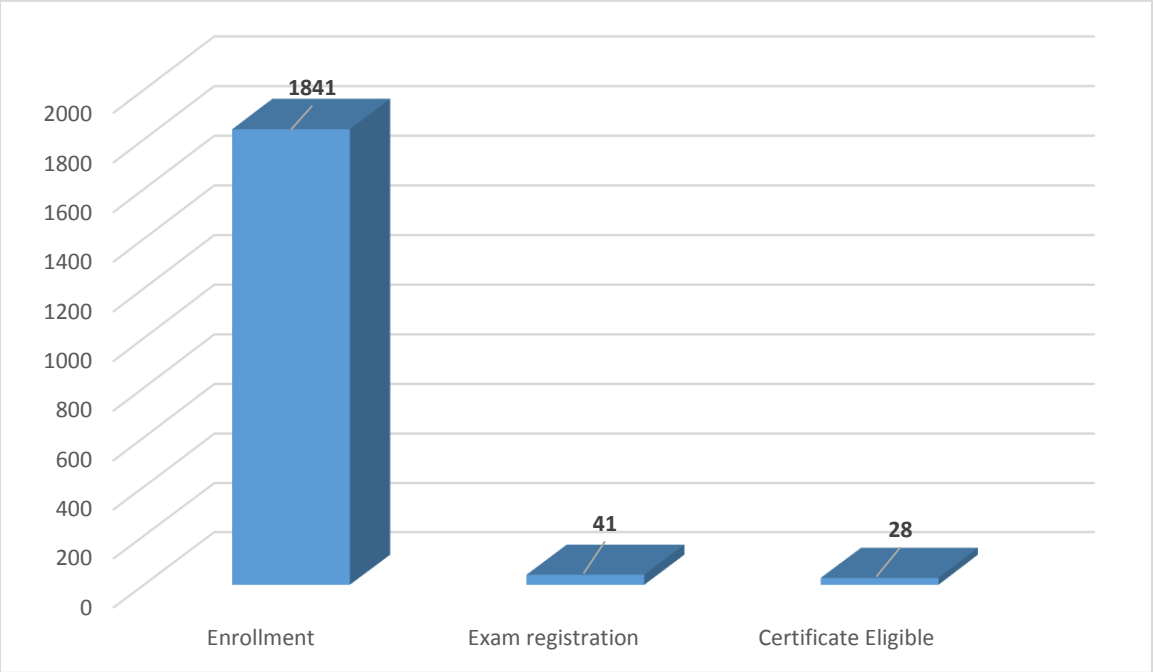
Course Outline:

The course contains very important aspects of modern day course curriculum, namely, numerical methods and simulation techniques that are going to be of utmost importance to both undergraduate and graduate level. Most of the real life problems are unsolvable using known analytic techniques, thus depending on numerical methods is imperative. The course introduces basic numerical methods and the key simulation techniques that are going to be useful to academia and industry alike. Even if the software packages, such as Mathematica, Mat lab etc. are available for most of the numeric computations, yet one should be aware of the techniques that are inbuilt into the software.

Total nos. of enrollment: 1841

Total nos. of Exam registration: 41

Total nos. of Certificate Eligible: 28



Nuclear and Particle Physics

Prof. Poulose Poulose
Physics

Type of the course: Re-run, July 2020 run Duration: 12 weeks

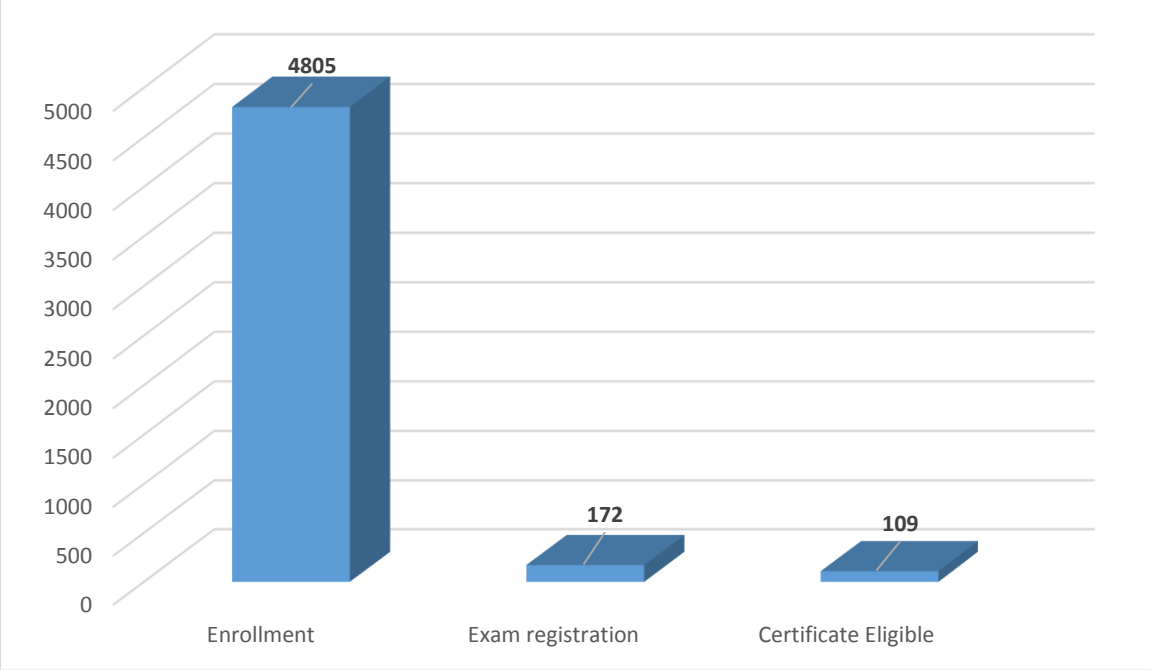
Course Outline:

The first part of the course will discuss nuclear physics. Properties of nuclei and details of popular nuclear models, properties of nuclear decays and nuclear reactions will be discussed in brief, but in a self-consistent manner. The second part will discuss the basics of particle physics. In this part, the fundamental forces and the dynamics of elementary particles under these forces will be considered. After introducing relativistic quantum mechanics, relativistic formulation of Maxwell's Equations and quantum electrodynamics will be discussed. This will be developed into the weak and strong nuclear forces based on the principle of gauge symmetry. The course will also introduce the physical principles of particle accelerators and detectors, including a very brief picture of the modern day complex detectors.

Total nos. of enrollment: 4805

Total nos. of Exam registration: 172

Total nos. of Certificate Eligible: 109



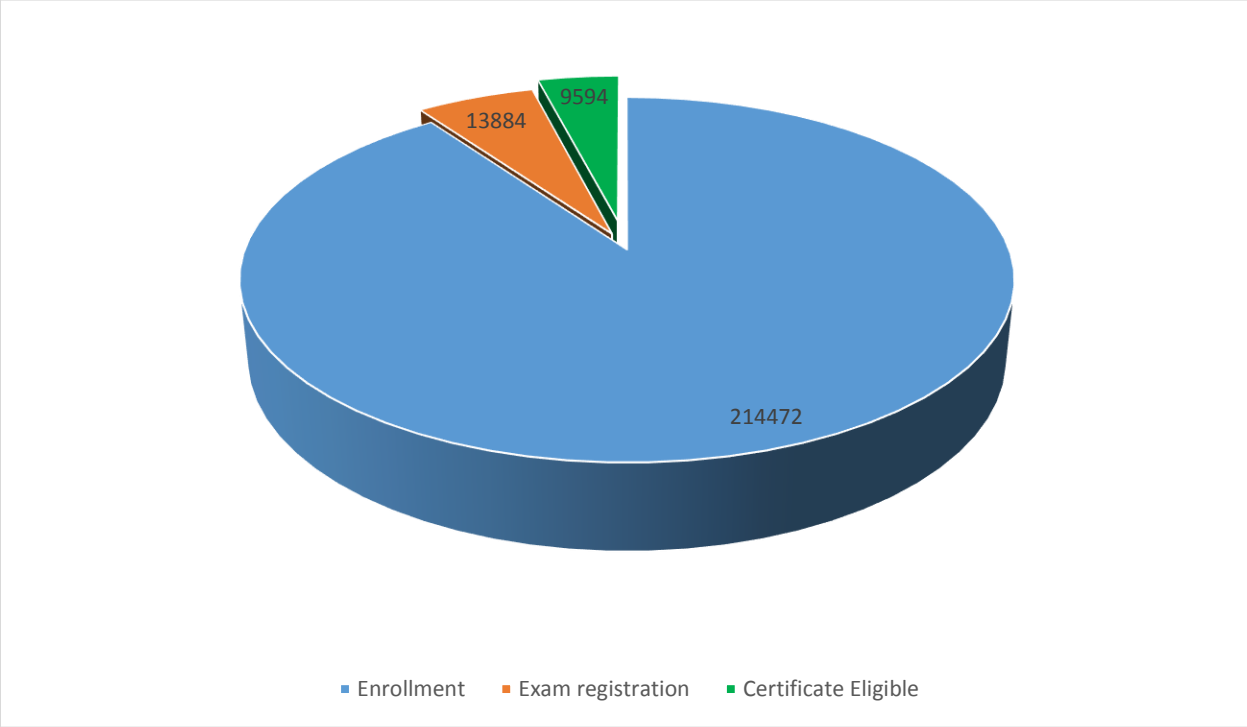
IIT Guwahati contribution in 2020 run Cumulative Data

Total nos. of Course Conducted: 76

Total nos. of Enrollment: 214472

Total nos. of Exam registration: 13884

Total nos. of Certificate Eligible: 9594



IIT Guwahati contribution in 2016-2020 run Cumulative Data

Total nos. of Course Conducted: 169

Total nos. of Enrollment: 432976

Total nos. of Exam registration: 33261

Total nos. of Certificate Eligible: 22711