Course Descriptions

Compulsory Courses

WEEM102 General Chemistry II (3 Cr. Hrs.)
Structure, Bonding and Molecular Properties of organic Compounds; Alkanes and Cycloalkanes; Stereochemistry of Alkanes and Cycloalkanes; Alkenes and alkynes; Stereochemistry; Alkyl Halides and their Reactions; Aromatic Compounds and their Reactions. Alcohols, ethers, thiols; Aldehydes and ketones; Carboxylic acids and derivatives; Amines

WEEM 121 Water Chemistry : (2 Cr. Hrs.)
Chemical species in the natural waters, Organic compounds in water. Organic pollutants and their measurement tests, toxic and hazardous compounds. Basic aqueous equilibria; the structure, behavior and fate of major classes of chemicals that dissolve in water; redox reactions and acid base reactions: carbonate systems, alkalinity. Hardness of water.
WEEM 122 Water Chemistry Lab : (1 Cr. Hr.)
Turbidity test, TS and TDS tests, Conductivity test, Acidity, alkalinity, Hardness, chloride measurement, Dissolved oxygen, BOD and COD tests.

WEEM 211 Fluid Mechanics: (3Cr. Hrs.)
Fluid statics, properties of fluids, Kinematics of fluids, analysis by continuity, energy and momentum equations. Applications of one-dimensional method to flow in pipelines, flow measurement, dynamic forces and turbo machines. Laminar and turbulent pipe flow; energy losses in pipe flow and open channel flow. Viscous and form drag in fluid flow; role of boundary layer in drag. Similitude and dimensional analysis with application to hydraulic models.

WEEM 213 Hydraulics: (3 Cr. Hrs.)
Review of fundamentals; flow in complex pipe systems; theory and operations of centrifugal pumps; gradually-varied open channel flows; backwater computations; flow measurements; unsteady flows; hydraulic models; sediment transport theory; introduction to wave theory.

WEEM 222 Introduction to Environmental Engineering: (3 Cr. Hrs.)
Definitions; units; material balance; energy fundamentals; environmental chemistry; mathematics of growth; water pollution; solid waste management; air pollution ; hazardous waste and risk assessment ; and noise Pollution and Control.
**WEEM251 Statics**

**WEEM252 Geology (2 Cr. Hrs.)**
The purpose of this course is to introduce students to earth science as it relates to human use of the planet, both global and local scales. In the lecture part, we will discuss the nature of earth, the types of materials of which the earth is made (minerals and rocks), the processes that effect the earth’s surface (endogenic and exogenic), natural hazards, and environmental issues. The nature of earth materials and their relevance to engineering problems will be emphasized. The lab section will include ways of characterizing and identifying minerals and rocks, the use of maps and field excursions.

**WEEM 253 Geographic Information systems (2 Cr. Hrs.)**

**IE 353 Engineering Economics (3 Cr. Hrs.)**
Time value of money, interest formula, depreciation models, tax effects, rate of return, cash flow. Project evaluation methods, replacement analysis, break even analysis economic studies for decision making under risk.

**WEEM 254 Material Science (2 Cr. Hrs.)**
Atomic structure, bonding, crystalline and non-crystalline structure, defects and dislocations, diffusion, structure-property and processing-property relations in metallic, ceramics, and polymers, mechanical behavior of materials, including: elastic and plastic deformation, fracture, creep, fatigue, impact, mechanical testing, metal strengthening, corrosion of metals and ceramics, polymer degradation, criteria for materials selection.

**WEEM 313 Hydrology (3 Cr. Hrs.)**
A holistic treatment of the field of surface hydrology with a focus on heterogeneity and variability, multiple flow pathways and residence times, water balance and scale issues. Hydrologic processes, including precipitation, evaporation, transpiration, snowmelt, infiltration, runoff, and stream flow. Rivers and lakes, springs and swamps. Surface runoff hydrology: hydrographic analysis, and its applications. Flood routing reservoirs.
routing and channel routing. Hydrologic forecasting. Run-off generation, flow and transport, and evapotranspiration and stream flow through exposition of fundamental theories combined with the analysis and interpretation from observed data. Risk analysis, introduction to urban drainage design. Aquatic habitats. Catchment processes and management. Functioning of water catchments from both natural science and social science perspectives, at a variety of scales. Empirical context will be drawn primarily from the Maain, Disi, Jordan Valley and Al Azraq situations.

GER 302B  German VI for Water and Environmental engineering students: (ENVIRONMENTAL IMPACT ASSESSMENT, IN GERMAN) (3 Cr. Hrs.)
Introduction into environmental impact assessment (EIA) involving an examination of: legislative/policy frameworks (In Jordan and elsewhere); theoretical underpinnings; the role of impact assessment in planning and decision making; methods and techniques for the assessment of impacts; implementation challenges; and the future directions for EIA. Analysis of various measures of environmental quality. Impacts on different types of resources, Benefit-cost consideration in environmental impact assessment. Methodologies that identify the human and social consequences of man made alterations, pollution, and resource limitation in the natural environment. Impact of engineering projects on food production, lands and water.

WEEM 334 Environmental and Water Law and Policy (2 Cr. Hrs.)
Introduction to the international legal system as it applies to environmental engineering and construction. An introduction to environmental policies at a range of institutional levels, including sustainable development principles; implementation of environmental policies by regulatory action at international, national, state and local levels; introduction to a range of environmental economic analytical tools, and implementation of environmental policies by market mechanisms.

WEEM351 Surveying (2 Cr. Hrs.)

WEEM 352 Heat and Mass Transfer (3 Cr. Hrs.)
A fundamental course in heat transfer processes and an introduction to mass transfer. Topics include equations of energy conservation, conduction, convection, radiation;
equations for chemical species conservation, diffusion, macroscopic balances. Emphasis on problem solving, especially for purposes of design.

WEEM361 Soil properties, Mechanics and foundations (3 Cr. Hrs.)

WEEM3610 Soil properties, Mechanics and foundations Lab (1 Cr. Hr.)
Soil Description and Identification, Moisture Content, Sieves and Hydrometer Analysis; Atterberg Limits (Liquid, Plastic and Shrinkage Limits); Compaction; Permeability tests (constant and falling head); Consolidation; Swell test; Direct Shear; Unconfined Compression test; Triaxial Compression test

WEEM 362 Strength of Materials (3 Cr. Hrs.)

WEEM 363 Structural Analysis (3 Cr. Hrs.)
Analysis of statically determinate beams, frames, and arches; analysis of simple, compound, and complex trusses; influence lines for beams, arches, and trusses; maximum effects due to moving loads; deflection of structures by moments-area, the conjugate – beam, and the unit-load (virtual work) methods; analysis of statically indeterminate structures of the first and second degree by the consistent deformation method; analysis of statically indeterminate structures by approximate methods.

WEEM 364 Concrete Design (3 Cr. Hrs.)
The course contains fundamentals of the behavior and design of reinforced concrete members subjected to bending, shear and axial force. Analysis of reinforced concrete sections. Design of beams, one-way slabs, columns, bearing walls and retaining walls using the ultimate strength theory and the principles of limit states design. Introduction to prestressed concrete. Design of simple prestressed concrete beams.
WEEM527 Solid Waste Management (3 Cr. Hrs.)
Introduction to the problems, regulations and techniques associated with the management of solid and hazardous waste. Composition, volume, classification and characterization of the wastes. Design of collection and disposal systems, including siting, construction and operation of sanitary landfills, composting solidification/stabilization and incineration.

WEEM 528 Air Pollution Control (2 Cr. Hrs.)

WEEM535 Environmental and Water Economics (3 Cr. Hrs.)
This course explores the relationship between economic activity and the environment. The objective is to familiarize students with the causes, consequences and possible solutions to local and global environmental issues. Students will become familiar with the techniques used by governments and businesses in determining the economic impact of various environmental policies. Building on economic concepts from introductory economics, this course will look at a variety of environmental problems and possible policy solutions. Topics covered include externalities, public goods, cost-benefits analysis, environmental degradation and policies for environmental regulation. The course will also cover global environmental issues such as ozone depletion and biodiversity.

WEEM536 Water resources engineering (3 Cr. Hrs.)
Water laws. Reservoirs, dams, and reservoir basins. Hydro-power generation. Flood estimation, routing and control. Engineering economy in water resources planning. Introduction to system engineering in water resources. Topics in arid and semi-arid region water resources. Desertification water conservation techniques, reuse of water, remote sensing and arid water resources. Linear programming and its applications in water resources.

WEEM 545 Water and wastewater Treatment (3 Cr. Hrs.)
The course examines the needs for water quality and how to achieve it by drinking water treatment, wastewater treatment, and other water-quality control strategies. The emphasis of the course is on principles and theory.

WEEM 546 Hydraulic structures (3 Cr. Hrs.)
The course deals with different aspects of the design of hydraulic structures. The course provides the knowledge to design various hydraulic structures, such as energy
dissipaters, head and cross regulators, canal falls and structures involved in cross drainage works.
The course also teaches the theory necessary to analyze and design these structures, such as the seepage and uplift theories and the hydraulic jump.

**WEEM 547 Environmental Unit process and operation (3 Cr. Hrs.)**
Characterization of water and wastewater; Design of water distribution networks and sewerage systems; Design of water treatment systems; Wastewater Treatment design; Storm drainage design; Landfill design; Design basics of non-conventional treatment methods including: absorbers, aeration towers and membrane processes; processing of sludge, and water

**WEEM 548 Project Management: (3 Cr. Hrs.)**
Examines the organization, planning, and controlling of projects and provides practical knowledge on managing project scope, schedule and resources. Topics include project life cycle, work breakdown structure and Gantt charts, network diagrams, scheduling techniques (CPM and PERT), and resource allocation decisions. Concepts are applied through team projects using project management software.

**WEEM 575 Environmental Graduation Project I: (3 Cr. Hr.)**
In graduation project I students will pick a particular problem in environmental engineering, other than the problem tackled in WEEM 591-E, and carry out a literature survey of the problem then suggest an alternate solution to the problem. They must show a good ability in effectively applying the fundamentals of mathematics, physics, chemistry, engineering, etc..., in finding the alternate solution. This course should help the students in assessing their strengths and weaknesses in applying fundamental principles to real life environmental problems.

**WEEM 576 Environmental Graduation Project II: (3 Cr. Hrs.)**
In order to stress the student self reliance, and to learn how to be a life long learner, in graduation project II students will continue with the problem in environmental engineering, in WEEM 591-E, and WEEM 598-E, and carry out an extensive study and suggest alternate solutions to the problem. They must show ability in effectively applying the fundamentals of mathematics, physics, chemistry, engineering, etc..., in finding the alternate solutions.
Elective courses

WEEM 414 Irrigation Engineering (3 Cr. Hrs.)
Fundamentals to the design of an irrigation system incorporating safe wastewater applications. System addressing a complex problem of water in the natural and constructed environment. Case study revolutionizes each year, generally drawn from a challenge confronting the region. Water balance concepts for tracking substances in the water systems. Field project to quantify the flux of pollutants from a local watershed outlet to the ocean, an aquifer or water body. Sociotechnical systems associated with human use of water as a resource and the hazards posed by too much or too little water. Potable and non-potable water use and conservation. Irrigation, rural and urban water supply systems, storm water management, and flood damage mitigation. Emphasis is on engineering design.

WEEM 424 Introduction to Biotechnology (3 Cr. Hrs.)
Basic concepts of biotechnology: Biomass characterization, Biomass growth and kinetics. Bioconversion systems: types of biomass, which are currently considered for conversion into bioenergy conversion pathways available to turn biomass into bio-products. Identify energy potentials of biomass and biogas. Biofuels and Combustions Engines

WEEM 425 Disposal Logistics: (3 Cr. Hrs.)
The course will provide the student with knowledge on the process of planning, implementing and controlling the efficient, cost effective flow and storage of waste including disposal collection, transportation, handling and storage.

WEEM 426 Pollution Control of the Aquatic Environment: (3 Cr. Hrs.)
Effects of domestic and industrial water pollution on the physical, chemical and biological characteristics of natural waters; associated environmental determinants of human disease, toxicology and epidemiology of chronic disease.

WEEM 433 Water Supply and Wastewater Collection: (3 Cr. Hrs.)
This course covers the design of reservoirs, conduits, water distribution systems, well fields, sewers, and drains. Included is a study of population growth and its effects on water supply requirements and sewage flows as well as techniques for analyzing rainfall, runoff, fluid flow, reservoir sitting, and groundwater flows.

WEEM 434 International Environmental Law: (3 Cr. Hrs.)
An overview of the history and current application of laws and rules used to protect the environment. This course outlines the general framework of legislation and includes
specific discussions of regulations as they are enforced at international, national, state and local levels. The Environmental Regulations course is concerned with Industry and its relationship with the environment and community and the impact of environmental regulations on Industry decision-making. Topics include waste minimization, pollution prevention, hazardous, special, industrial and municipal solid waste control, the Clean Air Act, and Clean Water Act, and the Occupational Safety and Health Act and how it relates to environmental regulations.

**WEEM 441 Process Engineering: (3 Cr. Hrs.)**
To promote an understanding of the fundamental hydraulic processes which underpin water treatment systems. Process engineering fundamentals, fluid mixing and flow, mass balance, mass transfer and elementary chemical reactor theory, flow sheeting and unit operations are discussed as key concepts. An understanding of the relevant hydraulic principles and algebraic relationships governing process design and performance, and the opportunity to apply governing equations to examples provided and demonstrate their proper usage.

**WEEM 442 Process Operation: (3 Cr. Hrs.)**
The principles of treatment plants operations. Unit operations related to production, treatment, disposal, and recycling. Principles of unit operations (mass and energy balance). Mechanical, thermal, chemical, and biological processes. Heat and mass transfer. Chemical and biological reactors. scope, limits, and methods of secondary and advanced treatment, solids handling, disinfection, reclamation of wastewater, through readings, discussions, analysis, and laboratory study. Specifically designed for individuals seeking employment or already employed in the wastewater field. Advanced wastewater treatment systems, including secondary and tertiary treatment, solids handling, disinfection, reclamation of wastewater, and laboratory study.

**WEEM 443 Advanced Wastewater treatment: (3 Cr. Hrs.)**

**WEEM 444 Drinking Water Abstraction and Distribution: (3 Cr. Hrs.)**
Applied water hydraulics, water storage tanks, backflow and cross-connections, valves, water mains, meters, pumps and motors, and system operating equipment. Principles of electricity, OHM’s Law, and the Power equation will be presented. Disinfection
methods, sampling procedures, ground water wells, distribution system operations, water quality parameters, and the public health aspects of a potable water supply.

**WEEM 474 A Special Topics (1 Cr. Hr.)**
Students may take this course after obtaining the department's consent and only once. A topic for this course may cover any of the topics related to water and environmental engineering and its applications. The course content must be commensurate with one credit hour.

**WEEM 474 B Special Topics (2 Cr. Hrs.)**
Students may take this course after obtaining the department's consent and only once. A topic for this course may cover any of the topics related to water and environmental engineering and its applications. The course content must be commensurate with two credit hours.

**WEEM 474 C Special Topics (3 Cr. Hrs.)**
Students may take this course after obtaining the department's consent and only once. A topic for this course may cover any of the topics related to water and environmental engineering and its applications. The course content must be commensurate with three credit hours.

**WEEM551: Thermofluids (3 Cr. Hrs.)**
An introduction to mechanical engineering thermodynamics dealing with the application of the first and second laws of thermodynamics to the thermodynamic design and performance analysis of typical thermo-mechanical plant using condensable vapors and gases as the working fluid. Basic fluid mechanics including: kinematics and dynamics of fluid flows; conservation laws applied to fluid flow; Euler, Bernoulli, Navier-Stokes equations; dimensional analysis; differential and integral flow analysis; flow visualisation. Per-requisite None.

**WEEM 510: Groundwater Modeling and dynamics (3 Cr. Hrs)**
This course will introduce students to groundwater modeling and dynamics of flow, including groundwater recharge, saturated and unsaturated flow, the nature of aquifer materials and the various types of porosity and permeability. Equations that govern the movement of groundwater will be covered, as well the techniques used to evaluate aquifer properties, specifically the different types of pumping tests. Students will also be utilizing groundwater modeling software, specifically MODFLOW. Emphasis will be placed on utilizing this knowledge and skills in the sustainable management of aquifer systems.
Course Description of Courses Taken from the Department of Service Courses

PHYS 103 Physics I (Mechanics): (3 Cr. Hrs.)

PHYS 104 Physics II (Electricity and Magnetism): (3 Cr. Hrs.)

MATH 101: Calculus I (3 Cr. Hrs.)
This course introduces the student to the calculus of single-valued functions. Topics include: limits, continuity, rates of change, rules for differentiating, differentials and local linear approximations, maxima and minima problems, L'Hôpital’s rule, related rates, logarithmic and implicit differentiation, inverse trigonometric and hyperbolic functions, Rolle’s theorem, the mean-value theorem, and applications of derivatives and integrals.

MATH 102: Calculus II (3 Cr. Hrs.)
This is a course in multivariate calculus as a continuation of Calculus I. The course focuses on power series, polar coordinates and polar functions, sequences and infinite series, vectors, functions of several variables and their limits, partial differentiation and their applications. The course views multiple integrals: double and triple, line integrals, surface integrals, Green’s theorem, Gauss's divergence theorem, and Stoke’s theorem.

MATH 203: Applied Mathematics for Engineers (3 Cr. Hrs.)
This course begins with an overview of vector analysis, linear algebra concentrating on using matrices to solve systems of equations, and the diagonalization of matrices, and complex numbers. It then moves into a study of differential equations, shedding light on the solutions of differential equations (first order, second and higher orders) with applications. The course will discuss Laplace transforms and Fourier Series and Fourier Transforms with applications in solving initial value problems.

MATH 231: Probability and Statistics for Engineers (3 Cr. Hrs.)
This course familiarizes students with descriptive statistics, probability basics, random variables, special discrete random variables, and various distributions: normal, Student's t, Chi-square, and Fisher's F. It includes a discussion of inference about one
mean, one proportion, difference between two means and difference between two proportions and the ratio of two variances, large and small samples, paired and independent samples. The MINITAB statistical software package will be used; there will also be an introduction to the use of SPSS.

**MATH 205: Differential equations (3 Cr. Hrs.)**
This course expounds the basics of second order partial differential equations, wave equation, heat flow equation in one dimension, potential equation on rectangles and disks. Various types of special functions.

**IC 101: Intercultural Communication (3 Cr. Hrs.)**
This course is designed to provide prospective students (whose majors have an international flavor) with tools that offer powerful possibilities for improving the communication process. We will examine the process of sending and receiving messages between people whose cultural background could lead them to interpret verbal and nonverbal signs differently. We will learn about the diversity of these cultural differences and at the same time learn how we might overcome them. Our efforts to recognize and surmount cultural differences will hopefully open up business opportunities throughout the world and maximize the contribution of all the employees in a diverse workforce.

**SFTS 101: SOFT SKILLS (3 Cr. Hrs.)**
This course is designed to help develop strong oral and written communication skills. The student will be given opportunities to practice writing and editing professional correspondence and technical reports. Additionally, the student will compose and deliver oral presentations. Assignments will include the use of inductive and deductive approaches to conveying a variety of messages. The course emphasis the use of software tools to prepare presentations, stress management, confidence, and sensitivity to others. It also stresses on resume writing and conducting interviews.

**SE 301: Social Entrepreneurship and Enterprises (3 Cr. Hrs.)**
This course will serve as an introduction to the field of social entrepreneurship and social enterprises. Through lectures, field visits, analyses of relevant literature, case studies and exercises, this course will explore social entrepreneurship’s potentials, opportunities and limitations. The topics will cover: Defining Social Entrepreneurship. Contextualizing Social Entrepreneurship (need, motives, forms, criteria). Role of Leadership, Creativity and Innovation. Locating SE on the profit/non-profit continuum. SE in the larger fields of development, social change, community activism. Social Enterprises (Missions, Markets, Finances). Ethical business and Corporate social responsibility.
NE 101: National Education (3 Cr. Hrs.)
In a context of striving towards democracy like the one Jordan enjoys today, the meaning and practice of active and responsible citizenship becomes more crucial. It is often argued that democracy requires “democrats” to flourish, and become well established. Democrats are those women and men who recognize pluralism, inclusion, positive engagement, and participation as the main values that govern their interaction with the state as citizens and with each other as diverse people of different interests. In this course you will be able to understand your rights and responsibilities as Jordanian citizen, expand your knowledge about the frameworks, and processes that regulates citizen-state relationships as well as the basic necessary skills for you to practice your citizenship rights in a civic manner.

Course Description of Courses Taken from other Departments at GJU

MILS 100: Military Sciences (3 Cr. Hrs.)

ARB 100: Arabic (3 Cr. Hrs.)
Grammar and structure. Rectifying weakness in linguistic application; training insound reading. Dictation; use of language in a manner free from grammatical and linguistic errors; accurate expression of intended meaning. Study and analysis of literary texts through the discussion of linguistic, grammatical and writing skills therein.

ENGL 98: English I (Elementary English) (0 Cr. Hrs.)
Students will focus on English at an elementary level concentrating on the receptive skills of reading and listening, and the productive skills of writing and speaking. These will include such things as independent clauses, verb tenses, model verbs, adverbs, short dialogues, reading simple material and answering short questions, writing short meaningful sentences, listening to short conversations.

ENGL 99: English II (Pre-Intermediate English) (0 Cr. Hrs.)
Students will focus on English at a pre-intermediate level concentrating on the receptive skills of reading and listening and the productive skills of writing and speaking. These will include such things as comparatives and superlatives, quantifiers, possessive adjectives and pronouns, vocabulary building, role play activities for speaking, reading comprehension and writing short descriptive paragraphs.
ENGL 101: English III (Intermediate English) (1 Cr. Hr.)
Students will focus on English at an intermediate level concentrating on the receptive skills of reading and listening and the productive skills of writing and speaking. These will include collocations, tense review, affirmative, negative statements, synonyms and antonyms, time clauses, conditionals, active and passive forms, reported speech, phrasal verbs, reading comprehension with detailed questions, vocabulary and writing developed descriptive and opinion essays.

ENGL 102: English IV (Upper-Intermediate English) (1 Cr. Hr.)
Students will focus on English at an upper-intermediate level concentrating on the receptive skills of reading and listening and the productive skills of writing and speaking. Model verb review, silent letters and proper pronunciation, jobs and careers, requests and offers, more phrasal verbs with vocabulary building, relative clauses and relative pronouns, narrative tenses for writing exercises, wishes and regrets, reading and comprehending longer passages with direct and inference questions of medium difficulty, hypothesizing, and writing fully developed descriptive, argumentative and analytical essays of 350 words.

ENGL 201: English V (Advanced English I) (2 Cr. Hrs.)
Students will focus on English at an Advanced level. Students will analyze and produce 2 – 3 page essays with an emphasis on argumentation and persuasion working both independently and cooperatively to gather, evaluate, and synthesize necessary information. Class activities include interactive lectures, small group and class discussions, informal debates, peer feedback, individual presentations, focused listening exercises and focused viewing exercises as well as assorted reading, writing, and grammar assignments. There will be some poetry analysis together with reading and understanding a short story and a drama using basic literary terms and concepts.

ENGL 202: English VI (Advanced English II) (2 Cr. Hrs.)
Students will continue to focus on English at an Advanced level. Students will analyze and produce 4 – 5 page essays emphasizing argumentative, persuasive and discursive styles of writing, working both independently and cooperatively to gather, evaluate, and synthesize necessary information. Students will integrate the practice of critical thinking and reading into the writing process. Class activities include interactive lectures, small group and class discussions, informal debates, mini conferences, peer feedback, individual presentations, focused listening exercises and focused viewing exercises as well as assorted reading, writing, and grammar assignments. There will be some poetry analysis together with reading and understanding a short story and a drama using stronger and more intensive literary terms and concepts than in 201.
GER 101: German I (3 Cr. Hrs.)
Can understand and use familiar, everyday expressions and very simple sentences, which aim at the satisfaction of specific needs. Can introduce oneself, and others, and ask others questions to themselves - e.g. where they live, which people they know or what kind of things they have - and can give answers on questions of this kind. Can communicate on a basic level if those involved with him/ her in a conversation speak slowly and clearly and are willing to help.

GER 102: German II (3 Cr. Hrs.)
Can understand sentences and frequently used expressions if those are connected with things of immediate meaning (e.g. information to the person and to the family, buying, work, closer environment). Can communicate in simple, routine situations, with the purpose of a simple and direct exchange of information about familiar and common things. Can describe with simple means their own origin and training, direct environment and things that are in connection with direct needs.

GER 201: German III (3 Cr. Hrs.)
Can understand the main points if no dialect is used and if it concerns familiar things about work, school, spare time etc. Can master most situations which one encounters on journeys in a German speaking area. Can express oneself simply and coherently about familiar topics and areas of personal interest. Can report experiences and events, describe dreams, hopes and goals and give short reasons or explanations about plans and opinions.

GER 202: German IV (3 Cr. Hrs.)
Can understand the main contents of complex texts, as well as concrete and abstract topics; even discussions between specialists in his/ her own special field. Can communicate spontaneously and fluidly a normal discussion with native speakers, without larger effort on both sides. Can express oneself clearly and in detail in a broad spectrum of topics, describe a point of view to a current question and indicate the pro and cons of different possibilities.

GER 301: German V (3 Cr. Hrs.)
Can understand and also seize implicit meanings of a broad spectrum of demanding, longer texts. Can express oneself spontaneously and fluidly, recognizing words without having to search for words frequently. Can use the language effectively and flexibly in social and vocational life or in training and study. Can express oneself clearly, structured and detailed, to complex subjects and use appropriate different means for linkage of texts.
CHEM 103: General Chemistry (3 Cr. Hrs)

ME 111: Computer Aided Engineering Drawing (3 Cr. Hrs.)
The Use of computer aided software in drawing such as AutoCAD. Geometric constructions. Orthographic and Isometric projections; Sketching, sectioning, dimensioning and layering. Model layout (wire-frame, surface, and solid modeling), plotting to scale, blocks and attributes, Introduction to descriptive geometry, perspective drawing. Engineering applications.