ALLIANCE COLLEGE OF ENGINEERING AND DESIGN

BACHELOR OF TECHNOLOGY

Alliance College of Engineering and Design

Alliance College of Engineering and Design offers degree courses aimed at building skills, expertise and knowledge among its graduates in the areas of technology and design. The College is committed to achieving excellence in technology development and its courses, under the various fields of engineering and technology aim at achieving in its graduates competent and motivated engineers and designers.

The Alliance College of Engineering and Design has been built on a strong foundation of achieving technological development through a curriculum that places a high emphasis on the design aspects of engineering by developing design professionals who are passionate and creative problem-solvers, and who possess strong multi-disciplinary fundamentals that are combined with a keen sense of aesthetics. Real-world, industry-driven internships and project work; centers of excellence and incubation for cutting-edge research and development; learning outcomes aligned with the criteria outlined by the Accreditation Board for Engineering and Technology (ABET), USA—the Alliance College of Engineering and Design provides unparalleled opportunities for graduates to pursue technological education with passion and confidence.

The Alliance College of Engineering and Design offers a four-year, full-time Bachelor of Technology (B. Tech.) degree course in seven branches. The undergraduate courses at the Alliance College of Engineering and Design are unique offerings where graduates receive a Bachelor of Technology degree in their chosen discipline of engineering alongside minor specializations.

About Bangalore

Bangalore is one of Asia's fastest growing cities and India's fifth largest city. It has a population of over nine million persons and is situated at an altitude of about 1,000 meters above sea level. Bangalore is the principal administrative, cultural, commercial and industrial center of the South Indian State of Karnataka. Thanks to its altitude, Bangalore enjoys a pleasant and equable climate throughout the year. Tree-lined streets and abundant greenery make it the “Garden City” of India.

In the early 1980s, Bangalore witnessed a major technology boom and is now home to more than 250 high-tech companies, including home-grown giants such as Wipro and Infosys. The erstwhile Garden City is now also referred to as the “Silicon Valley” of India.

The city has several institutions of learning and research such as the Indian Institute of Science, Raman Research Institute, National Institute of Mental Health and Neurosciences and the National Aerospace Laboratories. In art and culture, the city boasts a rich heritage and tradition and has several schools of classical music and dance. The city is widely known for its rich cultural diversity and welcomes people from all over India and abroad.

Bangalore abounds in picturesque parks, gardens and other scenic spots. The National Park, which is well within the city, is an attractive forest area with an abundant variety of animals, birds and butterflies.

Bachelor of Technology Course

The Alliance College of Engineering and Design offers a Bachelor of Technology (B.Tech.) degree in the following branches: Civil Engineering; Mechanical Engineering; Electrical and Electronics Engineering; Electronics and Communication Engineering; Aerospace Engineering; Computer Science and Engineering; and Information Technology.

Key features:

The key features of the Alliance College of Engineering and Design that make it the preferred destination of choice for students and recruiting partners are :

- The Bachelor of Technology (B. Tech.) degree is awarded by Alliance University
- Rigorous, progressive and industry relevant curriculum that places a high emphasis on the design aspects of engineering
- Advanced engineering laboratories
- State-of-the-art infrastructure for a high-quality living and learning experience on campus
- Delivered by accomplished full-time faculty and embellished by international adjunct faculty as well as renowned industry practitioners
- The B. Tech. degree course offers a choice of minor specializations. A student can opt to minor in any one of the following specializations:
    - Business Administration
    - Computer Science and Engineering
    - Electronics and Communication Engineering
- Internship opportunities and placement facilitation across industry sectors
- Articulation agreements with foreign universities and institutions provide for student exchanges, internships and short-term certification programs
- Generous scholarship schemes for merit and other categories
- Center for Development of Entrepreneurship and Leadership for innovation and business ideas
- Professional, career-oriented student clubs enhance skill development and provide opportunities to network
- The B. Tech. degree course is comprised of Learner's Value Proposition, Core Subjects, Elective Subjects, Industry Internship Program and Professional Skills Development

Course Duration

Four-years, full-time

Subject Credits

Depending on the relevance, intensity and contents covered, different subjects have the following durations:

Type	Credit(s)	Per Week	Total Sessions	Classroom Contact Hours	Laboratory Contact Hours
Theory	1	1 Session of Lecture	12	12	-
	2	2 Sessions of Lecture	24	24	-
	3	3 Sessions of Lecture	36	36	-
	4	4 Sessions of Lecture / 3 Sessions of Lecture + 1 Session of Tutorial	48	48	-
Practical	1	3 hours of Lab	12	-	36
Engineering Graphics	2	1 Sessions of Lecture + 3 hours of Lab	12 + 12	24	24

BASIC SCIENCE

Learning Statement

To succeed in the study of the various branches of engineering, the students should begin with a firm basis in mathematics and the natural sciences. Whether applied to a particular branch of engineering or not, the proficiency in mathematics and the natural sciences is a necessary quality for any educated engineer. So, in the formation of a program of study for any engineering student it is important to give a strong foundation to Mathematics and Basic Sciences that form the fundamental building blocks of all engineering activities. Therefore, a degree in engineering requires a total of 9 courses (28 Credits) as the "Mathematics and Basic Science" distribution requirements. A significant part of this requirement is sufficient education in mathematics. At least 4 of the 9 required courses (16 of 28 credits) must be in this area that includes coursework in basic mathematics followed by various topics of Differential Calculus, Integral Calculus, Graph Theory, Ordinary differential equations and many other engineering related mathematics. While the course in the first two semesters is basic mathematics, the next two semesters it is more specific to the branch of study. A solid understanding of physics is essential to any engineering student for describing all physical phenomena. Knowledge in chemistry is also essential in understanding the atomic, molecular and chemical properties of materials. The students are expected to acquire the skills and awareness that enable them to promote a significant social change for the better and to improve the living standards of communities. Therefore, the program encompasses the remaining 5 courses in the sciences, 2 of these courses must be in physics, two in chemistry and the remaining one in environmental sciences.

Learning Delivery Methodology

The learning methodology is interactive in nature with a focus on motivating the class about the subject. Since the course covers a very large amount of materials, the lectures are well-planned while at the same time flexible enough to allow for in-class discussion. The material leant in the class also relates with its practical applications. In addition to the conservative method of chalk/marker on board teaching, the following method will also be adopted based on the requirement of the specific subject:

- Interactive Lectures
- Animations/Video presentations
- Assignments and practice tests
- Experimental demonstrations
- Expert and guest lectures

In addition to the regular classroom teaching, the students are given extra coaching in the form of tutorials as well.

Subject Mapping

Students are required to complete a total of 28 credits spread over 11 subjects in the area of Mathematics and Basic Sciences.

Subject Integration

The curriculum gives an in-depth knowledge of various basic concepts in Mathematics and Basic Sciences that is required to understand the complex subjects that they study in the higher semesters. Apart from the regular courses, various departments under Basic Sciences propose to offer elective subjects relevant to the various branches of engineering at higher semesters. The subjects for electives were chosen carefully, in consultation with faculty from engineering departments, to support and enhance the knowledge of students to further their engineering skills. These shall also include research and development activities in various research laboratories under Basic Sciences. The topics are carefully chosen to make the students capable of problem solving, interpreting the results and expand their analytical skills and thinking capacities. The Curriculum will instill scientific curiosity in the student mind that will help the students to excel in their studies and make them successful engineers.

Subject Summary

Since all the students have to take few basic engineering courses as pre-engineering requirement, the courses in the Basic Sciences are taught by dividing the students in two group viz. Physics and Chemistry cycle. While the Engineering Mathematics-I and II are common to both the cycles, the Physics cycle students learn Engineering Physics, Environmental Engineering and Engineering Physics Lab, Chemistry cycle students learn Engineering Chemistry and Engineering Chemistry Lab in the first semester and swap the subjects in the second semester. Advanced mathematics required for various engineering branches will be taught in the third and fourth semester. Basic engineering mathematics is also offered to lateral entry students as Bridge Mathematics-I & II. The subject summery is given the following table.

I Semester

Code	Subject	L	T	P	Credit
MA 101	Engineering Mathematics - I	3	1	0	4
ME 102	Basics of Mechanical Engineering	3	0	0	3
CS 103	Foundations of Computing	3	0	0	3
PH 104	Engineering Physics-I	3	0	0	3
CE 105	Basics of Civil Engineering and Engineering Mechanics	3	0	0	3
CE 106	Environmental Studies	0	0	0	NC
CSL 107	Foundations of Computing Lab	0	0	2	1
PHL 108	Engineering Physics Laboratory	0	0	2	1
MEL 109	Basic Engineering Workshop	0	0	2	1

II Semester

Code	Subject	L	T	P	Credit
MA 201	Engineering Mathematics – II	3	0	0	3
PH 204	Engineering Physics-II	3	0	0	3
ME 111	Engineering Graphics Lab	1	0	1	2
EE 112	Basics of Electrical Engineering	3	0	0	3
CH 113	Engineering Chemistry	3	1	0	4
EC 114	Basics of Electronics Engineering	3	0	0	3
TE 115	Technical English	2	0	2	3
CHL 116	Engineering Chemistry Laboratory	0	0	2	1
EEL 117	Electrical and Electronics Laboratory	0	0	2	1

Open Electives Offered by Basic Sciences

Subject Code	Subject Name	Credits
XX XXX	Quantum Electronics/Photonics	3
XX XXX	Laser Spectroscopy Instrumentation	3
XX XXX	Nano Science	3
XX XXX	Advanced Energy Materials	3
XX XXX	Advanced Graph Theory	3
XX XXX	Operations Research	3

SUBJECT DESCRIPTION

PHYSICS CYCLE

SEMESTER I / II

MA 101 ENGINEERING MATHEMATICS-I

This paper lays a good foundation in terms of mathematics. Students revise the basics of mathematics studied earlier and get introduced to new concepts in Differential calculus, Matrices, partial differentiation, Integral calculus and Vector calculus.

ME 102 BASICS OF MECHANICAL ENGINEERING

This subject gives the student a broad idea of the fundamentals of Mechanical Engineering. The student gets the ability to apply principles of engineering, basic science, and mathematics (including multivariate calculus and differential equations) and thermodynamics to model,
analyze, design, and realize physical systems, components, or processes. Also the student is equipped to design and conduct experiments, as well as to analyze and interpret data, to identify, formulate, and solve engineering problems

CS 103 FOUNDATIONS OF COMPUTING

This subject acts as a foundation for any kind of computing and programming languages. It focuses of the basic terminology used in computing and programming concepts. This course mainly focus on history of computers, Number systems, types of memories , overview of Operating system and Learning C programming language.

PH104 ENGINEERING PHYSICS

Physics caters a baseline for any engineering stream. Engineering Physics is designed to impart the basic concepts and ideas in physics to develop scientific attitudes and enable the students to correlate the concepts of physics with the core programs. It underlines the strength of equations, formulae, graphs and mathematical tools to tackle the problems in an effective way. Engineering Physics helps in understanding the theoretical and mathematical applications and creates interest in core subjects. Engineering physics offers the basic understanding of quantum physics, nanoscience, ultrasonics, dielectric properties, magnetic properties, laser, fiber optics and crystallography.

CE 105 BASICS OF CIVIL ENGINEERING

This course will focus on essentials of Civil Engineering. The course aims to understand various branches of civil engineering and their applications to civilian requirements. Concrete Technology, Structural Engineering, Geotechnical Engineering, Transportation Engineering, Environmental Engineering, Urban Planning, RCC & Steel structural designs & use of civil engineering softwares. The course also aims at basics of structural engineering & their computations and applications to civilian requirements.

CE 106 ENVIRONMENTAL ENGINEERING

This course will focus on Environment and the current issues associated with it. The course aims to understand, through lectures and discussions, the burning problems of environment and possible solutions for the same. The students are expected to acquire the skills and awareness that enable them to promote a significant social change for the better and to improve the living standards of communities. The course offers a general study of ecosystem, resources and pollutions relevant to sustainable life. Presentations, lectures and seminars through case study include teaching scientific method while exposing students to current topics in conservation ecosystem linking between resources and causes of pollution of environment.

CSL 107 FOUNDATIONS OF COMPUTING LAB

This aim of this course is focus on studying different parts of a Computer and their use. Learning how to write algorithms, pseudo code and C programming for simple programs.

The objectives of this course include:

1. To give brief introduction Computer Science & Engineering, as well as Information Technology.
2. To give knowledge of Computer Architecture, Basic Computing Techniques.

Predominantly this course explains C Programming syntax and techniques.

PHL 108 ENGINEERING PHYSICS LABORATORY

In this technical era, the knowledge of converting theoretical results to technology is vital. Physics through experimentation helps to improve scientific attitude in general. So emphasis is given on the development of experimental skills, data analysis, calculations, and results obtained. The engineering physics laboratory experiments are designed to match the entire core subjects.

MEL 109 BASIC ENGINEERING WORKSHOP

This subject equips the students with adequate knowledge of the different manufacturing processes which are commonly employed in the industry, to fabricate components using different materials. The student is familiarized with usage of different types of hand tools and techniques which are simple yet very basic and useful in the practical world.

CHEMISTRY CYCLE

SEMESTER I / II

MA 201 ENGINEERING MATHEMATICS-II

This curriculum includes Integral Calculus in detail in the form of beta and gamma functions, Double Integrals and Triple Integrals, Orthogonal curvilinear coordinates, higher order ordinary differential equations and Laplace Transforms. Students get introduced to Numerical Methods which is the backbone of engineering analysis.

PH 204 Engineering Physics – II

This course focus on subjects that was not covered in Engineering Physics – I. This include topics viz. Mechanics, Heat and Thermodynamics, Electromagnetism, Simple Harmonic Oscillator and Optics. This course along with Engineering Physics – I will help the students understand the complex subjects that they study in higher semesters.

ME 111 ENGINEERING GRAPHICS

This subject prepares the student for using the techniques, skills, and modern engineering tools necessary for engineering practice. The different phases of manufacturing or construction require the conversion of new ideas and design concepts into the basic line language of graphics. Therefore, there are many areas (civil, mechanical, electrical, architectural and industrial) in which the skills of the CAD technicians play major roles in the design and development of new products or construction. Students prepare for actual work situations through practical training in a new state-of-the-art computer designed CAD laboratory using engineering software.

EE 112 BASICS OF ELECTRICAL ENGINEERING

This course provides basic concept of Electrical for multidisciplinary engineers. The objectives of this course are to acquaint the students with the basic principles of Electrical Engineering and help them master the concepts, laws and methods in applying the same. This subject also provides comprehensive idea about magnetic circuits, AC and DC circuit analysis, working principles and applications of Transformer and DC Machines.

CH 113 ENGINEERING CHEMISTRY

The Engineering Chemistry course is designed to strengthen the fundamentals of chemistry and to bridge the theoretical chemical concepts and their practical engineering applications. This course is intended to provide engineering students with a background in important concepts and principles of chemistry as it is quite essential and imperative, particularly in the modern era of industrialization in the world. Emphasis will be placed on those areas considered most relevant in an engineering context. The curriculum includes key topics such as nanoscience, membrane technology, thermodynamics, electrochemistry, polymers,

water technology and corrosion engineering. This course is intended to serve as a foundation course for students to further their interests in the respective branch of engineering.

EC 114 BASICS OF ELECTRONICS ENGINEERING

This course lays foundation on core fundamentals and it covers the broad range of foundational skills that apply across all basic application areas of electronics in various streams of engineering. This course provides a sufficient background to help novices understand the principles that underlie the operation of electronic circuits. Finally, the subject concludes with a look at some applications of electronics and communications like Op-Amps, Digital Systems, Communication System, and Instrumentation. The principles discussed throughout the course are designed to serve students with a variety of backgrounds, and for their minimal level awareness.

TE115 Technical English

1. Realistic Listening activities to learn language in technical discussion.
2. Situation-based speaking activities to practice extensively the language acquired.
3. Relevant vocabulary presented and practiced in professional contexts.
4. Engaging topics, articles, cases on technical subjects.

CHL 116 ENGINEERING CHEMISTRY LAB

The engineering chemistry laboratory course work is designed to enhance the practical skills of engineering students for better understanding of theoretical concepts. Through practical chemistry it is intended to develop qualitative and quantitative skills which can be applicable in all areas of sciences/engineering. The curriculum is designed in a way to impart knowledge of various instruments and their handling as well as to promote the engineering students to have an inkling of what goes on in industry. This is also supposed to equip them for better understanding of engineering subjects**.**

ECL 117 ELECTRICAL & ELECTRONICS LABORATORY

Familiarization of resistor color coding, CRO and Function generator, Verification of ohm's law Kirchhoff's Current Law, Kirchhoff's Voltage Law, Forward and reverse characteristic of P-N junction Diode, Forward and reverse characteristic of Zener diode, Maximum Power Transfer Theorem, Half wave rectifier with and without capacitor filter, Full wave rectifier with and without C filter, Zener diode as voltage regulator, Common Emitter Transistor Characteristics, Verification of Logic Gates, Implementation of logic gates using universal gates, Home Electrical Wiring Training System.

Bachelor of Technology in Aerospace Engineering

The aerospace engineering is primarily concerned with the design, analysis, testing and overall operation of vehicles which operate in air and space. The curriculum is designed to provide the student with an education in the fundamental principles of aerodynamics, flight dynamics, propulsion, structural mechanics, flight controls, design, testing and space technologies. A wide variety of opportunities awaits the aerospace engineering graduates in research, development, design, production, sales, and management in the aerospace industry and in many allied industries in which fluid flow, control and transportation problems play major roles.

Program Educational Objectives:

- Graduates are able to apply their skills and knowledge of fundamental principles of aerodynamics, flight dynamics, propulsion, structural mechanics, flight controls, design, testing and space technologies to the solution of significant aerospace problems.
- Graduates are able to identify and solve engineering problems systematically, critically, creatively and analytically.
- Graduates are competent, possess leadership qualities and able to act professionally in the field of mechanical engineering.
- Graduates are able to be successful in the workplace utilizing non-technical skills that include: communication skills, teamwork, and leadership, ethical and social responsibilities.
- Graduates are able to undertake lifelong learning and adapt to the changing environment.

Learning Delivery Methodology:

The learning methodology is focused on active learning of applications of concepts in real-time problems. The teaching learning methodology includes the following based on the requirement of the specific subject:

- Laboratory Sessions: to help students to understand the applications and concepts very precisely, this is learnt in the class room sessions.
- Tutorials
- Interactive Lectures
- Case study Exercises
- Class projects and exercises
- Field Projects and company visits
- Internships and industrial training
- Video Presentations
- Guest Lectures

Subject Mapping:

This course intends to teach the basic concepts of Aerospace Engineering and its importance to the society. The major emphasizes is set on the analysis, design, and working of aircraft and spacecraft.

Students learn the theories and practices in the fundamental subjects of aeronautics, astronautics, aerodynamics and fluid dynamics, aerospace materials and structures, dynamics and automatic control, aircraft stability and control and/or orbital and attitude dynamics and control, air-breathing and rocket propulsion, aircraft systems design. All of these place significant weight on the development and use of teamwork and communications skills for effective problem solving.

Every Student graduating from Department of Aerospace Engineering should complete total credits of 165 spread over eight semesters. The Aerospace Engineering is classified in to four broad fields, namely, Aerodynamics, Propulsion, Structures and Avionics. The foremost emphasis is on aerodynamics, propulsion and structures. Students specializing in any of the above disciplines will have to take a set of prescribed core and elective courses in the chosen discipline. They will also take courses in interdisciplinary areas for an encompassing learning experience. While a student specializes in a major discipline, he/she can also broaden his/her knowledge and skills by taking courses in other disciplines. The combination of courses taken by a student will be listed in his/her degree certificate.

As a part of industry interaction, it is essential for each student to complete internships in the industries at higher semesters (between fifth and eighth semesters). The students will also undergo the Flight lab training during sixth semester.

Course Structure:

Semesters 1 and 2: A systematic exposure to scientific, mathematical and engineering principles will take place during the first two semesters. In each of these semesters, the students will take one course each in physics, chemistry, mathematics and introductory course in different branches of engineering and Technical English. The teaching of the compulsory core courses in science and engineering will include substantial components of laboratory demonstrations and hands-on experiments. The students will also be exposed to courses that will help them appreciate science and its implications for society and also sharpen their skills in communicating science to both experts and to the general public.

Semesters 3 and 4: At the beginning of the third semester, each student will enter the department to specialize in Aerospace with a set of core subjects specially designed to train in the required field. The students shall be exposed to the fundamental concepts with both theory and experimental techniques during the two semesters. A preliminary course in numerical analysis shall also be given.

Semesters 5 and 6: At the beginning of the fifth semester, each student will have a choice of selecting an elective subject in the core area along with other mandatory subjects. The students shall be exposed to the fundamental concepts in different streams of Aerospace Engineering like Aerodynamics, propulsion, structures with both theory and experimental techniques. Also, short term flight lab training is included as a part of academics.

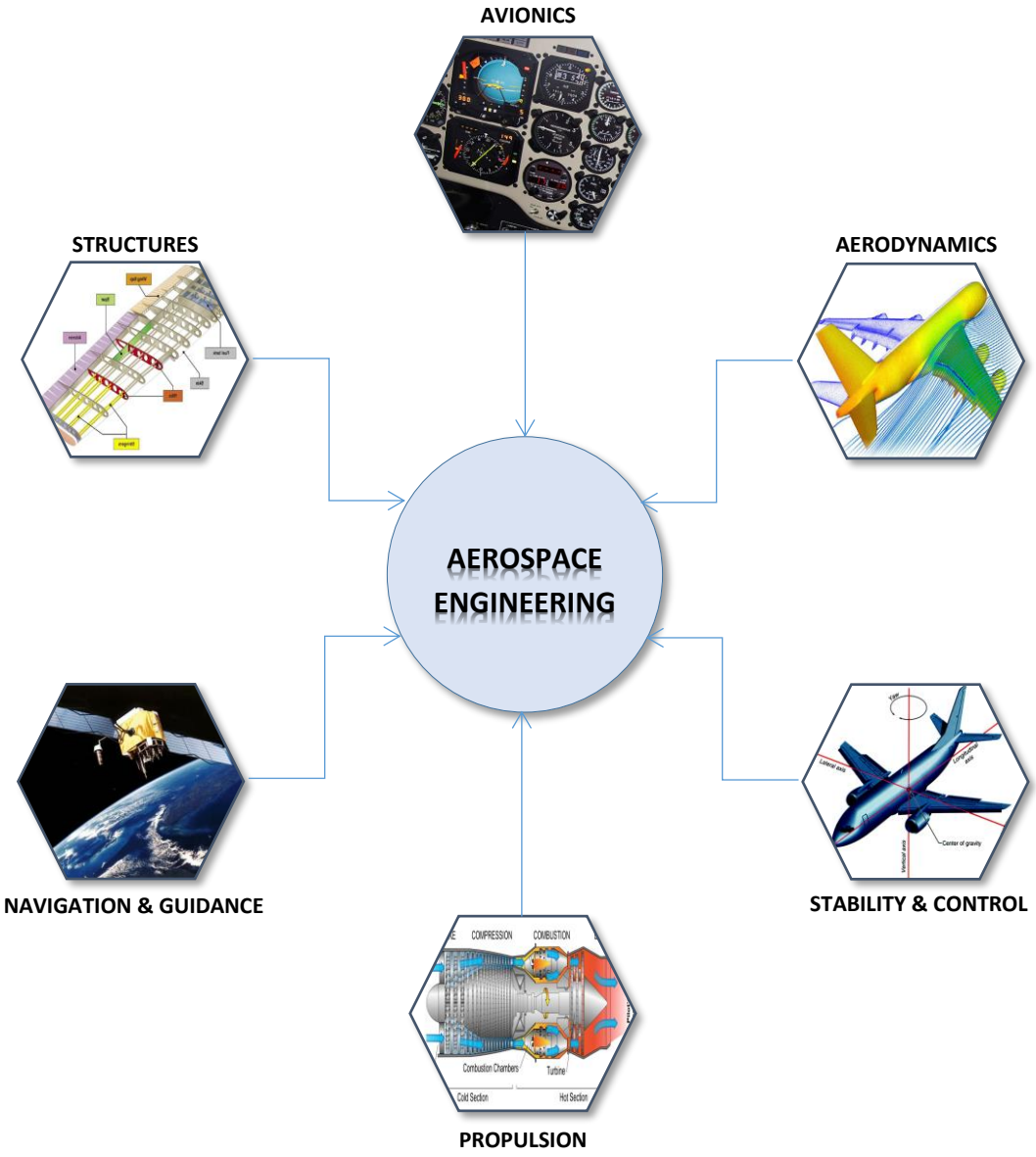
Semesters 7 and 8: During the seventh semester, the students shall be exposed to the advanced concepts in Aerospace Engineering with both theory and experimental techniques. Also, a short term internship

will be made compulsory in order to get the students exposed to industry procedures and techniques. The students are required to compulsorily take two minor subjects from outside the department. Also, the ground work for the project to be submitted in the next semester is started. During the last semester, the students are advised to take elective subjects based on their interests and choice of career. They have to do a project work in association with the choice of their electives. The project should be in the chosen major discipline or an interdisciplinary topic that substantially overlaps with the major discipline.

All lecture courses will be taught by faculty who bring their rich experience of industry, research and graduate training to bear on teaching at the undergraduate level. Mentoring and tutorials will be two important aspects of the undergraduate experience at Alliance College of Engineering and Design.

Open Subjects Electives (OSE)

To promote interdisciplinary knowledge OSE has been introduced in such a way that students can choose one elective course from any engineering department starting from third semester to seventh semester. The same way Department of Aerospace Engineering has offered OSE to the other disciplines.


AVIONICS
STRUCTURES
AERODYNAMICS
AEROSPACE ENGINEERING
NAVIGATION & GUIDANCE
STABILITY & CONTROL
COMPRESSION
COMBUSTION
Combustion Chambers
Turbine
Cold Section
Hot Section
PROPULSION

Subject Summary

Semester	Subject Code	Subject	Credits
I/II (22 Credits)	MA 101	Engineering Mathematics – I	04
	ME 102	Basics of Mechanical Engineering	03
	CS 103	Foundations of Computing	04
	PH 104	Engineering Physics - I	03
	CE 105	Basics of Civil Engineering	03
	CE 106	Environmental Engineering	02
	CSL 107	Foundations of Computing Lab	01
	PHL 108	Engineering Physics Laboratory	01
	MEL 109	Basic Engineering Workshop	01
I/II (25 Credits)	MA 201	Engineering Mathematics –II	04
	PH 204	Engineering Physics - II	03
	ME 111	Engineering Graphics	04
	EE 112	Basics of Electrical Engineering	03
	CH 113	Engineering Chemistry	04
	EC 114	Basics of Electronics Engineering	03
	TE 115	Technical English	02
	CHL 116	Engineering Chemistry Lab	01
	EEL 117	Electrical & Electronics Lab	01
III (24 Credits)	AE 301	Engineering Mathematics – III	4
	AE 302	Introduction to Aerospace Engineering (*OSE)	3
	AE 303	Fluid mechanics	3
	AE 304	Material Science and Metallurgy	3
	AE 305	Strength of Materials	3
	AE 306	Thermodynamics	3
	AEL 307	Fluid Mechanics Lab	1
	AEL 308	Machine Drawing Lab	1
		Biology	3
IV (22 Credits)	AE 401	Engineering Mathematics –IV	4
	AE 402	Space Mechanics (*OSE)	3

Semester	Subject Code	Subject	Credits
	AE 403	Aerodynamics	3
	AE 404	Theory of Mechanisms	3
	AE 405	Aircraft Systems and Instrumentation	3
	AE 406	Heat and Mass transfer	3
	AEL 407	Aerodynamics Lab	1
	AEL 408	Material Testing Lab	1
	AEL 409	Thermodynamics Lab	1
V (20 Credits)	AE 501	Aircraft Performance	3
	AE 502	Principles of Helicopters (*OSE)	3
	AE 503	Gas Dynamics	3
	AE 504	Composite Materials and Structures	3
	AE 505	Aircraft Structures- I	3
	AE 506	Aircraft Propulsion	3
	AEL 507	Mathematical Modeling and Simulation Laboratory	1
	AEL 508	Propulsion Lab	1
VI (20 Credits)	AE 601/602	Aircraft stability and control / Space Flight stability and control (**PEC)	3
	AE 603/AE 612	Finite Element Analysis / Viscous Flows (**PEC)	3
	AE 604	Vibrations	3
	AE 605	Aircraft Structure II	3
	AE 606	Rocket Propulsion	3
	AE 607	Experimental Fluid Mechanics (*OSE)	3
	HS 610	Professional Ethics and Constitution of India	1
	AEL 608	Structures Lab	1

Semester	Subject Code	Subject	Credits
	AEL 609	Computational Lab	1
VII (18 Credits)	AEI 700	Industry Internship Program	2
	AE 701/ AE 702	Aircraft Navigation and Guidance / Spacecraft Navigation and Guidance	3
	AE 703	Control Engineering	3
	AE 704/ AE 705	Aircraft Design/Spacecraft Design (**PEC)	3
	AE 706	Aerospace Avionics (*OSE)	3
	AE 707	Aero elasticity	3
	AEL 708	Control Engineering Lab	1
VIII (14 Credits)	AEP 899	Project Work	10
		Minor Elective I (Management Courses)	2
		Minor Elective II (Management Courses)	2
Total Credits = 165			

*** OSE - Open Subject Electives**

**** PEC - Professional Elective Course**

SEMESTER III

AE 301 ENGINEERING MATHEMATICS-III

Detailed studies of special topics relevant to these three branches like techniques and different procedures for obtaining approximate solutions to engineering problems where analytical solutions do not exist or difficult to obtain. It also introduces the student to the concepts of Fourier series, Partial Differential Equations and Applications to Partial Differential Equations. The students are expected to build more in their higher semesters based on what is imparted in this course.

AE 302 INTRODUCTION TO AEROSPACE ENGINEERING

This first part of the course Introduction to Aerospace Engineering presents an overall picture of the aeronautics and space domain. This overview involves a number of different perspectives on the aerospace domain, and shows some basic principles of the most important concepts for flight and space. Then the basic aerodynamics is covered, followed by flight mechanics and space mechanics.

AE 303 FLUID MECHANICS

The subject demonstrates the basic knowledge of the properties of different liquids typically used in daily life and their measurements. Physical characteristics of the fluid state, fluid statics, kinematics of fluid motion. This is made possible by understanding: different types of measurements, their advantages and disadvantages and knowledge of various phenomena like Similitude and dimensional analysis flotation, performing analysis by established equations such as Bernoulli's equation, Impulse-momentum principles. Examples of working of different machines employing hydraulic principles are discussed to enable the students to appreciate natural and artificial events.

AE 304 MATERIAL SCIENCE AND METALLURGY

To demonstrate the basic knowledge of science behind the appearance of different kinds of materials by understanding: differences between their structures, the defects therein and common types of mixing and altering the structures or subjecting them to different conditions of pressure and temperature including addition or removal of heat. Special consideration is given to ferrous and non-ferrous materials. New types of materials in the form composites are introduced briefly.

AE 305 STRENGTH OF MATERIALS

This subject is designed to give an insight to students about the behavior of materials under external forces. The concept of stress, strain, elasticity etc. as applied to various structural members under loading are included. They shall understand the strength characteristics of various structural members subjected to axial, bending, shearing and torsional loads. The students shall also study the internal effects produced and deformations of bodies caused by externally applied forces. The study would provide knowledge for use in the analyses and design courses.

AE 306 THERMODYNAMICS

Covers principles of classical thermodynamics. Develops understanding of mass, energy, heat, work, efficiency, ideal and real thermodynamic cycles and processes. Teaches first and second laws of thermodynamics, perfect gas law, properties of real gases, and the general energy equation for closed and open systems.

AEL 307 FLUID MECHANICS LAB

- To equip students with understanding of the fundamental principles and techniques to become familiar with different types of flow measurement systems
- To conduct assess performance of power generating and power absorbing devices.

AEL 308 MACHINE DRAWING

- To learn the standards used in the drawing
- To learn about fits and tolerances for a given product
- To learn various conventions involved in drawing of sectional views, assembly drawings, rivets, riveted joints, screw heads.

SEMESTER IV

AE 401 ENGINEERING MATHEMATICS-IV

Details of special topics relevant to these three branches like Introduction to Probability, Introduction to complex analysis, some concepts of curve fitting, an Introduction to series solutions to Differential Equations and to Linear Programing Problems are taught in this subject. The students are expected to build more in their higher semesters based on what is imparted in this course.

MADIP 401 BRIDGE MATHEMATICS-II (HAS NOT BEEN MENTIONED IN THE TABLE)

This curriculum includes Integral Calculus in detail in the form of beta and gamma functions, Double Integrals and Triple Integrals, Orthogonal curvilinear coordinates, higher order ordinary differential equations and Laplace Transforms that are intended to the lateral entry students. Students get introduced to Numerical Methods also which is the backbone of engineering analysis.

AE 402 SPACE MECHANICS

The space flight mechanics is the first course in graduate and undergraduate courses. The advanced course on space flight mechanics gets specialized in the sub streams of space flight mechanics. The proposed course even though is introductory but effort will be made to expose to the complicacies of the sub streams in space flight mechanics.

AE 403 AERODYNAMICS

Students will be introduced to the atmosphere, Incompressible and compressible one-dimensional flow. Airspeed measurement, two dimensional potential flows, Circulation theory of lift, thin airfoil theory, Viscous flow, Boundary layers, Finite wing theory, Drag in incompressible flow, wing-body interactions.

AE 404 THEORY OF MECHANICSMS

This course deals with advanced kinematic synthesis and analysis of mechanisms. Graphical and analytical methods for the synthesis of planar linkages will be presented. Techniques for velocity and acceleration analysis of complex mechanisms will be discussed. Force analysis of linkages will be introduced. Techniques for the synthesis and analysis of spatial mechanisms will be introduced.

AE 405 AIRCRAFT SYSTEMS AND INSTRUMENTATION

This course provides the student with a background in the major aspects of space flight. Topics covered include the history of space flight; propulsion theory; orbital mechanics fundamentals; Space Shuttle operations; present and future commercial, industrial, and military applications in space.

AE 406 HEAT AND MASS TRANSFER

Review of the modes of heat transfer: conduction, radiation, and convection. Space environment, heating fluxes. Basic differential equations for heat transfer; thermal conductivity of materials; critical radius of insulation; heat transfer in fins; heat transfer coefficient; overall heat transfer coefficient; log-mean temperature differences; forced and natural convection correlations; basic radiative heat transfer, basic principles of mass transfer

AEL 407 AERODYNAMICS LAB

This laboratory consists of a sequence of experiments that demonstrate basic aerodynamic theory while developing skills in the use of classic and modern experimental apparatus, the practice of good experimental technique, and the writing of experimental reports. This lab basically provides students with an opportunity to observe first hand aerodynamic phenomena that have been introduced in Aerodynamics course.

AEL 408 MATERIAL TESTING LAB

- Understand the fundamental principles and techniques for testing the properties of different types of materials and classify accordingly.
- To make students familiar with different techniques of heat treatment
- To make students familiar with different types of non-destructive methods of detection of defects
- To develop an understanding of how property data is generated and reported.

AEL 409 THERMODYNAMICS LAB

To enhance the basic knowledge in applied thermodynamics

SEMESTER V

AE 501 AIRCRAFT PERFORMANCE

Students will demonstrate knowledge in deriving equations of motion and simplification for performance analysis, drag, and estimation of drag polar, performance analysis – steady level flight, steady climb, range and endurance, accelerated level flight, maneuvers, V-n diagram, flight limitations, estimations of take-off distance and landing distance.

AE 502 PRINCIPLE OF HELICOPTERS

The development of rotating-wing aircraft and the helicopter. Hovering theory and vertical flight performance analysis. Auto-rotation, physical concepts of blade motion and control, aerodynamics and performance of forward flight. Blade stall, stability, and vibration problems. Design problems.

AE 503 GAS DYNAMICS

Laminar and turbulent flows, transition flow, skin friction drag on an airfoil. Obtaining equations for streamline, for particle path, and for streak line in a flow field. Compressible flow, shock waves, thermodynamics of gas flow. Reversible and irreversible processes. Changes in pressure, density, and temperature across shock waves. Isentropic duct flow and flow through a nozzle. Static performance and maneuvers in flight. Propeller theory.

AE 504 COMPOSITE MATERIALS AND STRUCTURES

Introduction to Composite Materials, Macro Mechanics of Lamina, Micro Mechanical Analysis of a Lamina, Macro Mechanical Analysis of a Laminate, Metal Matrix Composites, Failure Criteria and Strength of Laminates, Optimal Composite Structures

AE 505 AIRCRAFT STRUCTURE I

Methods of stress analysis of statically determinate and indeterminate lightweight structural systems. Applications include space structures and semi-monocoque structures. Inertia force and load factor computation. Topics in applied elasticity. Three-dimensional beam bending. Shear flow. Materials considerations.

AE 506 AIRCRAFT PROPULSION

This course is concerned with the preliminary design of various air breathing and non-air breathing engine for aircraft propulsion. Introduction to engines, conservation equations & derivation of the thrust equation for air breathing and non-air breathing engines. Efficiencies of air breathing and non-air breathing engines, quasi-one dimensional flow through nozzles. Cycle analysis of air breathing systems, detailed discussion on rocket engines.

AEL 507 MATHEMATICAL MODELING & SIMULATION LAB

Learn the fundamentals of MATLAB and get started working with advanced mathematical functions and building exciting matrix visualizations. In this course usual pattern of teaching/learning MATLAB from a programming view point to a mathematical one. The idea is that by thinking about mathematical problems, students are prodded into learning MATLAB for the purpose of solving the problem at hand.

AEL 508 PROPULSION LAB

Students will conduct experiments on nozzle, jet engine turbine, heat transfer experiments, jet engine compressor.

SEMESTER VI

AE 601 AIRCRAFT STABILITY AND CONTROL

This class includes a brief review of applied aerodynamics and modern approaches in aircraft stability and control. Topics covered include static stability and trim; stability derivatives and characteristic longitudinal and lateral-directional motions; and physical effects of the wing, fuselage, and tail on aircraft motion. Control methods and systems are discussed, with emphasis on flight vehicle stabilization by classical and modern control techniques; time and frequency domain analysis of control system performance.

AE 602 SPACECRAFT STABILITY AND CONTROL

This course presents the fundamentals of classical control in the context of spacecraft attitude control. This approach is particularly beneficial for the training of students in both of the subjects of classical control as well as its application to spacecraft attitude control. The entire treatment of both orbital and attitude dynamics makes use of vectrix notation, which is a tool that allows the user to write down any vector equation of motion without consideration of a reference frame. This is particularly suited to the treatment of multiple reference frames. Vectrix notation also makes a very clear distinction between a physical vector and its coordinate representation in a reference frame. This is very important in spacecraft dynamics and control problems, where often multiple coordinate representations are used (in different reference frames) for the same physical vector.

AE 603 FINITE ELEMENT ANALYSIS

Introduction to Finite Element analysis ,One-Dimensional Elements-Analysis of Bars and Trusses ,Two-Dimensional Elements-Analysis of Plane Elasticity Problems, Axi-symmetric Solid Elements-Analysis of Bodies of Revolution Under axi -symmetric Loading, Three-Dimensional Elements-Applications to Solid Mechanics Problems, Beam Elements-Analysis of Beams and Frames, Heat Transfer / Fluid Flow, Dynamic Considerations

AE 604 VIBRATIONS

To demonstrate the basic knowledge of vibrations observed in machine components by understanding: the degrees of freedom; types of vibrations; linear and nonlinear systems; instruments for measuring vibrations; causes of vibration and their reduction; fundamentals of acoustics.

AE 605 AIRCRAFT STRUCTURES II

Methods of computer-aided deflection and stress analysis of redundant lightweight structural systems by means of virtual work principles and their energy counterparts. Introduction to finite element theory. Buckling considerations. Applications include space structures and semimonocoque structures.

AE 606 ROCKET PROPULSION

A study of gas turbine and rocket engines. Topics include control volumes, conservation equations, combustion processes, efficiencies, fuel consumption, nozzle flow, diffusers, ideal and real ramjets, gas turbine engines, performance of rocket vehicles, and solid and liquid propellant rocket motors.

AEL 607 EXPERIMENTAL FLUID MECHANICS

The course will provide an introduction to measurement methods relevant to experimental fluid mechanics. Knowledge of these topics will also be of use for fluid mechanics students involved in modelling. The course will provide an overview of analysis techniques commonly used in experimental work. A variety of measurement methods and techniques will be presented in order to provide knowledge and understanding of common measurement methods used in research. Lab classes will provide the student with opportunities to apply the topics discussed in class to actual data. Literature which is relevant to the measurement techniques will be discussed in class as well.

AEL 608 AIRCRAFT STRUCTURES LAB

- To provide the basic knowledge of the testing equipment for various structural components.
- To impart the practical exposure with the measuring equipment and sensors.
- To impart the practical exposure with composite material manufacturing

AEL 609 COMPUTATIONAL LAB

To develop proficiency in the application of the finite element method (modeling, analysis, and interpretation of results) to realistic engineering problems using a major commercial general-purpose finite element and finite volume code.

HS 610 PROFESSIONAL ETHICS AND CONSTITUTION OF INDIA

The subject is intended for introducing the broader perspectives of the Indian Constitution with an aim to make the students informed citizens of India. The subject is also gives the basic knowledge about the working of Indian political system within constitutional framework. The principal objective of the course is to bring awareness towards the constitutional provisions like rights, duties and other values, to make the students responsible citizens of India.

AE 612 VISCOUS FLOWS

This course is intended to cover the fundamentals of fluid mechanics from an advanced point of view, with emphasis on the mathematical treatment of viscosity effects in laminar flows of a Newtonian fluid. We begin with the Navier Stokes equations and some of its exact solutions available in simplified configurations. Attention is given to the Stokes-flow regime of very low Reynolds numbers, flows with wall and free-shear boundaries, and the effects of pressure gradients, heat transfer and compressibility. We also introduce the turbulence modeling.

SEMESTER VII

AE 701 AIRCRAFT NAVIGATION AND GUIDANCE

This Course is about the Design of guidance and navigation systems for various aerospace vehicles. Discussion of the various guidance and control systems used in missile systems and launch vehicles. Equilibrium glide trajectories for atmospheric flight, energy guidance methods.

AE 702 SPACECRAFT NAVIGATION AND GUIDANCE

Introduce the concept of Navigation and Guidance in space vehicles and learn the fundamentals to determine the orbit of a space vehicle. This course mainly focusing on spacecraft trajectory optimizations,

techniques to transfer the space vehicle from one orbit to another orbit and the fundamentals of interplanetary missions.

AE 703 CONTROL ENGINEERING

This course shall introduce the fundamentals of modeling and control of linear time invariant systems; primarily from the classical viewpoint of Laplace transforms and a brief emphasis on the state space formulation as well. The course will be useful for students from major streams of engineering to build foundations of time/frequency analysis of systems as well as the feedback control of such systems.

AE 704 AIRCRAFT DESIGN

Students are acquainted with various stages in airplane design, steps in preliminary design, data collection, preliminary three-view drawing, weight estimation, wing parameters, optimization of wing loading and thrust loading, selection of engine. Fuselage parameters and internal layout.

AE 705 SPACECARFT DESIGN

The main objective of the course is to introduce the concept of space system design and engineering. The course will describe the various subsystems involved in the design of a satellite. It will also describe the techniques of systems engineering that are used to obtain a coherent satellite design.

AE 706 AEROSPACE AVIONICS

This course is a study of aviation electronic equipment with hands-on wiring and system testing. Emphasis will be placed on avionics system installation and the block diagrams of individual appliances. GPS unit is a requirement of the class. Upon completion of this course, the student will be able to understand the operation, testing, and troubleshooting of general aviation avionics systems and wiring concepts. Fly by Wire.

AE 707 AERO ELASTICITY

Students will be introduced to aero elastic problems, classification and solution of aero elastic problems. Static Aero elasticity, dynamics of aero elasticity. Flutter calculation, panel flutter.

AEL 708 CONTROL ENGINEERING LAB

- To help the students understand and practice the modeling, simulation, and implementation of a physical dynamical system by a linear time invariant ordinary differential equation.

- To highlight the electrical modeling of a second order system and analyze the underdamped over-damped and critically damped cases.
- To study the effects of Lead, Lag and Lag-Lead series compensator on a second order system transient and steady state system response.
- To familiarize students with Servo-Motor and implement the basic principles of Servo- Motor calibration.
- Incorporate testing theory and hands on experimental setup to enable the students with the ability to setup, perform, and properly analyze experimental results.

AE IIP INDUSTRY INTERNSHIP PROGRAM

The Internship aims to offer students the opportunity to apply their knowledge in real-life environments through an industry placement for four weeks. It is expected that the skills students will gain from working with an organization will help them perform better on their jobs after graduation. In addition, the Internship greatly increases the chances for students to obtain full time employment after graduation.

SEMESTER VIII

AEP 801 PROJECT WORK

This course introduces the student to independent project research. It is essentially an individual/Group study, topics chosen by the student/ Faculty with the approval of the department. The study may be in the area of design, theories, and methods in the field of Aerospace Engineering. The student conducts a thorough research under the supervision of an academic staff. For assessment, students submit reports of their progress and final results, and give in-person presentations and demonstrations of their work.

B. Tech. in Civil Engineering
(Batch 2018-2022)

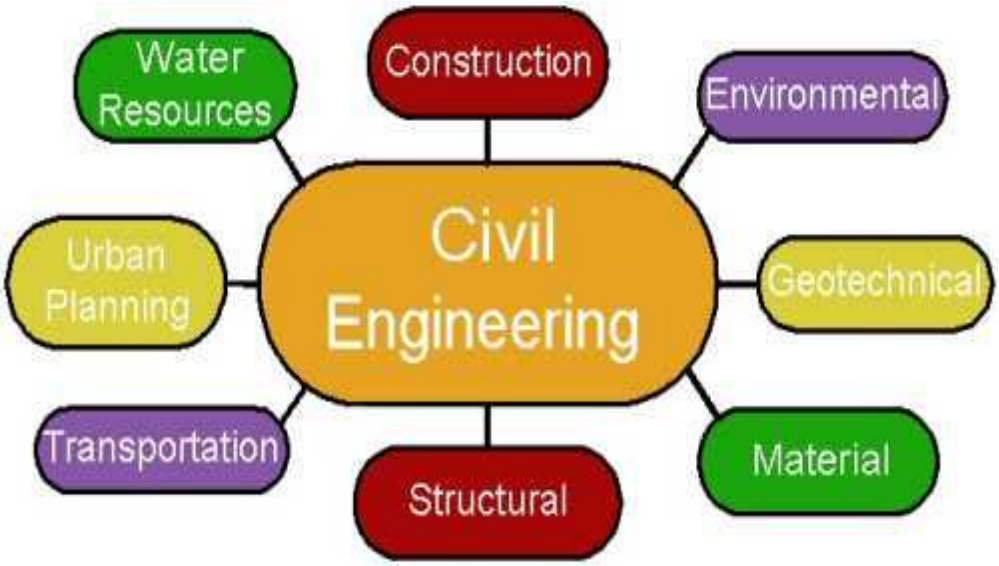
Civil Engineering is a professional engineering discipline that deals with the design, construction and maintenance of the manmade and naturally built environment, including works like roads, bridges, canals, dams and buildings.

The Department of Civil Engineering offers the B Tech degree in Civil Engineering and provides a dynamic, challenging and ethical environment for pursuing high quality teaching, research, learning and service across all areas where students, faculty and other key participants can interact, collaborate and partner with the global community for creation and dissemination of knowledge and transform lives of people through innovation and excellence in higher education.

Different Fields of Civil Engineering

Civil Engineering may be called for service in the following fields.

- Construction Engineering
- Environmental Engineering
- Geotechnical Engineering
- Structural Engineering
- Transportation Engineering
- Water Resources Engineering
- Urban Planning Engineering
- Building Material
- Surveying



Learning Statement

The civil engineering program will serve the nation by providing quality engineering education that enables students to enter a profession that can improve the civil infrastructure and economic welfare. Our civil engineering program will maintain a strong emphasis on undergraduate education with the goal that our program will be recognized for quality instruction in civil engineering analysis and design. An important emphasis of the civil engineering program is preparation of students for professional engineering license and practice.

Civil Engineering graduates will be prepared in advanced mathematics and in physical sciences. On graduation, students will have acquired knowledge of the fundamental engineering sciences common to most engineering disciplines and a solid undergraduate foundation in general civil engineering principles, enabling continued education at advanced levels. The program includes courses in environmental, geotechnical, surveying, structural, transportation and water resources engineering.

Learning Delivery Methodology

A Learning Methodology applied to the development of a technical system by setting a systematic approach to learning, focusing on individual and team training. The goal for the learning methodology is to provide the best learning knowledge with the best learning tools that can be built.

The methodology includes the following based on the requirements of the specific subject.

- Interactive lectures
- Field visits/Site visits
- Class projects and assignments
- Practical sessions
- Seminars/ Guest lectures

- Video presentations
- Projects/Mini Projects

Programme Learning Outcomes

Each graduate will demonstrate the following abilities upon graduation:

I. Graduates of the program will be skilled in the fundamental principles of mathematics, science, and sub-disciplines in Civil Engineering that are necessary for success in industry or graduate school.
II. Function ethically in their professional Civil Engineering roles.
III. Creating a supportive, controlled, learning environment.
IV. Graduates will be leaders, both in their chosen profession and in other activities.
V. Graduates will be familiar with current and emerging Civil Engineering and global issues, and have an understanding of ethical and societal responsibilities.
VI. Graduates will have the necessary qualifications for employment in Civil Engineering and related professions, for entry into advanced studies, and for assuming eventual leadership roles in their profession.
VII. Graduates will produce engineering designs that are based on sound principles and that consider functionality, aesthetics, safety, cost effectiveness and sustainability.

Subject Summary

S.No	Code	Subject Name	Credits	L	P	Sem	Category
Ist Semester							
1	MA 101	Engineering Mathematics - I	4	4	-	I	BSC
2	ME 102	Basics of Mechanical Engineering	3	3	-	I / II	ESC
3	CS 103	Foundations of Computing	3	3	-	I / II	ESC
4	PH 104	Engineering Physics	4	4	-	I / II	BSC
5	CE 105	Basics of Civil Engg. & Engg.Mech.	3	3	-	I / II	ESC
6	CE 106	Environmental Studies	2	2	-	I / II	MC
7	CSL 107	Foundations of Computing Lab	1	-	3	I / II	ESC
8	PHL 108	Engineering Physics Laboratory	1	-	3	I / II	BSC
9	MEL109	Basic Engineering Workshop	1	-	3	I / II	ESC
		Total	**22**	**19**	**9**		

S.No	Code	Subject Name	Credits	L	P	Sem	Category
IInd Semester							
10	MA 201	Engineering Mathematics - II	4	4	-	II	BSC
11	ME 111	Engineering Graphics	3	1	3	I / II	ESC
12	EE 112	Basics of Electrical Engineering	3	3	-	I / II	ESC
13	CH 113	Engineering Chemistry	4	4	-	I / II	ESC
14	EC 114	Basics of Electronics Engineering	3	3	-	I / II	ESC
15	TE 115	Technical English	3	2	2	I / II	HSMC
16	CHL 116	Engineering Chemistry Laboratory	1	-	1	I / II	ESC
17	EEL 117	Electrical & Electronics Laboratory	1	-	1	I / II	ESC
		Total	**22**	**17**	**7**		

S.No	Code	Subject Name	Credits	L	P	Sem	Category
IIIrd Semester							
18	CE 301	Remote Sensing and GIS	3	3	-	III	**OEC-I**
19	MA 301	Engineering Mathematics -III	4	4	-	III	BSC
20	CE 302	Biology for Engineers	3	3	-	III	BSC
21	CE 303	Strength of Materials	3	4	-	III	PCC
22	CE 304	Surveying - I	3	4	-	III	PCC
23	CE 305	Fluid Mechanics	3	4	-	III	PCC
24	CEL 306	Material Testing Laboratory	1	-	3	III	PCC
25	CEL 307	Surveying Practice - I	1	-	3	III	PCC
		Total Credits	**21**	**22**	**6**		

S.No	Code	Subject Name	Credits	L	P	Sem	Category
IVth Semester							
26	CE 401	Building Planning , Designing & Drawing	3	4	3	IV	**OEC-II**
27	MA 401	Engineering Mathematics -IV	4	4	-	IV	BSC
28	CE 402	Concrete Technology	3	3	-	IV	PCC
29	CE 403	Structural Analysis-I	3	4	-	IV	PCC
30	CE 404	Surveying - II	3	4	-	IV	PCC
31	CE 405	Hydraulics & Hydraulic Machinery	3	4	-	IV	PCC
32	CEL 406	Fluid Mech. & Hyd.Machines Lab.	1	-	3	IV	PCC-L
33	CEL 407	Surveying Practice - II	1	-	3	IV	PCC-L
		Total Credits	**21**	**23**	**9**		

S.No	Code	Subject Name	Credits	L	P	Sem	Category
Vth Semester							
34	CE 501	Building Materials & Cons. Techn.	3	3	-	V	**OEC-III**
35	CE 502	Structural Analysis-II	3	4	-	V	PCC
36	CE 503	Transportation Engg-I	3	3	-	V	PCC
37	CE 504	Geotechnical Engg-I	3	4	-	V	PCC
38	CE 505	Design of RCC str.-I	3	4	-	V	PCC
39	CE 506	Hydrology and Irrigation Engineering	3	3	-	V	PCC
40	CEL 507	CAD lab	1	-	3	V	PCC-L
41	CEL 508	Concrete Lab	1	-	3	V	PCC-L
		Total Credits	**20**	**21**	**6**		

S.No	Code	Subject Name	Credits	L	P	Sem	Category
VIth Semester							
42	CE 601	Project Planning & Management	3	3	-	VI	**OEC-IV**
43	CE 602	Environmental Engineering -I	3	3	-	VI	**PEC1**
44	CE 603	Design of RCC Str.-II	3	4	-	VI	**PEC2**
45	CE 604	Transportation Engg-II	3	3	-	VI	**PEC3**
46	CE 605	Geotechnical Engg-II	3	4	-	VI	**PEC4-a**
47	HS 607	Const. of India & Prof. Ethics	1	2	-	VI	HSMC
48	CEL 608	Geotechnical Engg lab	1	-	3	VI	**PEC4-b**
49	CEL 609	Extensive Survey Project & Edu.Tour	1	-	1	VI	PCC-L
50	CEL 610	Internship	2	-		VI	
		Total Credits	**20**	**19**	**4**		

S.No	Code	Subject Name	Credits	L	P	Sem	Category
VIIth Semester							
51	CE 701	Earthquake Resistant Design of Structures	3	3	-	VII	**OEC-V**
52	CE 702	Environmental Engineering - II	3	3	-	VII	**PEC5-a**
53	CE 703	Design of Steel Str.-I	3	4	-	VII	**PEC6**
54	CE 704	Hydraulic Structures	3	4	-	VII	**PEC7**
55	CE 705	Estimation & Costing	3	4	-	VII	**PCC**
56	CE 706	Design of PSC Structures	3	3	-	VII	**PEC8-a**
57	CEL 707	Environmental Engg Lab	1	-	3	VII	**PEC5-b**
58	CEL 708	Highway Engineering Lab	1	-	3	VII	**PEC8-b**
		Total Credits	**20**	**21**	**6**		

S.No	Code	Subject Name	Credits	L	P	Sem	Category
VIIIth Sem							
59	CE 801	Design of Steel Str.-II	3	4	-	VIII	**PCC**
60	CE 802	Intellectual Property Rights	2	2	-	VIII	HSMC
61	CE 82X	Entrepreneuship & Management	2	2	-	VIII	HSMC
62	CE 804	Project Work & Seminar	10	-	10	VIII	
		Total Credits	**17**	**8**	**10**		

Course wise credits

S. No.	CATEGORY	AICTE	ACED - CIVIL
1	Humanities , Social Sciences & Management	12	7
2	Basic Science Courses	26	24
3	Engineering Science courses.	29	26
4	Professional core courses	47	49
5	Professional Elective courses	23	27
6	Open Electives Courses	11	15
7	Project work, Internship	12	12
8	Mandatory Courses		
	Environmental Sciences, Induction program		
	Constitution & Others		
	Total Credits	160*	160

CE 301: REMOTE SENSING & GIS

This course provides students with an introduction to the principles of geographic information systems (GIS) and remote sensing and the application of these techniques to the environmental and life sciences

MA 301 :(AE/CE/ME) ENGINEERING MATHEMATICS-III

Detailed studies of special topics relevant to these three branches like techniques and different procedures for obtaining approximate solutions to engineering problems where analytical solutions do not exist or difficult to obtain. It also introduces the student to the concepts of Fourier series, Partial Differential Equations and Applications to Partial Differential Equations The students are expected to build more in their higher semesters based on what is imparted in this course.

CE 302: BIOLOGY FOR ENGINEERS

This subject conveys that biology is as important a scientific discipline for engineers as Mathematics, Physics & Chemistry and convey that all forms of life has the same building blocks and yet the manifestations are as diverse as one can imagine. The object is to bring out the fundamental differences between science and engineering by drawing a comparison between eye and camera, bird flying and aircraft.

CE 303: STRENGTH OF MATERIALS.

This subject is designed to give an insight to students about the behavior of materials under external forces. The concept of stress, strain, elasticity etc. as applied to various structural members under loading are included. They shall understand the strength characteristics of various structural members subjected to axial, bending, shearing and torsional loads. The students shall also study the internal effects produced

and deformations of bodies caused by externally applied forces. The study would provide knowledge for use in the analyses and design courses.

CE 304 : SURVEYING I

The objective of this subject is to ensure that the student develops knowledge of the basic and conventional surveying instruments, principles behind them, working of the instruments, plotting of the area from the field measurements, determination of the area and the theory behind curves.

CE 305 : FLUID MECHANICS

This course introduces the fundamentals of fluid flow and its behavior to equip the students to learn related subjects and their applications in higher semesters. The students shall know, understand and apply the basic concepts of Fluid Mechanics to carry out professional engineering activities in the field of fluids. They are equipped to apply scientific method strategies to fluid mechanics: analyze qualitatively and quantitatively the problem situation, propose hypotheses and solutions.

CEL 306 : MATERIAL TESTING LAB

This course introduces test the materials viz. steel, wood, aluminum etc for their strength. The major testing machines include Universal Testing Machine of 2000KN capacity.

CEL 307: SURVEYING PRACTICE - 1

This subject is designed to impart practical training in Chain, Compass, Plane table surveying & Levelling

SEMESTER IV

CE 401 : BUILDING PLANNING, DESIGNING & DRAWINGS.

During execution of a civil engineering project, civil engineers must have to refer so many drawings & this need is fulfilled in this subject matching with the industry requirement. All types of building planning, designing & drawings are studied using manual drawing & computer aided drawings.

MA 401 : ENGINEERING MATHEMATICS IV.

Details of special topics relevant to these three branches like Introduction to Probability, Introduction to complex analysis, some concepts of curve fitting, an Introduction to series solutions to Differential Equations and to Linear Programing Problems are taught in this subject. The students are expected to build more in their higher semesters based on what is imparted in this course.

CE 402: CONCRETE TECHOLOGY

This course aims at different aspects of cement based concrete applications in civil engineering. Manufacture of cement concrete for any application, their strength performance with age are included, different types of cements & their applications are included in this subject.

CE 403: STRUCTURAL ANALYSIS -I

The course aims to understand the basic strength and energy theorems of structural mechanics and its applications. The students shall study deformations of bodies caused by externally applied forces and the internal effects produced due to moving loads. This shall provide students with fundamental Structural Engineering principles that can be applied across multiple engineering applications (such as Aerospace, Civil, Marine, and Mechanical). This will also provide students with broad multi-disciplinary skills necessary to accomplish professional objectives in a rapidly changing technological world.

CE 404: SURVEYING -II

This course is an advanced version of surveying learnt in the previous semester. The students will gain an ability to apply knowledge of mathematics, science, and engineering to understand the measurement techniques and equipment used in land surveying and to understand advanced concepts of surveying by using basic instruments to study modern trends in surveying.

CE 405: HYDRAULICS AND HYDRAULIC MACHINERY

In this subject flow properties of water in irrigation engineering are studied along with the machineries for water lifting & pumping. The subject also introduces open channel flow characteristics and hydraulic machines, flow through turbines and pumps including their performance characteristics and design aspects. The students are exposed to the problems that man encountered in the field of water supply, irrigation, navigation and water power resulted in the development of fluid mechanics. It enables one to understand the interesting phenomena occurring in nature and it empowers to design and to create variety of fluid flow equipment for the benefit of mankind.

CEL 406: FLUID MECHANICS AND HYDRAULIC MACHINERY LABORATORY.

In this laboratory, experiments on flow properties of water under natural flow and forced flow are studied along with the necessary instruments for pumping. This subject gives the practical knowledge about the different flow mechanisms and properties of fluid in open and closed circuits and the working mechanisms of different hydraulics machines. The students get an idea of the working principles of power generating units as well as certain utility devices like pumps.

CEL 407: SURVEYING PRACTICE – II

In this laboratory, principles of advanced surveying are studied with the help of Theodolite and total station. This subject provides a good foundation in the practical knowledge in different aspects of Theodolite Surveying & Tachometry.

SEMESTER V

CE 501: BUILDING MATERIALS & CONSTRUCTION TECHNOLOGY

This subject deal with the detailed study regarding properties and testing of building materials, construction of building components. This course introduces the development, production, standardization of cost- effective innovative building materials and construction technologies in housing and building sectors. The student will be trained in construction technology used for building parts.

CE 502 : STRUCTURAL ANALYSIS -II

This course is designed to extend the concepts taught in Structural Analysis I. This course aims to enable the student get a feeling of how real-life structures behave and to make the student familiar with latest computational techniques and software used for structural analysis

CE 503 : TRANSPORTATION ENGINEERING -I

The purpose of this course is to provide students with a solid introduction to the principles of transportation engineering with a focus on highway engineering and traffic analysis. Also enable the students to differentiate between road pavement structures, to analyze road pavement structures, to differentiate between the different types of materials used and to design road pavements. The introduction of the design concepts, material properties and performance criteria are used together with vehicle loading criteria to demonstrate to the students how they are combined to design and construct road pavements.

CE 504 : GEOTECHNICAL ENGINEERING – I

The objective of this course is to introduce the student to the principles that govern the use and application of soil mechanics in Civil Engineering. Emphasis is placed on the fundamental behavior of soil as it pertains to engineering problems, and on the classification and evaluation of engineering properties of soil.

CE 505 : DESIGN OF RCC STRUCRES – I

The objectives of this course are to help students understand the fundamental principles and procedures of reinforced concrete design and to apply the principles of reinforced concrete design to real world problems. Also this course prepares the students for entry level structural engineering employment

CE 506 : HYDROLOGY AND IRRIGATION ENGINEERING

The objective of this subject is to ensure that the student develops knowledge of the basic in the hydrologic cycle, principles and processes necessary to effectively manage water resources through well designed drainage and irrigation systems. Also this course is designed to apply appropriate techniques and analyses to the effective design of both irrigation and drainage systems. The objective of this course is to study the hydrological processes at and immediately beneath the land surface that are responsible for the partitioning of water and energy into hydrological fluxes (infiltration, runoff, recharge,

evaporation, sensible heat, ground heat) and to introduce methods to extrapolate point scale information about these processes to hill slope and catchment scales.

CEL 507: CAD LABORATORY

This course is designed to provide civil engineering undergraduates with basic understanding of the theory and practice of engineering drawings and computer-aided design for civil engineering applications. Students will learn working drawings by means of lectures, discussion of drawing examples related to existing buildings or projects. Topics will include fundamentals of graphics and drafting principles, Auto-Cad fundamentals, architectural drawings, structural floor plan of building, detailing for typical reinforced concrete structural members. This course is designed to train the students with various civil engineering software's.

CEL 508: CONCRETE LABORATORY

In this laboratory, the fundamentals of cement, ingredients of cement-based concrete & manufactured cement concrete behavior are familiarized to students with standard quality laboratory testing procedures. This will help in understanding the strength & cost parameters involved in concrete based construction activities.

SEMESTER VI

HS 610 PROFESSIONAL ETHICS AND CONSTITUTION OF INDIA

The subject is intended for introducing the broader perspectives of the Indian Constitution with an aim to make the students informed citizens of India. The subject is also gives the basic knowledge about the working of Indian political system within constitutional framework. The principal objective of the course is to bring awareness towards the constitutional provisions like rights, duties and other values, to make the students responsible citizens of India.

CE 601: PROJECT PLANNING AND MANAGEMENT

This subject provides a good introduction to the study of Project Management as it is used on the larger construction project. The Students will study how construction contractors manage cost, time, scope and quality. As this knowledge is based on live engineering projects, this course will raise the students to industry requirement.

CE 602 : ENVIRONMENTAL ENGINEERING – I

The objective is to develop graduates that function successfully in areas of environmental engineering, such as water and wastewater treatment, and solid and hazardous waste engineering. Also to prepare graduates for advanced education in environmental engineering and related fields. Students will learn the essential principles used in environmental engineering, important issues in environmental engineering and students will understand the design processes for treatment of environmental pollutants

CE 603 : DESIGN OF RCC STRUCTRUES – II

This course introduces you to structural analysis techniques and their application in the structural design of reinforced cement concrete buildings. Students will build on their knowledge of basic reinforced concrete design and learn to model and predict the response of reinforced concrete members under axial, flexure and shear loads, and the design footings, retaining walls, slender columns . This subject gives the practical knowledge to illustrate and develop the design methodologies and introduce and employ the concept of codes and specifications for design of reinforced concrete members and elementary structures.

CE 604: TRANSPORTATION ENGINEERING – II

The objective of this course is for students to gain a solid understanding of the principles of railway engineering and airport engineering. This course will present many design problems, and in sufficient depth, such that the student will be capable of solving real problems.

CE 605: GEOTECHNICAL ENGINEERING – II

Geotechnical Engineering covers a wide range of problems in Civil Engineering. It includes projects such as: foundations for different types of buildings and bridges, road pavements, excavations, tunnels, slopes, earth dams, and landfills. This course builds on the basic introductory material from Geotechnical Engineering 1 to develop concepts and models for analysis and design of engineering projects involving soils in a natural or compacted state

CEL 608: GEOTECHNICAL ENGINEERING LABORATORY

The course aims to acquaint the student with the concept of soil as an engineering material and the properties and methods used to characterize soil for Geotechnical analysis and design. This course is designed to clarify concepts learned in Geotechnical Engineering

CEL 609: EXTENSIVE SURVEY PROJECT

This subject provides a good foundation in the practical knowledge of different types of surveying using different surveying instruments. The students will be trained on solving engineering problems with the aid of these exercises.

CEL 610: INDUSTRY INTERNSHIP

In this part of the training student will undergo 45 days of industry exposure and work as an Intern and get first-hand experience of already learnt things & understand how far he has to acquire remaining knowledge to make him fit for Industry.

SEMESTER VII

CE 701: EARTHQUAKE RESISTNAT DESIGN OF STRUCTRUES.

This course provides students with an introduction to design build structures against earthquake forces. This course mainly includes the use of IS 1893-2002 and other Indian codes for masonry buildings. The

students will be trained to understand the importance of detailed engineering in all construction activities for the safety of structures against earth quake forces.

CE 702: ENVIRONMENTL ENGINEERING – II

The objective of this course is to provide an orientation to the methods that are applied to control and prevent environmental pollution. The basic principles followed for eliminating negative impacts on the quality of water, air or land is introduced, the shifting emphasis from control to prevention will be considered; and the limitations of building solutions for individual environmental media will be examined. This course is designed to train students in the practical aspects of operating and maintaining industrial treatment plants, emphasizing safe practices and procedures.

CE 703: DESIGN OF STEEL STRUCTRUES – I

In this course students are trained to understand the strength properties of basic steel structural elements like nuts, bolts, welding and simple steel structural parts like beams, columns etc. The subject also gives understanding about different types of steels and related materials used for steel structures. Use of IS 800:2007 and IS 875(Part1-4):1987 are taught. The purpose of this course is to impart knowledge for the design of bolted and welded joints and to impart the knowledge in the design of tension, compression members.

CE 704: HYDRAULIC STRUCTRUES

This course aims to provide students, knowledge in the hydrological cycle, precipitation, evapotranspiration, infiltration and its measurements. This will help to understand the physics of translate of rainfall into runoff modeling of various runoff techniques, estimation of runoff and hydrograph, basic types of irrigation, irrigation standards and crop water assessment. Finally, the course will train students in storage structures like different DAMS and related structures.

CE 705: ESTIMATION & COSTING

The objective of the course is to introduce the students to the techniques of building construction estimation. This course is designed to understand the scope of work and related cost is perhaps the most fundamental knowledge required to start any activity. This course provides a theoretical framework to define the scope of work, schedule and cost, the student is exposed to the different methods used to identify and measure the cost elements as the first step to build a cost estimate. This course provides students with an introduction to the principles of various divisions that constitute the engineering unit that helps the section to achieve the primary objectives which are of Construction and Maintenance of infrastructure.

CE 706: DESIGN OF PRESTRESSED STRUCTRUES.

This course is in continuation with two subjects studied on RCC, during previous two semesters. with the help of prestressing technique how cost of construction can be brought down, and speed of construction can be increased. The detailed technique of prestressing on Steels used in RCC are taught to meet the present-day industry requirement.

CEL 707: ENVIRONMENTAL ENGINEERING LABORATORY

The objective of this laboratory is to determine the qualities of water and waste water and characteristics. The experiments include the determination of pH, turbidity, conductivity, and impurities in water and BOD, DO and COD of waste water. This laboratory course will help the students to understand the theoretical concepts learned in the course environmental engineering.

CEL 708 : HIGHWAY ENGINEERING LABORATORY

This course will help the students to understand different materials used in highway engineering. This course will equip the students to perform laboratory test on highway pavement materials keeping in view the present standards and specifications as per the Bureau of Indian standards that are being followed in India.

SEMESTER VIII

CE 801: DESIGN OF STEEL STRUCTRES – II

This course is an extended version of design of steel structures, where students learn to design industrial steel structures and its components such as design of purlins, roof truss, gantry girder, knee braced columns and long span beams. In this section students learn wind load analysis and get familiar use of IS 800:2007 and also IS 875 (Part1-4) :1987.The purpose of this course is to impart knowledge for the design of bolted and welded joints and also to impart the knowledge in the design of tension, compression members, beams, roof trusses, beam columns and beam-columns connections as per IS 800-2007

CE 802 : INTELLECCTUAL PROPERTY RIGHTS

This subject trains the student to understand the importance of Intellectual properties and their related laws.

CE 82X : ENTREPRENEURSHIP & MANAGEMENT

This subject trains the student to understand the importance of Entrepreneurship and management related principles practiced in engineering community.

CE 804: PROJECT WORK AND SEMINAR

The project work trains students to independently solve any civil engineering problem and document it. The project work runs for one full semester and students must interact with many experts, industry personnel and get firsthand experience as a researcher and an engineer.

Alliance College of Engineering and Design
Department of Electronics and Communication Engineering
Scheme of Studies in Bachelor of Technology in Electronics and Communication Engineering
Batch 2018 to 2022

I Semester **Total Credits: 19**

Code	Subject	L	T	P	Credit
MA 101	Engineering Mathematics - I	3	1	0	4
ME 102	Basics of Mechanical Engineering	3	0	0	3
CS 103	Foundations of Computing	3	0	0	3
PH 104	Engineering Physics-I	3	0	0	3
CE 105	Basics of Civil Engineering and Engineering Mechanics	3	0	0	3
CE 106	Environmental Studies	0	0	0	NC
CSL 107	Foundations of Computing Lab	0	0	2	1
PHL 108	Engineering Physics Laboratory	0	0	2	1
MEL 109	Basic Engineering Workshop	0	0	2	1

II Semester **Total Credits: 24**

Code	Subject	L	T	P	Credit
MA 201	Engineering Mathematics – II	3	0	0	3
PH 204	Engineering Physics-II	3	0	0	3
ME 111	Engineering Graphics Lab	1	0	4	3
EE 112	Basics of Electrical Engineering	3	0	0	3
CH 113	Engineering Chemistry	3	1	0	4
EC 114	Basics of Electronics Engineering	3	0	0	3
TE 115	Technical English	2	0	2	3
CHL 116	Engineering Chemistry Laboratory	0	0	2	1
EEL 117	Electrical and Electronics Laboratory	0	0	2	1

III Semester **Total Credits: 23**

Code	Subject	L	T	P	Credit
EC 301	Engineering Mathematics -III	3	1	0	4
EC 302	Electronic Devices and Circuits -I	3	0	0	3
EC 303	Network Theory	3	0	0	3
EC 304	Logic Design	3	0	0	3
EC 305	Modern Instrumentation	3	0	0	3
BI 306	Biology	2	0	0	2
O3XX	Open Elective-1	1	0	3	3

ECL 307	Electronics Devices and Circuits Laboratory	0	0	2	1
ECL 308	Logic Design Laboratory	0	0	2	1

IV Semester **Total Credits: 21**

Code	Subject	L	T	P	Credit
EC 401	Engineering Mathematics -IV	3	1	0	4
EC 402	Analog Circuits	3	0	0	3
EC 403	Electromagnetic Waves	3	0	0	3
O4XX	Open Elective-2	3	0	0	3
EC 405	Signals and Systems	3	0	0	3
EC 406	Microcontrollers and Embedded Systems	3	0	0	3
ECL 407	Microcontrollers and Embedded Systems Laboratory	0	0	2	1
ECL 408	Analog Circuits Lab	0	0	2	1

V Semester **Total Credits: 20**

Code	Subject	L	T	P	Credit
O5XX	Open Elective-3	3	0	0	3
EC 502	VLSI Design Techniques	3	0	0	3
EC 503	Digital Signal Processing and Architecture	3	0	0	3
EC 504	Communication Systems	3	0	0	3
EC 505	RF and Microwave Engineering	3	0	0	3
ECE 511	Major Elective-1	3	0	0	3
ECL 507	VLSI Design Laboratory	0	0	2	1
ECL 508	Digital Signal Processing Laboratory	0	0	2	1

VI Semester **Total Credits: 18**

Code	Subject	L	T	P	Credit
HS 610	Constitution of India and Professional Ethics	1	0	0	NC
O6XX	Open Elective-4	3	0	0	3
ECE61X	Major Elective-2	3	0	0	3
EC 603	Computer Communication Networks	3	0	0	3
EC 604	Control Systems	3	0	0	3
EC 605	Electronic Design Workshop-Mini Project	0	0	4	2
ECL 606	Network laboratory	1	0	2	1
ECL 607	Communication systems Laboratory	1	0	2	1
ECL 608	Summer Industrial Training/Internship	0	0	2	2

VII Semester **Total Credits: 16**

Code	Subject	L	T	P	Credit
EC 701	Optical Fiber Communication	3	0	0	3
EC 702	Wireless and Mobile Communication	3	0	0	3

O5XX	Open Elective-5	3	0	0	3
ECE51X	Major Elective -3	3	0	0	3
ECL	Microwave , Antenna & OFC Laboratory	1	0	0	1
ECP 700	Project Work –Phase 1	0	0	6	3

VIII Semester **Total Credits: 19**

Code	Subject	L	T	P	Credit
ECE 81X	Major Elective -4	3	0	0	3
ECE 82X	Major Elective-5	3	0	0	3
ECM81X	Minor Elective-1	2	0	0	2
ECM82X	Minor Elective-2	2	0	0	2
ECP 899	Project Work-Phase 2	0	0	18	9

Total Credits including all FOUR Years: 160

Elective I

Code	Subject	L	T	P	Credit
ECE 511	Industrial Electronics	3	0	0	3
ECE 512	Hardware Description Languages	2	0	2	3
ECE 513	Computer Architecture	3	0	0	3
ECE 515	Wireless AD-HOC Sensor Networks	3	0	0	3

Elective II

Code	Subject	L	T	P	Credit
ECE 611	Information Theory and Coding	3	0	0	3
ECE 612	Advanced Embedded C programming	1	0	4	3
ECE 613	Low Power VLSI Design	3	0	0	3
ECE 614	Introduction to MEMS	3	0	0	3

Elective III

Code	Subject	L	T	P	Credit
ECE711	Digital Image Processing	3	0	0	3
ECE712	Speech and Audio Processing	3	0	0	3
ECE713	Nano Electronics	3	0	0	3

ECE714	Fuzzy Logic	3	0	0	3

Elective IV

Code	Subject	L	T	P	Credit
ECE 811	Satellite Communication and Radar	3	0	0	3
ECE 812	Adaptive Signal Processing	3	0	0	3
ECE 813	Artificial Neural Networks	3	0	0	3
ECE 814	MIMO Wireless Communication	3	0	0	3

Elective V

Code	Subject	L	T	P	Credit
ECE821	Bio-Medical instrumentation	3	0	0	3
ECE822	Electronic Product Design	1	0	4	3
ECE823	Multimedia Compression Techniques	3	0	0	3
ECE824	Cognitive Radio Communication	3	0	0	3

Minor Elective I

Code	Subject	L	T	P	Credit
ECM831	Intellectual Property Rights	2	0	0	2
ECM832	Data structures with C	2	0	0	2
ECM833	Quality Management	2	0	0	2
ECM834	Database Management Systems	2	0	0	2

Minor Elective II

Code	Subject	L	T	P	Credit
ECM841	Entrepreneurship	2	0	0	2
ECM842	Big data and Data science	2	0	0	2
ECM843	Customer Relationship Management	2	0	0	2
ECM844	Java & J2EE	2	0	0	2

Open Elective-1 (SEM 3)

Code	Subject	L	T	P	Credit
AEO3XX	Introduction to Aerospace Engineering	3	0	0	3
BSO3XX	Quantum Electronics/Photonics	3	0	0	3
CEO3XX	Remote Sensing and GIS	3	0	0	3
CS**O3XX**	Data structures with C	0	2	2	3
EE**O3XX**	Renewable Energy Sources	3	0	0	3

EC**O3XX**	Matlab Programming	0	2	2	3
IT**O3XX**	PLC Programming (Delta)	0	2	2	3
ME**O3XX**	Human Body Mechanics	3	0	0	3

Open Elective-2(SEM 4)

Code	Subject	L	T	P	Credit
AEO4XX	Space Mechanics	3	0	0	3
BSO4XX	Laser Spectroscopy Instrumentation	3	0	0	3
CEO4XX	Building Planning , Designing & Drawing	3	0	0	3
CS**O4XX**	Object Oriented Programming with C++	0	2	2	3
EE**O4XX**	MATLAB for Engineers	0	2	2	3
EC**O4XX**	Robotic Control	3	0	0	3
	Signals and Systems				
IT**O4XX**	Industrial Internet of Things (IIoT)	3	0	0	3
ME**O4XX**	Energy Studies	3	0	0	3

Open Elective-3 (SEM 5)

Code	Subject	L	T	P	Credit
AEO5XX	Principles of Helicopters	3	0	0	3
BSO5XX	Nano Science	3	0	0	3
CEO5XX	Advanced Building Materials & Construction Technology	3	0	0	3
CS**O5XX**	Computational Complexity	3	0	0	3
	Unix System Programming	3	0	0	3
EE**O5XX**	Electrical Machines and Drives	3	0	0	3
	Soft Computing	3	0	0	3
EC**O5XX**	Machine learning and Artificial Intelligence	3	0	0	3
IT**O5XX**	Python Programming	3	0	0	3
ME**O5XX**	Computational Fluid Dynamics	3	0	0	3
	Flexible Manufacturing	3	0	0	3

Open Elective-4 (SEM 6)

Code	Subject	L	T	P	Credit
AEO6XX	Experimental Fluid Mechanics	3	0	0	3
BSO6XX	Advanced Graph Theory	3	0	0	3
	Advanced Energy Materials	3	0	0	3

CEO6XX	Project Planning & Management	3	0	0	3
CS **O6XX**	Compiler Design	3	0	0	3
EE**O6XX**	Power Plant Instrumentation	3	0	0	3
EC**O6XX**	Virtual Reality and Augmented Reality	3	0	0	3
IT**O6XX**	Information Security	3	0	0	3
ME**O6XX**	Nano Materials	3	0	0	3
	Cryogenics	3	0	0	3

Open Elective 5 (SEM 7)

Code	Subject	L	T	P	Credit
AEO7XX	Aerospace Avionics	3	0	0	3
BSO7XX	Operations Research	3	0	0	3
CEO7XX	Earth Quake Resistant Design of Structures	3	0	0	3
CS **O7XX**	Data Science & Analytics	3	0	0	3
EE**O7XX**	Electrical and Hybrid Vehicle	3	0	0	3
	Wind and Solar Energy Systems	3	0	0	3
EC**O7XX**	Internet of Things	3	0	0	3
IT**O7XX**	Big data Analytics and R Programming	3	0	0	3
ME**O7XX**	Robotics	3	0	0	3
	Additive Manufacturing and 3D Printing	3	0	0	3

EC 301: ENGINEERING MATHEMATICS III

The objectives of this course include:

1. To equip the students with basic numerical techniques and procedures for obtaining appropriate solution to engineering problems.
2. To expose the students to the concepts of Fourier transforms.
3. To correlate the theoretical principles with application based studies.

EC 302: ELECTRONICS DEVICES AND CIRCUITS

This course will give an overview of analysis and design of electronic circuits and devices. Primary emphasis is made on bipolar junction transistor, its biasing, stability and its working under low and high frequency. It also deals with the working and biasing of field effect transistors.

EC 303: NETWORK THEORY

The objectives of this course include:

1. Acquire the basics of electricity and theorems.
2. Study different theorems and network topologies.
3. Study about the transient behavior, initial conditions and different types of two port networks .

EC 304: LOGIC DESIGN

This course focuses on the design and implementation of the digital systems at the heart of much modern technology. Digital electronics is the foundation of all microprocessor-based systems found in computers, robots, automobiles, and industrial control systems. This course introduces the students to digital electronics and provides a broad overview of many important concepts, components.

EC305: MODERN INSTRUMENTATION

This syllabus has been designed to impart the knowledge of basic principles involved in Modern instrumentation system. The instrument part deals with the principles and functioning of measuring instruments to monitor and control of process variables within a production or manufacturing area. While sensors and values are important in all aspects of engineering they assume greatest importance in the study of automatic control applied in process industries.

ECL 307: ELECTRONIC DEVICES AND CIRCUITS LABORATORY

To understand the basic operation and working of different electronic circuits and verify the basic network theorems.

#	**List of experiments**

1	Design and implement Diode Clipping Circuits
2	Design and implement Diode Clamping Circuits
3	Design and implement R C-Coupled CE Amplifier using BJT-input and output impedance, frequency response
4	Verification of Thevenin's and Norton's theorem
5	Verification of Maximum power transfer theorem
6	Design and implement Darlington Emitter Follower-input and output impedance, frequency response
7	Design and implement Emitter follower circuit
8	RC Phase shift, Hartley, Colpitt and Crystal Oscillator
9	Study of Series and Parallel Resonance

ECL 308: LOGIC DESIGN LABORATORY

Apply the concepts of basic combinational logic circuits, sequential circuit elements, and programmable logic in the laboratory setting

#	**List of experiments**
1	Realize the following expressions Using Logic gates and universal gates in (i) SOP form (ii) POS form
2	Realization of half/full adder using basic, NAND/NOR gates.
3	Realization of half/full subtractors using basic, NAND/NOR gates.
4	Realization of (i) Binary to Gray code converter and vice versa (ii) BCD to XS3 code conversion and vice versa.
5	Realization of one bit and two bit comparator using Basic gates.
6	Verifying the functionality of MUX \ DEMUX using IC 74153 \ IC 74139.
7	Truth table verification of flip flops using gates and IC's. J -K master slave, T-Type, D-Type
8	Realization of shift registers using IC 7495 and carryout the following operations: Shift left, shift right, SIPO, SISO, PISO, PIPO.
9	Design of asynchronous MOD N up and down counter using 7476.
10	Design synchronous 3-bit MOD N up and down counter using IC 7476.
11	Realization of Ring counter/Johnson counters using IC 7495.

Sem IV

EC 401: ENGINEERING MATHEMATICS

The objectives of this course include:

1. To make students aware about the importance and symbiosis between Mathematics and Engineering.
2. To equip students with adequate knowledge of probability distributions that will enable them in formulating and solving problems in real situations.
3. To familiarize students with tools like Z transforms in solving problems

To provide a good platform to students to understand and appreciate concept of complex analysis.

EC 402: ANALOG CIRCUITS

The objectives of this course include:

1. To give the students some basic understanding of electronic principles, concepts, components and circuitry.
2. To design simple circuits like amplifiers using op-amps.
3. To design waveform generating circuits
4. To design simple filters circuits for particular application.

EC 403: ELECROMANGNETIC WAVES

1. To build a bridge between circuit theory and electromagnetic theory.
2. This requires a strong foundation on the theory of transmission lines and waveguides that can be achieved by taking this course.

ECO 4XX: ROBOTICS

The objectives of this course include:

1. To gain introductory knowledge of systems, and how the functional units connect to each other.
2. To design or modify a system or sub-system.
3. To initiate and complete a project or practical job to a reasonable standard.
4. To read drawings related to mechanics, electronics and pneumatics.
5. To develop skills in the use of mechanic and electronic tools.
6. To develop skills in the use and application of test equipment.
7. To gain knowledge of symbols and units of measure.

EC405: SIGNALS AND SYSTEMS

This course aims to teach some of the basic properties of signals and systems and the necessary mathematical tools that aid in this process. The particular emphasis is on the time and frequency domain analysis of linear time invariant systems.

EC406: MICROCONTROLLERS AND EMBEDDED SYSTEMS

This course covers the broad range of foundational skills that apply across all embedded application areas, along with Domain and Application Specific Applications. Topics include Core Systems specifically focusing on 8051 microcontrollers, Communication Interfaces and the Embedded System Design Process, Involving Software and Hardware, The Assembly Language Programming Process, Programming Tools, Testing tools, EDA Tools, Interfacing with Keyboards, Displays, D/A and A/D Conversions, Real Time Operating Systems.

ECL 407: MICROCONTROLLERS AND EMBEDDED SYSTEMS LABORATORY

To understand the basic operation and working of Microprocessors and their interfacing with external devices like stepper motor.

#	**List of experiments**
1	To Add two numbers using 8086
2	To find 2's Complement of two numbers using 8086
3	To find if the given number is Even or Odd using 8086
4	To find if the given number is Positive or Negative using 8086
5	To Exchange Contents of two Memory Locations using 8086
6	To multiply two number's using 8086
7	To arrange the numbers in Ascending / Descending Order using 8086
8	To find if the given number is Odd or Even Parity using 8086
9	To count the number of 0's and 1's in the given number using 8086
10.	To move a string of bytes from one set of locations to another using 8086
11.	To generate Fibonacci series of numbers using 8086
12.	Implementation of Counters (BCD Counter) using 8086
13.	Interfacing Analog to Digital Conversion(ADC) / Digital to Analog Conversion(DAC) using Keil.
14.	Interfacing of different types motors (DC Motor / Stepper Motor) seven segment display using Keil.

ECL 408: ANALOG CIRCUITS LABORATORY

To design various analog circuits that are covered under the subjects linear integrated circuits and Electronic Devices and Circuits-II and verify their output.

#	**List of experiments-LIC / EDC**
1	To study different Configuration of Op-amp as Inverting, Non-inverting, summing and averaging amplifier
2	To study Op-amp as 1. Instrumentation amplifier. 2.differential amplifier Configurations
3	To design differentiator and integrator using Op-amp
4	Design Low pass filter, High pass filter using Op-amp
5	Design Band pass filter and Band stop filter using Op-amp
6	Application of Op-amp as 1. Saw tooth wave generator 2. Schmitt trigger for the given value of UTP and LTP.
7	To examine the operation of a PLL and to determine the free running frequency, the capture range and the lock in range of PLL.
8	Implement the following DAC: a. Weighted resistor DAC. b. R-2R Ladder
9	a. Implement a Differential amplifier using BJT. b. Verify the Frequency response of Tuned amplifier.
10	Construct a Voltage Series Feedback amplifier using BJT.
11	Design and implement the following Oscillators using BJT: RC-phase shift, Hartley, Colpitts, crystal.
12	Implement Power Amplifier Class A, Class B and Class AB
13	Implement the following Multivibrators: Astable, monostable, Bi-stable

SEM – V

ECO5XX: MACHINE LEARNING AND ARTIFICIAL INTELLIGENCE\

Introduce and define the meaning of intelligence and explore various paradigms for knowledge encoding in computer systems. Introduce the concept of learning patterns from data and develop a strong theoretical foundation for understanding the state of the art Machine Learning algorithms.

EC502: VLSI DESIGN TECHNIQUES

1. To study and realize various building blocks of digital VLSI circuits in transistor level.
2. To understand the equivalent circuits and models of MOS devices for characterization of MOS circuits
3. To design the architectural choices and performance tradeoffs involved and to realize circuits in CMOS Technology

To identify suitable FPGA platform and develop an application.

EC503: DIGITAL SIGNAL PROCESSING AND ARCHTECTURE

This course introduces fundamental concepts, algorithms and applications of digital signal processing and how to implement it with the DSP processors. The course includes Fast Fourier Transform (FFT) algorithm for efficient computation of Discrete Fourier Transform and focuses on the design of Infinite Impulse Response (IIR) filters and Finite Impulse Response (FIR) digital filters.

EC504: COMMUNICATION SYSTEMS

This course will enable the student to acquire knowledge about Modulation Process, its importance in Communications, difference between Base Band Transmission and Pass Band Transmission, various types of Analog and Digital- Modulation and Demodulation Techniques and the concept of Spread Spectrum in communications.

EC 505: RF AND MICROWAVE ENGINEERING

The course will give an introduction to antennas and its types, their principle of operation, analysis and their applications. It also deals with the measurement of antenna parameters. The course provides an overview of wave propagation over ground, through troposphere and ionosphere, propagation effects in radio frequencies.

ECE 5XX: INDUSTRIAL ELECTRONICS

I. To give the students basic understanding power electronics
II. To know the importance of electronics in Industry.

ECL 507: VLSI DESIGN LAB

#	List of experiments
1	Introduction to Basic Simulation using Mentor Graphics QuestaSim10.3 and Synthesis using HDL designer and Precision Synthesis RTL.
2	Design/Synthesize a four bit Ripple carry adder.
3	Design/Synthesize a four bit carry look ahead adder.
4	Design/Synthesize 4:1 multiplexer.
5	Design/Synthesize 1:4 decoders.
6	Design/Synthesize 4 bit magnitude comparator.
7	Code Converters(Binary- Gray, Binary-Excess-3)
8	Implement D and T flip flop.

9	4-Bit Shift Register
10	4-bit Ripple Counter
11	Random number generation
12	Finite State Machines
13	Switch level Simulations

ECL 508: DSP LAB

#	List of Experiments
1	Introduction to MATLAB
2	Working with Signals
3	Analysis in z-domain
4	Analysis in Frequency Domain
5.	IIR Filter Design – 1
6	IIR Filter Design – 2
7	FIR Filter Design – 1
8	FIR Filter Design – 2
9	DSP Applications Using MATLAB
10.	Filter Implementation using DSP Kit

VI SEMISTER

HS 610 PROFESSIONAL ETHICS AND CONSTITUTION OF INDIA

The subject is intended for introducing the broader perspectives of the Indian Constitution with an aim to make the students informed citizens of India. The subject is also gives the basic knowledge about the working of Indian political system within constitutional framework. The principal objective of the course is to bring awareness towards the constitutional provisions like rights, duties and other values, to make the students responsible citizens of India.

ECO 6XX: VIRTUAL AND AUGMENTED REALITY

The Objectives of the course are to:

1. get familiar with state-of-the-art VR/AR technology, its current limitations and near-future developments.

2. study and experience available VR/AR content and identify what sets VR apart from screen-based media.
3. analyze how VR/AR can help to understand and solve complex problems.
4. obtain skills to create interactive VR/AR content.
5. create a VR/AR prototype that has potential value for research and/or education.

ECE 6XX: INFORMATION THEORY AND CODING

This is intended to be a straightforward and accessible course on information theory. Information theory is the mathematical theory that deals with the fundamental aspects of communication systems. As such, its primary goal is not to deliver practical solutions to communications problems, but rather to answer the question whether encoding and decoding schemes exist or not for a given combination of a source model and a channel model.

EC 603: COMPUTER COMMUNICATION NETWORKS

1. Build an understanding of the fundamental concepts of computer networking.
2. Familiarize the student with the basic taxonomy and terminology of the computer networking area.
3. Understand state-of-the-art in network protocols, architectures, and applications
4. Learn their fundamental layered structure, understand common offered layered services, and examine protocols used to operate the network.
5. Be exposed to the TCP/IP, UDP protocol suite. Security and protection issues.

EC 604: CONTROL SYSTEMS

This is an introductory control systems course. It presents a broad overview of control techniques for continuous and discrete linear systems, and focuses on fundamentals such as modeling and identification of systems in frequency and state-space domains, stability analysis, graphical and analytical controller design methods.

ECP 605: Electronic Design Workshop-Mini Project

#	TITLE OF EXPERIMENTS
1	Crimping LAN Wires and creating small LAN
2	Introduction to packet tracer simulation environment
3	Implementation of Static Routing
4	Implementation of DHCP server.
5	Implementation of Dynamic Routing Protocols : RIP V1 and RIP V2
6	IPV4 addressing
7	Variable Length Subnet Masking (VLSM)
8	Implementation of VLAN
9	Implementation of VTP and Inter-VLAN Routing
10	Implementation of Access Control List..

ECL 607: COMMUNICATION SYSTEMS LAB

#	Title of the Experiments
1	Amplitude Modulation (AM) and Demodulation
2	Frequency Modulation (FM) and Demodulation
3	Amplitude Shifting Keying Modulation (ASK)and Demodulation
4	Frequency Shifting Keying Modulation (FSK) and Demodulation
5	Phase Shifting Keying Modulation (PSK) and Demodulation
6	Differential Phase Shifting Keying Modulation (DPSK) and Demodulation
7	Pulse Amplitude Modulation (PAM) and Demodulation
8	Pulse Position Modulation (PPM) and Demodulation
9	Pulse Width Modulation (PWM) and Demodulation
10	Sampling & Reconstruction Techniques
11	Analog to Digital Converter
12	Pre-emphasis and De-emphasis
13	Linear Delta Modulation and Demodulation
14	Time Division Multiplexing

SEM – VII

EC 701: OPTICAL FIBER COMMUNICATION

1. The objectives of this course include:
2. To understand the technology and utilization within optical fiber global communication network.
3. To understand the principle of light propagation through optical fibers
4. To understand signal distortion mechanisms in the fiber
5. To understand optical transmitters and receivers for fiber /free space links
6. To understand optical network concepts and components involved.

EC 702: WIRELESS AND MOBILE COMMUNICATION

This course will enable the students to acquire knowledge about the Evolution, Developments and Modelling of Wireless Communication Systems. It also deals with various Multiple Access Techniques, Introduction to GSM, GPRS and CDMA architectures. Also it provides an introduction to various Wireless IEEE standards.

ECO 7XX: INTERNET OF THINGS

The explosive growth of IOT is changing our society and drop in price for typical IOT components allowing people for new innovative design and product development which raises demands for Electronics Engineers. To full fill this gap in the practical world. It made necessary for design and fabrication engineers to learn and know the basics of IOT, technology, trends, components associated with its design and development with a better understanding of internet and their protocols with in a IOT device.

ECE 7XX: DIGITAL IMAGE PROCESSING

This course covers the broad range of foundational skills and applications that can be apply on Images in various Image processing application areas, with different images. The basic Topics include the techniques of enhancement, segmentation, compression, noise, color image processing higlightening the fundamentals of images and digital images.

ECL 703: MICROWAVE, ANTENNA & OFC LAB

#	TITLE OF EXPERIMENTS
1	To study various Microwave components. To set up a fiber optic analog Link using Optical fiber trainer kit.
2	To set up a Fiber optic Digital Link.
3	To measure losses in Fiber optic communication link.
4	To estimate the Numerical Aperture of the 1mm diameter plastic fiber at 650 nm.
5	To study Time division multiplexing of signals.
6	To study the Characteristics of Reflex Klystron tube & to determine its electronic tuning range.
7	To measure the frequency of a microwave source and demonstrate relationship among guide dimensions, free space wavelength and guide wavelength and to measure VSWR.
8	To study the characteristics of Gunn oscillator Gun diode as modulated source.
9	To study Isolations, coupling coefficient and input VSWR for E, H plane waveguide Tee and Magic Tee junctions.
10	To measure coupling coefficient, Insertion loss & Directivity of a Directional coupler.
11	To measure isolation and insertion loss of a three port Circulators/Isolator. To measure attenuation and insertion loss of a fixed and variable attenuator.
12	To study the directional pattern of Horn antenna using Microwave test bench.

13	To measure Directivity, Gain of Micro strip patch antenna, Yagi uda, Dipole antenna and find the beam width.
14	To measure the Resonance Characteristics of Microstrip Ring Resonator. To measure the isolation characteristics of a microstrip 3 db power divider.

SEM – VIII

ECE 81X: SATELLITE COMMUNICATION

The objectives of this course include:

1. To introduce orbital mechanics and related parameters
2. To introduce the different satellite subsystems
3. To introduce different aspects of communication link design, multiple access methods
4. To expose some of the important applications of satellites.
5. To learn the concept behind the Satellite communication system.
6. To understand Satellite Communications and its dominance in wireless communication.

ECE 82X: BIO MEDICAL INSTRUMENTATION

This course covers the fundamental electronic devices and instruments used in medical laboratory and medical applications. This course helps in understanding the anatomy of human body and internal structure operation principle of electronic devices, which enhances the skills to design and analyze the electronic instruments to measure any type of bio quantities in terms of electrical quantities.

ECE 82X: MULTIMEDIA COMPRESSION TECHNIQUES

This course covers the broad range of foundational skills and applications that can be apply on Images in various Image processing application areas, with different images. The basic Topics include the techniques of enhancement, segmentation, compression, noise, color image processing highlighting the fundamentals of images and digital images.

B. Tech. in Computer Science and Engineering

The Department of Computer Science and Engineering at Alliance University has established the state of the art undergraduate education and prepares its students for real world challenges. The department invites the inspired students from India and neighboring countries who possess decent knowledge & aptitude in Science & English, and creative ability to design innovative products/solutions and would like to contribute in fundamental research.

- The undergraduate (four-year B. Tech) curriculum provides a strong foundation in the field of computer science and engineering.
- The newly designed curriculum has greater emphasis on design and project work which will enrich students' analytical and independent thinking.
- The students will get opportunities to involve in interesting, market relevant projects jointly with world class engineers in Collaborative Education mode which will provide an environment to convert their innovation into reality.
- Further, the open elective courses enable students to develop expertise in other areas like Computational Mathematics, Communications, Cloud computing, Mobile technology, Analytics, Data Mining, Bio-informatics, Robotics, Management etc. in addition to core Computer Science subjects.
- Additionally, the students must complete six months' training / internship in the final academic year, towards fulfilment of degree requirements.
- The undergraduate curriculum emphasized on Object Oriented programming, computational complexity theory, algorithms, database management, computer graphics, software engineering, system architecture, operating system, artificial intelligence among others.
- Students are encouraged to publish technical papers regularly in reputed journals and conferences under the guidance of dedicated faculty members.
- The department has strong faculty, with well blended academic and industrial experience and are active in research.
- The students interact freely with faculty on all matters related to studies. The curriculum gives them ample opportunity to work in close cooperation with any faculty member.

Program Objectives

- To prepare graduates to take up professional careers in different roles in diverse industry.
- To enable the students to design and construct hardware/software systems, components, and processes to meet desired needs prevailing in economic, environmental, social and political domains.
- To equip computer science graduates with communication skills, both oral and written, to become effective team-oriented problem-solvers, as well as effective communicators.
- To equip graduates with the knowledge and skills to take up research and higher studies in computer

science and related engineering/ scientific disciplines.

Learning Delivery Methodology

- Interactive lectures
- Class Assignments
- Video Presentation
- Laboratory experiments
- Company Visits / Guest lectures
- Projects development

Subject Mapping

Students are required to complete a total of **160 credits** spread over 49 subjects in the area of 'Computer Science and Engineering' and related subject areas.

Course Structure:

Semesters 1 and 2: A systematic exposure to scientific, mathematical and engineering principles will take place during the first two semesters. In each of these semesters, the students will take one course each in physics, chemistry, mathematics, foundation of computer and introductory course in different branches of engineering and Technical English. The teaching of the compulsory core courses in science and engineering will include substantial components of laboratory demonstrations and hands-on experiments. Students are required to complete 42 Credits in 1st year (Semester I & Semester II).

Semesters 3 and 4: At the beginning of the third semester, each student will enter the particular discipline (Computer Science & Engineering) for specialization according to his/her academic choice. Students are required to complete 39 Credits in 2nd year (Semester III & Semester IV).

Semesters 5 and 6: During 3rd year of study, each student will have a choice of selecting an elective subject for the semester-V, and two more elective subjectsfor semester-VI in the core areas along with other mandatory subjects. Students are required to complete 43 Credits in 3rd year (Semester V & Semester VI).

Semesters 7 and 8: During the seventh semester, the students will explore advanced concepts in Computer Science and Engineering with both theory and experimental techniques. During 4th year of study, studentshave a choice of selecting two elective subjects in each semesters from the Computer Science specialized areas along with other mandatory subjects. Students are required to complete 36 Credits in 4th year (Semester VII & Semester VIII). In final semester, the students are required to completethe project work. The project should be in the chosen major discipline or an interdisciplinary topic that substantially overlaps with the major discipline.

Total Credits: 160

Semester I

Sl. No	Subject Code	Subject Title	Hours per week		Total contact hours	Credits
			Lecture	Practical		
1	MA 101	Engineering Mathematics I	4	0	4	4
2	ME 102	Basics of Mechanical Engineering	3	0	3	3
3	CS 103	Foundations of Computing	3	0	3	3
4	PH 104	Engineering Physics I	3	0	3	3
5	CE 105	Basics of Civil Engineering	3	0	3	3
6	CE 106	Environmental Engineering	2	0	2	0
7	CSL 107	Foundations of Computing Lab	3	0	3	1
8	PHL 108	Engineering Physics Lab	0	0	3	1
9	MEL 109	Basic Engineering Workshop	0	0	3	1
				Credits		19

Semester II

Sl. No	Subject Code	Subject Title	Hours per week		Total contact hours	Credits
			Lecture	**Practical**		
1	MA 201	Engineering Mathematics II	4	0	4	4
2	ME 111	Engineering Graphics	1	3	4	2
3	PH105	Engineering Physics I	3	0	3	3
4	EE 112	Basics of Electrical Engineering	3	0	3	3

5	CH 113	Engineering Chemistry	4	0	4	4
6	EC 114	Basics of Electronics Engineering	3	0	3	3
7	TE 115	Technical English	2	1	3	2
8	CHL 116	Engineering Chemistry Lab	0	3	3	1
9	EEL 117	Electrical and Electronics Lab	0	3	3	1
				Credits		23

3rd Semester

Sl. No.	Subject Code	Subject Name	Hours /Week		Total Contact Hours	Credit
			Lecture	Practical		
1	CS 301	Engineering Maths-III	4	0	4	4
2	CS302	Data Structure & Algorithms	4	0	4	4
3	CS 303	Electronic circuits & Digital Logic	3	0	3	3
4		Biology	3	0	3	3
5		Open Elective – I	3	0	3	3
6	CSL304	Data Structure & Algorithms-LAB	1	3	3	1
7	CSL305	Electronic circuits & Digital-Logic-LAB	1	3	3	1
		Total Credit				19

4th Semester

Sl. No.	Subject Code	Subject Name	Hours/Week		Total Contact Hours	Credit
			Lecture	Practical		
1	CS401	Engineering Mathematics IV	4	0	4	4
2	CS402	Discrete Mathematics	3	0	3	3
3	CS403	Object oriented Programming with C++	3	0	3	3
4	CSE4XX	Prof. Elective I	3	0	0	3
5	CSE4XX	Prof. Elective II	3	0	3	3
6	CSOE02	Open Elective II	3	0	3	3
7	CSL404	Object oriented Programming with C++ Lab	0	3	3	1
						20

5th Semester

Sl. No.	Subject Code	Subject Name	Hours/Week		Total Contact Hours	Credits
			Lecture	Practical		
1	CS501	Computer Networks	4	0	4	4
2	CS502	Operating System	4	0	4	4
3	CS503	Database Management Systems	4	0	4	4
4	CSE5XX	Prof. Elective III	3	0	3	3
5	CSE5XX	Prof. Elective IV	3	0	3	3
6		Open Elective III	3	0	3	3
7	CSL504	Operating Systems Lab	0	3	3	1
8	CSL505	Database Management System Lab	0	3	3	1
		Total Credits				23

6th Semester

Sl. No.	Subject Code	Subject Name	Hours/Week		Total Contact Hours	Credits
			Lecture	Practical		
1	CS601	Complier Design	4	0	4	4
2	CS602	Service Oriented Programming	3	0	3	3
3	CS603	Machine Learning	3	0	3	3
4	CSE6XX	Prof. Elective V	3	0	3	3
5	CS6IN1	Internship	0	0	0	2
6	HS 610	Constitution of India and Professional Ethics	3	0	3	3
7	CSL604	Complier Design-Lab	1	3	3	1
8	CSL605	Service Oriented Programming Lab	1	3	3	1
		Total Credits				20

7th Semester

Sl. No.	Subject Code	Subject Name	Hours/Week		Total Contact Hours	Credits
			Lecture	Practical		
1	CS701	Mobile Application Development Using Android	3	0	3	3
2	CS702	Cryptography & Network Security	3	0	3	3
3	CS703	Big-data Analytics	3	0	3	3
4	CSE7XX	Prof. Elective VI	3	0	3	3
5	CSP701	Project Phase I				3
6		Open Elective V	3	0	3	3
7	H&M	Elective I	2	0	2	2
8	CSL704	Data Analytics Lab		3	3	1
		Total Credit				21

8th Semester

Sl. No.	Subject Code	Subject Name	Hours/Week		Total Contact Hours	Credits
			Lecture	Practical		
1	CS801	Software Engineering & Architectural Patterns	3	0	3	3
2	H&M	Elective II	2	0	2	2
3	CSP899	Project Work	10	0		10
		Total Credits				15

ELECTIVES

4th Sem Electives:

Sl. No.	Subject Code	Subject Name	Hours/Week		Total Contact Hours	Credits
			Lecture	Practical		
1	CSPE 401	Principles of Data communication	3	0	3	3
2	CSPE 402	Dot Net Technologies	3	0	3	3
3	CSPE 403	Object Oriented Modelling and Design	3	0	3	3
4	CSPE 404	Computer organization and architecture	3	0	3	3
5	CSPE 405	Introduction to Micro processors	3	0	3	3

5th sem Electives:

Sl. No.	Subject Code	Subject Name	Hours/Week		Total Contact Hours	Credits
			Lecture	Practical		
1	CSPE 501	Distributed System	3	0	3	3
2	CSPE 502	Core Java Programming	3	0	3	3
3	CSPE 503	Theory of Computation	3	0	3	3
4	CSPE 504	Virtual Reality	3	0	3	3
5	CSPE 505	Artificial Intelligence	3	0	3	3

6th Sem Electives:

Sl. No.	Subject Code	Subject Name	Hours/Week		Total Contact Hours	Credits
			Lecture	Practical		
1	CSPE 601	Data Ware housing & Data Mining	3	0	3	3
2	CSPE 602	Computer Systems Performance Analysis	3	0	3	3
3	CSPE 603	Multi Agent System	3	0	3	3
4	CSPE 604	Scripting Language (Pearl & Python)	3	0	3	3
5	HS 610	PROFESSIONAL ETHICS AND CONSTITUTION OF INDIA	0	0	3	1

7th sem Electives:

Sl. No.	Subject Code	Subject Name	Hours/Week		Total Contact Hours	Credits
			Lecture	Practical		
1	CSPE 701	Topics in Internet of Things	3	0	3	3
2	CSPE 702	Image Processing	3	0	3	3
3	CSPE 703	Wireless sensor network	3	0	3	3
4	CSPE 704	Advanced Computer Architecture	3	0	3	3

SEMESTER III

CS301 ENGINEERING MATHEMATICS-III

Students are given the exclusive knowledge in Relations and Functions., Some concepts of Combinatorics like recurrence relation and generating functions, as well as an introduction to Graph theory and its applications related Computer Science and Information Technology will also be taught. . The subject is designed to understand theory and applications to develop their analytical skills.

CS302 DATA STRUCTURE & ALGORITHMS

This course introduces the data structures and its types. Understanding the underline concepts of data structures(lists, stacks, queues, trees (binary trees and tree traversals, height-balanced trees), graphs, hash tables).and their Applications. Also students learn how to write recursive functions , searching and sorting programs.

CS 303 ELECTRONIC CIRCUITS AND DIGITAL LOGIC

Electronics Circuits is one of the basic courses to understand the basic operation of the computer at component level. It covers various topics of analog electronics related to electronic devices and its operation. Here, each device is first introduced by explaining the internal behavior which is then followed by discussion on its characteristics, equivalent circuit and finally, to study the behavior of device at low and high frequencies. Special efforts have been made to provide the student with a perfect blend of theoretical as well as practical information's related to semiconductor devices. This course also introduces basics of issues in design and verification of modern digital systems. Topics include Boolean algebra, digital number systems and computer arithmetic, combinational logic design and simplification, sequential logic design and optimization, register-transfer design of digital systems, basic processor organization and instruction set issues, assembly language programming and debugging, and a hardware description language. This includes computer-aided digital design and actual hardware implementation laboratory experiments.

CSL 304 DATA STRUCTURE AND ALGORITHMS LAB

This course is designed to strengthen the practical application knowledge of students on data structures like stacks, queues, linked list, trees and various searching and sorting algorithms.

CSL 305 ELECTRONICS CIRCUITS AND DIGITAL LOGIC LAB

The course introduce to digital logic design includes an overview of basic logic gates IC's internal structure, truth table and circuit diagram. Students can design the logic circuit using either basic gates or universal

gates. Here in this course we try to include more examples which helps the students to develop their own logic and circuits for real-time applications.

SEMESTER IV

CS 401 ENGINEERING MATHEMATICS-IV

The topics in this curriculum equip the students with Introductory concepts of Descriptive statistics, Probability, and some concepts of Linear Algebra like vector spaces and Linear Transformation and Inner Product space. The subject is designed to understand theory and applications to develop their analytical skills.

CS 402 DISCRETE MATHEMATICS

This course has been designed to provide you with a clear, accessible introduction to discrete mathematics. Discrete mathematics describes processes that consist of a sequence of individual steps (as compared to calculus, which describes processes that change in a continuous manner). The principal topics presented in this course are logic and proof, induction and recursion, discrete probability, and finite state machines. As you progress through the units of this course, you will develop the mathematical foundations necessary for more specialized subjects in computer science, including data structures, algorithms, and compiler design. Upon completion of this course, you will have the mathematical know-how required for an in-depth study of the science and technology of the computer age.

CS 403 OBJECT ORIENTED PROGRAMMING WITH C++

Object Technology introduces differences between C and C++, Notions of syntax and semantics of programming languages; introduction to operational/natural semantics of functional and imperative languages. Data abstractions and control constructs; block structure and scope, principles of abstraction, qualification and correspondence; parameter passing mechanisms; runtime structure and operating environment; practical and implementation issues in run-time systems and environment; abstract machines; features of functional and imperative languages; object initialization, overloading, polymorphism; objects; classes and inheritance, file handling and exceptional handling.

ELECTIVE I & II

CSPE 401 PRINCIPLES OF DATA COMMUNICATION

Fundamentals of data communication, analog versus digital, fundamentals of data transmission communication modes, transmission system, synchronous system, communication channels, data transmission protocol, introduction transmission concepts, local area network, implementation of LAN using fiber-optic cables implementation of LAN using wireless technology. Network architectures and OSI, network architectures layering the communications process, routing concepts, routing in wide area networks hop-by-hop versus source routing congestion control, deadlocks. Queuing theory, queuing model and factors traffic theory lost call rate, network services communication protocols over WAN, transmission control protocol/internet protocol (TCP/IP), OSI and Ethernet data encapsulation, data

routing TCP/IP Services and application protocols, data link layer address, naming, addressing, and routing, domain name system (DNS), broadband network. Network security, encryption security against remote access, electronic mail E-Mail addresses format, important features of E-Mail, Electronic Data Interchange (EDI).

CSPE 402 DOT NET TECHNOLOGIES

The Objectives of the course are to: The ability to effectively use visual studio .NET.An understanding of the goals and objectives of the .NET Framework. .NET is a revolutionary concept on how software should be developed and deployed. A working knowledge of the C# programming language.An understanding of how how to use forms to develop GUI programs under .NET.Knowledge of some of the tools available in the .NET Framework class library. (FCL). Improved object-oriented programming skill through practice and insights gained by studying a new programming language.

CSPE 403 OBJECT ORIENTED MODELING AND DESIGN

The Objectives of the course are to: Create a requirements model using UML class notations and use-cases based on statements of user requirements, and to analyze requirements models given to them for correctness and quality. Create the OO design of a system from the requirements model in terms of a high-level architecture description, and low-level models of structural organization and dynamic behavior using UML class, object, and sequence diagrams.Comprehend enough Java to see how to create software the implements the OO designs modeled using UML..Comprehend the nature of design patterns by understanding a small number of examples from different pattern categories, and to be able to apply these patterns in creating an OO design. Given OO design heuristics, patterns or published guidance, evaluate a design for applicability, reasonableness, and relation to other design criteria

CSPE 404 COMPUTER ORGANIZATION & ARCHITECTURE

This course introduces the progression of computer organization and architecture; introduce computer system organization and structure; explain instruction execution through instruction cycles; system interconnection and the different I/O techniques. Discuss the basic concept of interrupts and how interrupts are used to implement I/O control and data transfers. Describe the reasons of using different formats to represent numerical data. Functioning of arithmetic and logic unit; different instruction formats, such as address per instruction and variable length vs. fixed length formats; functioning of control unit and different implementations of the control unit (hardwired and micro-programmed). Identification

of different architectural and organizational design issues and dependences with performance of a computer such as instruction set design, pipelining, RISC architecture and superscalar architecture. Identify the different mechanisms used for read/ write operations in the memory design.

CSPE 405 INTRODUCTION TO MICROPROCESSOR

Basic structure and operating principle of microprocessor, architecture of microprocessor, Assembly Language of 8086, Interfacing with 8086, Co-Processor 8087, Interfacing with 8086, High End Processors, hardware and software components of a microprocessor-based systems to implement system-level features, the tools and techniques to design, implement, and debug microprocessor-based systems.

CSL 405 OBJECT ORIENTED PROGRAMMING WITH C++ LAB

This course gives knowledge on what is object oriented programming and its benefits, one will learn the key concepts of oops which include encapsulation, polymorphism, inheritance etc. Student will learn to develop programs in C++, handling files in C++ and have deeper insight of the syntax of C++programming skills.

SEMESTER V

CS 501 COMPUTER NETWORKS

The main emphasis of this course is on the learning in depth about all OSI layers functionality and protocols used. The course objectives include learning about computer network organization and implementation, obtaining a theoretical understanding of data communication and computer networks. In addition the course includes an overview on WiFi and 802.11 networks.

CS 502 OPERATING SYSTEM

This course introduces the functions of Operating Systems, layered architecture basic concepts; parallelism, multitasking, interrupt architecture, system calls and notion of process and threads; synchronization and protection issues; scheduling; memory management including virtual memory and paging techniques; methods for handling deadlocks; input-output architecture and device management; file systems; distributed file systems. Case studies of common OS like UNIX, Windows.

CS 503 DATABASE MANAGEMENT SYSTEMS

A database-management system (DBMS) is a collection of interrelated data and a set of programs to access those data. Databases form the backbone of all major applications today – tightly or loosely coupled, intranet or internet based, financial, social, administrative, and so on. While DBMS's differ in details, they share a common set of models, design paradigms and a Structured Query Language (SQL). In this background the course would examine data structures, file organizations, concepts and principles of DBMS's, data analysis, database design, data modeling, database management, data & query

optimization, and database implementation. More specifically, the course introduces relational data models; entity-relationship modeling, SQL, data normalization, and database design.

ELECTIVES III & IV

CSPE 501 DISTRIBUTED SYSTEMS

The Objectives of the course are to: Understand foundations of Distributed Systems.Introduce the idea of peer to peer services and file system. Understand in detail the system level and support required for distributed system. Understand the issues involved in studying process and resource management

CSPE 502 CORE JAVA PROGRAMMING

Java is a high level, object-oriented, platform independent language.Java, unlike some languages before it allows for the use of words and commands instead of just symbols and numbers. Java also allows for the creation of advanced data types called objects which represent real world things like a chair or a computer where you can set the attributes of these objects and things they do.Java is very flexible - it can be used to develop software as well as applets (small programs that run on webpages). But the flexibility doesn't end there because you can run the same Java programs on various operating systems without having to rewrite the code (unlike some other languages such as C and C++) thanks to the Java run-time environment which interprets Java code and tells the operating system what to do. Learning Java serves as a good introduction to software development.

CSPE 503 THEORY OF COMPUTATION

This course covers basic concepts of theory of computation; formal languages and Automata theory; Generative grammar, Chomsky hierarchy, Finite state Automata: Definition, concept of non-determinism, push down Automata: definition, equivalence between NPDA and context free grammars; Turing machines: definition, extension to turning machines: Multi-track, Multi-tape and non-determinism; Recursive function theory, relation between general recursive functions and Turing machines.

CSPE 504 VIRTUAL REALITY

The Objectives of the course are to: get familiar with state-of-the-art VR technology, its current limitations and near-future developments. study and experience available VR content and identify what sets VR apart from screen-based media. analyze how VR can help to understand and solve complex problems.obtain skills to create interactive VR content using Unity3D.create a VR prototype that has potential value for research and/or education.

CSPE 505 ARTIFICIAL INTELLIGENCE

The Objectives of the course are to: To apply a given AI technique to a given concrete problem.To Implement non-trivial AI techniques in a relatively large system. To understand uncertainty and Problem solving techniques.To understand various symbolic knowledge representation to specify domains and reasoning tasks of a situated software agent.To understand different logical systems for inference over formal domain representations, and trace how a particular inference algorithm works on a given problem specification.

CSL 502 OPERATING SYSTEMS LAB

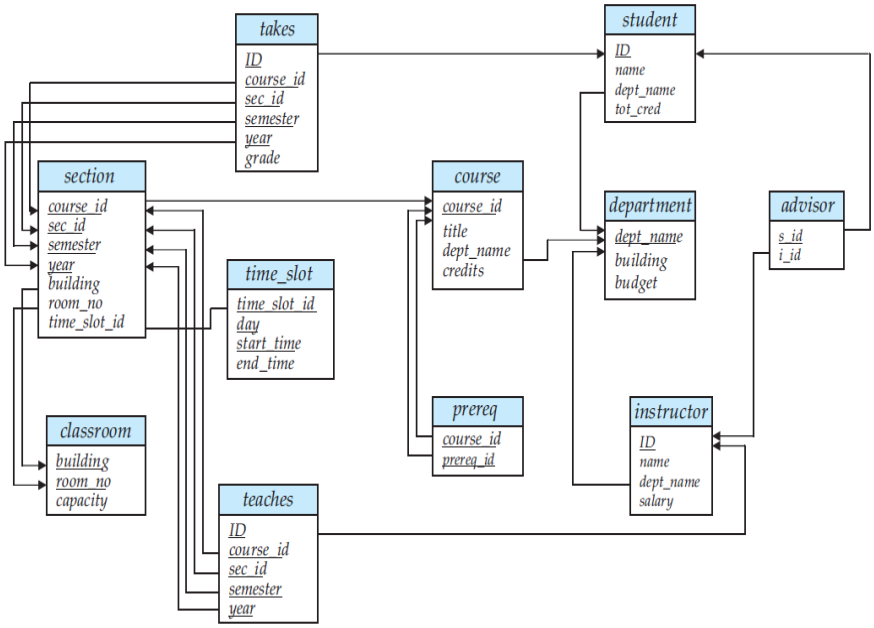
This lab complements the operating systems course. Students will gain practical experience with designing and implementing concepts of operating systems such as system calls, CPU scheduling, process management, memory management, file systems and deadlock handling using C language in Linux environment

CSL 503 DATABASE MANAGEMENT SYSTEM LAB

This Database Systems Lab develops capabilities on data analysis, data modeling and database design, using a suitable database management system. The course provides practical experience on database schema development, data modeling, SQL DDL and DML, Query optimization, database administration and performance tuning.

LAB PROGRAMS

(Based on Schema Diagram for University Database given fig #1.)



SEMESTER VI

HS 610 PROFESSIONAL ETHICS AND CONSTITUTION OF INDIA

The subject is intended for introducing the broader perspectives of the Indian Constitution with an aim to make the students informed citizens of India. The subject is also gives the basic knowledge about the working of Indian political system within constitutional framework. The principal objective of the course is to bring awareness towards the constitutional provisions like rights, duties and other values, to make the students responsible citizens of India.

CS 601 COMPILER DESIGN

The course is intended to teach the students the basic techniques that underlie the practice of Compiler Construction. The course will introduce the theory and tools that can be standardly employed in order to perform syntax-directed translation of a high-level programming language into an executable code. These techniques can also be employed in wider areas of application, whenever we need a syntax-directed analysis of symbolic expressions and languages and their translation into a lower-level description. They have multiple applications for man-machine interaction, including verification and program analysis. In addition to the exposition of techniques for compilation, the course will also discuss various aspects of the run-time environment into which the high-level code is translated. This will provide deeper insights into the more advanced semantics aspects of programming languages, such as recursion, dynamic memory allocation, types and their inferences, object orientation, concurrency and multi-threading.

CS 602 SERVICE ORIENTED PROGRAMMING

J2EE is aimed to be a standard for building and deploying enterprise applications, held together by the specifications of the APIs that it defines and the services that J2EE provides. In other words, this means that the “write once, run anywhere” promises of Java apply for enterprise applications too: Enterprise applications can be run on different platforms supporting the Java 2 platform.Enterprise applications are portable between application servers supporting the J2EE specification.

CS 603 MACHINE LEARNING

Machine learning techniques enable us to automatically extract features from data so as to solve predictive tasks, such as speech recognition, object recognition, machine translation, question-answering, anomaly detection, medical diagnosis and prognosis, automatic algorithm configuration, personalization, robot control, time series forecasting, and much more. Learning systems adapt so that they can solve new tasks, related to previously encountered tasks, more efficiently.

ELECTIVE V

CSPE 601 DATA WAREHOUSING ANDDATA MINING

The Objectives of the course are to: To understand different methods for handling unstructured data in a data warehouse, to learn the techniques to store the data across multiple storage media, to examine Relational and Multidimensional Models, to explore advanced topics, including data monitoring and testing. To provide an in-depth knowledge of data mining concepts, algorithms and performance measures .To get an insight of efficiency of data mining algorithms in solving practical problems .To provide hands-on experience in commercial data mining tools

1. Apply predictive and descriptive modeling to analyze complex data	X	X	X			X	X	X	X	

CSPE 602 COMPUTER SYSTEMS PERFORMANCE ANALYSIS

The Objectives of the course are to: Computer systems and networks are often evaluated through measurements, simulations, and emulations. This course will cover a number of techniques that are quite useful for experimental performance evaluation. These techniques are from the areas of experimental design, statistics (both parametric and non-parametric), data presentation, workload characterization, random number generation, simulation, queueing theory, and time series analysis/forecasting. Additionally, the course will cover several case-studies of experimental performance evaluation from the areas of operating and distributed systems, computer architecture, databases, and networks.

CSPE 603 MULTI AGENT SYSTEM

This course examines the mathematical and computational foundations of modern multi-agent systems, with a focus on game theoretic analysis of systems in which agents cannot be guaranteed to behave cooperatively; overall, problems at the interface of economic theory and computer science. (No prior experience in economics is assumed.) Specific topic include: Games: normal-form; extensive-form;

repeated; stochastic; coalitional; Bayesian; Computation of game-theoretic solution concepts; Mechanism design: key positive and negative results; Single-good auctions. Combinatorial auctions: bidding; mechanisms; computational issues.

CSPE 604 SCRIPTING LANGUAGES

The Objectives of the course are to: Understand the syntax and semantics of the Perl, Python language and their similarity and differences from Java. Understand how to develop and implement various types of programs in the Perl& Python language. Understand various forms of data representation and structures supported by the Perl& Python language .Understand the appropriate applications of the Perl & Python language. Recognize similarities and common characteristics of programming languages. Creating dynamic web content using javascript and AJAX.

CSL 603 COMPILER DESIGN LAB

It helps them to understand the use of lex and yacc tools for designing the compiler.The use of finite automata and their regular expressions for writing the grammar to check for syntax and semantic rules, tounderstsnd the LL(1) and LR(1) parsers.Helps to analyze the code generator.Helps them to Understand and use Context free grammars.

CSL 604 SERVICE ORIENTED PROGRAMMING LAB

This lab course focus on implementing concepts like connecting database with java programming, doing CRUD operations on database through GUI , creating client server architecture applications using servlets and JSP. And learning how to improve MVC architecture using Hibernate concepts.

SEMESTER VII

CS 701 MOBILE APPLICATION DEVELOPMENT USING ANDROID

This course briefs the concept of android environment from basics, developing first android application to SMS messaging. Understanding the anatomy of android application, android development tools and android SDK would be the first learning step in the course. Student shall be knowing android user interface, using different layouts and orientations. This course also lets know about the storage of user preferences (saving and loading), external storage and internal storage. It gives information about creating an application for a mobile using android platform, connecting to the outside world, location-based services and graphics.

CS 702 CRYPTOGRAPHY AND NETWORK SECURITY

This course exposes the learner to various security issues related to network design, one will learn about what is security and cryptographic attacks, will be able to implement the cryptosystems using the various cryptography algorithm. Various encryption algorithm like AES and DES as a counterpart to network attacks. Student will learn threats to information over network and security techniques related to internal and external sharing of information in an organization. Application of secure solutions like PGP, SSL, IPSec for network design. Sign and verify messages over network. Understand security in email and S/MIME.

CS 703 BIG DATA ANALYTICS

The explosion of social media and the computerization of every aspect of social and economic activity resulted in creation of large volumes of mostly unstructured data: web logs, videos, speech recordings, photographs, e-mails, Tweets, and similar. In a parallel development, computers keep getting ever more powerful and storage ever cheaper. Today, we have the ability to reliably and cheaply store huge volumes of data, efficiently analyze them, and extract business and socially relevant information. The key objective of this course is to familiarize the students with most important information technologies used in manipulating, storing, and analyzing big data. The students are also introduced to basic tools for statistical analysis, R, and several machine learning algorithms.

ELECTIVE VI

CSPE 701 TOPICS IN INTERNET OF THINGS

This course focus on introduction to internet of things, design architecture and technologies used in IOT. Build IOT applications using Raspberry Pi with Python programming.

CSPE 702 IMAGE PROCESSING

One picture is worth thousand words. A course in digital image processing teaches how such visual information can be used in various applications. This course will introduce the basic ideas and techniques used for processing images and their popular applications.

CSPE 703 WIRELESS SENSOR NETWORKS

The Objectives of the course are to: Obtain a broad understanding of the technologies and applications for the emerging and exciting domain of wireless sensor networks.Get in-depth hands-on experience in designing and developing a real operational embedded network system. Design and develop foundational systems software, sensor-actuator-controller algorithms and network protocols.

CSPE 704 ADVANCED COMPUTER ARCHITECTURE

The Objectives of the course are to: Technical competence in computer architecture and high performance computing. Ability to describe the operation of modern and high performance computers. Provide an understanding of memory hierarchy design and optimization techniques.Analyze and compare different type of architecture at Instruction level, Data Level and Thread level.Ability to undertake performance comparisons of modern and high performance computers. Ability to improve the performance of applications on modern and high performance computers. Development of software to solve computationally intensive problems.

CSL 705 DATA ANALYTICS LAB

COURSE OBJECTIVES

The objectives of this course include:

1. Understand and apply the Big Data Flow to actual projects
2. Being able to describe and apply the Data Analytics lifecycle to Big Data projects and lead other team members in the process
3. Identify and successfully apply appropriate techniques (such as ML) and tools to solve actual Big
4. Data problems (derive value from vast data sets)
5. Have an in-depth understanding of the Big Data ecosystem, specifically the Apache projects
6. HDFS, MapReduce, Tez, Kafka, Zookeeper, Storm, Cassandra, HBase, and Mahout.

SEMESTER VIII

CS 801 SOFTWARE ENGINEERING AND ARCHITECTURAL PATTERNS

Software engineering and development methods overview is given in this course. Differentiate system models, use UML diagrams and apply design patterns. Recognize the importance of software maintenance and describe the intricacies involved in software evolution. Application of different architectural and design patterns and support building efficient software architecture considering key factors in design and requirement.

B.Tech. in Information Technology

The Department of Information Technology at Alliance University has established the state of the art undergraduate education and prepares its students to apply their knowledge and multifaceted skills to be employed and excel in IT professional careers and/or to continue their education in IT and/or related post graduate programs.

- The undergraduate (four-year B.Tech) curriculum provides good breadth of knowledge in core areas of Information Technology and related engineering so as to comprehend engineering trade-offs, analyze, design, and synthesize data and technical concepts.
- The newly designed curriculum has greater emphasis on design and project work which will enrich students' analytical and independent thinking.
- The curriculum will provide students competency in mathematical, scientific and basic engineering fundamentals - necessary to formulate, analyze and solve hardware and software engineering problems and/or also to pursue advanced study or research.
- Further, the open elective courses enable students to develop expertise in other areas like Computational Mathematics, Communications, Cloud computing, Mobile technology, Analytics, Data Mining, Bio-informatics, Robotics, Management etc. in addition to core Information Technology subjects.
- Additionally, the students must complete six months' training / internship in the final academic year, towards fulfilment of degree requirements.
- The undergraduate curriculum emphasized on Object Oriented programming, computational complexity theory, algorithms, database management, computer graphics, software engineering, system architecture, operating system, artificial intelligence among others.
- Students are encouraged to publish technical papers regularly in reputed journals and conferences under the guidance of dedicated faculty members.
- The department has strong faculty, with well blended academic and industrial experience and are active in research.
- The students interact freely with faculty on all matters related to studies. The curriculum gives them ample opportunity to work in close cooperation with any faculty member.

PROGRAM OBJECTIVES

- To prepare graduates to take up professional careers in different roles in diverse industry.
- To inculcate students to maintain high professionalism and ethical standards, effective oral and written communication skills, to work as part of teams on multidisciplinary projects and diverse professional environments, and relate engineering issues to the society, global economy and to emerging technologies.
- To provide our graduates with learning environment awareness of the life-long learning needed for a successful professional career and to introduce them to written ethical codes and guidelines, perform excellence, leadership and demonstrate good citizenship.

- To enable students to design hardware and software systems, components, or processes to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability.
- To equip students to work individually or as a member with responsibility to function on multi-disciplinary teams and to become effective team-oriented problem-solvers, as well as effective communicators with communication skills, both oral and written.
- To equip students to use the techniques, skills, and modern engineering tools necessary for computer engineering practice.
- To equip students to design and conduct experiments, as well as to organize, analyze and interpret data to produce meaningful conclusions and recommendations.
- To equip graduates with the knowledge and skills to take up research and higher studies in computer science and related engineering/ scientific disciplines.

LEARNING DELIVERY METHODOLOGY

- Interactive lectures
- Class Assignments
- Video Presentation
- Laboratory experiments
- Company Visits / Guest lectures
- Projects development

SUBJECT SUMMARY

Students are required to complete a total of **160 credits** spread over 48 Professional courses, 12 Humanities and Social Science courses, 25 Basic Science Courses, 24 Engineering Courses, 18 Professional elective courses, 18 Open Elective subjects, and 15 Credit project, industry internship and Seminars, in the area of 'Information Technology ' and related subject areas.

Curriculum for 1st Year (Semester I & Semester II)

A systematic exposure to scientific, mathematical and engineering principles will take place during the first two semesters. In each of these semesters, the students will take one course each in physics, chemistry, mathematics, foundation of computer and introductory course in different branches of engineering and Technical English. The teaching of the compulsory core courses in science and engineering will include substantial components of laboratory demonstrations and hands-on experiments. Students are required to complete 43 Credits in 1st year (Semester I & Semester II).

Curriculum for 2nd Year (Semester III & Semester IV)

At the beginning of the third semester, each student will enter the particular discipline (Information Technology) for specialization according to his/her academic choice. Students are required to complete 48 Credits in 2nd year (Semester III & Semester IV).

Curriculum for 3rd Year (Semester V &Semester VI)

During 3rd year of study, each student will have a choice of selecting an elective subject for the semester-V, and two more elective subjects for semester-VI in the core areas along with other mandatory subjects. Students are required to complete 48 Credits in 3rd year (Semester V & Semester VI).

Curriculum for 4th Year (Semester VII &Semester VIII)

During the seventh semester, the students will explore advanced concepts in Information Technology with both theory and experimental techniques. The students are required to take two elective subjects in the core areas per semester for semester-VII & semester-VIII. In final semester, the students are required to do the project work. The project should be in the chosen major discipline or an interdisciplinary topic that substantially overlaps with the major discipline. Students are required to complete 41 Credits in 4th year (Semester VII & Semester VIII).

Semester	Subject Code	Subject	Credits
I/II (23 Credits)	MA 101	Engineering Mathematics – I	04
	ME 102	Basics of Mechanical Engineering	03
	CS 103	Foundations of Computing	04
	PH 104	Engineering Physics	04
	CE 105	Basics of Civil Engineering	03
	CE 106	Environmental Engineering	02
	CSL 107	Foundations of Computing Lab	01
	PHL 108	Engineering Physics Laboratory	01
	MEL 109	Basic Engineering Workshop	01
I/II (22 Credits)	MA 201	Engineering Mathematics –II	04
	ME 111	Engineering Graphics	04
	EE 112	Basics of Electrical Engineering	03
	CH 113	Engineering Chemistry	04
	EC 114	Basics of Electronics Engineering	03
	TE 115	Technical English	02
	CHL 116	Engineering Chemistry Laboratory	01
	EEL 117	Electrical & Electronics Laboratory	01
III (18 Credits)	IT 301	Engineering Mathematics –III (Combinatorics & Graph Theory)	4
	IT 302	Data Structures and Algorithms	4
	IT 303	Digital Design and Computer Organization	4
	IT 304	Object Oriented Programming and C++	3

Semester	Subject Code	Subject	Credits
	ITL 305	Object Oriented Programming Lab	1
	ITL 306	Data Structure Lab	1
	ITL 307	Digital System and Design Lab	1
IV (17 Credits)	IT 401	Engineering Mathematics –IV (Probability & Linear Algebra)	4
	IT 402	Java Programming	4
	IT 403	Microprocessors and Interfacing	4
	IT 404	Design and Analysis of Algorithms	3
	ITL 405	Microprocessors Lab	1
	ITL 406	Java Programming Lab	1
V (17 Credits)	IT501	Automata Theory	4
	IT502	Database Systems	3
	IT503	Principles and Data Communication and Computer Networks	4
	ITE504	**Elective I**	3
	ITL505	Database Systems Lab	1
	ITL506	Computer Networks Lab	1
VI (18 Credits)	IT601	Web Technologies	4
	IT602	Data Warehousing and Data Mining	4
	ITE603	**Elective-II**	3
	ITE604	**Elective-III**	3
	ITL605	Web Technologies Lab	1
	ITL606	Data warehousing Lab	1
	HS 610	PROFESSIONAL ETHICS AND CONSTITUTION OF INDIA	1
VII (14 Credits)	IT701	Software Testing	3
	IT702	Advanced Java/J2EE	4
	IT703	Big data analytics with R Programming	3
	ITE704	**Elective-IV**	3
	ITL705	Software Testing Lab	1
	ITL706	Advanced Java/J2EE (Project)	1
VIII (16 Credits)	ITL801	**Elective V**	3
	ITP 899	Project Work	10
TOTAL CREDITS = 160			

ELECTIVE SUBJECTS

Group 1: for IT Elective-I

Options	Name of the Subject	Subject Code	Credit
1	Operating Systems	ITE511	3
2	Computer Graphics	ITE512	3
3	Cloud Computing	ITE513	3

Group 2: for IT Elective-II

Options	Name of the Subject	Subject Code	Credit
1	Mobile Computing	ITE621	3
2	Software Engineering	ITE622	3
3	Software Project Management	ITE623	3

Group 3: for IT Elective-III

Options	Name of the Subject	Subject Code	Credit
1	Information Security	ITE631	3
2	Enterprise Resource Planning (ERP)	ITE632	3
3	Image Processing	ITE633	3

Group 4: for IT Elective-IV

Options	Name of the Subject	Subject Code	Credit
1	Artificial Intelligence	ITE741	3
2	Internet of Things	ITE742	3
3	Compiler Design	ITE743	3

Group 5: for IT Elective-V

Options	Name of the Subject	Subject Code	Credit
1	Operations Research	ITE851	3
2	Analytics	ITE852	3
3	Service Oriented Architecture	ITE853	3

SEMESTER III

IT 301 ENGINEERING MATHEMATICS-III

Students are given the exclusive knowledge in Relations and Functions., Some concepts of Combinatorics like recurrence relation and generating functions, as well as an introduction to Graph theory and its applications related Computer Science and Information Technology will also be taught. . The subject is designed to understand theory and applications to develop their analytical skills.

IT 302 DATA STRUCTURES & ALGORITHMS

This course introduces linear data structures - sequential representations; representation of linear arrays in memory, single-dimensional arrays with Traversal, Selection, Searching, Insertion, Deletion, Sorting operations. Multidimensional arrays, array of strings, variable-length arrays, pointers and arrays, dynamically allocated arrays; link representations like - Linear Linked Lists, Circularly Linked Lists, Doubly Linked Lists, Stacks, Queues, Strings; design of recursive algorithms, Tail Recursion, When not to use recursion, Removal of recursion. This course also includes non-linear Data Structure like Trees - Binary Trees, Traversals and Threads, Binary Search Trees, Insertion and Deletion algorithms, Height-balanced and weight-balanced trees, B-trees, B+ trees, Application of trees; Graphs - representations, Breadth-first and Depth-first Search; Hashing Functions, collision Resolution Techniques. Sorting and Searching Algorithms like Bubble sort, Selection Sort, Insertion Sort, Quick Sort, Merge Sort, Heap sort and Radix Sort. File Structures like Sequential and Direct Access, Relative files, Indexed files - B+ tree as index, Multi-indexed files, Inverted files and Hashed filesare also part of the curriculum.

IT 303 DIGITAL DESIGN AND COMPUTER ORGANIZATION

This course covers how digital electronics works and what is the typical buildup of any digital electronic circuitry to have a thorough understanding of the basic structure and operation of a digital Computer with covering following topics: logic gates and Boolean algebra with examples; minimization techniques of these Boolean expressions. This course introduces the design of arithmetic and logic circuits like Half adder, Full adder, Subtractor, BCD adder, Excess-3 adder, Comparator, Shift operation, Multiplier, Code Converter, Decoder, Parity detector-generator, Multiplexer, DE multiplexer, Encoder. The basic structure computer will explore the knowledge of Functional units, its basic operational concepts, Bus Structures, Performance and metrics, Instructions and instruction sequencing – Hardware – Software interface – Instruction set architecture – Addressing modes – RISC – CISC – ALU design – Fixed point and floating point operations. Along with these Basic Processing Units, Memory Systems are also covered.

IT304 Object Oriented Programming in C++

Object Technology introduces differences between C and C++, Notions of syntax and semantics of programming languages; operational/natural semantics of functional and imperative languages. Data abstractions and control constructs; block structure and scope, principles of abstraction, qualification and correspondence; parameter passing mechanisms; runtime structure and operating environment; practical

and implementation issues in run-time systems and environment; abstract machines; object initialization, overloading, polymorphism; objects; classes and inheritance, file handling and exceptional handling are also covered in this paper.

ITL 305 Object Oriented Programming C++ Lab

Object Oriented Programming in C++ includes writing program to implement the concepts such as Class, object, data hiding, data extraction, abstraction, overloading, inheritance and exception handling, virtual function with functions, array of objects.

ITL306 Data Structures Lab

Data Structure Lab includes algorithm and C program writing exercises covering all major data structures & POPs in 'Data Structure' course. This Lab assignment includes different data structure related problems with Linked Lists, Stacks, Queues, Strings; Recursion, Trees, insertion and deletion algorithms, application of Trees; Hashing Functions; Sorting and Searching algorithms like Bubble Sort, Selection Sort, Insertion Sort, Quick Sort, Merge Sort, Heap Sort. It includes file access techniques like sequential and direct access, indexed files - B+ tree as index and hashed files and intensive use of C programming concepts.

ITL308 Digital Systems and Design Lab

Digital Systems Lab enables students to learn basic functions of digital trainer kit and its usage & application with simple digital circuits using the kit. The objective of the Lab is to make students understand the link between their previously learned knowledge with the design and implementation of a digital system in Verilog and to gain confidence in Verilog syntax.

SEMESTER IV

IT 401 ENGINEERING MATHEMATICS-IV

The topics in this curriculum equip the students with Introductory concepts of Descriptive statistics, Probability, and some concepts of Linear Algebra like vector spaces and Linear Transformation and Inner Product space. The subject is designed to understand theory and applications to develop their analytical skills.

IT 402 Java Programming

The course begins with an introduction to the Java programming language and a review of the principles of object-oriented (OO) development before focusing on how to create object-oriented applications in Java. This course includes topics such as recognizing Java constructs that enable object-orientation. The course provides you with an overview of the Java language syntax, includes packages, classes, methods, variable, conditional statements, and control flow. Students learn about the role of inheritance and interfaces in Java, how to create and handle exceptions, and how to refractor code. In addition, this course

covers various new features of Java SE 5 and Java SE 6, such as generics, auto-boxing, and annotation. Students also learn about the different Java application programming interfaces (APIs), focusing on the APIs most commonly used in real-world Java applications such as Collections, Input/output (I/O), Threads, and other utility classes.

IT 403 MICROPROCESSORS AND INTERFACING

The course introduces the basic structure and operating principle of microprocessor, architecture of microprocessor, Assembly Language of 8085 and 8086, Interfacing with 8086, Co-Processor 8087, Interfacing with 8051, High End Processors, hardware and software components of a microprocessor-based systems to implement system-level features, the tools and techniques to design, implement, and debug microprocessor-based systems.

IT404 Design and Analysis of Algorithms

This course covers introduction to algorithms and its importance, mathematical foundations: growth functions, basic analyzing method of an algorithms like performance analysis, space complexity, time complexity, summations, recurrences, sorting, asymptotic notation, big oh notation, omega notation, theta notation, probabilistic analysis, Divide-and-Conquer strategy for solving problems, Greedy method, dynamic programming, various graph search techniques, merits and demerits of these search techniques. He students are taught how to design algorithms, establish their correctness, study their efficiency and memory needs and study a strong mathematical component in addition to the design of various algorithms.

ITL 407 MICROPROCESSOR LABS

Students should be able to demonstrate programming proficiency using the various addressing modes and data transfer instructions of the target microprocessor, develop program using the capabilities of the stack, the program counter, and the status register, how to execute a machine code program, able to apply knowledge of the microprocessor's internal registers and operations by use of a PC based microprocessor simulator. Assembly language program writing, assemble into machine a cross assembler utility and download and run their program on the training boards. Design electrical circuitry to the Microprocessor I/O ports in order to interface the processor to external devices, assembly language program writing to provide solutions like fluid level control, temperature control, and batch processes, to familiarize with microprocessor and micro controller kit. Also understand they can be interfaced to produce meaningful outputs.

ITL406: Java Programming Lab

The course introduces the object oriented programming with three main concepts such as encapsulation, inheritance, and polymorphism. Along with programs on these concepts the

programs on packages, interfaces, threads, multithread and exception handling as well as applets are invoked.

SEMESTER V

IT 501 AUTOMATA THEORY

This course covers introduction to Regular Languages, Finite Automata, equivalence, minimization, Myhill-Nerode Theorem, introduction to non-determinism, Context free grammars, Pushdown automata, equivalence and applications. Turing machines, Recursive and Recursively enumerable sets, non-determinism, RAMs and equivalence, Universal Turing Machines, undesirability, Rice's theorems for RE sets, Post machines, Basics of Recursive function theory. Equivalence, Church's thesis, computational complexity, space and time complexity of Turing Machines, Relationships, Savage's theorem, Complexity classes, Complete problems, NP-completeness, Cook-Levin theorem.

IT 503 DATABASE SYSTEMS

This course introduces the purpose of Database Systems; evaluation and architecture of database-system; centralized and client-server architecture; structure of Relational Databases, fundamental relational algebra and relational calculus, database design and E-R model, concepts of Normalization; functional dependency theory and different Normal forms. Logical & Physical database design, modeling temporal data; data definition and 'SQL' - the Query Language. It covers concept of ordered Indices, B+ Tree Index Files, multiple-key access; static and dynamic Hashing, transaction state, Concurrent executions and serialization.

IT503 Principles of Data communication and Computer Networks

This course outlines on A communication model, Data communications, Data communication networking, Protocol Architecture, Digital Conversions, Analog Conversions, Types of Errors, Data Link Control, ALOHA, CSMA, CSMA/CD,CSMA/CA. In the computer Network part Network model; all the layers of networks, TCP/IP are focused

ITL505 Database Systems Lab

This Database Systems Lab develops capabilities on data analysis, data modelling and database design, using a suitable database management system. The course provides practical experience on database schema development, data modeling, SQL DDL and DML, Query optimization, database administration and performance tuning.

ITL506 Computer Networks Lab

This Computer Networks Lab develops capabilities on simulate the network topologies, routing techniques, Protocols and implementation of different networking technologies. The course also provides practical experience on working with networking devices to design and configure the network for

implementation. Practical's related to cabling, cable crimping and testing using different types of cables are performed.

SEMESTER VI

HS 610 PROFESSIONAL ETHICS AND CONSTITUTION OF INDIA

The subject is intended for introducing the broader perspectives of the Indian Constitution with an aim to make the students informed citizens of India. The subject is also gives the basic knowledge about the working of Indian political system within constitutional framework. The principal objective of the course is to bring awareness towards the constitutional provisions like rights, duties and other values, to make the students responsible citizens of India.

IT 601 Web Technologies

This course introduces the detailed study of Internet Applications and Web technologies. This course covers: introduction to basics of Web Development with HTML, Perl and JavaScript; Dynamic Web Development: JSP, CGI, PHP; Database Connectivity: Oracle, DB2, MySQL; Internet Technologies: XML, File handling; Image Handling; Interactive Web Application using Ajax and PHP.

ITL602 Data Warehousing and Data mining Lab

During these Lab sessions, students will explore different schema creation options such as snowflake, Star Schema; will design & create Data Mart based on different functional area requirements. Students will practice how to create fact and dimension table. They will explore the concepts of data modeling and importance of data warehouses and data marts. The syllabus is also includes experiments on R-OLAP using Star schema and Snowflake schema. The lab experiments on data extraction, standardization and loading and data cleansing are also included. Data mining lab experiments includes classification apriori, association etc.

ITL 605 Web Technologies Lab

This course is having objective to explore the knowledge of development of web pages with HTML, Perl and JavaScript along with Dynamic Web Development: JSP, CGI and PHP. The pupils also get the power of Database Connectivity with Oracle, DB2, MySQL and its applications as well as Internet Technologies like XML, File handling; Image Handling; Interactive Web Application using Ajax and PHP.

ITL606 Data Warehousing and Data mining Lab

During these Lab sessions, students will explore different schema creation options such as snowflake, Star Schema; will design & create Data Mart based on different functional area requirements. Students will

practice how to create fact and dimension table. They will explore the concepts of data modeling and importance of data warehouses and data marts. The syllabus is also includes experiments on R-OLAP using Star schema and Snowflake schema. The lab experiments on data extraction, standardization and loading and data cleansing are also included. Data mining lab experiments includes classification apriori, association etc.

ITL607 Mini Project

Project based on java and web technologies.

SEMESTER VII

IT 701 SOFTWARE TESTING

This course provides the fundamental knowledge of software testing; software failures, testing process, testing terminologies, limitations of testing, functional testing, structural testing, test cases, regression testing, levels of testing – unit testing, integration testing, systems testing, acceptance testing; Object Oriented testing, matrices and models of software testing, web application testing techniques, testing tools and Automated testing.

IT702 Advanced Java /J2EE

The course gives platform to learn advanced Java which includes the servelts, javascripts, applets class, event handling, AWT, graphics, windows, streams etc.

IT703 Big Data Analytics with R Programming

The course provides the types of Digital Data, Introduction to Big Data, Big Data Analytics, The Design of HDFS, HDFS Concepts, Command Line Interface, Hadoop file system interfaces, Map Reduce Anatomy of a Map Reduce Job Run, Failures, Job Scheduling, Hadoop Eco System Pig. Data Analytics with R .

ITL707 Software Testing Lab

This Lab course introduces hands-on software testing, identification of software testing failures scenarios, test case preparation from requirement and use cases. For the given test cases, ways to select and prioritise the regression testing is to be discussed. Hands-on practice on integration tests, systems testing will be given to the students. The course also covers web application testing, testing tools and Automated testing using some of the popular testing tools.

ITL702 Advanced Java /J2EE (Project)

Project based on java and web technologies - The project should be in the chosen major discipline or an interdisciplinary topic that substantially overlaps with the major discipline.

SEMESTER VIII

ITP 802 Projects

Elective Subjects:

Elective Group - I

ITE 511 OPERATING SYSTEMS

This course introduces the functions of Operating Systems, layered architecture basic concepts; parallelism, multitasking, interrupt architecture, system calls and notion of process and threads; synchronization and protection issues; scheduling; memory management including virtual memory and paging techniques; methods for handling deadlocks; input-output architecture and device management; file systems; distributed file systems. Case studies of common OS like UNIX, Windows.

ITE 512 COMPUTER GRAPHICS

The course introduces the computer graphics with design, drawings, animation of multimedia applications and also simulations. The students also get knowledge of storing the process of pictures and difficulties for displaying pictures. The different graphics devices like Cathode Ray tube, Quality of Phosphors, CRTs Beam Penetration; functions for handling events, polling task design, Input functions, dragging and fixing, hit detection. This includes the drawing methods like Point Plotting Techniques, Qualities of good line drawing algorithms, the Digital Differential Analyzer (DDA), Brenham's Algorithm, and Generation of Circles; two dimensional transformations and clipping and windowing, curves and surface drawing methods, solid area scan conversion and three dimensional transformations.

ITE 513 CLOUD COMPUTING

The course covers the overview of the cloud with the topics like: Introduction of clouding computing-Components of cloud, applications: Need of cloud: The first mover in to the cloud – Amazon, Google, Microsoft: The main services of Cloud – Infrastructure as a Services, Platform as a Services, and Software as a Service. The other auxiliary services: Architecture: Types of deployments – Private Cloud, Public Cloud, Hybrid Cloud, and Community Cloud: Virtualization and its significance – Virtualization of Server, Network Virtualization, Storage Virtualization, Virtualization of machines (VMs).

Elective II

ITE 621 MOBILE COMPUTING

This course introduces the various mobile computing algorithms and wireless application protocols to develop mobile content applications and gives the fundamentals of wireless communication; Telecommunication Networks; GSM – GPRS – DECT – UMTS – IMT-2000 – Satellite networks; Wirless LAN – IEEE 802.11 - architecture – services – MAC – physical layer – IEEE 802.11a - 802.11b standards – HIPERLAN – Blue tooth.; mobile network layer; mobile IP – Dynamic host configuration protocol – Routing; transport and application layers.

ITE 622 SOFTWARE ENGINEERING

This course introduces Software development process models like waterfall, spiral, agile models; Feasibility Analysis, Cost Benefit Analysis, COCOMO model, Requirement Analysis concepts and principles, software design concepts and principles, Design patterns, UML Documentation, abstraction, modularity, object-oriented techniques; software architecture; Coding and software testing strategies, software configuration management, software quality assurance; component based software engineering and computer aided software engineering (CASE). Software project planning and risk analysis; Cost analysis and estimation, manpower and time management. Organization and management of large software design projects.

ITE 623 SOFTWARE PROJECT MANAGEMENT

The Project Management course introduces project management context, project management processes. This course covers project integration management, scope management, time management, cost management, Quality management, human resource management, project communication management, procurement management and project risk management.

Elective III

ITE 631 INFORMATION SECURITIES

This course includes study of various information security issues (threats and attacks) and different security services, models for Network security, conventional encryption principles and algorithms; message confidentiality; basic Cryptography and message authentication, digital signature, key management. The course covers IP security, Web security, Intrusion techniques and intrusion detection, nature of viruses, Anti-Virus approaches, Firewalls characteristics and configuration.

ITE 632 ENTERPRISE RESOURCE PLANNING (ERP)

This course covers an overview of Enterprise; introduction to ERP: common ERP Myths – A Brief history of ERP – The advantage & disadvantages of ERP – Over expectations in ERP – The ERP Packages; risk and benefits of ERP; Functional modules of ERP Software; Technological, Operational and Business reasons for implementing ERP - Implementation Challenges; Implementation methodologies, ERP implementation Plan and strategies; Risk Assessment – Budget – Cost – Performance measurement; ERP Package selection; success and failure factors of an ERP Implementation.

ITE 633 IMAGE PROCESSING

This course introduces the basic theory and algorithms that are widely used in digital image processing along with critical thinking about short-comings of the state-of-the-art in image processing with following concepts. Examples of fields that use digital image processing; fundamental steps in digital image

processing; components of an image processing system; image sensing and acquisition image sampling and quantization; basic relationships between pixels-image enhancement in the spatial domain; image enhancement in the frequency domain; introduction to the Fourier Transform and frequency domain; smoothing frequency domain filters; sharpening frequency domain filters; introduction to wavelets and multi-resolution processing; image compression fundamentals; image compression models; error free compression; image segmentation: detection of discontinuities; edge linking and boundary detection; the use of motion in segmentation.

Elective IV

ITE 741 ARTIFICIAL INTELLIGENCE

This course covers an Introduction to Artificial Intelligence; Agents and environments. Problem solving by search; uninformed search, informed ("heuristic") search, constrained satisfaction problems, adversarial search, Knowledge representation and reasoning; rule based representations, logical formalisms, frames or object oriented systems, network based approaches and mixed representations; Theorem-proving; Knowledge bases and expert systems; overview of LISP and PROLOG; reasoning in uncertain environments; planning communication and multi-agent systems; Learning; Vision; Natural Language Processing.

ITE 742 Internets of Things

This course covers is an Introduction to M2M and IoT Technology Fundamentals- Devices and gateways, Local and wide area networking, Data management, Business processes in IoT, Everything as a Service (XaaS), M2M and IoT Analytics, Knowledge Management.

IoT Reference Architecture - Introduction, Functional View, Information View, Deployment and Operational View, Other Relevant architectural views. Real-World Design Constraints- Introduction, Technical Design constraints-hardware is popular again, Data representation and visualization, Interaction and remote control. Industrial Automation- Service-oriented architecture-based device integration, SOCRADES: realizing the enterprise integrated Web of Things, IMC-AESOP: from the Web of Things to the Cloud of Things, Commercial Building Automation- Introduction, Case study: phase one-commercial building automation today, Case study: phase two- commercial building automation in the future.

ITE 743 Compiler Design

This course covers is an Introduction to the major concept areas of language translation and compiler design. It enrich the knowledge in various phases of compiler ant its use, code optimization techniques, machine code generation, and use of symbol table. Compilers – Analysis of the source program – Phases of a compiler – Cousins of the Compiler – Grouping of Phases – Compiler construction tools – Lexical Analysis – Role of Lexical Analyzer – Input Buffering – Specification of Tokens. Role of the parser – Writing Grammars –Context-Free Grammars – Top Down parsing – Recursive Descent Parsing – Predictive Parsing – Bottom-up parsing – Shift Reduce Parsing – Operator Precedent Parsing – LR Parsers – SLR Parser – Canonical LR Parser – LALR Parser.

Elective V

ITE 851 OPERATIONS RESEARCH

The subject demonstrates the basic knowledge of operations research with exploring the definition and scope of Operation Research, the models used in Operation Research, Linear programming problem formulation and solution, simplex method, Transportation problem, Queuing theory, Game theory and job sequencing.

ITE 852 Analytics

Data Analytics is the science of analysing data to convert information to useful knowledge. This knowledge could help to understand our world better, and in many contexts enable us to make better decisions. This course seeks to present you with a wide range of data analytic techniques and is structured around the broad contours of the different types of data analytics, namely, descriptive, inferential, predictive, and prescriptive analytics.

ITE 853 SERVICE ORIENTED ARCHITECTURE (SOA)

This course covers SOA Overview, SOA and Web Service Fundamental, the evolution of SOA, Activity management, Orchestration, Advance Massaging, correlation, policies, Metadata exchange, notification and eventing; Principles of service orientation; service layers; SOA delivery strategy; WSDL and XML Schema language basics; SOAP language basics; UDDI and SOA; SOAP and SOA; WSDL and SOA; XML and SOA; SOA support in J2EE.

B. Tech. in Mechanical Engineering

B.Tech in Mechanical Engineering course intends to impart the basic concepts of Mechanical Engineering and its importance to the society. Mechanical Engineering is one of the oldest branches of engineering and has helped other branches evolve in due course of time. The branch is vital to every other branch of engineering and is truly interdisciplinary in nature. In due course it has developed its own software capable of handling complex problems. The students are made to ponder about the machines in general from different perspectives and taken right through the evolution starting from the material chosen for the machine to the end product with all accessories. Students are also exposed to different types of analyses taking into consideration the needs of other sections of the society involved. Students are made to appreciate the roles and responsibilities of a mechanical engineer. They would also be taught how a mechanical engineer can shape the society towards a better future through a curriculum that expands over eight semesters in a gradual manner.

The four-year B.Tech. Programme is organized into eight semesters. Students specializing in Mechanical Engineering discipline will have to take a set of prescribed core and elective courses. They will also take courses in interdisciplinary areas for an encompassing learning experience. While a student specializes in a major discipline, he/she can also broaden his/her knowledge and skills by taking courses in other disciplines. The combination of courses taken by a student will be listed in his/her degree certificate. The total number of credits shall be about 180 depending upon the choice of subjects taken.

Programme Objectives

- Graduates are able to apply their knowledge and skill to design, analyze and evaluate mechanical engineering systems.
- Graduates are able to identify and solve engineering problems systematically, critically, creatively and analytically.
- Graduates are competent, possess leadership qualities and able to act professionally in the field of mechanical engineering.
- Graduates are able to communicate effectively and address issues related to social, cultural and environment.
- Graduates are able to undertake lifelong learning and adapt to the changing environment.

Programme Learning Outcomes

Each graduate will demonstrate the following abilities upon graduation:

I. Ability to acquire knowledge and understanding of science and engineering principles relevant to Mechanical Engineering.

II. Ability to apply knowledge, techniques and tools in solving problems relevant to Mechanical Engineering.

III. Ability to design systems and critically evaluate components, processes or systems related to Mechanical Engineering using total approach.
IV. Ability to creatively exploit the current knowledge and technology in line with the development in Mechanical Engineering.
V. Ability to manage engineering projects. Ability to prepare, submit and present quality technical reports within a given time frame.
VI. Ability to communicate effectively as an engineer.
VII. Ability to work as a team.
VIII. Ability to adapt to technical changes taking into consideration cultural, political and environmental issues.
IX. Ability to continue in lifelong learning.
X. Ability to practice professional ethics and execute work with sensitivity towards workers safety and health, the environment and those with special needs.

Course Structure:

Semesters 1 and 2: A systematic exposure to scientific, mathematical and engineering principles will take place during the first two semesters. In each of these semesters, the students will take one course each in physics, chemistry, mathematics and introductory course in different branches of engineering and Technical English. The teaching of the compulsory core courses in science and engineering will include substantial components of laboratory demonstrations and hands-on experiments. The students will also be exposed to courses that will help them appreciate science and its implications for society and also sharpen their skills in communicating science to both experts and to the general public.

Semesters 3 and 4: At the beginning of the third semester, each student will study 5 compulsory core subjects along with the subject of mathematics. The students shall be exposed to the fundamental concepts in different streams of Mechanical Engineering with both theory and experimental techniques during the two semesters. This is aimed at helping them to cope up with subjects of advanced topics in higher semesters. A preliminary course in numerical analysis shall also be given.

Semesters 5 and 6: At the beginning of the fifth semester, each student will have a choice of selecting an elective subject in the core area along with other mandatory subjects. The students shall be exposed to the fundamental concepts in additional subjects in different streams of Mechanical Engineering with both theory and experimental techniques.

Semesters 7 and 8: During the seventh semester, the students shall be exposed to the advanced concepts in Mechanical Engineering with both theory and experimental techniques. Also, a short term internship will be made compulsory in order to get the students exposed to industry procedures and techniques. The students are required to compulsorily take one minor subject from outside the department. Also, the ground work for the project to be submitted in the next semester is started. During the last semester, the

students are advised to take elective subjects based on their interests and choice of career. They have to do a project work in association with the choice of their electives. The project should be in the chosen major discipline or an interdisciplinary topic that substantially overlaps with the major discipline.

All lecture courses will be taught by faculty who bring their rich experience of industry, research and graduate training to bear on teaching at the undergraduate level. Mentoring and tutorials will be two important aspects of the undergraduate experience at Alliance College of Engineering and Design.

subject Summary

Semester	Subject Code	Subject	Credits
I/II (19 Credits)	MA 101	Engineering Mathematics – I	04
	ME 102	Basics of Mechanical Engineering	03
	CS 103	Foundations of Computing	0 3
	PH 104	Engineering Physics - I	03
	CE 105	Basics of Civil Engineering	03
	CE 106	Environmental Engineering	0
	CSL 107	Foundations of Computing Lab	01
	PHL 108	Engineering Physics Laboratory	01
	MEL 109	Basic Engineering Workshop	01
I/II (23 Credits)	MA 201	Engineering Mathematics –II	04
	PH 204	Engineering Physics - II	03
	ME 111	Engineering Graphics	0 2
	EE 112	Basics of Electrical Engineering	03
	CH 113	Engineering Chemistry	04
	EC 114	Basics of Electronics Engineering	03
	TE 115	Technical English	02
	CHL 116	Engineering Chemistry Laboratory	01
	EEL 117	Electrical & Electronics Laboratory	01
III (21 Credits)	ME301	Engineering Mathematics –III	4
	ME 302	Materials Science and Metallurgy	3
	ME 303	Strength of Materials	3
	ME 304	Manufacturing Technology	3
		Open Elective - I	3
		Biology	3

Semester	Subject Code	Subject	Credits
	MEL 30 5	Metallography and Material Testing Lab	1
	MEL 306	Manufacturing Lab	1
IV (23Credits)	ME 401	Engineering Mathematics –IV	4
	ME 402	Thermodynamics	4
	ME 403	Fluid Mechanics and Machinery	4
	MPE XXX	Professional Elective - I	3
	MPE XXX	Professional Elective - II	3
		Open Elective - II	3
	MEL 405	Fluid Mechanics Lab	1
	MEL 40 6	Computer Aided Machine Drawing Lab	1
V (22Credits)	ME 501	Design of Machine Elements I	3
	ME 502	Dynamics of Machines	3
	ME 503	Applied Thermodynamics	4
	ME 504	Theory of Machines and Mechanisms	4
		Open Elective - III	3
	MPE XXX	Professional Elective – III	3
	MEL 506	Design and Dynamics Lab	1
	MEL 50 7	Energy Conversion Lab	1
VI (19 Credits)	ME 601	Finite Element Method	3
	ME 602	Design of Machine Elements II	3
	ME 603	Heat and Mass Transfer	4
	HS 610	PROFESSIONAL ETHICS AND CONSTITUTION OF INDIA	1
	MPE XXX	Professional Elective - IV	3
	MEL 605	Heat and Mass Transfer Lab	1
	MEL 606	Finite Element Analysis Lab	1
VII (18 Credits)	MEI 700	Industry Internship Program	1
	ME 701	Computer Integrated Manufacturing	3
	ME 702	Mechatronics	4
	MPE XXX	Professional Elective - V	3
		– Open Elective - V	3

Semester	Subject Code	Subject	Credits
	H&M	Elective I	2
	MEL 704	Computer Integrated Manufacturing Lab	1
	MEL 705	Mechatronics Lab	1
	MEP 706	Project I	1
VIII (15 Credits)	MPE 801	Professional Elective - VI	3
	H&M	Elective	2
	MEP 899	Project II	10
TOTAL CREDITS = 160			

LIST OF ELECTIVES

Professional Elective Courses			
SEMESTER	SUBJECT CODE	SUBJECT TITLE	CREDITS
4th semester	MPE 401	Metal Forming and Powder Metallurgy	3
	MPE 402	Metrology and Measurement	3
	MPE 403	Composite Materials	3
	MPE 404	Non-traditional Machining	3
	MPE 405	Power Plant Engineering	3
5th semester	MPE 501	Rapid Prototyping and 3D Printing	3
	MPE 502	Internal Combustion Engines	3
	MPE 503	Refrigeration and Air Conditioning	3
	MPE 504	Hydraulics and Pneumatics	3
	MPE 601	Turbo Machinery	3

6th semester	MPE 602	Mechanical Vibrations	3
	MPE 603	Bio Materials	3
	MPE 604	Automation	3
7th semester	MPE 701	Gas Dynamics and Jet Propulsion	3
	MPE 702	Automobile Engineering	3
	MPE 703	Fatigue and Fracture Mechanics	3
	MPE 703	Tool Design	3
8th semester	MPE 801	Tribology	3
	MPE 802	Computational Fluid Dynamics	3
	MPE 803	Cryogenics	3

Open Elective Courses			
SEMESTER	SUBJECT CODE	SUBJECT TITLE	CREDITS
3rd semester	MOE 301	Human Body Mechanics	3
4th semester	MOE 401	Energy Studies	3
5th semester	MOE 501	Flexible Manufacturing	3
6th semester	MOE 601	Robotics	3
7th semester	MOE 701	Supply Chain Management	3

SEMESTER III

ME 301 ENGINEERING MATHEMATICS-III

Detailed studies of special topics relevant to these three branches like techniques and different procedures for obtaining approximate solutions to engineering problems where analytical solutions do not exist or difficult to obtain. It also introduces the student to the concepts of Fourier series, Partial Differential Equations and Applications to Partial Differential Equations The students are expected to build more in their higher semesters based on what is imparted in this course.

ME 302 MATERIAL SCIENCE & METALLURGY

To demonstrate the basic knowledge of science behind the appearance of different kinds of materials by understanding: differences between their structures, the defects therein and common types of mixing and altering the structures or subjecting them to different conditions. Special consideration is given to ferrous and non-ferrous materials. New types of materials in the form composites are introduced briefly.

ME 303 STRENGTH OF MATERIALS

The objective of this Course is to provide an introductory treatment of Strength of Materials to all the students of engineering, with a view to prepare a good foundation for taking up advanced courses in the area in the subsequent semesters. This course helps the students to understand the nature of stresses developed in simple geometries such as bars, cantilevers, beams, shafts, cylinders and spheres for various types of simple loads and also to calculate the elastic deformation occurring in various simple geometries for different types of loading

ME 304 MANUFACTURING TECHNOLOGY

To demonstrate the basic knowledge of different kinds of manufacturing processes by understanding: differences between different methods, the defects therein and advanced types prevalent in the industry. The methods will include metal removal processes and also the most common types of finishing processes.

BIOLOGY

The objective of the course is to provide an understanding of the biological observations of 18th century that lead to major discoveries and to convey that classification *per se* is not what biology is all about but highlight the underlying criteria, such as morphological, biochemical and ecological. The aim is also to convey that all forms of life have the same building blocks and yet the manifestations are as diverse as one can imagine

MEL 305 METALLOGRAPHY AND MATERIAL TESTING LAB

- To equip students with understanding of the fundamental principles and techniques for testing the properties of different types of materials and classify accordingly

- To make students familiar with different techniques of heat treatment
- To make students familiar with different types of non-destructive methods of detection of defects

MEL 306 MANUFACTURING LAB

- To equip students with understanding of the fundamental principles and techniques of different types of manufacturing processes and classify them by their properties
- To develop different models used in foundry
- To compare and analyse the different qualities of sand
- To develop an understanding of different types of press working tools

SEMESTER IV

ME 401 ENGINEERING MATHEMATICS-IV

Details of special topics relevant to these three branches like Introduction to Probability, Introduction to complex analysis, some concepts of curve fitting, an Introduction to series solutions to Differential Equations and to Linear Programing Problems are taught in this subject. The students are expected to build more in their higher semesters based on what is imparted in this course.

ME 402 THERMODYNAMICS

The course aims at providing insight into work and heat interactions, and balance of energy between system and its surroundings. The students will learn about application ofI laws of thermodynamics to various energy conversion devices and to evaluate the changes in properties of substances in various processes. Also this course will help to understand the difference between high grade and low grade energies and II law limitations on energy conversion

ME 403 FLUID MECHANICS AND MACHINERY

The course aims to demonstrate the basic knowledge of the properties of different liquids typically used in daily life and their measurements. This is made possible by understanding: different types of measurements, their advantages and disadvantages and knowledge of various phenomena like floatation, performing analysis by established equations such as Bernoulli's equation. Examples of working of different machines employing hydraulic principles are discussed to enable the students to appreciate natural and artificial events.

MEL 405 FLUID MECHANICS LAB

- To equip students with understanding of the fundamental principles and techniques to become familiar with different types of flow measurement systems

To conduct assess performance of power generating and power absorbing devices.

MEL 406 COMPUTER AIDED MACHINE DRAWING LAB

- To equip students with understanding of the fundamental principles and techniques to identify different types of fasteners and classify them by their shapes and usage.
- To develop a model of a mechanical system using different views.
- To develop knowledge for machine drawing and design of a particular component.

SEMESTER V

ME 501 DESIGN OF MACHINE ELEMENTS I

To demonstrate the basic knowledge of concept of design of simple machine elements conforming to Indian and International standards by understanding: stresses and strains on machine elements, theories of failures, basics of mechanical power transmission, wear and tear of components within the expected life cycle.

ME 502 DYNAMICS OF MACHINES

To demonstrate the basic knowledge of concept of dynamic analysis of components involved in transmission of mechanical power by understanding: different components such as flywheels, cams, belt drives and gyroscopes, their characteristics and undertaking feasibility studies involving fluctuations of energy and the causes for the same.

MEL 503 APPLIED THERMODYNAMICS

To demonstrate the basic knowledge of various power cycles in engines and machines. This is made possible by understanding: different types of processes, differences between them and knowledge of the various laws that govern the physics behind an existing situation. Examples of different applications of laws are discussed to enable the students to appreciate natural and artificial events and mechanisms.

MPE 504 HYDRAULICS AND PNEUMATICS

The objective of the course is to introduce the industrial hydraulics and pneumatics, their parts, functions and their structure. To give the required information about hydraulics and pneumatics and to teach the fundamentals of hydraulic and pneumatic circuit design. To teach the hydraulic and pneumatic automation and basics of PLC controls

MEL 506 DESIGN AND DYNAMICS LAB

- To equip students with understanding of the fundamental principles and techniques for analysis of different types of dynamic systems and classify them by their governing equations
- To develop models of different systems vibrating under different conditions

To develop equations of motion for translational and rotational mechanical systems

MEL 507 ENERGY CONVERSION LAB

- To equip students with understanding of the fundamental principles and techniques for identifying different types of engines and classify them by their work principles

To equip students with determination of different properties of fuels used in these engines

SEMESTER VI

HS 610 PROFESSIONAL ETHICS AND CONSTITUTION OF INDIA

The subject is intended for introducing the broader perspectives of the Indian Constitution with an aim to make the students informed citizens of India. The subject is also gives the basic knowledge about the working of Indian political system within constitutional framework. The principal objective of the course is to bring awareness towards the constitutional provisions like rights, duties and other values, to make the students responsible citizens of India.

ME 601 FINITE ELEMENT METHODS

To demonstrate the basic knowledge of finite element analysis by understanding: the degrees of freedom; methods of formulation of problem; linear and non linear systems; problems in one and two dimensions; using FEA tool; analysis of the formulated problem using FEA; different models and solution techniques.

ME 602 DESIGN OF MACHINE ELEMENTS II

To demonstrate the basic knowledge of design of more complicated, sophisticated and demanding machine components by understanding: the method of designing a curved beam as used in a crane hook; different kinds of springs; design of gears for all types of transmission; differentiating between types of clutches and brakes; different types of lubricants, their properties and specific applications.

ME 603 HEAT AND MASS TRANSFER

To demonstrate basic knowledge of heat transfer by understanding: differences between conduction, convection and radiation; basic differential equations for heat transfer; thermal conductivity of materials; conduction through walls and composite walls; critical radius of insulation; heat transfer in fins; heat transfer coefficient; overall heat transfer coefficient; log-mean temperature differences; forced and natural convection correlations; Biot, Nusselt, Reynolds, Grashof, Rayleigh and Prandtl numbers; basic radiative heat transfer, basic principles of mass transfer

MEL 605 HEAT AND MASS TRANSFER LAB

- To equip students with understanding of the fundamental principles and techniques for measuring different types of heat transfer between materials
- To develop a practical understanding of refrigeration and air conditioning processes among the students.

MEL 606 FINITE ELEMENT ANALYSIS LAB

- To equip students with understanding of the fundamental principles and techniques for different types of analysis of static and dynamic systems
- To develop equations of motion for translational mechanical systems

SEMESTER VII

ME 701 COMPUTER INTEGRATED MANUFACTURING

The course will enable the student to understand the importance of computer integration and automation in the of field machine tool based manufacturing process and also to get the knowledge of various elements of manufacturing automation – CAD/CAM, sensors, pneumatics, hydraulics and CNC systems.

ME 702 MECHATRONICS

The course helps the students to understand the structure of microprocessors and their applications in mechanical devices, apart from the understanding of principle of automatic control and real time motion control systems, with the help of electrical drives and actuators. The students also will understand the use of micro-sensors and their applications in various fields.

MEL 704 COMPUTER INTEGRATED MANUFACTURING LAB

The course will enable the student to understand the practical significance of computer integration and automation in the of field machine tool based manufacturing process and also to get the knowledge of various elements of manufacturing automation – CAD/CAM, sensors, pneumatics, hydraulics and CNC systems. The students will be exposed to the various codes required for control of CNC machines and robots.

ME 705 MECHATRONICS LAB

The course helps the students to understand the practical significance and the structure of microprocessors and their applications in mechanical devices, apart from the understanding of principle of automatic control and real time motion control systems, with the help of electrical drives and actuators. The students also will practically use the various sensors and actuators and build simple models to control routine activities and their applications in various practical fields.

MEP 706 PROJECT WORK I

It is intended to start the project work early in the seventh semester and carry out both design and fabrication of a mechanical device whose working can be demonstrated. The concept is expected to be completed in the seventh semester while the design, fabrication and demonstration will be carried out in the eighth semester.

MEP 802 PROJECT WORK II

It is intended to start the project work early in the seventh semester and carry out both design and fabrication of a mechanical device whose working can be demonstrated. The concept is expected to be completed in the seventh semester while the design, fabrication and demonstration will be carried out in the eighth semester.

ELECTIVES:

VI SEMESTER

MPE 401 METAL FORMING AND POWDER METALLURGY

The course gives the students an insight into the concepts involved in metal forming processes such as forging, extrusion, drawing, along with sheet metal work. The advantages of the powder metallurgy process along wih its practical application will be elaborated.

MPE 402 METROLOGY AND MEASUREMENT

This course provides the students with an idea about the importance of metrology and measurement in industrial as well as in daily life. The various concepts and terminologies involved will be elaborated and the students will be able to appreciate the significance of metrology and measurement.

MPE 403 COMPOSITE MATERIALS

To demonstrate the basic knowledge of composite materials and associated theories by understanding: the classification and characteristics of composites; different types; the concept of matrix and reinforcement, relative merits of different strength theories; metal matrix composites; fabrication process for metal matrix composites; use of MATLAB.

MEP 404 NON-TRADITIONAL MACHINING

The students will acquire knowledge on the various non-traditional machining processes like EDM, ECM, AJM, WJM, and laser machining techniques. They will be able to understand the difference between the conventional and non-conventional machining processes and appreciate the significance of such techniques in the practical world.

MPE 405 POWER PLANT ENGINEERING

The course provides an overview of power plants and the associated energy conversion issues. Upon completion of the course, the students can understand the principles of operation for different power plants and their economics.

V SEMESTER

MPE 501 RAPID PROTOTYPING AND 3D PRINTING

The course aims at demonstrating the basic knowledge of rapid prototyping and additive manufacturing. The student gets to understand the concepts of rapid prototyping; stereo lithography, laser sintering and fusion modelling; principle of lamination and application for different situations; different rapid tooling

methods; introduction to specific software used in rapid prototyping. Also included are basic concepts of additive manufacturing and the way it is set to revolutionize the concept of manufacturing.

MPE 502 INTERNAL COMBUSTION ENGINES

The course aims to familiarize the students with the terminology associated with IC engines and to understand the basics of IC engines. The student can understand the concept of combustion, and various parameters and variables affecting it in various types of IC engines. Also the course will help the students to learn about various systems used in IC engines and the type of IC engine required for various practical applications.

MPE 503 REFRIGERATION AND AIR CONDITIONING

The objective of the course is to demonstrate the basic knowledge of refrigeration and air conditioning by understanding: the different methods of refrigeration; thermodynamic cycle for refrigeration; compression and absorption systems; the function of components involved; the design considerations for air conditioning; the storage, transmission and distribution of air.

MPE 504 HYDRAULICS AND PNEUMATICS

The objective of the course is to introduce the industrial hydraulics and pneumatics, their parts, functions and their structure. To give the required information about hydraulics and pneumatics and to teach the fundamentals of hydraulic and pneumatic circuit design. To teach the hydraulic and pneumatic automation and basics of PLC controls

6th SEMESTER

MPE 601 TURBO MACHINERY

The course aims at giving an overview of different types of turbomachinery used for energy transformation, such as pumps, fans, compressors, as well as hydraulic, steam and gas-turbines. It will focus on applications in power generation, transport, refrigeration and the built environment.

MPE 602 MECHANICAL VIBRATIONS

The course gives an insight into the basic vibration terminology, creating of mathematical models of mechanical systems, free and forced vibration of the mechanical systems, vibration measuring instruments, introduction to vibration of continuous system, industrial vibration measurement and analysis applications.

MPE 603 BIO MATERAILS

The course aims to demonstrate the basic knowledge of bio engineering by understanding the requirements and classification of biomaterials, the surface, physical and mechanical properties of materials, the implant materials, and their bio compatibility.

MPE 604 AUTOMATION

The purpose of this course is to provide the student with basic skills useful in identifying the concepts of automated machines and equipment and describe the terms and phrases associated with industrial automation. The student will perform preventative maintenance, identify or solve problems in machines, and other technologies. Performance will be satisfactory when student can demonstrate competence in maintaining and troubleshooting technology includes identifying, understanding, and performing routine preventative maintenance and service on technology; detecting more serious problems; generating workable solutions to correct deviations; and recognizing when to get additional help.

7th SEMESTER

MPE 701 GAS DYNAMICS AND JET PROPULSION

To demonstrate the basic knowledge of gas dynamics by understanding: the equations of steady flow; the fundamentals of isentropic flow; entropy considerations and involved heat transfer in adiabatic flow; the flow with friction; analysis of wave phenomena; variable area flow. The students will be able to establish understanding of propulsion systems in aircraft that are essential to graduate engineers to work in aircraft system/component manufacturing/maintenance environments.

MPE 702 AUTOMOBILE ENGINEERING

The course aims at providing an ntroduction to engineering analysis of the automobile and its sub-systems and application of engineering principles to automotive design. It helps familiarization with modeling and analysis methods and also with the automotive industry and its terminology .

MPE 703 FATIGUE AND FRACTURE MECHANICS

The course will teach fatigue and fracture mechanics principles and their applications to structural design. Fracture phenomena in metals and nonmetals will be discussed and testing methods will be highlighted. Also the computer assisted techniques for fracture study will be discussed. The significance of fatigue failure in practical applications will be highlighted along with possible ways in which it can be countered.

MPE 704 TOOL DESIGN

To demonstrate the basic knowledge of the engineering tool design by understanding: the fundamentals of tool design; considerations for the design of single point and multi point cutting tools; considerations for the design of jigs and fixtures for purposes of clamping, turning, milling, grinding and broaching.

8th SEMESTER

MPE 801 TRIBOLOGY

To demonstrate the basic knowledge of tribology by understanding the properties of oils and equation of flow, hydrodynamic lubrication, journal bearings, pressure distribution, load carrying capacity, friction in a pivoted shoe bearing, oil flow through bearing, and hydrostatic lubrication.

MPE 802 COMPUTATIONAL FLUID DYNAMICS

To demonstrate the basic knowledge of computational fluid mechanics by understanding: the differences between experimental, theoretical and computational approaches; classification of equations and their characteristics; the basics of discretization methods; the finite volume method.

MPE 803 CRYOGENICS

The course aims to impart the various methods to produce low temperature and phenomena involved at cryogenic temperature. The student will be able to understand the working principle of different cryogenic refrigeration and liquification system and also the functions and working principles of insulations and various low temperature measuring and storage devices.

B. Tech. in Electrical and Electronics Engineering

Over the recent decades, Electrical and Electronics Engineering has emerged as one of the key technological disciplines that greatly impacted today's society. The scope of this multi-faceted field is broad, encompassing such diverse fields as information technologies, signal processing, solid-state electronics, optoelectronics, control, electromagnetics, and electric power systems. Interdisciplinary research, combining several of these fields, has led to the realization of new technologies. Electrical and Electronics Engineering is one of the largest and most diverse field of engineering, and is concerned with the development and design, application, and manufacture of systems and devices that use electric power and signals.

Rapid developments and the unprecedented accumulation of technical knowledge require creative, competent engineers who can lead innovative research and development in these technological fields. Therefore, creativity, teamwork and diversity have become the main components of our education philosophy which fosters interdisciplinary work through a rich selection of elective courses. Hence, students have the option of training themselves, according to their special interests and talents. In addition, creativity is strengthened through design projects that have been incorporated into the technical courses.

What does an Electrical and Electronics Engineer do?

- Applied research based on the findings of basic research and directed at discovering new applications and principles of operation
- Development of new materials, devices, assemblies, and systems suitable for existing or proposed product lines
- Design of devices, equipment, and systems for manufacture
- Field-testing of equipment and systems
- Establishment of quality control standards to be observed in manufacture
- Supervision of manufacture and production testing
- Postproduction assessment of performance, maintenance, and repair
- Engineering management, or the direction of research, development, engineering, manufacture, and marketing and sales.

Electrical and Electronics Engineering Course

The Electrical and Electronics Engineering program aims at giving the students a strong background in physical sciences, mathematics, and computational methods as well as the basic stream concepts, such as power systems, electric machinery, electric and electronic circuits, analog and digital systems, communications, and control systems. In cutting-edge fields such as power generation, transport, medicine, quantum information, computing, artificial intelligence, cryptography and communications,

electrical and electronic engineers are developing technologies which have a great impact on the way the society thinks and acts.

The four-year B.Tech program is organized into eight semesters. Students specializing in Electrical and Electronics Engineering will have to take a set of prescribed core and elective modules. They will also take modules in interdisciplinary areas for an encompassing learning experience. While a student specializes in a major discipline, he/she can also broaden his/her knowledge and skills by taking modules in other disciplines. The combination of modules taken by a student will be listed in his/her degree certificate. The total number of credits shall be about 180 depending upon the choice of subjects taken.

Teaching Methodology and Assessment

Teaching and training is important but creating a thirst for knowledge by questioning, encouraging and challenging, is the most crucial task. We attempt to motivate students to think beyond the visible, urge to do things differently and achieve success by providing problem based learning. The teaching methodology adopted during the course includes the following steps based on the requirements of the specific subject:

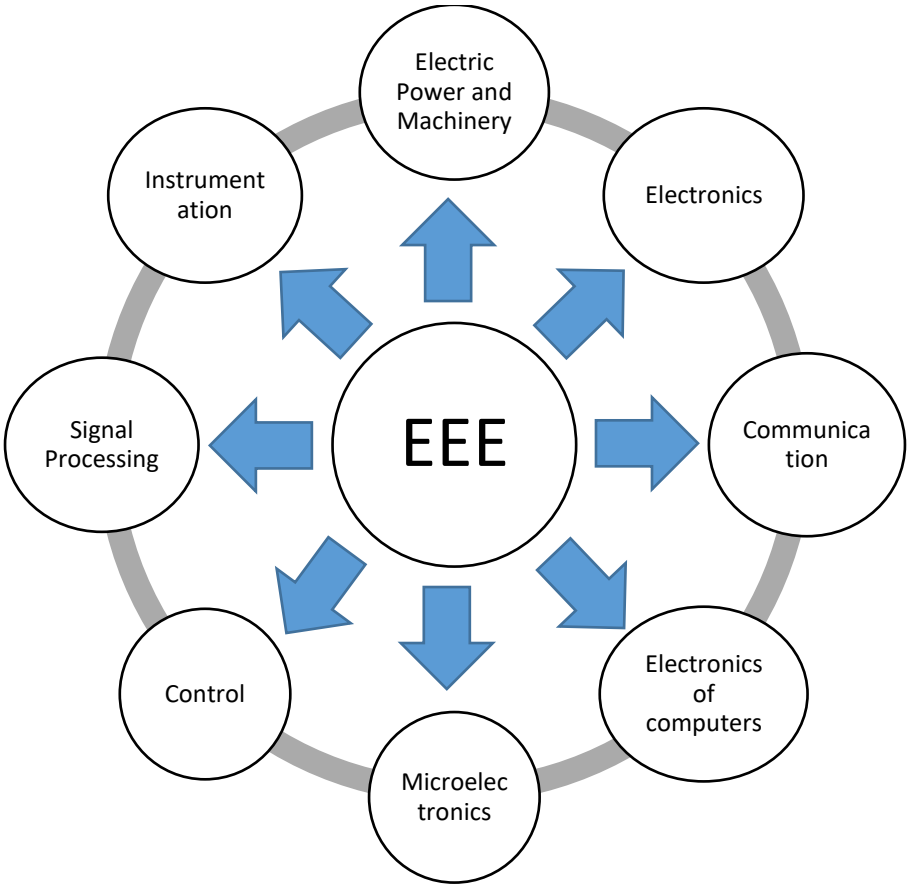
- Interactive classroom teaching and discussion
- Class exercises and seminars
- Use of multimedia tools
- Homework
- Group and individual assignments
- Regular testing
- Simulation
- Guest lectures from distinguished speakers from academia and industry
- Revision lectures
- Final test and analysis

Electrical and Electronic Engineering is a fast-moving program and we continually revise our modules to reflect both the latest developments in engineering education and the emerging needs of industry.

Course structure:

In general the course offers a generous ratio of laboratory time to lecture time in the belief that understanding comes best when the students are asked to apply theory in a practical environment.

Core Divisions of Course Structure:



First year (Semesters 1 and 2)

A systematic exposure to scientific, mathematical and engineering principles will take place during the first two semesters. In each of these semesters, the students will take one course each in physics, chemistry, mathematics and introductory course in different branches of engineering and Technical English. The teaching of the compulsory core courses in science and engineering will include substantial components of laboratory demonstrations and hands-on experiments. The students will also be exposed to courses that will help them appreciate science and its implications for society and also sharpen their skills in communicating science to both experts and to the general public.

Second year (Semesters 3 and 4)

At the beginning of the third semester, each student will enter Electrical and Electronics Department for specializing in the core area. Students continue to follow the core program by taking ten compulsory technical modules, two basic sciences modules and six laboratory modules. The students shall be exposed to the fundamental concepts in that particular field of choice with both theory and experimental techniques during the two semesters. Learning of Engineering Mathematics will be continued further from the first year.

Third year (Semesters 5 and 6)

In the third year the student can start to design his/her degree program to fit his/her interests and skills, in consultation with the faculty, by selecting a range of elective subjects from the Department. Students continue to follow the core program by taking twelve compulsory technical modules and six laboratory modules. The students shall be exposed to the fundamental concepts in different streams of Electrical and Electronics Engineering with both theory and experimental techniques. The department hopes to inspire the student to either spend the summer vacation on a one week technically related industrial exposure or to work on a minor group project. The student will be required to submit a report on the industrial knowledge gained or a report on the project work carried out. At the start of the fourth year, the student will give a presentation about the work done at the end of third year. This third year training or minor project is intended to introduce the student to a wider view of engineering that considers economic, social and political factors and expose them to industry procedures and techniques.

Fourth year (Semesters 7 and 8)

In the seventh semester, students continue to follow the core program by taking four compulsory technical modules and two laboratory modules. Continuing the intention to aid the student to recognize and develop his/her own interest and skills, the course offers four core stream modules and one other engineering or business stream module across both the semesters, which the student can choose from a selection of around 32 specialized modules. During the fourth year, the students shall be exposed to the advanced concepts in Electrical and Electronics Engineering with both theory and experimental techniques. During that year the student will need to complete a substantial technical project and a dissertation. The most important part of final year is the individual project. It provides the student with the opportunity to demonstrate independence and originality, to plan and organize a project over a period of time, and to put into practice some of the techniques he/she has learnt throughout the course. The project should be in the chosen major discipline or an interdisciplinary topic that substantially overlaps with the major discipline. The course expects to motivate the students to show their individuality and imagination in this major technical project and help them achieve the most satisfying and inspiring piece of work in their degree. The final-year projects are assessed by thesis, viva-voce, and presentation.

Subject Summary

Semester	Subject Code	Subject	Credits
I/II (22 Credits)	MA 101	Engineering Mathematics – I	04
	ME 102	Basics of Mechanical Engineering	03
	CS 103	Foundations of Computing	04
	PH 104	Engineering Physics - I	03
	CE 105	Basics of Civil Engineering	03
	CE 106	Environmental Engineering	02

Semester	Subject Code	Subject	Credits
	CSL 107	Foundations of Computing Lab	01
	PHL 108	Engineering Physics Laboratory	01
	MEL 109	Basic Engineering Workshop	01
I/II (25 Credits)	MA 201	Engineering Mathematics –II	04
	PH 204	Engineering Physic - II	03
	ME 111	Engineering Graphics	04
	EE 112	Basics of Electrical Engineering	03
	CH 113	Engineering Chemistry	04
	EC 114	Basics of Electronics Engineering	03
	TE 115	Technical English	02
	CHL 116	Engineering Chemistry Laboratory	01
	EEL 117	Electrical & Electronics Laboratory	01
III (25 Credits)	EE 301	Engineering Mathematics –III	4
	EE 302	Electrical Machines I	3
	EE 303	Electrical Circuits Analysis	3
	EE 304	Analog Electronics	3
	EE 305	Electrical Power Generation	3
	EE 306	Electromagnetic Fields	4
	EEL 307	Analog Electronics Laboratory	1
	EEL 308	Electrical Machines I Laboratory	1
	EEL 309	Electrical Circuits Laboratory	1
IV (25 Credits)	EE 401	Engineering Mathematics –IV	4
	EE 402	Electrical Machines II	3
	EE 403	Transmission Lines and Waveguides	4
	EE 404	Electrical Power System - I	3
	EE 405	Measurement and Instrumentation	3
	EE 406	Digital Electronics	3
	EEL 407	Electrical Machines II Laboratory	1
	EEL 408	Measurement and Instrumentation Laboratory	1
V (24 Credits)	EE 501	Electrical Power System - II	3
	EE 502	Control Systems	3

Semester	Subject Code	Subject	Credits
	EE 503	Microprocessors & Microcontrollers	3
	EE 504	Signals & Systems	3
	EE 505	Electrical Machine Design	3
	XX XXX	Open Elective - I	3
	EE 506	Microprocessors & Microcontrollers Lab	1
	EEL 507	Control Systems Laboratory	1
VI (23 Credits)	HS 610	PROFESSIONAL ETHICS AND CONSTITUTION OF INDIA	0
	EE 601	Power Electronics	4
	EE 602	High Voltage Engineering	3
	EE 603	Digital Signal Processing	3
	EE 61X	Elective-I	3
	EE 604	Power Electronics Laboratory	1
	EEL 605	High Voltage Laboratory	1
	EEL 606	Digital Signal Processing Laboratory	1
	EEI 700	Industry Internship Program	0
	EE 701	Utilization of Electrical Energy	3
	EE 702	Modern Control Theory	3
	EE 703	Power System Protection and Switchgear	3
	EE 704	Computer Applications in Power Systems	3
	EE 71X	Elective-II	3
	EEL 705	Power System Protection and Switchgear Laboratory	1
	EEL 706	Power System Simulation Laboratory	1
	XX XXX	Minor Project	3
VIII (15 Credits)	EE 801	Industrial Drives and Applications	3
	EE 81X	Elective III	3
	XX XXX	Minor Elective - I	3
	EEP 899	Project Work + Seminar (3 + 1)	8
TOTAL CREDITS = 161			

LIST OF ELECTIVES

Open Elective –I (Group 1)

Subject Code	Subject	Teaching Dept.	Credits
XX XXX	Renewable Energy Systems	EE	3
XX XXX	Electric and Hybrid Vehicles	EE	3
XX XXX	MATLAB for Engineers	EE	3
XX XXX	Power Plant Instrumentation	EE	3
XX XXX	Electrical Machines and Drives	EE	3
XX XXX	Wind And Solar Energy Systems	EE	3

Electives (Group 2)

Subject Code	Subject	Teaching Dept.	Credits
EE 611	Electronic Instrumentation	EE/EC	3
EE 612	Discrete Control Systems	EE	3
EE 613	Renewable Energy Systems	EE/ME	3
EE 614	Testing and Commissioning of Electrical Equipment	EE	3
EE 615	Operations Research	ME	3
EE 616	C++ and OOPs	CS	3

Electives (Group 3)

Subject Code	Subject	Stream	Credits
EE 711	Advanced Electric Machines	EE	3
EE 712	Energy Auditing and Demand Side Management	EE	3
EE 713	Database Management Systems	CS	3
EE 714	Advanced Power Electronics	EE	3
EE 715	Consumer Electronics	EC	3
EE 716	Wireless Communication	EC	3
EE 717	Entrepreneurship Management	MBA	3
EE 718	EHV A.C. and D.C. Transmission	EE	3

Electives (Group 4)

Subject Code	Subject	Stream	Credits
EE 811	Power Quality &Flexible AC Transmission	EE	3
EE 812	PLC, PIC and SCADA Applications	EC	3
EE 813	Power System Stability and Control	EE	3
EE 814	Power Generation, Operation and Control	EE	3

SEMESTER III

EE 301 ENGINEERING MATHEMATICS III

The objectives of this course include:

- To equip the students with basic numerical techniques and procedures for obtaining appropriate solution to engineering problems.
- To expose the students to the concepts of Fourier transforms.
- To correlate the theoretical principles with application based studies.

EE 302 ELECTRICAL MACHINES I

The objectives of the course is to

- Understand the basic concepts of the electrical machines working in the modern power system
- Learn the analytical methods and modern tools for solution of problems associated with design and operation of transformers, motors and generators.
- Learn the basic skills of how to approach and deal with real life situations and solve operating problems.
- Utilize knowledge of mathematics, physics, system's control, circuits and basic engineering sciences in order to effectively analyze a diverse set of fundamental problems in electrical machines

EE 303 ELECTRICAL CIRCUITS ANALYSIS

This is an introductory course to the analysis of electrical networks consisting of linear passive and active elements. The student will learn the characterization of such networks using linear, algebraic and ordinary differential equations with constant coefficients using which steady state and transient analysis is carried out. The course provides a solid foundation in electrical circuits to enable further studies in related and specialized fields. The objectives of the course is to

- Gain an understanding of the methods of analysis for, and the properties of, electrical circuits.
- Develop skills in determining steady state solutions to electrical networks.
- Master analysis of physical circuits through the use of various theorems and ideal circuit element models.

EE 304 ANALOG ELECTRONICS

The objectives of this course include:

- Introduce to the student the working principals of Diodes, Transistors, Oscillators and Amplifiers
- To understand need of Biasing, Types of Biasing, Advantage and Applications of Biasing and its stabilization.
- To analyze the difference in operating a device at low and high frequencies.
- To understand the basic concepts of Power Amplifier of various classes of operation.
- To understand the basic concept of feedback.

EE 305 ELECTRICAL POWER GENERATION

This course deals with electric power generation from conventional sources. The students will learn different types of power plants and modes of energy conversion to generate electrical energy in this course. The economic aspects of power generation and the various factors involved in generation systems are also dealt with. The objective of the course is

- To provide exposure to students to the general aspects of power generation.
- To impart knowledge of the theory, methods, techniques and applications of conversion of electrical energy to mechanical energy and vice-versa.
- To develop good understanding of electric power generation.
- To develop a basic understanding of devices used in the operation of the electric power systems.
- To develop a professional attitude and approach to the solution of practical problems encountered in the industry.

EE 306 ELECTROMAGNETIC FIELDS

The course aims for students to:

- Learn the basics of electricity and magnetism and equations governing them.
- Understand the behaviour of electromagnetic fields and ways in which they are used in electrical engineering, including their relationship to circuit theory.
- Understand quantitatively such concepts as charges, capacitance, inductance, Faraday's law (transformers, motors, and generators), transmission lines, and wave propagation and reflection.
- Relate basic electromagnetic concepts to the performance of devices, circuits, and systems.
- To be prepared for potential follow-on study in electromagnetics, microwaves, optics, power engineering, wireless communications, and remote sensing.

EEL 307 ANALOG ELECTRONICS LAB

This Lab is designed to impart practical knowledge about transistor as amplifiers, oscillators and other devices. They will get familiarized with the design concept of biasing for active devices, analyze and test the various circuits. Every effort is made to expose the students to the basic world of electronic devices and circuits.

EEL 308 ELECTRICAL MACHINES -I LAB

The objectives of this course are to

- Provide students practical knowledge to supplement to the DC Machines and Transformers course.
- The ability to conduct testing and experimental procedures on different types of electrical machines.
- A chance to practice different types of wiring and devices connections.
- The capability to analyze the operation of electric machines and transformers under different loading conditions

EEL 309 ELECTRICAL CIRCUITS LAB

Laboratory experiments to support the introduction to DC circuit analysis, Kirchhoff's laws, network theorems, transient analysis, phasor and AC circuits analysis. The objectives of this course are to

- Provide students practical knowledge to supplement to the Electric Circuits course.
- Use various laws and theorems to simplify circuit analysis.
- Understand AC circuit analysis.
- Calculate the impedance of capacitors and inductors.
- Be familiar with current and voltage calculations in AC circuits.
- Understand resonant circuits and their characteristics.

SEMESTER IV

EE 401 ENGINEERING MATHEMATICS –IV

To make students aware about the importance and symbiosis between Mathematics and Engineering.

- To equip students with adequate knowledge of probability distributions that will enable them in formulating and solving problems in real situations.
- To familiarize students with tools like Z transforms in solving problems
- To provide a good platform to students to understand and appreciate concept of complex analysis

EE 402 ELECTRICAL MACHINES -II

This course is the backbone of the power sector, the understanding of which is very important for practicing electrical engineers. The objectives of the course is to

- Develop familiarity with general principles of magnetic fields, materials, and energy conversion.
- Impart knowledge on constructional features, analysis, modelling, and applications of synchronous machines, induction motors and some special purpose motors.
- Learn to numerically analyse characteristics of synchronous generators operating alone and in large power system and characteristics of induction motors.
- Provide in-depth knowledge related to the problems of electromagnetic and electromechanical energy transformations in synchronous and asynchronous machines.

EE 403 TRANSMISSION LINES AND WAVEGUIDES

Course Objective:

- To build a bridge between circuit theory and electromagnetic theory.
- This requires a strong foundation on the theory of transmission lines and waveguides that can be achieved by taking this course.

EE 404 ELECTRICAL POWER SYSTEM – I

The objectives of the course is to

- Learn fundamentals of AC electric power systems and its various components.
- Acquire the ability to analyse operating characteristics of AC transmission lines.
- Acquire the ability to analyse unbalanced operating conditions of AC electric systems using symmetrical component theory.
- Acquire the ability to analyze the phasor techniques in the analysis of power systems.
- Understand the concept of load-flow in an integrated system.
- Learn the need of various analysis like fault analysis, short circuit analysis stability analysis, steady state and transient analysis.

EE 405 MEASUREMENTS AND INSTRUMENTATION

The objective of this course is to

- Give students baseline knowledge of measurements & instrumentation theory and practice, in order to support their present and future needs in engineering testing and research.
- Understand details about the various instruments available for monitoring / measuring electrical parameters encountered in domestic / industrial applications.
- Make students aware of various types of measurements, requirement of calibrations, instruments used, errors in measurement etc.
- Describe common measuring instruments, devices and circuits, and their application to electrical testing.
- Identify and classify error sources, and explain how their effects can be minimised in particular measurement situations.
- Analyse single- and three-phase circuits to determine voltage and current values.
- Specify details of instrumentation and devices intended for a particular application.

EE 406 DIGITAL ELECTRONICS

This course covers the basics of digital logic circuits and design through the basic understanding of Boolean algebra and number systems. It introduces the student to the fundamentals of combinational logic design and then to sequential circuits (both synchronous and asynchronous). The student will also learn the principles of digital design and applies them to useful and meaningful real-world design. Emphasis is given on the two most popular digital (IC) circuit families, namely the transistor-transistor logic (TTL). It provides coverage of classical hardware design for both combinational and sequential logic circuits. The course also

introduces the student to design of flip-flops, registers, counters and design of synchronous sequential circuits. The course teaches the basics of Digital Principles, Digital Logic Design, Design of Combinatorial logic circuits, data processing circuits, various number systems and codes, Design of Arithmetic circuits, and Clock and Timing Circuits.

EEL 407 ELECTRICAL MACHINES-II LAB

The objectives of this course are to

- Provide students practical knowledge to supplement to the AC Machines course.
- The ability to conduct testing and experimental procedures on different types of electrical machines.
- A chance to practice different types of wiring and devices connections.
- The capability to analyze the operation of electric machines and transformers under different loading conditions

EEL 408 MEASUREMENT AND INSTRUMENTATION LAB

The objectives of this course are to

- Provide students practical knowledge to supplement to the Measurement and Instrumentation course.
- Provide an overall understanding of the elements and processes, including sources of errors, involved in obtaining electrical analog measurements and digitally acquiring these measurements.
- Develop an understanding of various methods of measurements and instruments.
- Incorporate testing theory and hands on experimental setup to enable the students with the ability to setup, perform, and properly analyze experimental results.

SEMESTER V

EE 501 ELECTRICAL POWER SYSTEM – II

The objectives of this course are for the students to learn to:

- Calculate symmetrical components in a power system.
- Calculate fault currents in simple power systems.
- Determine relay settings for a portion of power systems.
- Solve power system stability problems using equal area criterion

EE 502 CONTROL SYSTEMS

Students will be made familiarized with open-loop and closed-loop systems. Mathematical modeling of control systems through transfer function and state space model will be studied exhaustively for mechanical (translational and rotational) and electrical systems. Transient and steady state analysis will be introduced. Root-locus analysis and design of the system by Root-locus method will be studied.

Students will be made capable of analyzing frequency response of Control systems using Bode and Nyquist plot methods. At the last analysis of Control systems in State Space Model will be introduced.

The objectives of this course are for the students to learn:

- The fundamental concepts of Control systems and mathematical modelling of the system
- To study the concept of time response and frequency response of the system
- To teach the basics of stability analysis of the system
-

EE 503 MICROPROCESSORS & MICROCONTROLLERS

This course is a primary course to the more advanced topic of embedded systems design. This course will cover operation and applications of microprocessors, microcontrollers, including system level organization, analysis of specific processors, and software and hardware interface design. The objectives of this course include:

- To make the students understand the basics of stored program computers, 8085 microprocessors and 8051 microcontrollers
- To train the students in programming 8085 microprocessor and 8051 microcontroller using assembly language and C language
- To make the students familiar with special features available in 8051 microcontrollers and to prepare them to use the features for their design requirements

EE 504 SIGNALS AND SYSTEMS

The main objective of this course is to explore the basic concept of signal and systems in a simple and easy-to-understand manner. Considering the mathematical nature of this subject, more emphasis is given on the problem solving methodology. The concept of the discrete time signals and systems are organized to provide the fundamental and practical implications for better understanding. In this, we shall explore the various classifications of continuous time signal, systems and possible mathematical operation such as scaling, folding etc. This will aid in clear understanding of the analysis of continuous time signal using Laplace transform. We will also study discrete Fourier transform and fast Fourier transform.

EE 505 ELECTRICAL MACHINE DESIGN

To teach the design process for electric motors and generators based upon fundamental theories. It supplements electric machine theory for advanced courses in electric machines. The objectives of this course is for the students is

- To gain a thorough knowledge of the design procedures in design of the electric machines.
- To gain the knowledge about the calculation of total MMF in the machine.
- To find out the dimension of various parts of the machine.
- To examine various losses in the machines.
- To understand the usage of auxiliary windings.

EEL 506 MICROPROCESSORS & MICROCONTROLLERS LABORATORY

The objectives of this course include:

- To train the students in programming 8085/8086 microprocessor and 8051 microcontroller using assembly language and C language
- To make the students familiar with 8085/8086 microprocessor and 8051 microcontroller interfacing procedures involving simple I/O devices like switches, LEDs, relays, fhp dc motors etc.
- To enable the students to carry out mini-project in teams to enhance their engineering skills, team working skills and communication skills.

EEL 507 CONTROL SYSTEMS LABORATORY

The objectives of this course are

- To help the students understand and practice the modelling, simulation, and implementation of a physical dynamical system by a linear time invariant ordinary differential equation
- To highlight the electrical modeling of a second order system and analyse the under-damped, over-damped and critically damped cases
- To study the effects of poles and zeros location in the s-plane on the transient and steady state behavior.
- To study the effects of Lead, Lag and Lag-Lead series compensator on a second order system transient and steady state system response.
- To familiarize students with Servo-Motor and implement the basic principles of Servo-Motor calibration.
- To investigate the Servo-Motor speed and position control principles by designing and selecting specific P, I and PI gains for specific responses.

SEMESTER VI

HS 610 PROFESSIONAL ETHICS AND CONSTITUTION OF INDIA

The subject is intended for introducing the broader perspectives of the Indian Constitution with an aim to make the students informed citizens of India. The subject is also gives the basic knowledge about the working of Indian political system within constitutional framework. The principal objective of the course is to bring awareness towards the constitutional provisions like rights, duties and other values, to make the students responsible citizens of India.

EE 601 POWER ELECTRONICS

This course is the backbone of the power sector, the understanding of which is very important for practicing electrical engineers. The objectives of the course is

- To understand the operation, characteristics and performance parameters of controlled rectifiers.
- To study the operation, switching techniques and basic topologies of DC-DC converters
- To learn the different modulation techniques of pulse width modulated inverters.
- To study simple applications
- To understand the operation of AC voltage regulators.

EE 602 HIGH VOLTAGE ENGINEERING

The course serves as an introduction to high voltage engineering, including basics of electrical breakdown, high voltage generation, high voltage test systems, and measurement and analysis techniques as applied to power system apparatus such as cables, insulators, transformers, and generators. The objectives of this course is for the students to

- Understand fundamental concepts of high voltage AC, DC, and impulse generation
- Learn the techniques employed in high voltage measurements
- Apply analytical and numerical techniques for electric field calculations in high voltage systems
- Learn the fundamental concept of electric breakdown in liquids, gases, and solids
- Become familiar with non-destructive test techniques in high voltage engineering

EE 603 DIGITAL SIGNAL PROCESSING

This course will introduce the basic concepts and techniques for processing signals. The course helps the student to learn fundamental digital filtering along with classical filter design methods, realizations of finite impulse response (FIR) filters, infinite impulse response (IIR) filters, Linear time invariant systems. By the end of the course, the student will be familiar with the most important methods in DSP, including digital filter design and transform-domain processing. The course emphasizes intuitive understanding and practical implementations of the theoretical concepts.

EEL 604 POWER ELECTRONICS LABORATORY

The objectives of this course is for the students to learn to

- Describe the characteristics of power semiconductor devices and identify suitable switch choices for a given application
- Enable students to analyse basic circuits containing power diodes and thyristors.

- Enable students to design and simulate basic electronics converter circuits for particular applications.
- Work in teams to perform a project and present it to the class.
- Enable the students to put hands on experiments and test the characteristics of some power electronic devices and circuits.

EEL 605 HIGH VOLTAGE LABORATORY

The objectives of this course is for the students to

- Test the Cables for HV DC
- Compare and study the dielectric strength of the cable, air, insulating material used for transformer, AC & DC machines.
- Determine the string efficiency of string of insulator attached to the HV transmission, and also measure and compare its dielectric strength for dry and wet flash over.
- Measure the resistance of AC & DC machines peripherals for different range of values using standard bridges.
- Develop experimental skills with hands on experimental setup to test electric breakdown strength, dielectrics and diagnostics.

EEL 606 DIGITAL SIGNAL PROCESSING LABORATORY

The objectives of this course is for the students to

- Learn the aid of different mathematical tool such as Discrete Fourier Transform and Fast Fourier Transform in Digital signal analysis for different objectives.
- Implementation of the mathematical model for digital filters using different approximation techniques such as FIR & IIR techniques.
- Lear how to use simulation tool MATLAB to analyze the mathematical approximation techniques.
- How to sample the continuous time signal into digital signal and for a given digital signal how reconstruct the continuous time signal.
- Study the impulse response of digital system, and also perform convolution operation.

EEL 607 INTERNSHIP

- Internship enables student to interact with industry and helps them to bridge the gap in real time implementation of the academic's technical aspects.
- Enables student to develop the skill set required for the future working environment
- Gives an exposure to student, to understand the key factor such punctual, team work, timely response
- Enables student to understand the functionality of domain specific industries and helps them to prepare themselves for the standards
- Confidence of student build s up as he is assured with technical aspect of academics in Industry

SEMESTER VII

EE 701 UTILIZATION OF ELECTRICAL ENERGY

To clearly understand the basic concepts related to use of electric energy in various industrial, commercial and residential applications and important issues related to such usage. The course also discusses issues related to power quality, economics of energy system usage and renewable energy systems. This course is designed to give students in Electrical and Electronics Engineering an ability to represent extensive electricity utilization for the hallmarks of a modern society. Use of electric energy in various industrial applications, issues related to economics of energy system usage and the concept of load management are also presented within the scope of this course. The primary objective of the course is to provide students with the skills to understand the analytical methods and modern tools for solution of problems associated with utilization of electric energy in industrial sectors.

EE 702 MODERN CONTROL THEORY

This is the continuation of the control systems studied in the fifth semester. This course is important as it exposes the student to analysis of physical systems which are nonlinear in nature. This course offers a continuation of control system analysis and design, with emphasis on PID control and compensator design (lead, lag, lead-lag), and an introduction to modern control theory, which covers basic concepts and principles of system modeling, analysis and controller design for linear time-invariant systems with the state space approach including state variable models, controllability, observability and stability analysis, state feedback control and observer design.

EE 703 POWER SYSTEM PROTECTION AND SWITCHGEAR

In this course, we plan to teach the following:

- Fundamental principles of fuse and overcurrent protection and application to feeder and motor protection.
- Fundamental principles of distance relaying and application to transmission system protection.
- Fundamental principles of differential protection and application to transformer, busbar and generator armature winding protection.
- Role of Current and Voltage transformers in power system protection.
- Relay co-ordination in transmission and distribution system.
- Introduction to Numerical relaying. DSP fundamentals like aliasing, sampling theorem, Discrete Fourier Transform and application to current and voltage phasor estimation.
- Numerical relaying algorithms for overcurrent, distance and differential protection with application to transmission system, transformer and bus bar protection.

EE 704 COMPUTER APPLICATIONS IN POWER SYSTEMS

Modern power systems have grown over larger geographical area with many interconnections between neighboring systems. Optimal planning, operation and control of such large scale systems require advanced computer based techniques. This course will cover the modeling issues and analysis methods for the power flow, short circuit, contingency and stability analyses, required to be carried out for the power systems. Necessary details of numerical techniques to solve nonlinear algebraic as well as differential equations and handling of sparse matrices will also be included.

EEL 705 POWER SYSTEM PROTECTION AND SWITCHGEAR LABORATORY

The objectives of this course is for the students:

- To design overcurrent, and distance protection schemes for transmission and distribution lines and differential protection schemes for transformers.
- To identify the different apparatus/ equipment in the switchgear system
- To study the function of different equipment used in the switchgear system
- To identify the symbols used in protection scheme.

EEL 706 POWER SYSTEM SIMULATION LABORATORY

MATLAB is a software tool for technical computations that is used by many engineers around the world. The objective of this course is to give fundamental knowledge about the basics of MATLAB as well as practical skills in working with the system. By learning how to use MATLAB and having access to MATLAB, students will be able to use this software throughout their engineering education and most likely in their professional career.

XX XXX MINOR PROJECT

A minor project is an assignment that you try to complete at the end of every semester, especially in engineering to strengthen the understanding of your fundamentals through effective application of theoretical concepts.
There are separate credits for each minor project which students complete at college.
Minor project can help to boost their skills and widen the horizon of thinking.

SEMESTER VIII

EEL 801 INDUSTRIAL DRIVES AND APPLICATIONS

The objectives of this course include:

1. To understand steady state operation and transient dynamics of a motor load system.
2. To study and analyze the operation of the converter / chopper fed DC and AC drive, both qualitatively and quantitatively.
3. To analyze and design the current and speed controllers for a closed loop solid state DC and AC motor drive.
4. To study the applications of various drives.

EE 802 PROJECT WORK + SEMINAR (3 + 1)

Engineering projects involve creative problem solving, and they are not hypothesis testing. Each engineering design, software application or device project should have a clear engineering goal which can fit the following model statement:

1. Define a need; express as a goal
2. Establish design criteria and constraints
3. Evaluate alternative designs
4. Build a prototype of best design
5. Test and evaluate the prototype using the design criteria
6. Analyze test results, make design changes, and retest
7. Communicate the design

Elective Subjects

XX XXX RENEWABLE ENERGY SYSTEMS

As the conventional sources of energy are fast depleting, the focus has shifted to nonconventional energy sources. As a practicing electrical engineer, it is very important to know the various methods of generating power from nonconventional energy sources with the emphasis on solar and wind power. This course will give a very good insight into the various aspects of power generation through these sources. The course discusses the use of solar (thermal and photovoltaic), wind, geothermal, ocean energy, as well as energy from biomass. The objectives of this course are to:

- Describe the fundamentals and main characteristics of renewable energy sources and their differences compared to fossil fuels.
- Describe the main components of different renewable energy systems.
- Compare different renewable energy technologies and choose the most appropriate based on local conditions.
- Perform simple techno-economical assessments of renewable energy systems

XX XXX ELECTRIC AND HYBRID VEHICLES

This course introduces the fundamental concepts, principles, analysis and design of hybrid, electric and fuel cell vehicles. The main objective of this subject is to understand working of different configurations of electric vehicles, and its components, hybrid vehicle configuration and performance analysis.

XX XXX MATLAB FOR ENGINEERS

This course teaches computer programming to those with little to no previous experience. It uses the programming system and language called MATLAB to do so because it is easy to learn, versatile and very useful for engineers and other professionals. MATLAB is a special-purpose language that is an excellent choice for writing moderate-size programs that solve problems involving the manipulation of numbers.

- The design of the language makes it possible to write a powerful program in a few lines.
- The problems may be relatively complex, while the MATLAB programs that solve them are relatively simple: relative that is, to the equivalent program written in a general-purpose language, such as C++ or Java.

XX XXX POWER PLANT INSTRUMENTATION

The objectives of this course include:

- To enable the student to gain a fair knowledge on various power plants & their related instruments.
- To get detailed knowledge on thermal power plant.
- To learn the measurements of various parameter in power plant and their control.

XX XXX ELECTRICAL MACHINES AND DRIVES

This course on Electric machines & Drives aims at introducing control of motor with the help of power electronic converters. Also, to enable the students to get a comprehensive knowledge on various motor & its control. The objectives of this course include:

- To understand the construction and characteristics of DC motor and its control.
- To understand the construction and characteristics of single& three phase induction motor.
- To understand the stable steady state operation and transient dynamics of motor-load system.
- To learn characteristics and control of solid state DC motors drives, induction motor drives.

XX XXX WIND AND SOLAR ENERGY SYSTEMS

The objectives of this course include:

- To understand the energy scenario and the consequent growth of the power generation from renewable energy sources.
- To understand the basic physics of wind and solar power generation.
- To understand the power electronic interfaces for wind and solar generation.
- To understand the issues related to the grid-integration of solar and wind energy systems.

EE 611 ELECTRONIC INSTRUMENTATION

Electronic Instrumentation techniques are among the most important tools used by engineers and scientists. Experimental methods utilize measurement systems and various types of instrumentation to design, evaluate and control a variety of systems and testing equipment. Standard engineering practice includes validation testing - using electronic instrumentation techniques. The objective course is to give the base line knowledge of measurements and instrumentation theory and practice. In order to support their present and future needs in engineering testing and research

EE 612 DISCRETE CONTROL SYSTEMS

Discrete control system course gives knowledge to students about, how to mathematically model a digital system and analyze the behavior of the modelled system in terms of stability. Instructs students to adopt the suitable technique in order have error free accurate controlled output for the given system. It also enables them to identify and understand the trade-offs between different solutions for the same system. Universal controllers and regulators for controlled closed loop operation serves as the basic knowledge to students for automation in the course.

EE 613 RENEWABLE ENERGY SYSTEMS

The purpose of this course is to provide a survey of the most important renewable energy resources, and the technologies for harnessing these within the framework of a broad range of simple to state-of the-art advanced energy systems. The objectives of this course are to learn about the issues in renewable energy systems and distributed generation. It covers the understanding and design of single-phase and three-phase renewable energy systems based on fuel cells, micro-hydro power, photovoltaics, wind turbine power and other distributed generation sources. These systems can be connected to the utility grid or to a micro grid.

EE 614 TESTING AND COMMISSIONING OF ELECTRICAL EQUIPMENT

The objective of this course is to review fundamentals of Motors, Generators, Cables, Switchgears, Power and Distribution Transformers, along with their construction, installation, commissioning testing and maintenance. This course will cover the latest maintenance trends and diagnostics testing.

EE 615 OPERATIONS RESEARCH

The objective of this course is to acquaint the students with applications of operations research to solve business and industry problems. Decision - making in a competitive environment increasingly becomes more and more complex. This course exposes the students to the significance of various scientific tools and models that are available in operations research to take decisions in a complex environment. The course also aims to equip students with the use of software in solving decision making problems. The course will cover basic deterministic methods of operations research (linear programming, network flows, integer programming and nonlinear programming) and their applications to resource allocation problems in business and industrial organizations.

EE 616 C++ and OOPS LAB

1. To understand the difference between C and Object based C++ programming languages.
2. To provides a clear modular structure for programs which can be given by OOPs for defining abstract data types where implementation details are hidden and the unit has a clearly defined interface.
3. To know how to makes it easy to maintain and modify existing code as new objects can be created with small differences to existing ones.
4. Understand the fundamental concepts of the Object-Oriented paradigm and their implementation in the C++ Programming language.
5. Be familiar with the C++ language and its run-time and development environments.
6. Use the basic C++ language syntax and constructs.
7. Understand the use of arrays.
8. Write simple C++ programs.
9. Use and modify a simple C++ application.
10. Understand advanced features of OOPs.
11. Understand C++'s Exception handling, and C++'s I/O classes, File handling.

EE 711 ADVANCED ELECTRIC MACHINES

The main objective behind teaching this course to students is to make them aware of the various special electrical machines used in the industrial processes. The course also deals with the analysis and construction of the various special or advanced electrical machines with main area of concentration being the application of these machines. This course will cover dynamic analysis of machines using reference frame transformations; tests for parameter determination; reduced order modeling of machines; mechanical subsystems including governors, prime movers and excitation systems; digital simulation of inter-connected machines.

EE 712 ENERGY AUDITING AND DEMAND SIDE MANAGEMENT

The objectives of this course is for the students to

- 1. Learn energy management approaches, energy audit need and types of energy audit
- 2. Learn to do financial analysis and cost prediction for energy saving
- 3. Learn to conduct audit investigation and energy measurement using different tools
- 4. Learn to perform energy performance diagnosis and analysis.
- 5. Learn to prepare and provide sound recommendations and report

EE 713 DATABASE MANAGEMENT SYSTEM

The main objective of this course is to provide students with the background to design, implement, and use database management systems. The course will provide knowledge of DBMS, both in terms of use and implementation/design, experience with SQL, increased proficiency with the programming language C++, experience working as part of team, experience with analysis and design of (DB) software.

EE 714 ADVANCED POWER ELECTRONICS

The objectives of this course is for the students

- To understand the concept of resonant switch converters.
- To analyse the factors affecting harmonics and electromagnetic Interference.
- To understand the concepts of FACTS and their usage in power systems.
- To learn the advanced Power Electronic Devices and their applications.

EE 715 CONSUMER ELECTRONICS

The objectives of this course include:

- To give students an in-depth knowledge of various electronic audio and video devices and systems.
- To give an overview of working principles, block diagram, main features of consumer electronics gadgets/goods/devices like audio-systems, CD systems. TV, VCR etc. which in-turn will develop in them capabilities of assembling, fault diagnosis and rectification in a systematic way.

EE 716 WIRELESS COMMUNICATION

The main objective of this course is to provide an understanding of basic principles in wireless data networks and related technologies and to give an in depth knowledge of the currently available wireless data network types. The course will cover topics like introduction to wireless communication systems and networks; cellular wireless networks and system principles; 1G, 2G, 2,5G and 3G wireless systems; IEEE 802.11 protocol suit, its nomenclature, design, and network operations; personal area networks, mobile IP; state of the art technologies for wireless networking and on-going research work.

EE 717 ENTREPRENEURSHIP MANAGEMENT

The objectives of this course include:

1. To expose students to concept of Self, Creativity and Innovation
2. To introduce the concept of Entrepreneurship
3. To explore the dynamics of Enterprise Management.
4. To introduce to the field of Entrepreneurial finance.
5. To motivate students to become Entrepreneurs

EE 718 EHV A.C. AND D.C. TRANMISSION

The objectives of this course include:

- To understand fundamentals of Extra High Voltage of AC and DC transmission lines such as ac-dc links, travelling waves, converter etc.
- To understand importance of type of HVDC Transmission, reactive power control and power factor Improvement.
- To provide an in-depth understanding of the different aspects of Extra High Voltage A.C. and D.C. Transmission system design and Analysis.

EE 811 POWER QUALITY & FLEXIBLE AC TRANSMISSION

The advent of high power electronic devices has led to the development of FACTS Technology. The concept of FACTS envisages the use of power electronics to improve system operation by fast & reliable control. This course will cover concepts of FACTS including the description, principle of working and analysis of various FACTS controllers, control of FACTS and system interactions. The objectives of this course are for the students:

- To acquire the knowledge on flexible AC Transmission System and its importance for FACTS controllers.
- To understand the various FACTS controllers operation on FACTS systems and technological innovations in flexible AC power transmission
- Modelling and analysis of high power electronic devices for power transmission flow and voltage control
- Role of FACTS on system control

EE 812 PLC, PIC AND SCADA APPLICATIONS

Automation is the use of machines, control systems and information technologies to optimize productivity in the production of goods and delivery of services**.** Automation plays an increasingly important role in the world economy and in daily experience. With the modest technological advancements, the expected skill and knowledge level of the workforce is also increasing. This comprehensive course covers the essentials of SCADA and PLC systems, which are often used in close association with each other. A selection of case studies are used to illustrate the key concepts with examples of real world working SCADA and PLC systems in the water, electrical and processing industries. The objectives of this course are to:

- Provide practical up-to-date information on the application of PLC systems to the automation and process control industries.
- Provide basic theoretical and practical understanding of PLC and SCADA systems and how this can be applied to optimize systems in terms of safety, flexibility and costs.
- Provide conceptual as well as practical knowledge of the Industrial Automation & latest technologies being used to achieve industrial automation.

EE 813 POWER SYSTEM STABILITY AND CONTROL

The objectives of this course is for the students to

- Learn how to calculate power flow in a power systems network.
- Learn about voltage stability and reactive power control in power systems.
- Learn about rotor-angle transient stability.
- Learn about control of interconnected power system and economic dispatch.

EE 814 POWER GENERATION, OPERATION AND CONTROL

The objectives of this course include:

1. To get an overview of system operation and control.
2. To understand economic operation of power systems, hydrothermal scheduling and modeling of turbines, generators and automatic controllers.
3. To understand single area and two area load frequency control.

EE 815 POWER QUALITY

The objectives of this course is for the students to

- Learn about the characteristics of various power system loads, power quality criteria and the power quality issues.

- To introduce to students the term and definition of power quality disturbances, and their causes, detrimental effects and solutions.
- To introduce the harmonic sources, passive filters, active filters and standards.
- To prepare students to know the power quality monitoring method, equipment and develop the ability to analyze the measured data.
- To analyze power circuits under faulted conditions.
- To gain practical skills including determining the origin of an unknown disturbance in an electrical system.

International Programs

Alliance College of Engineering and Design, Alliance University offers international study abroad options for students studying the Bachelor of Technology (B. Tech.) course. The Office of International Affairs apprises students on the available options during the first semester of study. The International Program orientation provides the B. Tech. students with an overall perspective on study abroad opportunities with the partner institutions of Alliance University, while elaborating on the countries and cities they can travel to as also the degree programs and certifications that they can acquire. Students can opt for either a short-term or a long-term International Program that helps them align themselves with their future career or, alternatively, further study options.

Semester Exchange

A Semester Exchange Program gives B. Tech. students a choice to intersperse their semesters at Alliance University with one semester abroad at a partner university during the second or third year of their undergraduate program. The Semester Exchange Program provides definitive immersive learning in engineering at an international partner institution and acquaints students with the new developments in their field.

Partner Institutions:

PEOPLE'S REPUBLIC OF CHINA

- Nanjing University of Aeronautics and Astronautics
- Beijing Institute of Technology

FRANCE

- ISEP

UK

- University of Dundee

Twinning Program

A unique and exciting opportunity awaits the B. Tech. students who are looking to enhance their study abroad experience. The articulation agreements of Alliance University with international partners enable B. Tech. students to study their third and final year of the course at an international partner university. The students gain unparalleled and superior skills in the Twinning Program that will prepare them for careers with a distinctive edge.

Partner Institutions:

UK

- University of Dundee

Dual Degree Program

The Dual Degree Program enables the B. Tech. students to undertake a four-year period of undergraduate, cumulative study at an international partner institution. Under the Dual Degree Program study option, a B. Tech. student is required to complete the first four semesters at Alliance College of Engineering and Design, Alliance University and then continue with the remaining four semesters of study at an international partner university. The B. Tech. students, upon completion of their final year, will obtain a degree from Alliance University as well as a degree from the partner university.

Partner Institutions:

PEOPLE'S REPUBLIC OF CHINA

- Nanjing University of Aeronautics and Astronautics
- Beijing Institute of Technology

FRANCE

- ISEP

International Summer School

Spending two to four weeks at one of our international partner institutions, intensive classroom learning, earning credits, working knowledge of a foreign language, cultural trips to places of historical significance—all constitute elements of an International Summer School Program. This program is offered by Alliance University in convenient and affordable packages that allow our students to experience a foreign country, its culture and its people in an inclusive manner. The International Summer School Program is a great peer learning opportunity for our B. Tech. students in a multi-cultural, academic setting.

Partner Institutions:

PEOPLE'S REPUBLIC OF CHINA

- Nanjing University of Aeronautics and Astronautics
- Beijing Institute of Technology

FRANCE

- ISEP
- Telecom Sud Paris

UK

- University of Dundee

Infrastructure, Academic and Support Services

Infrastructure, Academic and Support Services

Infrastructure

Some of the features of the campus infrastructure include:

- An eco-friendly educational campus in Bangalore, India
- Spacious classrooms with excellent acoustics
- State-of-the-art ambience created by the appropriate use of information technology
- A futuristic library with unmatched brilliance and aesthetics
- Halls of residence for students
- A spacious cafeteria
- Recreational facilities
- Healthcare centre
- And, many more features that provide a unique learning and living experience to all students

Laboratories

The Alliance College of Engineering and Design has well-equipped, state-of-the-art laboratory facilities, that further applied learning in engineering and design.

Library

The library is well-stacked with a vast collection of books, reports, journals and periodicals. It also provides access to the best of engineering and engineering-related digital resources through its subscription to various databases consisting of scholarly and industry-relevant content. Students utilize these services for their classroom-related work and to further research into their areas of interest. The library with its ample reading room area and a collection that is continuously updated, is conducive for learning.

IT Infrastructure

Alliance University has implemented an IT network infrastructure and a state-of-the-art Unified Communication Solution for the University campus with the latest technology that suits the present and future needs of higher education. The University in association with CISCO and WIPRO has built a strong network and communication infrastructure, which includes excellent campus-wide Wi-Fi connectivity.

Lecture and Seminar Halls

Spacious, gallery-type lecture and seminar halls are equipped with the latest audio-visual facilities for an enhanced learning experience. Seminar halls, which accommodate large groups at a time are used often for seminars and group meetings with speakers and guests from industry and academia.

SERVICES

Mentoring

The mentoring process for BBM students at Alliance School of Business, Alliance University is oriented towards their holistic growth and development. Each student is provided a mentor who guides students and advices them on their progresses in academics as well as in non-academic areas. The mentors provide their expertise to the students in helping them to identify their strengths and facilitate the developmental process in them.

Health

At Alliance School of Business, Alliance University we believe in healthy living. We provide the facility of a visiting doctor as well as ambulance service to cater to the health and well being of the students.

Counseling

Personal, non-academic counseling is provided by a trained counselor to help and motivate the students to attend to their overall developmental needs and to maintain and enhance their psychological, emotional and relational well being. These consultations are treated with the same standard of confidentiality that is applied to counseling consultations.

Sports and Recreation

A fit mind is an active mind. Studying at Alliance School of Business, Alliance University has always been about enjoying learning. Alliance University encourages students to participate in various sports and recreational activities apart from their regular academic schedules.

Transport

Alliance School of Business, Alliance University has a regular transport facility for its students with comfortable buses from the city to the Central Campus, both in the morning and evening hours.

LIFE BEYOND REGULAR CLASSES

Student Governing Council (SGC)

SGC enables a culture of collaborative effort with individual brilliance coupled with a strong sense of ethical standards by connecting and supporting all the students through mentoring programs, networking opportunities, speaker series, annual conferences and social events all year round.

SGC's mission is:

- To establish and develop a professional ethos and attitude among the students
- To prepare the foundations of a powerful network of student leaders and to effectively connect current students to alumni

Cultural and Sports Club

The Club targets and promotes athletic and aesthetic development of all students through varied competitive activities and events that endorse such knowledge. Also, the Club:
Emphasizes fun, teamwork and leadership
Promotes good entertainment that is intellectually enriching
Endorses cultural activities that uphold talent, creativity as well as curiosity and openness towards unfamiliar situations

Alliance Adventure Club

Alliance Adventure Club encourages student participation in adventure sports, physical fitness and outdoor games, which aim at increasing students' productivity levels as well as sensitivity and awareness towards teams and the environment. Participation in adventure and related outdoor activities promote among students traits such as leadership, courage, vigor as well as a sense of self-growth and comradeship.

Activities include:

- Trekking
- Rappelling
- River crossing
- Chimney climbing
- Rock climbing
- High-rope crossing
- Cave exploring
- Jungle safari
- Scuba diving
- Surfing
- Kayaking
- Archery
- Water rafting
- Para sailing
- Raft building

Corporate Social Responsibility

Corporate Social Responsibility (CSR) at Alliance University has evolved to include the participation of all stakeholders: students, faculty, non-government organizations (NGOs) and the local community. Over the years, the students and faculty at the University have actively participated in outreach program initiatives where they contribute their knowledge, skills and technical expertise to the community. At the same time,

the University has enthusiastically supported the program activities of several NGOs operating in the community.

The CSR Center at the University encourages and propels graduates to imbibe the qualities of enlightened leadership and thereby instills in them a level of trust and confidence about themselves and the community. The values of social responsibility that graduates imbibe are:

- Genuine respect for others and their points of view
- The ability to be sensitive and to draw a line when making profits and contributing towards social investment
- Strong personal integrity and reaching out to those whose lives they can touch and make a difference
- Ability to handle challenging situations and providing workable solutions for the same

Corporate Social Responsibility at Alliance University aligns itself and works towards achieving the UN Millennium Development Goals, by 2015. In this context, several innovative programs in the thematic areas of health, education, environment, livelihood, natural resource management and the preservation of traditional arts and culture as well as other related areas are designed and implemented. These innovative programs are developed bearing in mind the local cultural context and the needs of beneficiaries. Apart from funding various activities of the communities, the University also extends its expertise in terms of knowledge and human resources for the success of the programs.

Student Handbook (ACADEMIC RULES)

1.0. The Learning Process

1.1 Pedagogy

B. Tech Course uses a semester based approach for subject coverage. The pedagogy generally includes a variety of teaching methods such as lectures, Practical's in Labs, case studies, simulations, role-plays, etc. Students are required to complete a series of assignments/ experiments/projects in addition to their classroom contact hours.

1.2 Working Groups

For the B. Tech program, each student is assigned to a working group at the beginning of the first year. These groups work together on all group assignments for the duration of Semester I. New groups are formed at the beginning of Semester III and these groups generally continue to work together till the end of the program.

1.3 Responsible Use of the University Resources

Students are expected to use responsibly the resources of the University.

1.4 Mobile Phones

Use of mobiles phones are strictly prohibited in the Learning Centre, Computer Lab, Administrative Block, Examination Halls, and the Library. If any student is found to be using mobile phone, it will be confiscated by any member of the faculty or staff followed by appropriate disciplinary action.

2.0. Promotion Scheme

Only such students who have no more than six failed subjects from the previous academic year and who have successfully completed all subjects of years preceding the immediate previous year shall be eligible to be promoted to the subsequent years which is applicable from the second year of the program.

Explanation

A student will be promoted from second year to third year only if he/she has not more than six subjects as backlogs and has no backlogs of first year.

A student will be promoted from third year to fourth year only if he/she has not more than six subjects as backlogs and has no backlogs of first and second years.

3.0. Evaluation

The evaluation system consists of *continuous assessment* during the semester followed by *Semester End Examination*. The final grade for a subject is a combination of During Semester Assessment (DSA) and Semester End Examination (SEE) for all the subjects other than the projects.

- The division of the DSA and SEE marks is 50 marks each
- The division of marks for projects is as follows:

  Report – 60 marks Viva-Voce – 40 Marks

3.1 DETAILS OF DURING SEMESTER ASSESSMENT (DSA) AND *SEMESTER-END EXAMINATION (SEE)*

3.1.1 *Test-I*

Credits	Duration	Maximum Marks	Remarks
1	1.5 hours	50 marks	Converted to 15 marks
2	1.5 hours	50 marks	Converted to 15 marks
3	1.5 hours	50 marks	Converted to 15 marks
4	1.5 hours	50 marks	Converted to 15 marks

3.1.2 *Test-II*

Credits	Duration	Maximum Marks	Remarks
3	1.5 hours	50 marks	Converted to 15 marks
4	1.5 hours	50 marks	Converted to 15 marks

Notes:

There will be two DSA tests for 3 and 4 credit courses(Test-I and Test-II)

There is no re-test for absentees.

3.1.3 The following evaluation scheme is used in assessing student's DSA performance:

a. Theory Subjects

Subject Credits	Attendance (Maximum marks)	Tests (Maximum marks)	Project work/ Presentation/ Assignments /Quiz etc.* (Maximum marks)	Total (Maximum Marks)
1	5	30	15	50
2	5	30	15	50
3	5	30	15	50
4	5	30	15	50
* Varies from subject to subject depending upon the faculty and the nature of the subject				

b. Lab Subjects

Subject Credits	Attendance (Maximum marks)	Tests (Maximum marks)	Record (Maximum marks)	Vive-Voce (Maximum marks)	Observation & Procedure (Maximum marks)
1	5	15	10	10	10

The DSA marks are declared prior to the semester end examinations.

Students must fulfill the minimum requirements of Classroom Attendance and the DSA of each subject to be eligible to take the Semester-end Examination of that subject. The minimum requirements are:

Classroom Attendance : 75%

DSA (including attendance marks) : 50% (25/50)

Failing to secure the above, the student will be declared as 'I' (Incomplete). Such students however, can take the SEE of the particular subject(s) for a total of 100% of marks after six months.

3.1.4 *SEMESTER-END EXAMINATION (SEE)*

Credits	Duration	Maximum Marks	Remarks
2	3 hours	100 marks	Converted to 50 marks

3	3 hours	100 marks	Converted to 50 marks
4	3 hours	100 marks	Converted to 50 marks

b. Lab Subjects

Credits	Duration	Max Marks
1	2.00 Hours	50 Marks

Students must secure a minimum of 50% in the Semester-End Examination and 50% in Total (DSA+ SEE) in order to pass.

3.2 RE-TOTALING AND RE-EVALUATION

3.2.1 Students may apply for re-totaling/re-evaluation within the stipulated time from the day of declaration of the respective semester results.

3.2.2 Re-totaling/re-evaluation provision is not available for DSA Tests.

Note: *The outcome of **Re-Totaling** will supersede the marks obtained earlier. The marks obtained in the re-totaling (even if it is lower) will be final.*

***Re-Evaluation**: Only if there is a difference of more than 15% marks between the marks awarded earlier and the marks awarded in the re-evaluation, then the new marks will be awarded. Otherwise, the earlier marks shall be final. However, the student is entitled to the marks advantageous to him /her in case of the deviation being more than 15%.*

RE-EXAMINATION FOR STUDENTS DECLARED AS FAILED/ABSENT OR FOUND GUILTY IN A MALPRACTICE CASE

Such students will be required to write Semester-end Examination which will be conducted once in six months (after the lapse of the debarred period in the case of “Malpractice” cases).

3.3 Grading System

The following grading system is used for each subject:

Grading Scale

Percentage Range of Marks	Letter Grade	Honor points	Grading
90 - 100%	A+	4.0	Excellent
80 - 89.9%	A	3.5	Excellent
70 - 79.9%	B+	3.0	Very Good
65 - 69.9%	B	2.5	Good
60 - 64.9%	C+	2.0	Good
55 - 59.9%	C	1.5	Fair
50 - 54.9%	D	1.0	Fair
< 50	E	0.0	FAIL

Calculation of Grade Point Average

There are two types of Grade Point Averages - Semester Grade Point Average (SGPA) and Cumulative Grade Point Average (CGPA).

SGPA is calculated in the following manner. The total marks for a given subject, i.e. the combined DSA and SEE performance, are given as a percentage. For instance, suppose that a student receives 83% in a subject, this percentage is converted into a letter grade using the scale shown in the above table; continuing the example above, 83% would be assigned the letter grade A. This letter grade is then converted into honor points, e.g. letter grade A is equivalent to 3.5 honor points.

SGPA is then calculated as follows:

$$\frac{\sum(Subject\ honor\ points\ earned\ \times\ subject\ credits)}{Total\ semester\ credits}$$

CGPA is calculated as:

$$\frac{\sum(subject\ honor\ points\ \times subject\ credits)}{Total\ credits\ completed}$$

3.4 Recognition of Superior Scholarship

Graduating students with 75% and above weighted percentage of marks graduate from the course with “Distinction”.

3.5 Attendance

Classroom attendance is a compulsory component of the subject, and students are expected to attend all scheduled classes. Attendance accounts for 5% of the total assessment for a subject and forms part of the DSA. Students failing to obtain a minimum of 75% attendance will not be permitted to appear for the Semester End Examination. In such circumstances, they will be declared as “Incomplete”. The students however, can take the SEE of the particular subject(s) for a total of 100% of marks after six months.

The following is distribution of Marks for Attendance:

Percentage of Attendance	Marks
95 - 100	5
90 – 94	4
85 – 89	3
80 – 84	2
75 – 79	1

Attendance will be considered by the Dean’s office for the sessions missed by the students representing the University/College or participating in various institutional activities with prior approval.

3.6 Additional Activities

In addition to classes, students must be present at all programs and functions hosted by Alliance College of Engineering and Design, Alliance University where students' attendance is mandatory. These include, but not limited to, guest lectures, informational meetings with faculty, administrators and management, organized trips **/** tours and social functions deemed essential. Failure to attend such events may lead to suspension of the student which will result

in loss of attendance in regular classroom sessions leading to severe consequences resulting from such loss of attendance.

3.7 Maximum Duration allowed for Program Completion

A student who for whatever reasons is not able to complete the programme within the normal period or the minimum duration prescribed for the programme, may be allowed two years period beyond the normal period to clear the backlog to be qualified for the degree.

In exceptional circumstances a further extension of one more year may be granted subject to re-registration. Such students will have to re-register for the program by paying re-registration fee as stipulated by the University.

3.8 Academic Policy

- A student of B. Tech must have secured the minimum attendance in every single subject of a particular semester. A student must also have secured the minimum During Semester Assessment (DSA) marks (which is 50%) in a subject to qualify to take the Semester End Examination (SEE). In the event a student falls short of the minimum attendance requirement or/and minimum DSA marks requirement in any subject(s) of the semester, the student is disqualified to take the SEE of that subject(s). The student, however, can take the SEE of the particular subject(s) for a total of 100% of marks after six months.

- **Promotion Scheme**

  Only such students who have no more than six failed subjects from the previous academic year and who have successfully completed all subjects of years preceding the immediate previous year shall be eligible to be promoted to the subsequent years which is applicable from the second year of the program.

  Explanation

  A student will be promoted from second year to third year only if he/she has not more than six subjects as backlogs and has no backlogs of first year.

  A student will be promoted from third year to fourth year only if he/she has not more than six subjects as backlogs and has no backlogs of first and second years.

- **Academic Standards**: students are expected to maintain a CGPA well above 2.0. Students will be placed on “Academic Probation” in the event they fall short of the minimum CGPA of 2.0.

4.0. Additional Information

4.1. Issue of Transcripts and Degree

- Transcripts will be issued to the students at the end of each semester
- It is the responsibility of the student to collect the transcript of each and every semester within the stipulated time
- Total credits, honor points, maximum marks, obtained marks, SGPA,CGPA and Weighted percentage of marks will be shown on the transcript
- Students will get additional transcript(s) for the subject(s) in which they failed when they appear. These transcripts will indicate revised marks, Honor Points, SGPA and CGPA
- Students will be issued a Consolidated Transcript on completion of the course
- In case of any loss of original document issued by the University, duplicate documents will be issued to the student on payment of the requisite fee and fulfilling prescribed formalities
- Result will be mentioned on the transcripts with the following indicators:

TRANSCRIPT KEY	
ABBREVIATION	KEY
P	PASS
AB	ABSENT
F	FAIL
I	INCOMPLETE

5.0. Award of Degrees

A student will be eligible for the award of B. Tech degree only when he/she has successfully completed all the prescribed courses. The CGPA at the end of the program reflects the cumulative academic performance across all ten semesters.

6.0. Disenrollment from the Institute

If a student disenrolls from the University, he or she must submit an official request to the Registrar.

7.0. Power to Modify.

The University reserves the right to make changes in curricula, degree requirements, course offerings, change in student intake and academic regulations or change of location at any time without assigning any reason or prior notice. The said change may apply not only to prospective students but also to those who are already enrolled with the University.

8.0. Examinations Guidelines

All students are required to read and internalize the guidelines detailed below:

The College places great importance on academic rigor and academic integrity. The standards of conduct and discipline which students are expected to show while writing examinations are equally high. Students should note that any breach of these guidelines will result in disciplinary procedures.

8.1. Prior to Examinations

8.1.1. Seat numbers/venue will be put on the Official Notice Board at least 30 minutes before the commencement of the Examination.

8.1.2. Students must know their seat numbers/venue before entering the Examination Hall.

8.1.3. Any student who has not been allotted a seat number/venue or who has any queries about these should inform the Registrar's Office (Evaluation) and complete the required formalities prior to the commencement of the examination.

8.1.4. Students must carry the Institute's identification card for Tests and also Hall Ticket for SEE to the Examination Hall.

8.1.5. Students must possess all materials such as calculators, pens, pencils, rulers and erasers, which are necessary for the Examination. Exchange of any material among the students is strictly prohibited during examination.

8.1.6. Students must ensure that the calculator for use in the Examination is silent and battery-operated. The invigilator for the examination will have the final say on a calculator's admissibility.

8.1.7. Students must ensure that mobile phones and laptops or any other electronic devices are switched off and placed with personal belongings in the area designated by the invigilator.

8.1.8. Students must ensure that under no circumstance they carry any unauthorized material into the Examination Hall.

8.2. During Examinations

8.2.1. Students are advised to arrive in the Examination Hall at least five minutes before the commencement of the examination. Students should check their seat numbers, and take assigned seats.

8.2.2. Entry into the examination hall is not permitted after 30 minutes from the commencement of the examination.

8.2.3. Students must enter the required information on the answer sheets/booklets before attempting the answers to the questions.

8.2.4. Rough work/calculations can be done on the last pages of the answer sheets/booklet. This page(s), however, should be crossed out before submitting the answer booklet.

8.2.5. Students must write answers in pen (not pencil) and only in the answer sheets/booklet provided. DO NOT use red ink.

8.2.6. Students must not fold or crease the answer sheets/booklet.

8.2.7. Students must refrain from identifying themselves anywhere in their answer sheets/booklet except as required on the front/cover page of the booklet.

8.2.8. Students, who have completed writing the answers before one hour has elapsed, will have to wait until the hour has passed before being permitted to leave the Examination Hall.

8.2.9. Students should maintain silence, discipline and avoid creating distractions.

8.2.10. Students should be co-operative with the invigilators and follow instructions. An invigilator is authorized to exclude a student from an examination if the circumstances warrant. If this happens, he/she will submit a written report on the circumstances to the Registrar (Examination & Evaluation) immediately after the examination.

8.2.11. Students shall not use or have in their possession any books, writing papers, notes, manuscripts, electronic items (including electronic dictionaries), laptops, i-Pods, or any form of stored or recorded information.

8.2.12. Food or beverages are not permitted in the Examination Hall.

8.3. Concluding Formalities of Examinations

8.3.1. The Invigilator will give a time check to students 15 minutes before the allotted time expires. Students shall cease writing immediately when the time for writing the examination is over and hand in their answer booklets. No time extension is permitted.

8.3.2. No additional graph sheets will be issued during the last 15 minutes of the examination.

8.3.3. Students are responsible for returning the answer sheets/booklet/formula tables etc., within the approved time regardless of whether or not they have finished.

8.3.4. Examination answer sheets/booklets must be submitted intact. No part of the answer sheets/booklet must be defaced, removed, destroyed or taken out of the Examination Hall.

8.3.5. Approval for extension for completing an examination is solely at the discretion of the Registrar (Examination & Evaluation).

8.3.6. Students should collect all belongings before leaving the Examination Hall.

9.0. Important Committees at the Alliance College of Engineering and Design, Alliance University

9.1.

9.1.1. Academic Standards Committee: The ASC oversees all academic related matters, including the ratification of grades, the approval of any changes in the curriculum, and students' academic standings.

9.1.2. **Curriculum Review Committee:** The CRC works closely with leading industry and academic experts and periodically reviews the curriculum and keeps it up-to-date and relevant for the changing scenario.

9.1.3. **Internship and Dissertation Committee:** The IDC oversees all academic matters related to the Internship and the Dissertation, including the approval of student project proposals.

9.1.4. **Placement Committee:** The Placement Committee works closely with the Career Advancement & Networking (CAN) department and makes recommendations on various matters related to placements.

9.1.5. **Library Committee:** The Library Committee is responsible for ensuring that the library is well run and has all the relevant books, magazines and journals.

9.1.6. **Student Affairs and Grievances Committee:** The Student Affairs and Grievances Committee is comprised of Faculty advisor, tutor mentor, chief warden, etc. and is an opportunity for exchange of views on student related matters. The committee considers any grievance brought to it by a student for redressal.

9.1.7. **Research and Publications Committee:** The Research and Publications Committee explore and aid research initiatives in various functional areas and reviews research contributions made by the faculty, staff and students.

9.1.8. **Accreditation Committee:** The Accreditation Committee takes care of the national and international accreditations/ BCI approvals by working closely with various stakeholders of the University.

9.1.9. **Doctoral Program Committee**: The Doctoral Program Committee oversees all matters related to the Doctoral Program including the Curriculum, Administration and Award of Doctoral Degrees.

9.1.10. **Committee for Industry Interaction:** The Committee caters to the ever increasing need to bridge the gap between the Industrial and academic practices. The expertise that leading and experienced professionals bring to the table in the form of guest lectures has proven to be a valuable source of inspiration to students

9.1.11. **Examination & Class Management Committee:** To manage the examinations and class time table.

9.1.12. **Policy Implementation Committee:** The PIC is responsible for ensuring that all students' related policies are implemented swiftly.

9.1.13. **Seminars & Conferences Committee:** To organize the seminars and conferences.

9.1.14. **Professional body Committee:** To establish student chapters.

9.2. Each of the above mentioned committees will be formed by the Dean, Alliance College of Engineering and Design. Each committee will be composed of

- Chairman
- Convener
- Co-convener
- Members

9.3. The Dean Alliance College of Engineering and Design will be the de-facto chairman of all the committees.

9.4. The Dean will also appoint the following persons for the smooth working of the College.

9.5. **Centre coordinator-** There will be coordinators for each center of research.

9.6. **Department Head-** There will be HoDS for each branch of Engineering . Department of Science and Humanities will be a supporting department catering to all branches of Engineering. During the fIrst year, students will be under the Department of Science and Humanities.

Tutor Mentors- Students of each branch will be divided into small groups and will be allocated a tutor Mentor. Primarily to assist students during their tenure in Alliance College of Engineering and Design, both from the academic and non-academic perspectives. The HoD oversees the work of the tutor mentors.

STUDENTS GUIDELINES & REGULATIONS

1. RULES AND REGULATIONS OF THE UNIVERSITY

ACADEMIC INTEGRITY

The University attaches utmost importance to personal integrity and honesty in academic work by all students. Therefore, students must maintain strict discipline in classroom interactions, all forms of examinations, assignments, research, and other aspects of academic work.

ACADEMIC MISDEMEANOR

The following are considered as serious offences by Alliance University and may result in immediate dismissal from the course. The Registrar (Examination & Evaluation) records all offences for any future reference.

Plagiarism

Plagiarism occurs when a student submits work (i.e., research, essays, assignments) that steals and attempts to pass off another's ideas or words, or that uses another's work product without properly crediting the source. In such cases, the parties involved will

i. Forfeit marks available for a given assignment and/or
ii. Fail the course.

Academic Misconduct

Students engaging in any form of activities construed as cheating, copying, assisting others or receiving any form of assistance during the examinations will be subject to disciplinary action.
Any breach of requirements relating to examinations and assessments, whether committed intentionally or unintentionally, will be regarded as a “gross misconduct” and flagrant violation of the Code of Academic Integrity. Registrar (Examination & Evaluation) or Dean will refer the matter to the Academic Standards Committee or Enquiry Committee, which can take any action deemed necessary.
Please refer to Academic Integrity section for full details regarding this subject.

Proxy Signatures

Signing in by proxy in classroom attendance or elsewhere amounts to signature forgery and will be treated as a criminal offence by Alliance University. Students involved in such forgery will be liable to prosecution.

RULES REGARDING ATTENDANCE AND PUNCTUALITY

Students are required to attend all classes. Consistent attendance brings continuity to the learning process and induces intensive interaction with the faculty, who are keen to share their experience and knowledge with students. The participative learning process depends to a great extent on the level of interaction the students have with faculty.

Students should be punctual for all classes. Attendance will be taken in the first five minutes of each session. Students who are not present when attendance is taken will be marked absent for the session. The penalties applicable to "absence from classes without permission" will apply.

DRESS CODE

Students are required to be dressed appropriately while on the University Campus (Administrative Building, Learning Center, Technical Block, Laboratories, etc.) at all times; Monday through Friday.

The Dress Code shall be as follows:

Male	Formal dress (trouser and shirt), Leather Shoes; Coat is preferred on formal occasions
Female	Western formals / Salwar Kameez; Shoes / Semi-shoes

On Saturdays and Sundays, students may wear smart casuals. One can be casually, but appropriately and decently dressed, at other locations on the campus.

ID Card

All students shall always wear the ID card issued by the University during office hours while on all Alliance University premises.

DISCIPLINE AND DISCIPLINARY ACTION

GENERAL RULES OF DISCIPLINE

- All students must wear their identity cards while on campus or while attending Alliance University functions held outside the campus and where students are representing the institution. Loss of an identity card should be promptly reported to the administration. Cards must not be mutilated, defaced or rendered ineffective for identification.

- For smooth induction of fresher's, stringent anti-ragging measures and self-regulating discipline measures are built into the system. The Students Affairs and Grievances Committee shoulders this responsibility. The decision taken by this committee in this regard shall be binding on all students.
- To ensure discipline, the university makes positive and constructive efforts to induce self-discipline, self-restraint and self-regulation
- There are strict disciplinary guidelines pertaining to:
    - Code of conduct or behavior
    - Ragging
    - Activities that tarnish the image of the University
    - Activities that are anti-institute and antisocial
    - Hostel stay
    - Attendance and mass absenteeism
- Students are required to exhibit high standards of academic interest and responsible behavior befitting a professional level of maturity
- Silence and decorum in the corridors of institute buildings must be maintained at all times
- Smoking, consumption of alcohol, drugs, etc., on campus is strictly prohibited. Students under the influence of alcohol are not permitted into the campus at any time.
- It is strongly advised that students do not indulge in any unlawful activities. The institution will not be responsible if students are caught by the police for any violation of law.
- Students should park their vehicle only in "parking area for students" provided on campus
- Any student breaking or damaging any University property shall be required to pay the cost of repair or replacement, apart from any penalty that may be levied

RAGGING

Students must refrain from ragging of any kind. Students who violate this rule shall be immediately suspended from the university and hostel for a period of one week. The matter will be placed before the Student Affairs and Grievances Committee, which will hear the matter and take action according to due process of law. Student must take note that ragging results in dismissal from the university. The attention of the students is also drawn to the judgment of the Honorable Supreme Court of India wherein it is mandatory for the institution to file a complaint with the police with all resulting consequences as per the Circular of the Education Department, Government of Karnataka dated 16/08/1999 on prohibition of ragging in colleges and hostels.

ANTI-RAGGING MEASURES

- Government/University Grants Commission (UGC), guidelines notified vide No. F. 1-16/2009 (CPP-II) dated 21-10-2009 on curbing the menace of ragging in higher educational institutions, 2009 (Under Section 26(1) (g) of the University Grants Commission Act, 1956) are strictly implemented
- In addition to the above, those who indulge in acts of ragging shall attract the punishments as applicable, which include:

i. Expulsion from the University or hostel.
ii. Suspension from the classes.
iii. Fine with a public apology.
iv. Withholding scholarship or other benefits extended to those involved in ragging.
v. Debarring from representation in events such as cultural or sports, or any other representation in events for which the student(s) may have been selected.
vi. Withholding results by the University.
vii. Entering the ragging incident on Transfer Certificate or Migration Certificate, which may adversely affect the career of the students.
viii. No placement assistance.
ix. Filing of complaint with the Police Authority (as per Supreme Court's Directive).

At the time of admission or enrollment to the University, a printed undertaking is to be duly filled by the candidates in their own handwriting and signed to the effect that they are aware of the university's approach towards ragging and the punishment to which they shall be liable if found guilty of ragging.

- The Student Affairs and Grievances Committee keeps:
  i. Continuous watch and vigil over ragging.
  ii. Promptly deals with the incidents of ragging brought to its notice.
  iii. Summarily punishes or reprimands the guilty, either by itself or by following procedures, administrative or otherwise, constituting a special enquiry committee and putting forth its findings or recommendations before the competent authority to take decision.
  iv. Students are encouraged to report any ragging act witnessed or experienced by them to the administrators, faculty, Student Affairs and Grievances Committee or any other staff member of the University with whom the student may feel comfortable. The University ensures the confidentiality of such a disclosure.

DISCIPLINARY ACTION

The Student Disciplinary Committee and Student Affairs and Grievances Committee will deal with all disciplinary and any student grievances matters. The Committee shall constantly monitor the behavior of the students. All disciplinary matters will be placed before the Committee, which will hear the matter and take action according to due process of law.
The Student Affairs and Grievances Committee hearing any matter shall pass a resolution of termination, suspension, retention, penalties, or any other action as deemed fit and necessary. The decision of the committees shall be final and binding.

PAYMENT OF FEES TO BE MADE TO THE UNIVERSITY

All payments to the University should be made on or before the date specified by the University
Failure to make payments on time will invite appropriate penalties as the University may prescribe, which also includes cancellation of admission

Fees for the entire course shall be paid by the student who intends to discontinue for any reason whatsoever, at any time during the course

DISPUTE RESOLUTION

Disputes of any kind are subject to the jurisdiction of the courts in Bangalore only.

2. LIBRARY RULES AND REGULATIONS

- All library users are required to enter their names and sign the register provided at the entrance
- Students can borrow three books each for a period of 15 days
- Students can borrow one book for internal use, subject to the condition that they return the book on the same day
- Library books should be returned on or before the due date. A fine of Rs. 5/- will be levied per day after the due date. All issued books must be returned and library fines (if any) must be settled on time.
- Borrowers shall replace lost or damaged library materials with new versions of the same
- Renewal is generally allowed if no reservation has been made for the same
- Personal items (e.g. books, folders, files, blazer, jerkins, overcoats, etc.) are not allowed in the library
- Case studies, project reports will not be issued to students
- Library users are expected to maintain silence at all times in the library. Cell phones are strictly prohibited.
- Library users should present their identity card for borrowing or renewal of library material. The librarian reserves the right to deny issuance or renewal of library materials where the identity card is not presented.
- Marking of any kind, underlining, writing on books, and defacing any publication are strictly prohibited and if defaced, the item must be replaced with new version
- Smoking anywhere in the library is prohibited as is food and refreshments in the reading rooms
- Suggestion for the purchase of new books, periodicals and newspapers may be made through the concerned area chairs
- Membership of the library is not transferable
- Books or journals removed from the shelves should not be replaced on the shelves but should be left on the table
- All library users are expected to read the notice board or browse the library website for library timings and other services
- The librarian reserves the right to refuse admission to any one violating the rules and regulations of the library
- Students are requested to maintain dress code while they are in the library
- Students should return all the borrowed items from the library, clear all the fines and return the library ID card before leaving the University

4. **INFORMATION TECHNOLOGY POLICY**

- Students are advised to collect their LAN username and password to access the University network and the Internet Login credentials are to be kept confidential to avoid misuse of the same
- Students are advised to register their Laptop MAC address for Wi-Fi Access in the Campus and are prohibited from accessing the Wi-Fi Internet through any other devices other than from their personal laptop computers
- Student access to Internet will be monitored using advanced monitoring tools and hence they are advised to make use of the facility for academic and research purposes only. Download of large amounts of data or heavy files over the Internet is prohibited and will be monitored.
- Students will be provided with a unique email ID that is registered to the Alliance University domain. Students are advised to use that email ID for academic purposes only and are advised not to send anonymous and offensive emails, as it will be tracked and may lead to a police investigation and legal action.
- All users are prohibited from posting or writing anonymous or defamatory content in any online media against the University, its staff or students
- Students must abide by the terms of copyright laws, software licensing agreements, and contracts that pertain to the computing, information and communications resources of the University. Reproduction or distribution of copyrighted works, including, but not limited to, images, video, text, audio, or software, without permission of the owner can lead to legal issues.
- The information technology resources of the University are intended to be used to fulfill its mission. Use of any of the University information technology resources for personal either for profit, gain, or for commercial purposes is prohibited.
- Students are responsible for the security of their computer accounts, including the changing of passwords on a regular basis. Students are also responsible for all activities that originate from their accounts. Computer accounts are University property and are deactivated according to the policies and procedures of the University.
- Allowing another individual to use one's computer account or password is strictly prohibited. Students may not attempt to access another user's electronic communications, nor may they read, copy, change, or delete another user's files or software without the permission of the user.
- Use of the campus network to gain unauthorized access to any computer account or computer system, bypass data protection schemes, uncover a security loophole, or mask the identity of a computer account or machine, is prohibited
- Although the University respects the privacy of an individual's electronic communications, students should be aware that files and mail messages are not guaranteed to be private or secure. Files and messages may be viewed in the course of routine management of computing, telecommunications, and network services. In the event of a security breach—suspected breach, suspected illegal activity, or suspected violation of University policy—file(s) or email account(s) may be accessed by authorized personnel.
- Students may not deliberately perform an act that will interfere with the normal operations of computers, terminals, peripherals, or networks. This includes, but is not limited to, tampering

with any component of either the Local Area Network (LAN), Intranet, or Wide Area Network (WAN).

Regulations for the responsible use of Information Technology

Alleged or suspected violations of the Alliance University Policy should be reported to either the ITS Help Desk, Alliance University or the concerned University authorities. All alleged or suspected violations will be reviewed in collaboration with the Disciplinary Committee, Alliance University. Abuse of information technology privileges is subject to disciplinary action, which may include the loss of these privileges and other disciplinary sanctions up to, and including dismissal. A student who abuses the University's computing, information, and communications resources of the University may also be subject to civil action and/or criminal prosecution. Alliance University will pursue criminal and civil prosecution of violators, when appropriate. Individuals will also be responsible for any financial loss to the University that results from inappropriate use of information technology resources.

4. COMPUTER LAB RULES AND REGULATIONS

Entry and Exit

- Computer Lab will be open during University working hours
- Only students, Lab faculty and staff of University are allowed inside the Computer Lab
- No visitors are allowed inside the Lab without prior permission from appropriate authorities
- Students must log-in and log-out in the biometric reader or attendance register at the time of entry and exit from the Computer Lab
- Students should be dressed in a formal attire (as per University dress code stipulations) to gain entry into the Lab
- Students shall not carry any pen drives, CD's or other storage devices without prior permission from the Lab In-charge and the details of these storage devices shall be registered. Failure to observe this code of conduct will result in the student being barred from using the Lab for the remainder of the program.

Inside the Lab

- Students have to maintain silence at all times in the Lab
- Students will occupy the systems as identified by the Lab In-charge
- All the students should login to the system with their username and password
- Where the students have carried pen drive, CD's or other storage devices, the same will be tested for any presence of virus or undesirable content
- Students should not access servers
- Students shall not indulge in:
    - Hacking or retrieval of sensitive information

- Destruction of data or programs in individual machines as well as the server

- The Internet facility is provided purely for academic learning and acquiring knowledge Students shall not use this facility for sending unproductive, provocative, illegal mails or indulge in undesirable chat.
- Whenever any student has copied any data or program from the system, the same should be shown to the Lab In-charge for verification or approval
- University or its staff are not responsible for loss of any personal property of the students
- Beverages and eatables are strictly prohibited inside the Lab
- Mobile phones are strictly prohibited in the Lab and the violation of the rule results in the confiscation of the instrument and expulsion from the Lab
- Internet usage is free of cost, subject to certain conditions. Students are requested to vacate the system after 60 minutes if required by other fellow students.
- Audio or Video chatting is prohibited in all the Labs of the University
- Students are prohibited from visiting any sites which do not add learning value or are illegal
- Students should use the Computer Lab only for academic learning and activities of the students over a campus network will be monitored for security purposes

5. **HOSTEL RULES AND REGULATIONS**

All students residing in the hostels provided by the University must follow the rules and regulations mentioned below including those that may be framed from time to time. Failure to follow these rules will invite disciplinary action from the University.

1. Inmates must return to their respective hostels before the deadline for the entry in the night and must log their entry in the register available with the warden. Failing to sign would result in automatically being marked as absent from the hostel. Students wishing to stay out beyond the time limit shall seek written permission in advance from the hostel management and submit the same to the security guard at the hostel. Failure to follow this procedure could result in eviction from the hostel immediately and without notice.
2. Please adhere to the hostel and the campus entry timings which are stipulated and subject to change.
3. Hostel residents are not permitted to change their hostel rooms without prior permission from the hostel management.
4. Hostel residents shall pay the rent for 12 months irrespective of vacations.
5. Six months' hostel charges are to be paid in advance to the University at the time of joining. Hostel charges for the subsequent period(s) must be paid on or before the date notified. A late penalty of Rs. 25/- per day will be levied. The hostel fees may be revised as per the decision of the management.
6. Hostel residents should retain the allotted room till the completion of the course. At the time of vacating the hostel, the hostel resident must submit the "No Dues Certificate" from the hostel management along with room keys, hostel identity card and original deposit receipt to hostel

management. Hostel deposit will be refunded after deducting maintenance charges of Rs. 2,000/- along with any other charges the University feels appropriate.

7. Hostel residents who wish to stay out for the night may do so only after receiving permission from the warden or appropriate authority to their written request
8. Students who choose to use the hostel facility are required to use the hostel facility for the entire duration of the course. If they wish to vacate in the middle of the course they have to pay the hostel rent for the entire period of the course. However, they can vacate the hostel if and when the option is given to them by a separate notice by the University.
9. All valuables (cash, jewelry, clothes, laptop, transistors, cameras, mobile phones, etc.) must be kept under lock and key. The University or hostel management will not be responsible for loss or theft of such items.
10. Cooking and cooking equipment are not allowed in the hostel. No electrical appliances such as electric irons, heaters, electrical coils, etc., are to be used in the room. Violation of this rule will result in confiscation of such items as well as a penalty of Rs. 2,000/-.
11. Hostel residents are expected to be considerate of others and should refrain from noisy activities at all times and particularly late at night (after 10 PM) and early mornings (before 7 AM).
12. Playing loud music or engaging in activities that may disturb other residents or neighbors are prohibited.
13. The hostel residents are collectively responsible for keeping the premises clean and organized. Hostel residents are required to clean their rooms and to keep a dustbin in each room. Scribbling, spitting or hanging posters or art on walls is strictly prohibited. Drilling, nailing and fixing other fixtures are not allowed.
14. Water and electricity are scarce resources. Residents are advised to ensure that all electrical switches are turned off and water taps closed while not in use.
15. Damage or loss caused by the hostel residents to moveable or immoveable hostel property (such as furniture, fittings, etc.) will be repaired or replaced by the University at the expense of the offending hostel residents.
16. Parents or guardians may visit the hostel only with prior permission obtained from the hostel management. They are not allowed to stay in the hostel.
17. Hostel management along with student representatives are responsible for taking care of health related issues until the preliminary treatment. In case of a medical emergency, the student is taken to the nearest hospital or doctor for preliminary treatment and the local guardian or parent is informed. The local guardian or parent will have to take charge thereafter and the entire responsibility for treatment and related expenses will have to be borne by the parents or local guardian. In case of contagious health problems, the hostel resident must vacate the hostel and is required to reside at home or at that of the local guardian.
18. No student shall arrive at his or her respective hostel beyond the specified hours. Hostel residents arriving late at night or staying outside without prior permission from the appropriate authority are subject to action and penalties. Such students are liable to pay a fine of Rs. 1,000/- for the first offence and Rs. 2,000/- for the second offence. If repeated again, these students will be dismissed from the hostel forthwith and their rent and security deposit will be forfeited.

19. Men are not allowed in the women's hostels and vice versa. Violation of this rule will result in immediate eviction from the hostel and suspension from classes for seven days. These students may also be expelled from the university immediately.
20. It is imperative that hostel residents do not indulge in any activities that are considered inappropriate, unethical or illegal. Such activities include but are not limited to the following: use of narcotics, smoking, drinking (consumption of liquor), use of gutka, use of abusive language, quarrels and arguments, driving without license or without proper documents, rash driving, among others. Students found indulging in any of these activities and other behavior considered detrimental to the image of the institution will be liable for disciplinary action by the University including filing of an FIR with the local police for appropriate and necessary legal action, and expulsion from the hostel and from the University.
21. Indulging in any political activities or unwarranted dangerous activities that may cause nuisance to neighbors and the neighborhood will be viewed seriously and could lead to expulsion of the student from the hostel and the University immediately.
22. Ragging, in any form, in the hostel or on campus is prohibited. Ragging will be viewed seriously and dealt with as per anti-ragging rules and regulations, which can result in the dismissal of the student from the University.
23. All complaints must be recorded in the complaint book only.
24. University reserves the right to instruct any hostel resident to move from one room to another in the same hostel or from one hostel to another hostel, if need be, without explanation. Students are bound to carry out such instructions.
25. The University reserves the right to change and introduce any new rules from time to time, in the larger interest of the University and the students. Rules and regulations formulated and those added from time to time are to be followed strictly. Violation of any rules and regulations will result in immediate eviction from the hostel and suspension from the university. A student facing such charges will be asked to appear before the Policy Implementation or Disciplinary Committee. This committee will hear the matter and take action according to the due process of law and pass resolutions for termination, suspension, penalty or any other action as deemed fit and necessary. The decision of the Disciplinary Committee shall be final and binding.

6. GUEST HOUSE FACILITY

Alliance University offers limited accommodation in the guesthouse to alumni and parents, guardians or guests of our current students. Those interested in availing this facility may make a request at least three working days in advance to the HR Department. Accommodations will be offered based on availability and on first-come-first-served basis.

1.	AC Suite	:	Rs. 1,250/- per day	
2.	AC Room	:	Rs. 1,000/- per day	Guest House
3.	Non-AC Room	:	Rs. 900/- per day	
4.	Non-AC Suite	:	Rs. 750/- per day	Staff Quarters
5.	Non-AC Room	:	Rs. 500/- per day	
6.	Single occupancy room	:	Rs. 300/- per day	Hall of Residence
7.	Double occupancy room	:	Rs. 250/- per person per day	

Note: the above rates are subject to change

The Registrar

Alliance University
Bangalore

Dear Sir,

UNDERTAKING

I …… have been admitted to the Bachelor of Technology course of ……..batch. I have carefully read all the Guidelines and Regulations as prescribed in the Alliance Learning Experience (Course Catalogue) regarding various aspects of the course including the rules governing the academic requirements, computer lab, library, attendance, fee payment, hostel, general discipline and anti-ragging measures etc. I hereby sign this undertaking and agree to follow and abide by all the University Guidelines and Regulations prescribed in this booklet as well as those prescribed elsewhere. I further undertake that in the event of a failure on my part to follow any of the rules or regulations or guidelines, the University may initiate any action against me, including termination from the course.

Signature of the Student Date

Student's Name : ……

Provisional Reg. No. : ……

Permanent Address : ……

……

……

Contact No. : ……..

E-mail ID : ……..

ALLIANCE
UNIVERSITY
Private University established in Karnataka State by Act No.34 of year 2010
Recognized by the University Grants Commission (UGC), New Delhi
Alliance College of Engineering and Design