BUNDELKHAND INSTITUTE OF ENGINEERING & TECHNOLOGY, JHANSI

INFORMATION BROUCHURE

2019 – 2020

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(2019 – 2020)

Bundelkhand Institute of Engineering & Technology,
Jhansi
Jhansi – 284128 (U. P.), India

IMPORTANT INFORMATION

Following courses are under self-finance scheme (SFS)

1. **B.Tech. (Information Technology)**
2. **B.Tech. (Electrical Engineering)**
3. **Master of Business Applications (MBA)**
4. **All M.Tech. programmes**

Therefore, all rules, regulations and fees will be as per applicable to SFS courses.

WELCOME MESSAGE

It is a great pleasure for me to welcome you all, especially new entrants to this institute of professional excellence i.e. Bundelkhand Institute of Engineering & Technology, Jhansi, which is known for providing quality education of International standards in Bundelkhand Region.

I would like to congratulate the new students for their decision of selecting this institution, which I assure you, will provide you a platform where from you will embark on your first journey towards your professional career. I assure you that BIET Jhansi will provide education of high standard alongside with a homely atmosphere of the hostels and other excellent infrastructural facilities.

I am sure that overall inputs provided by the institution will help you to develop into a complete and competent professional in true sense for the better future of our country.

I wish you all a happy and healthy stay with quality environment conducive to academic growth at this institution.

(Prof. V. K. Tyagi)
Director

Institute Vision

To transform the institute as a premier centre for imparting technical education to produce quality professionals to meet the global challenges and societal needs.

Institute Mission

1. To create an academic ambience leading to quality professionals.
2. To design and implement the curriculum to meet the needs of the industry and society.
3. To collaborate with premier academic institutions, research organizations and industry to enhance skills and employability.

1.0 ABOUT THE INSTITUTE

Bundelkhand Institute of Engineering & Technology, Jhansi (Formerly Bundelkhand Engineering College, Jhansi) was established in the year 1986 with an objective to develop Bundelkhand region, a back ward region of state of Uttar Pradesh, through growth of technical education and industrial research. Subsequently, basic infrastructural facilities, on an area encompassing 220 acres of land, were developed. The institute was started initially with two branches, viz., Computer Science & Engineering and Electronics and Instrumentation Engineering with an intake of 30 students in each.

The campus was gradually developed into a neat, clean and green campus adding two additional branches, Mechanical Engineering and Civil Engineering with an intake of 20 students each in 1990. Moving ahead on the path of progress, in 1997, Chemical Engineering with an intake of 30 students was started and in 2000 Information Technology with intake of 40 students was added. In the same year, the intake of Mechanical Engineering and Computer Science & Engineering were raised to 45 and 60 students respectively, and Electronics & Instrumentation Engineering was renamed as Electronics & Communication Engineering and intake was raised to 60. In 2006, the intake of Civil Engineering has been increased to 45. From session 2007-08, a four-year B.Tech. programme in Electrical Engineering with an intake of 60 students has been added to the existing six B.Tech. programmes.

In addition to these undergraduate programmes from session 2005-06 two post graduate programmes in (i) Environmental Engineering and (ii) Construction Technology & Management in Civil Engineering Department and one in Manufacturing Science & Technology in Mechanical Engineering Department with intake of 18 students each, had been started. From the session 2006-07 a M.Tech. Programme in Digital Communication System in Electronics & Communication Engineering Department with intake of 20 students had also been added. From session 2007-08, a two-year management programme leading to M.B.A. degree with intake of 60 students has also been started. From the session 2014-15 three M.Tech. Programmes in Bio-medical Engineering in Electronics & Communication Engineering Department, Thermal Engineering in Mechanical Engineering Department and Energy Science & Technology in Chemical Engineering Department with intake of 18 students in each branch had also been added to the list of P.G. programmes being run by the institute. In this way the total intake of students in the institute including M.Tech. programmes is 528. It is worth to mention that all P.G. programmes are under SFS scheme.

1.1 Courses of Study

The institute offers the following programme:

Undergraduate Programme in	**Intake**
Civil Engineering	45 Seats
Computer Science & Engineering	60 Seats
Electronics & Communication Engineering	60 Seats
Mechanical Engineering	45 Seats
Chemical Engineering	30 Seats
Information Technology	40 Seats
Electrical Engineering	60 Seats

The total intake of the institute is 340 seats. Beside this 5% seats are available for NRI/ NRI sponsored candidates and 10% seats for the fee waiver students. Similarly, 10% seats are reserved in unreserved category for Economical Weaker Section (EWS) and 10% seats are allotted for lateral entry at the time of admission.

Post Graduate Programmes (all are under SFS)

M.Tech. (Environmental Engineering)	18 seats
M.Tech. (Manufacturing Science & Technology)	18 Seats
M.Tech. (Construction Technology and Management)	18 Seats
M.Tech. (Digital Signal System)	20 Seats
M.Tech. (Bio-medical Engineering)	18 Seats
M.Tech. (Thermal Engineering)	18 Seats
M.Tech. (Energy Science & Technology)	18 Seats
M.B.A.	60 Seats

2.0 ELIGIBILITY REQUIREMENT FOR ADMISSION

All the admissions are done by A. P. J. Abdul Kalam Technical University Lucknow. For details please visit http://upsee.nic.in.

3.0 HOSTELS

Institute is fully residential to accommodate all students in hostels. Boys are accommodated in seven hostels namely Vrindavan Bhawan, Saket Bhawan, Panchvati Bhawan, Jai Bharat Bhawan, Dr. A. P. J. Abdul Kalam Bhawan, Major Dhyanchand

Bhawan and Atal Bihari Bajpai Bhawan. Girls are lodged in Yashodra Bhawan and Kalpana Chawla Bhawan.

All hostels are equipped with gensets for full power backup and RO plants for safe drinking water. The dine facility for students are provided by student's cooperative mess in each hostels. The expected expenditure for a dine month is around Rs. 2300/- which is adjusted by their mess advance deposited at the time of registration.

3.1 Hostel Rules

- Students are expected to act in such a manner that an atmosphere conducive to effective study prevails in the hostel.
- Students are required to be aware of all notices that are put up on the Notice Boards.
- The hostel wardens have full authority to check any room in the hostel at any time with or without the help from local administration.
- Ragging is a cognizable offence, punishable under the law and is strictly banned. Any student involved in any kind of ragging will be liable for immediate expulsion from the hostel/ college.
- Possession of fire arms, daggers, cycle chains, rods, iron rods or any other kind of weapons are strictly prohibited (Arms Acts.). Hostel inmates found in possession of the above will be handed over to the police or expelled from hostel immediately. No inquiry into the matter shall be required.
- No one is allowed to take part in any type of video film show in the hostel premises without the permission of the hostel warden.
- Unauthorized guests or outsiders in the hostel room are strictly prohibited. Any student keeping unauthorized person in his/ her room will be liable to disciplinary action amounting to expulsion from the hostel. Guest may be allowed on prior written permission of the warden.
- No student shall occupy or interchange the room without permission and proper allotment of the room by hostel warden.
- Consumption of alcohol and other intoxicants and drugs are strictly prohibited. Anyone found consuming alcohol or drugs will be expelled from the hostel immediately. No enquiry into the matter shall be required.
- Cooking food in the hostel room is strictly prohibited. In order to avoid fire hazards, no fire producing equipment in the room is permitted.
- Hostellers are warned not to keep valuable goods in their rooms. Hostel management shall not be responsible for loss of such valuables.

- Students shall have to abide by the decisions of the hostel wardens with respect to enforcement of the hostel rules failing which strict disciplinary action may be taken.
- While leaving the rooms, it must be ensured that the light and fans are switched off failing which he/ she will be liable to imposition of fines.
- Use of electrical appliances such as heaters, electrical irons etc. are strictly prohibited. Violation of this rule will lead to strict disciplinary action. Confiscation along with a fine of Rs. 500/- shall be imposed.
- Tampering with and alteration of electrical fittings are strictly prohibited and liable for action.
- Hostellers desiring to go out of station must obtain permission from the warden concerned before going out.
- Damage to hostel property such as doors, windows, electrical fitting, toilet fitting, glass panes etc. will lead to fine, disciplinary action, expulsion from the hostel. A general deduction from the hostel security deposit will be made at the end of the course, towards the breakage other than those, which are charged against the individuals.
- No permission shall be given to a student to stay in the hostel after his/ her even semester examinations are over, and for the purpose of preparation or appearance in any entrance test or any competitive examination he/ she must obtain permission from the warden.
- The boarders must keep their rooms neat and clean. They have to use waste paper baskets of their own in their rooms. Any waste found in hostel lobby is likely to get it cleaned by the residents of the lobby and a fine shall be realized from the residents in a combined manner as deemed fit by the hostel management.
- Each boarder should check the fittings in his room at the time of occupation and takeover of the fittings and furniture in writing which are returnable on vacation of the room. Any loss or damage will be borne by the concerned boarder or boarders.
- Room furniture, electric fittings etc are required to be maintained by the students in good conditions. At the time of allotment of seat/ leaving the hostel for Summer Vacation every student must take over/ handover the hostel room properly and carefully. They shall not break or damage any furniture and fittings. If any breakage occurs then cost will be realized (individually or collectively), together with heavy fines imposed on them.
- Private picnics are prohibited in principle. The boarders are therefore cautioned against arranging picnic of their own without the written permission of the Wardens.
- Student shall not remain absent from their hostels during the night between 10:00 p.m. to 5:00 a.m. without prior permission of the warden.

- Visitors are not permitted to stay in hostel after 8:00 a.m. and guest of student are not allowed to stay in hostel.
- Female visitors are not permitted at any time into the Hostels for boys. Parents Visitors may take prior reservation from Chief Warden to stay in Institute Guest House/ Visitors House on payment.
- Boarders shall not leave the hostel without prior permission of the warden they shall apply to the Warden/ Chief Warden stating reason of leaving and address of destination. Boarders who leave without application and permission shall be deemed to be missing and Police authorities/ parents may be intimated as such.
- Boarders will be personally/ collectively responsible for any loss or damage caused to the properties and equipment and other fittings in the common places, due to indiscipline.
- College will not be responsible for acts of student which lead to the disturbance of public peace and tranquility or cases of Law and Order in which they are knowingly or unknowingly involved in or outside the College premises.
- Any boarder harboring any unauthorized element or any one expelled/ removed from hostel earlier or any outside element, will be punished which may be up to removal from Hostels/ College.
- Boarders shall treat their fellow boarders, institute staff, hostel staff, mess staff with dignity and decorum.
- Non-regular and Non-collegiate students having filled up form to appear at examination may be allowed to stay in the hostel temporarily, vacancy permitting, only if they obtain prior written permission of the authorities and undertake to abide by the hostel rules and deposit the fees of hostels in advance.
- Students belonging to above categories willing to appear at their back-paper examinations may be allowed temporary accommodation in hostel not exceeding two months at a time on payment of usual charges for food and accommodation to the hostel in advance, subject to satisfying other conditions.
- Ex-students, if allotted room temporarily will have to pay in advance seat-rent and electricity charges as per rate defined in the institute. Such students cannot claim provision of furniture if not available in the hostel.
- Students/ Delegates from other organizations may be allowed temporary accommodation in hostel with permission from the Warden/ Chief Warden/ Director, for which they may have to pay usual temporary accommodation charges.
- No notice shall be put in the Hostel by any student directly unless such permission has been granted by the Warden of respective hostels.
- No student or students shall raise or assist others to raise any subscription in the Hostel on any account without prior permission of the authorities.

- Each boarder will be completely responsible for his/ her belongings. The Institute will not be responsible for loss incurred due to his negligence or any other reason whatsoever.
- Students must not keep valuable in their rooms. Extra money must be deposited in the post office/ savings bank account. They should lock their rooms properly when they go out for bath, etc.
- No one should use the belongings of other students without their consent.
- Employment of personal servant or attendant in a hostel is not allowed.
- Each student must carry identity card whenever he/ she goes outside the hostel and produce on demand from institute/ hostel authorities otherwise a fine or disciplinary actions might be taken.
- Residents desirous of purchasing second hand bicycle, calculator, mobiles, computers etc should ensure about the authenticity of the owner to avoid purchase of stolen and incriminating items.
- Boarders are not to patronize food/ soft drinks/ snacks from unhygienic shops and road-side vendors to avoid infection to themselves and spreading amongst fellow boarders.
- The boarders must be very particular about payment of hostel dues/ Institute fees. The Accounts Section shall accept the Institute fees only after production of up to date mess dues clearance from the hostel. For payment of dues only two chances shall be given, the first without fine and the second with fine.
- A student must remember that the hostel is the home of the students on the campus, he/ she should behave himself/ herself on the campus as well as outside in such manner as to bring credit to him/ her and to the Institute.
- A student once admitted in the hostel continues to be a hostel inmate throughout the year. He/ she has to pay the room rent for the full academic session. The amount will be forfeited if the inmate decides to leave the hostel in the mid-session.
- Every student should stay in the accommodation allotted to him/ her by the Warden concerned. He/ she will not be allowed to change the accommodation once allotted.
- A student should not enter the rooms of others who are not in their rooms.
- A student shall not hand over the keys of his/ her room to any other student/ person except the Warden or person authorized by him.

3.2 Mess Rules

- Each Hostel has a Mess of its own, financed and managed by the boarders themselves through their representatives.

- Each student residing in a Hostel must join the mess attached to it. Individual cooking and messing outside is not permitted. All students as notified by the Warden from time to time shall observe mess rules.
- The cost of food including other overhead and establishment charges is to be borne by the boarders themselves. The Institute allows no subsidy.
- The students must observe the timings of the mess and visit the mess in a proper dress.
- Proper care of the utensils and mess furniture while in use must be ensured, failing which the students are likely to be punished by the hostel management.
- Mess dues/ advances should be paid every month by the dates in the respective hostel accounts as notified by the Hostel authorities failing which the concerned boarder has to pay fines for the days of default, as imposed by the Warden of the Hostels.
- For payment of hostel dues, the boarders are required to open an account with Central Bank of India, BIET branch, Jhansi, and make all payments by transfer through bank vouchers which will be supplied to them. No payment in cash will be accepted.
- Boarders are to share responsibilities in running their messes and keeping their hostel clean and tidy.
- The students should dine together in the mess. Meals other than sick diets will not be served in the rooms of the borderers. Utensils/ chairs kept in the messes are not allowed to be brought to the rooms of borderers.

3.3 Additional Instruction for Female Hostellers

- At the time when students are accepted for admission in the hostel, the parents or guardians should submit a list of names and address of persons who may visit or be local guardians of their daughters or ward subject to approval by the Director/ warden. If no names are received the Director/ warden will exercise his/ her discretion. Certified signature and photograph of local guardian should be given. Local guardian can be any close relation who has a family unit.
- If the visit of any person/ persons has an adverse effect on the discipline of hostel in any way, the warden reserves the right to disallow such visitors.
- Visitors listed by the parents or guardians may meet the students as per visiting hours given below:

Visiting Hours: 5:30 p.m. – 7:00 p.m. daily

a. Approved visitors out of town and residents of campus may be allowed at the discretion of the warden.

b. Male Students are not allowed to meet the girls in hostel unless in emergency for which they must obtain warden's written permission.

- Each visitor should make proper entries in the visitor's book and obtain permission of the warden before meeting the concerned student. They should meet only the concerned student. Further, visitors are not allowed to enter the hostel rooms. They must meet the concerned student at the specified place and the visit should be as brief as necessary.
- Violation of the above mentioned hostel rules will lead to disciplinary action and expulsion from the hostel and deduction of general proficiency marks.

4.0 BRANCH CHANGE

Branch change is allowed on vacant seats in third semester as per instructions from AKTU and rules prescribed by AICTE time to time.

5.0 EXAMINATION

The Academic year comprises of two semesters. Each semester contains three examinations: Two Mid semester examination and one End semester examination. The marks obtained in mid semester examination are directly added in marksheet of final examination.

Assignment, quiz, surprise tests, laboratory tests and viva-voce are essential parts of examination.

First year students are required to undergo 3 – 4 weeks training/ mini project etc. in the summer vacation before commencement of 3rd semester. Second year students are also required to undergo a training of 4 – 6 weeks while pre-final year students will undergo 4 – 6 weeks industrial training. Project and seminars are integral parts of the undergraduate programme.

6.0 STUDENT'S ACTIVITY

Council of Student Activity (CSA) functions in the institute to help students to organize various activities under its banner. The council headed by a senior faculty member acting in the capacity of the President, council of Student Activity, comprises six sub councils each looked after by a faculty officer-in-charge.

A dedicated team of student works under the guidance of respective officer-in-charge for each sub council. The various sub councils that constitute the CSA are listed below.

6.1 Literary Sub-Council

To inculcate a literary taste in the student and to boost up dormant talents in field literature, the literary sub-council organizes a number of events in the campus. These include debates, jam session, quiz, and cartoon contests to name a few. The literary sub-council contributes to publishing in the institute magazine.

6.2 Cultural Sub-Council

The cultural sub-council works towards enhancement of various cultural activities in the campus, besides various round the year activities, two important functions, ABHINANDAN/ UTSAV are organized by this sub council every year.

6.3 Sport Sub-Council

The sports sub-council conducts various matches, competitions and other events round the year. This sub-council also organizes Institute championships and Annual Games & Sports meet every year. For first year students, white shirt, white pant and sports shoes are compulsory. The institute provide the sports facilities for the students in the listed events:

Athletics: Athletics is an exclusive collection of sporting events that involve competitive running, jumping, throwing, and walking. BIET Jhansi has a very efficient team of athletes. Team not only takes part in the sporting events held within college, but also participates in the competitions held in other Institutes across the country. BIET Jhansi is equipped with 400 m standard track and field in central playground.

Badminton: This racquet sport is one of the major game which is played by almost the whole community, both the students and the residents. This game is so popular that BIET Jhansi has 6 courts (4 in student activity centre, 1 in girl's hostel and 1 in boy's hostel) and hosts a badminton academy. Besides these, the wooden indoor courts in student's activity centre are constructed as per international standards having proper seating stands.

Basketball: Basketball is one of the world's most popular and widely viewed sports. This game is very good to increase the stamina of the player and also the height if the player is a kid. BIET Jhansi has a very efficient basketball team who participate in different matches in and outside the campus. BIET Jhansi hosts a wooden indoor basketball court and 2 outdoor cemented courts (1 in girl's hostel and 1 in boy's hostel).

Cricket: Cricket is the most popular game our country plays. Central playground of BIET Jhansi is equipped with cricket playground and practice pitches.

Football: Although India is not a key player of football in the world scenario, still BIET Jhansi has pretty strong team. Almost all the boy's hostels have their own football teams. Central playground has facilities for proper conduction of this sport.

Volleyball: Volleyball is a team sport in which two teams of six players each are separated by a net. Each team tries to score points by grounding a ball on the other team's court under organized rules. This is a very popular game amongst the students at

BIET Jhansi. Because of its popularity central playground consist of two volleyball courts and most of the hostels also have volleyball courts.

Table Tennis: Table tennis also known as ping-pong is a sport in which two or four players hit a lightweight ball back and forth using a table tennis racket on a hard table divided by a net at the middle. The game is very fast paced and demands quick reactions. This game helps in developing concentration. Table tennis rooms are present in almost every hostel and student activity centre comprises of separate table tennis room for proper conduction of this sport.

Chess: Chess is the game which tires your mind at an astonishing rate. It requires great thinking capability and observation skills. BIET Jhansi in equipped with separate room for conduction of the game properly.

Carom: Carom is a cue sport-based table top game of Indian origin. It is the sport most commonly played by everyone in our country. BIET Jhansi has separate room for carom.

Gymnasium: The Institute is equipped with two gymnasium halls necessary for the overall development of the students. Out of these two gymnasium room, one is for boys and situated in student activity centre whereas other in for female candidates and is in girl's hostel.

Upcoming Sports facilities: Lawn tennis court and air rifle shooting range will be started soon within college premises.

6.4 N.S.S.

Institute N.S.S. has a strong work force of 50 students who under-take various social service, developmental works, awareness and literary campaigns.

6.5 N.C.C.

The Institute is affiliated of 56 UP BN NCC Army wing. A squad of 50 enthusiastic cadets takes regular parade sessions and other N.C.C. activity.

6.6 Hobbies, Fine Art and Photography Sub-Council

This sub council conducts various activities such as sketching, Dexterity Collage Photography etc.

7.0 DEPARTMENTS

7.1 Department of Applied Science and Humanities

Department of Applied Science and Humanities is composed of four main sections namely: Physics, Chemistry, Mathematics and Humanities. This department has been playing an important role in the teaching of core courses related to above subjects. It may be emphasized that thee departmental in developing Management skills among the students whom have well taken these courses.

The courses have been designed so as to equip the students with the basic knowledge of the subjects in addition to make them realize the importance of the basic applied tools in reference to application in engineering problems.

The laboratories of the department have all basic facilities in addition to research facilities in Applied Mathematics, Physics and Chemistry.

FACULTY

Dr. M. K. Gupta	Professor and **Head**
Dr. V. S. Yadav	Professor
Dr. Suman Yadav	Assistant Professor
Dr. P. K. Srivastava	Assistant Professor
Dr. Ekta Pandey	Assistant Professor
Dr. Vimal Kishore	Assistant Professor
Dr. Anjani Kumar Shukla	Assistant Professor (Under NPIU)
Dr. Pushpa Farswan	Assistant Professor (Under NPIU)
Mr. Narendra Kumar	Assistant Professor (Under NPIU)

7.2 Department of Civil Engineering

Department of Civil Engineering was established in the year 1990. Its courses of study include all important subjects of Civil Engineering with more emphasis on the analysis and design of various types of Civil Engineering structures. The department has fully developed Concrete Lab, Environmental Engineering Lab, Fluid Mechanics lab, Geotechnical Engineering Lab, Structures Lab, Survey Lab and CAD Lab.

The department has established its reputation in providing consultancy in the field of design of various Civil Engineering structures and testing of building materials, highway materials and soil. The department is also engaged by Ministry of Urban Development, Govt. of India and U.P. Jal Nigam to train field and sector professionals of various government departments. The department has also successfully completed numbers of Research Projects sponsored by UNICEF/ AICTE/ DST/ UPCST etc.

The B.Tech. (Civil Engineering) offered by this department is assessed best in Uttar Pradesh by National Board of Accreditation-AICTE and had been awarded five years accreditation in 2004.

FACULTY

Dr. A. K. Verma	Professor
Dr. Mukesh Shukla	Professor
Dr. A. K. Nigam	Professor and **Head**

Dr. A. K. Srivastava	Professor
Dr. R. K. Kaushal	Associate Professor
Dr. Ashish Gupta	Assistant Professor
Er. Beerendra Kumar	Assistant Professor
Dr. Hemant Shrivastava	Assistant Professor (Under NPIU)
Er. Vineet Jain	Assistant Professor (Under NPIU)
Er. Anvita Tripathi	Assistant Professor (Under NPIU)
Er. Vikrant Patel	Assistant Professor (Under NPIU)

7.3 Department of Chemical Engineering

The chemical engineering department was established in 1996. Chemical Engineering (UG Programme) with an intake of 30 students was started and Energy Science and Technology (PG Programme) with an intake of 18 students was started in 2014. It focuses and trains people who can shape the future with competence and dedication. Its courses include all important aspects of chemical engineering with more emphasis on analysis and implementation of various types of technologies and development. Department has fully equipped laboratories to facilitate students to improve their practical knowledge in different subjects. We try to insist value through courses, activities, events and environment created in department. In the department, we have elite faculty members with excellent teaching experience. Department has fully developed infrastructure, well equipped laboratories, and departmental library. Apart from this, department regularly organizes seminars and workshop on its own or with collaboration with other elite institutions. Department is well equipped with CAD lab with chemical engineering software like ASPEN, ORIGIN, PROSIMULATOR, etc. in order to provide more quality education.

Chemical Engineering built & operate chemical manufacturing plants. Their approach is to break down the manufacturing operations into a series of steps. All the labs in Chemical Engineering department are will equipped and properly furnished with modern equipments. These equipments sufficiently incorporate all the processes concerned with Chemical Engineering. It is essential that chemical engineering students have a comprehensive picture of the chemical industries. Chemical engineering laboratories provide the student a wide range of equipments for understanding the subject more clearly.

FACULTY

Dr. A. D. Hiwarkar	Associate Professor and **Head**
Dr. Sudeep Yadav	Assistant Professor
Dr. T. P. Singh	Assistant Professor
Er. Ravindra Kumar	Assistant Professor
Er. Swasti Medha	Assistant Professor (NPIU)
Er. Om Kumar	Assistant Professor (NPIU)

7.4 Department of Computer Science and Engineering

The Department of Computer Science and Engineering among the first two departments established in the year 1989 of Bundelkhand Institute of Engineering and Technology. Initially, it is started with an intake of 30 students then further increased to 60 students. The department is a member of the Computer Society of India (CSI) and Indian Society for Technical Education (ISTE) and is government-funded. The department is also an approved study centre for IGNOU computer courses. Prof. Anil Kumar is the Head of Department of Computer Science and Engineering and whose mission is to achieve leadership in the field of Computer Science and Engineering by strengthening fundamentals and facilitating interdisciplinary sustainable research to meet the ever-growing needs of society. The department has highly qualified faculty resources, collectively involved in teaching as well as research.

The department has a Software Development Lab, Information System Lab, Computer Graphics Lab, Network Lab, UNIX and Linux Lab, New Computer Center Lab, Algorithm Lab and a Database Management Lab. The unique feature of the college is SUN Java Lab, which is not available in any other college of AKTU. The computer network laboratory is equipped with LAN Trainer Kit, NetSys-T and W-LAN Kit which enhances the theoretical knowledge of the subject through practical. The state-of-the-art laboratories are equipped with latest configuration hardware and software. The department gives internet service to students through ISDN line. These computers are connected to each other through LAN and these are supported by a SUN server with EM 64T (extended Memory 64-Bit Technology Intel Xeon processor) with 800 or higher MHz front-side bus and hyper-threading support. The department is well equipped with all basic facilities like internet, lab, classroom, computer centre etc. The department also has 3 smart classrooms and 1 smart lab. The departmental labs have more 300 computer system with the latest configuration to fulfill all educational needs of the students.

The placement of the department is highest relative to other departments. There is 80% (approx.) placement as well as students of the department also go for higher study.

There are two departmental forums running under the Computer Science and Engineering department. COSSCO is run by the Computer Science & Engineering branch. Branch fresher, technical events and coding events (Hackathon) are organized by these branch forums.

FACULTY

Dr. Anil Kumar	Professor and **Head**
Dr. Yashpal Singh	Associate Professor
Dr. Sanjai Kumar Gupta	Associate Professor
Dr. R. N. Verma	Assistant Professor
Er. Shashank Gupta	Assistant Professor

Dr. Shailendra Pratap Singh	Assistant Professor (NPIU)
Dr. Mrityunjay Singh	Assistant Professor (NPIU)
Er. Anuj Yadav	Assistant Professor (NPIU)
Er. Shivam Pandey	Assistant Professor (NPIU)

7.5 Department of Electronics and Communication Engineering

Department of Electronics and Instrumentation Engineering was established in 1989. Its courses of study include all aspects of measurement and Industrial Instrumentation viz. analysis, design and monitoring in addition to Electronics and Communication Engineering. Students are given good exposure to various instrumentation schemes being used in industries like steel plants, cement factories textile industry, food processing plants, paper industry, traffic control and biomedical instrumentation etc. The department has an ardent ambience to channelize the effort of students and enhance their technical skills. The department Courses are composed of subjects giving extensive coverage to basic principles and exposing students to both theoretical concepts and practical aspects, special emphasis is given on Microprocessor and its support chips, Automation in Process Industries, Digital Switching transmission network, Satellite System, Processing & Data Communication Networks To provide continuous and quality feedback about latest developments in electronics technologies: The department has fully developed Microprocessor Lab. Microprocessors, which have established themselves as an integral part in modern electronics era. Additional Digital Electronics Lab, learning use of, encoders & decoders, multiplexers & demultiplexers various flip -flop, counters & shift registers, parity generators and parity checkers and the magnitudes comparators. A brief idea of different digital I.C. is provided. Fibre Optics Communication Lab, Fibres being fastest medium for transmission mandatory part of our studies. This lab provides an overview on fundamentals of fibre optics communication and includes study of analog and digital link, knowledge of various types of attenuation: banding, impurity etc. Except these we have Printed Circuit Board Lab and Electrical Machine Lab, to provide a best knowledge to our students.

Microprocessor laboratory, Printed circuit board laboratory, Process control and instrumentation laboratory and the digital electronics and communication laboratory are some of the facilities, which the department has developed.

FACULTY

Dr. J. P. Saini	Professor (On Leave)
Dr. D. K. Srivastava	Professor and **Head**
Dr. Deepak Nagaria	Professor
Dr. D. C. Dhubkarya	Associate Professor
Dr. Mahendra Kumar	Associate Professor
Dr. Shahnaz Ayub	Associate Professor
Dr. N. S. Beniwal	Associate Professor

Dr. Surendra Sriwas	Assistant Professor
Dr. Satish Kumar Singh	Assistant Professor
Dr. Atul Kumar Dwivedi	Assistant Professor
Dr. Jitendra Bahadur Maurya	Assistant Professor (NPIU)
Er. Avinash Mishra	Assistant Professor (NPIU)
Dr. Bhanu Priya	Assistant Professor (NPIU)
Er. Julie Devi	Assistant Professor (NPIU)

7.6 Department of Electrical Engineering

The Electrical engineering department was established in 2007 with aim to impart technical education in the field of electrical engineering. The department has intake of 60 students. The department courses have extensive coverage from basic principles of electrical engineering to advanced techniques. Students are exposed to both theoretical concepts and practical aspects as well. Emphasis is given on electrical machines, power system, power electronics, network theory, control system, electric drives.

To provide continuous and quality feedback about latest developments in electrical technologies, department has electrical engineering Lab, control system lab, machines lab, IPC Lab etc. Except these labs we have Simulation lab to provide the circuit design imparting the best knowledge to our students. The department conducts mini projects, seminars, industrial training, final year projects. The department also conducts industrial visits for the students.

FACULTY

Dr. D. K. Srivastava	Professor and **Head**
Er. Shailendra Gautam	Guest Faculty
Er. Punya Pratap Singh Bhadauriya	Guest Faculty
Er. Vinay Kumar Sahu	Guest Faculty
Er. Bupendra Kumar	Guest Faculty
Er. Aditya Yadav	Guest Faculty
Er. Maneesh Yadav	Guest Faculty

7.7 Department of Information Technology

The Department of Information Technology (IT) was established in the year 2000, it is a one of the propitiate Department of the Institute. Intake of students in IT department is 40. The department gives exposure to its students, not only through the regular Engineering Curriculum but also to the aspirations of today's corporate world, by inculcating a professional attitude in them.

Information Technology is a broad subject which deals with technology and other aspects of managing and processing information. It refers to anything related to

computing technology such as Internet, networking, Hardware, Software, or the people that works with these technologies. Our labs are well equipped and connected to high speed Internet facility, which gives our students a cutting edge in technical exploration and enhance their Information search and analytical skill. The computer network laboratory is equipped with LAN Trainer Kit, NetSys-T and W-LAN Kit which enhances the theoretical knowledge of the subject through practical. Students are encouraged to join various technical and non-technical forms, which in turn gives them horizontal exposure to Engineering concept and technology.

Student Council of Information Technology or as commonly spoken S.C.O.I.T. is the branch council for Information Technology students. SCOIT is established in year 2008. Apart from bringing students of the branch together under the same banner, it organises events all year round to make the students well-versed with branch. SCOIT organises "Arnav"- annual techno-management branch event in order to welcome first year students as well as develop their technical and managerial acumen. Students are subjected three days of rigorous procedure of varied events which allow them to hone their skills and moreover, understand the essence of what Information Technology is all about. SCOIT not only caters to needs of first year students but also aims to hone organising and managerial skills of the other students who conceptualise and coordinate the events. SCOIT is like a family for students of Information Technology as it nurtures us from the very beginning right till the very end of our academic connection with the alma mater.

The faculty is well qualified and some of faculty members are pursuing Ph.D. from renowned Institution & Universities. The faculty members of technical staff are involved, not only in classroom teaching but also in project Guidance, Industrial interaction, seminars, workshops and various co-curricular activities beyond the syllabus for development of the students.

FACULTY

Dr. Anil Kumar	Professor and **Head**
Er. Mudresh Mohan Tripathi	Guest Faculty
Er. Pawan Gupta	Guest Faculty
Er. Anuj Gupta	Guest Faculty
Er. Dharmendra Singh	Guest Faculty
Er. Sharad Kumar	Guest Faculty
Er. Kratika Verma	Guest Faculty
Er. Sudha Singh	Guest Faculty

7.8 Department of Mechanical Engineering

Department of Mechanical Engineering was established in 1990. It offers different subject courses keeping in view the requirement of modern days industries. The latest

state of the art subject courses are coupled with all essential traditional Mechanical Engineering subjects. The department offers unique blend of Design, Thermal, Production, Industrial Engineering & Management course, with modern and latest laboratories.

The department has its own CAD/ CAM lab, which provides latest design facility with all important software. The lab is connected with central computer centre with UNIX INDY Computer of Silicon Graphics.

Labs related to Thermal Engineering, Production Engineering and Industrial Engineering are well equipped with new and latest Apparatus. Department execute certain industrial projects for final year students from nearby industries for better industrial exposure.

The department also has Mechanical Engineering Forum being look after by students themselves. It organizes industrial tour technical quizzes, general quizzes along with lot other activities regularly.

FACULTY

Dr. Sanjay Agarwal	Professor
Dr. N. P. Yadav	Professor
Dr. Tarun Soota	Associate Professor and **Head**
Dr. A. K. Padap	Associate Professor
Dr. Arun Kumar Pandey	Associate Professor
Dr. Ajay Suryawanshi	Assistant Professor
Dr. S. K. Rajput	Assistant Professor
Dr. Narendra Kumar	Assistant Professor
Dr. Vijay Verma	Assistant Professor
Er. Anurag Tripathi	Assistant Professor (NPIU)
Er. Ippaka Naveen Kumar	Assistant Professor (NPIU)
Er. Kuldeep Kumar Singh	Assistant Professor (NPIU)

7.9 Department of MBA

The department of Master of Business Administration (MBA) was established in the year 2007. MBA is a two-year full time course spread over four semesters. The programme is duly approved by AICTE, New Delhi and affiliated to the U.P. Technical University, Lucknow. Besides, BIET faculty, a team of highly specialized resource person is associated with the programme. The MBA programme aims at providing inputs to the students relevant to the business, industry and trade so that they can efficiently & effectively function in different organization and face the challenges arising as a sequel to all round development of the country. The objective is being achieved by various activities like case studies, debates, group discussions, students' workshop & mock-interviews. BIET is dedicated to providing the best management education in the Asian

region. SUMMER TRAINING Students undergo a two year rigorous programme at BIET including two months' summer training in various reputed organizations like BHEL, HINDALCO, RELIANCE, IFFCO, ITC, COKE, GODREJ, BLUE STAR, LML, HAL, HDFC, BAJAJ, ICICI etc, and are ready to face the challenges. MISSION to establish, for altitude seekers, an ethics based management education and research center of excellence comparable with the best.

FACULTY

Dr. M. K. Gupta	Professor and **Head**
Mr. Shashank Gurudev	Guest Faculty
Mr. Arjun Verma	Guest Faculty
Mr. Akash Saxena	Guest Faculty
Mrs. Heena Singh	Guest Faculty
Mrs. Hemlata Tiwari	Guest Faculty

8.0 INTERNET AND WIFI FACILITY

Internet and wifi facilities are provided in the institute for all Department, Central Library, Administrative department, all Hostels and Residents in BIET campus. 1 Gbps bandwidth made by National Knowledge Network (NKN) and 40 Mbps Bharat Sanchar Nigam Limited (BSNL). Total number of wifi access points 135 (indoor 120 and outdoor 15) are working in the institute for excellent internet for 24 hours in whole BIET campus. Our campus is one of the institute which provides the High speed internet service for his students. All Students are taking advantage with our internet service and they are following Online Learning classes and Tutorials without any problem. In this technical era our internet service is becoming the part of their education.

Dr. Yashpal Singh **In-charge** (Internet and wifi)

9.0 CARRIER GUIDANCE AND PLACEMENT UNIT

The placement cell is headed by Director of the Institute and a faculty member of each department. The day to day work is looked after by the concerned faculty member, who is supported by student representatives from respective departments. The Director of the Institution and all other faculty members has extended their wholehearted cooperation for this august venture. By hard work and dedication, students have created their enviable position in Indian industries and abroad.

The unit is fully supported with all modern equipments like, Interactive/ Multumedia Boards, PA system, OHP, TV, VCR, slide projector etc. Separate facilities are available for group discussion and interview designed for this purpose.

The objectives of the unit are:

i. To place final year students in respectable organizations through campus recruitment.
ii. To provide industrial training to students during their study.
iii. To organize lectures, group discussions, mock interviews etc.
iv. To provide information and assistance to students regarding:
   - Job opportunity in India and abroad.
   - Opportunities for self-employment.
   - Opportunities for higher studies in India and abroad through competitive examinations like GRE, GMAT, GATE, CAT etc.

Continuing with its tradition of making new grounds every year, BIET JHANSI, the placement of this year is started with finalizing the schedule of dream companies like ADOBE, TCS, TECH MAHINDRA, WIPRO, OPTUM, LPGCL, SYNERGY TECH, etc. the **highest package offered this year is staggering Rs. 10.61 Lacs/year excluding benefits**. The profiles offered included software, quality engineering, system administrator etc, and many more. The placements at BIET JHANSI witnessed, reaffirming the faith the industry has in the college and the quality of its students.

In standing with BIET JHANSI being the pre-eminent technical campus of the country. Most of the students choose to join the developing sector with higher salaries. By placing one of the largest batches across all Govt. college, we have reaffirmed the faith of our recruiters-cum-partners in this process. BIET JHANSI has always been the preferred destination among recruiters. This has been established by our placement figures, which are one of the best across the state year after year. The strong academic culture fostered by the faculty and the supportive Alumni have played a major role in our sustained success and we like to use this opportunity to thank them all. The placement team also takes this opportunity to thank everyone- the administration, support staff, students and faculty who helped us run the process smoothly.

This year more than 50% students are qualified for GATE and other examinations for higher studies.

The training & placement will be done by a council of faculty members under direct coordination of Director.

The details of students placed through campus selection during year 2018 – 19 are given below;

Placement Record 2018 – 19

Company Name	CTC	CS	IT	EC	EE	ME	CH	CE	MBA	Total
Newgen	4.25 Lpa.	3	1	-	-	-	-	-	-	4
TCS	3.25 Lpa.	12	4	5		-	-	-	-	21
TCS (Codevita)	3.36 Lpa.	6	3	1	-	-	-	-	-	10

India Mart	4.00-5.00 Lpa.	3	-	-	-	-	-	-	-	3
EPAM	6.00 LPA	1	-	-	-	-	-	-	-	1
BYJU's	9.00 LPA	-	-	-	2	2	1	1	1	7
GlobalLogic	4.80 LPA	10	2	-	-	-	-	-	-	12
Wipro	3.50 LPA	3	1	2			1			7
HexaWare	4.00 LPA	1	-	-	-	-	-	-	-	1
CronJ	5.50 LPA	2	-	-	-	-	-	-	-	2
Optum	10.50 LPA	4	1	-	-	-	-	-	-	5
Inormatica	6.50 LPA	2	-	-	-	-	-	-	-	2
ACT-21	3.50 LPA	1	-	-	-	-	-	-	-	1
Pristyn Care	5.00 LPA	-	1	-	-	-	-	-	-	1
Toyo Ink Pvt. Ltd	2.25 LPA	-	-	-	-	-	2	-	-	2
Jalan Technology	4.00 LPA	-	1	-	-	-	-	-	-	1
Umesh	3.00 LPA	-	-	-	-	1	-	-	-	1
BIOREV	3.50 LPA	-	-	1	-	-	-	-	-	1
Extra Marks	7.00 LPA	-	-	-	2	-	-	1	-	3
American Express Internship	30000 Per Month	-	1	-	-	-	-	-	-	1
Mechmocha	8.50 LPA	1								1
Vault board consultant. pvt limited Internship	20,000 Per Month			1						1
Apollo Munich Health Insurance.	-	-	-	-	-	-	-	-	3	3
Aegon	-	-	-	-	-	-	-	-	4	4
Adobe	10.61 LPA	1	1	-	-	-	-	-	-	2
Resonance Eduventures	-					1				1
Tech Mahindra	-	1	-	-	-	-	-	-	-	1
Josh Technology	7.5 LPA	1	-	-	-	-	-	-	-	1
LPGCL, Lalitpur	6.00 LPA	-	-	1	4	4	2	-	-	11
Total		49	15	11	8	7	6	2	8	**111**

LIST OF SELECTED STUDENTS

S. NO.	CANDIDATE NAME	UG SPECILIZATION	COMPANY NAME	Package/Annum
1	Ashutosh Rai	EE	Byju's	9.00 LPA
2	Shivanshu Dwivedi	CE	Byju's	9.00 LPA
3	Prateek Mishra	EE	Byju's	9.00 LPA
4	Devesh Srivastava	ME	Byju's	9.00 LPA
5	Utkarsh Mishra	ME	Byju's	9.00 LPA
6	Shubhendra Singh	CH	Byju's	9.00 LPA
7	Anuj Rai	CS	EPAM	6.00 LPA
8	AkankshaTomar	CS	Indiamart	5.00 LPA
9	Nikhil Singh	CS	Indiamart	5.00 LPA
10	Anurag Jaiswal	CS	Indiamart	5.00 LPA
11	Bharat Gupta	CS	Global Logic	4.80 LPA
12	Sagrika Khandelwal	IT	Global Logic	4.80 LPA
13	Avinash Singh	CS	Global Logic	4.80 LPA
14	Ashish Pandey	CS	Global Logic	4.80 LPA

15	Himanshu Yadav	CS	Global Logic	4.80 LPA
16	AnshikaVarshney	CS	NEWGEN	4.25 LPA
17	Surabhi Gupta	CS	NEWGEN	4.25 LPA
18	Akanksha Tomar	CS	NEWGEN	4.25 LPA
19	Simran Gupta	IT	NEWGEN	4.25 LPA
20	Rajat Shukla	CS	Hexa Ware	4.00 LPA
21	Nikhil Singh	CS	TCS	3.36 LPA
22	Vikas Sharma	IT	TCS	3.36 LPA
23	SaurabhYadav	IT	TCS	3.36 LPA
24	Aman Dwivedi	CS	TCS	3.36 LPA
25	Anurag Jaiswal	CS	TCS	3.36 LPA
26	Ananth Singh	CS	TCS	3.36 LPA
27	Kishori Tiwari	CS	TCS	3.36 LPA
28	Shweta Tomer	CS	TCS	3.36 LPA
29	Vaibhav Srivastava	CS	TCS	3.36 LPA
30	Ayushi Singh	CS	TCS	3.36 LPA
31	HimanshuYadav	CS	TCS	3.36 LPA
32	Surabhi Gupta	CS	TCS	3.36 LPA
33	Prashant Mishra	CS	TCS	3.36 LPA
34	Somesh Tripathi	CS	TCS	3.36 LPA
35	Shubhangi Goyal	EC	TCS	3.36 LPA
36	Anurag Yadav	EC	TCS	3.36 LPA
37	Abhishek Agrawal	EC	TCS	3.36 LPA
38	Fardeen Khan	IT	TCS	3.36 LPA
39	Ritvik Rastogi	IT	TCS	3.36 LPA
40	Manisha Tewari	EC	TCS	3.36 LPA
41	Lakshya Manchanda	IT	TCS (CODEVITA)	3.36 LPA
42	Sagrika Khandelwal	IT	TCS (CODEVITA)	3.36 LPA
43	Ashish Pandey	CS	TCS (CODEVITA)	3.36 LPA
44	Anuj Rai	CS	TCS (CODEVITA)	3.36 LPA
45	Bharat Gupta	CS	TCS (CODEVITA)	3.36 LPA
46	Ayush Sahni	CS	TCS (CODEVITA)	3.36 LPA
47	Nitin Nema	EC	TCS (CODEVITA)	3.36 LPA
48	Ayush Singh	CS	TCS (CODEVITA)	3.36 LPA
49	Akash Shukla	CS	TCS (CODEVITA)	3.36 LPA
50	Vishal Agrawal	IT	TCS (CODEVITA)	3.36 LPA
51	Vishal Agrawal	IT	OPTUM	10.00 LPA
52	Akash Shukla	CS	OPTUM	10.50 LPA
53	Rohit Shukla	CS	OPTUM	10.50 LPA
54	Shweta Tomar	CS	OPTUM	10.50 LPA
55	Akanksa Tomar	CS	OPTUM	10.50 LPA
56	AnshikaVarshney	CS	Informatica	6.50 LPA
57	Ashutosh Rai	EE	Extra Marks	7.00 LPA
58	Shivam Sarar Dubey	EE	Extra Marks	7.00 LPA
59	Mansi Tiwari	CE	Extra Marks	7.00 LPA
60	Ayushi Singh	CS	Informatica	6.50 LPA
61	Dilip Kumar Maurya	CS	CronJ	5.50 LPA
62	Anurag Jaiswal	CS	CronJ	5.50 LPA
63	Shubhankar Dubey	IT	Pristyn Care	5.00 LPA
64	Ayush Singh	CS	Global Logic	4.50 LPA
65	Manoj Panchal	CS	Global Logic	4.50 LPA

66	Shubham Sengar	IT	Global Logic	4.50 LPA
67	Rajat Singh	CS	Global Logic	4.50 LPA
68	Ashish Shukla	CS	Global Logic	4.50 LPA
69	Upendra Kant	CS	Global Logic	4.50 LPA
70	Satyam Bajpai	CS	Global Logic	4.50 LPA
71	Shubhankar Dubey	IT	Jalan Technology Consulting	4.00 LPA
72	Sharad Singh	CS	Act 21	3.50 LPA
73	Rimjhim Nigam	CH	Wipro	3.50 LPA
74	Manoj Kumar Panchal	CS	Wipro	3.50 LPA
75	Rajat Shukla	CS	Wipro	3.50 LPA
76	Prashant Chaudhary	CS	Wipro	3.50 LPA
77	Smriti Singh	EC	Wipro	3.50 LPA
78	Wajia Farooq	EC	Wipro	3.50 LPA
79	Nitin Nema	EC	Bio-Rev	3.50 LPA
80	Deepak Chaurasia	IT	American Express	30,000 per month (6 month)
81	Umesh Kumar	ME	Eleation	3.00 LPA
82	Akansha	CH	TOYO INK	2.25 LPA
83	Shubham Agrawal	CH	TOYO INK	2.25 LPA
84	Arti	CH	TOYO INK	2.25 LPA
85	Aman Dwivedi	CS	Mechmocha	8.50 LPA
86	Nitin Nema	ECE	Vault Board Cons. Pvt. limted	20,000 Per month
87	Shivam Srivastava	IT	Wipro	3.50 LPA
88	Akash Singh	MBA	Byju's	10.00 LPA
89	Vipul Sharma	MBA	Apollo Munich	3.50 LPA
90	Kalidas Kushawaha	MBA	Apollo Munich	3.50 LPA
91	Shubham Batta	MBA	Apollo Munich	3.50 LPA
92	Shaweta Singh	MBA	Aegon	4.00 LPA
93	Divya Gupta	MBA	Aegon	4.00 LPA
94	MuskanAggrawal	MBA	Aegon	4.00 LPA
95	Akash Singh	MBA	Aegon	4.00 LPA
96	Sagrika Khandelwal	IT	Adobe	10.61 LPA
97	Ayushi Singh	CS	Adobe	10.61 LPA
98	Rahul Chauriya	ME	Resonance Edventures	
99	Rudr Pawan	CS	Tech Mahindra	
100	Himanshu Yadav	CS	Josh Technology	7.50 LPA
101	Shubhendra Singh	CH	LPGCL	6.50 LPA
102	Abhinav Rai	CH	LPGCL	6.50 LPA
103	Abhay Tomar	EE	LPGCL	6.50 LPA
104	Ashish Kumar	EE	LPGCL	6.50 LPA
105	Deepanshu	EE	LPGCL	6.50 LPA
106	Brijnandan Singh	EE	LPGCL	6.50 LPA
107	Devesh Tiwari	ME	LPGCL	6.50 LPA
108	Atul Rajpoot	ME	LPGCL	6.50 LPA
109	Aditya Gautam	ME	LPGCL	6.50 LPA
110	Shivansh Tiwari	ME	LPGCL	6.50 LPA
111	Aman Dwivedi	ECE	LPGCL	6.50 LPA

10.0 FEE STRUCTURE

Details of fee for B.Tech./ MBA/ M.Tech.
(Students admitted in session 2019 – 20)

S.No.	Fees Details	B.Tech Ist yr.& Lateral Entry CE, CS, EC, ME, CH (Govt. Aided)	B.Tech Ist yr.& Lateral Entry EE & IT (SFS)	MBA Ist yr. (SFS)	M.Tech Ist yr. (SFS)	B.Tech IInd yr. CE, CS, EC, ME, CH	B.Tech IIst yr. (SFS) EE & IT	MBA Final yr. (SFS)	M.Tech Final yr. (SFS)	B.Tech IIIrd yr. CE, CS, EC, ME, CH	B.Tech IIIrd yr. EE & IT (SFS)	B.Tech Final Yr. CE, CS, EC, ME, CH	B.Tech Final Yr. EE & IT (SFS)
	University Fees :												
1	University Enrolment fees	2500	2500	2500	5000	2500	2500	2500	5000	2500	2500	2500	2500
2	University Insurance fees												
3	University Development fees												
4	Degree Fees												
5	Instt. Exam fees	5000	5000	5000	5000	5000	5000	5000	5000	5000	5000	5000	5000
	Total-	**7500**	**7500**	**7500**	**10000**	**7500**	**7500**	**7500**	**10000**	**7500**	**7500**	**7500**	**7500**
	Institute Fees												
6	Registration fees	300	300	300	300	300	300	300	300	300	300	300	300
7	Tution fees	40000	55000	50000	35000	40000	55000	50000	35000	40000	55000	40000	55000
8	Recreation fees	700	700	700	700	700	700	700	700	700	700	700	700
9	Medical fees	600	600	600	600	600	600	600	600	600	600	600	600
10	Identity Card fees	50	50	50	50	50	50	50	50	50	50	50	50
11	Magazine fees	200	200	200	200	200	200	200	200	200	200	200	200
12	Student aid fund	200	200	200	200	200	200	200	200	200	200	200	200
13	Library fees	600	600	600	600	600	600	600	600	600	600	600	600
14	Laboratory fees	600	600	600	600	600	600	600	600	600	600	600	600
15	College day fees	150	150	150	150	150	150	150	150	150	150	150	150
16	Syllabus fees	200	200	200	200	200	200	200	200	200	200	200	200
17	Placement fees	500	500	500	500	500	500	500	500	500	500	500	500
18	Internet fees	3000	3000	3000	3000	3000	3000	3000	3000	3000	3000	3000	3000
19	Computer charges & Stationary	300	300	300	300	300	300	300	300	300	300	300	300
20	Semester Exam fees	900	900	900	900	900	900	900	900	900	900	900	900
21	Caution Money	5000	5000	5000	5000	-	-	-	-	-	-	-	-
22	Alumni Association Regd. Fees	1000	1000	-	1000	-	-	-	-	-	-	-	-
	Total	**54300**	**69300**	**63300**	**49300**	**48300**	**63300**	**58300**	**43300**	**48300**	**63300**	**48300**	**63300**
	(Day Scholar) Grand Total	**61800**	**76800**	**70800**	**59300**	**55800**	**70800**	**65800**	**53300**	**55800**	**70800**	**55800**	**70800**
	Hostel Fees :												
23	Room Rent	4800	4800	4800	4800	4800	4800	4800	4800	4800	4800	4800	4800
24	Electric & Water Charges	2600	2600	2600	2600	2600	2600	2600	2600	2600	2600	2600	2600
25	Electric Fan Charges	300	300	300	300	300	300	300	300	300	300	300	300
26	Utensil & Crockery Charges	500	500	500	500	500	500	500	500	500	500	500	500
27	Hostel Activities Charges	200	200	200	200	200	200	200	200	200	200	200	200
28	Hostel Maintenance	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
29	Bus Charges	200	200	200	200	200	200	200	200	200	200	200	200
	Total -	**9600**	**9600**	**9600**	**9600**	**9600**	**9600**	**9600**	**9600**	**9600**	**9600**	**9600**	**9600**
	(Hostler) Grand Total -	**71400**	**86400**	**80400**	**68900**	**65400**	**80400**	**75400**	**62900**	**65400**	**80400**	**65400**	**80400**

(Fees Structure for Ph.D. Student Session 2019-20)

S.No.	Fees Details	Ph.D 1st Year	Ph.D 2nd Year	Ph.D 3rd Year	Ph.D After 3rd Year
	University Fees :				
1	Enrolment Fees	500	-	-	-
2	Institute Exam fees*	3000	-	-	-
3	Institute Insurance fees	200	200	200	200
4	Institute Development Fees	250	250	250	250
5	University Degree Fees	-	-	500	-
	Institution Fees :				
6	Registration fees	300	300	300	300
7	Tuition fees	20000	20000	20000	20000
8	Recreation/Sports/Students Activity fees	700	700	700	700
9	Medical fees	600	600	600	600
10	Identity Card fees	50	50	50	50
11	Magazine fees	200	200	200	200
12	Student aid fund	200	200	200	200
13	Library fees	600	600	600	600
14	Laboratory fees	600	600	600	600
15	College day fees	150	150	150	150
16	Internet fees	3000	3000	3000	3000
17	Computer charges & Stationary	300	300	300	300
18	Caution Money	2500	-	-	-
19	Alumni Association Registration	1000	-	-	-
	Total -	**34150**	**27150**	**27650**	**27150**
	Hostel Fees :				
20	Room Rent	4800	4800	4800	4800
21	Electric & Water Charges	2600	2600	2600	2600
22	Electric Fan Charges	300	300	300	300
23	Utensil & Crockery Charges	500	500	500	500
24	Hostel Activities Charges	200	200	200	200
25	Hostel Maintenance	1000	1000	1000	1000
26	Bus Charges	200	200	200	200

11.0 ORDINANCES FOR B.TECH., M.TECH. AND MBA

As per the first Academic Council held on 2013.

Important Telephone Numbers for First Year Students (2019 – 2020)

Wardens – Vrindavan Bhawan (for First Year BIET Boys)	
Prof. Anil Kumar	9415060081
Dr. Vimal Kishore	9559959377
Wardens – Yashodra Bhawan (for Girls)	
Prof. A. K. Verma	9415136394
Ms. Swasti Medha	9725121985
Chief Warden	
Prof. Anil Kumar	9415060081
Academic Matter	
Prof. Sanjay Agarwal (Dean Academics)	9450504743
Dr. Sanjai Kumar Gupta (Deputy Dean Academics)	9415057834
Dr. Vimal Kishore (Assistant Dean Academics)	9559959377
Fee Related Matter (Accounts Section)	
Sri S. K. Jain (F & AO)	9935500146
Sri O. P. Sharma	8765643131
Sri S. N. Soni	8004099044
Proctors	
Dr. Mukesh Shukla (Chief Proctor)	9415503652
Dr. Mahendra Kumar (Proctor)	9415115011
Dr. Suman Yadav (Proctor)	8400222279
Medical Officer	
Dr. Vikram Agarwal	9793882199
Director	
Prof. V. K. Tyagi	**0510 – 2320349; 2320321**
	9450723106

BIET Jhansi is a ragging free institute however students are free to contact any one of the following faculty members if needed.

S. No.	Name	Designation	Contact No.
1.	Prof. V. K. Tyagi	Director	9450723106
2.	Prof. M. K. Gupta	Head, Applied Science and Humanities & MBA	9415030610
3.	Prof. Anil Kumar	Chief Warden and Warden Vrindavan Bhawan & Head, Computer Science and Engineering & Information Technology	9415060081
4.	Prof. A. K. Verma	Warden, Yashodhara Bhawan	9415136394
5.	Prof. Mukesh Shukla	Chief Proctor	9415503652
6.	Prof. A. K. Nigam	Head, Civil Engineering	9935016061
7.	Prof. Sanjay Agarwal	Warden, Atal Bihari Bhawan	9450504743
8.	Prof. D. K. Srivastava	Warden, Panchvati Bhawan & Head, Electronics and Communication Engineering & Electrical Engineering	9415179133
9.	Dr. Mahendra Kumar	Proctor	9415115011
10.	Dr. A. D. Hiwarkar	Head, Chemical Engineering	9450077707
11.	Dr. Tarun Soota	Warden, Kalpana Chawla Bhawan & Head, Mechanical Engineering	9335383720
12.	Dr. R. K. Kaushal	Warden, Saket Bhawan	9721880550
13.	Dr. A. K. Padap	Warden, Dr. A. P. J. Abdul Kalam Bhawan	9454014776
14.	Dr. A. K. Pandey	Warden, Jai Bharat Bhawan	9575272128
15.	Dr. Suman Yadav	Proctor	8400222279
16.	Dr. Narendra Kumar	Warden, Major Dhyanchand Bhawan	7007533800

ALL INDIA ANTI RAGGING HELP LINE – 1800 – 180 – 5522 (Toll Free)

B. Tech 1st Year (All branches) course structure in accordance with AICTE Model Curriculum

SEMESTER - I

S. No.	Code	SUBJECT	PERIODS			EVALUATION SCHEME				END SEMESTER		TOTAL	CREDI T
			L	T	P	CT	TA	Total	PS	TE	PE		
3 WEEKS COMPULSORY INDUCTION PROGRAM													
1	**KAS101/ KAS102**	Physics/Chemistry	3	1	3	30	20	50	25	100	25	200	5.5
2	**KAS103**	Mathematics-I	3	1	0	30	20	50	-	100	-	150	4
3	**KEE 101/ KCS101**	Basic Electrical Engineering/Programming for Problem Solving	3	1	2	30	20	50	25	100	25	200	5
4	**KCE101/ KWS101**	Engineering Graphics & Design/Workshop Practices	1	0	4	-	-	-	25	-	25	50	3
	MOOCs (For B.Tech. Hons. Degree**)***												0
		TOTAL										600	17.5

SEMESTER - II

S. No.	Code	SUBJECT	PERIODS			EVALUATION SCHEME				END SEMESTER		TOTAL	CREDI T
			L	T	P	CT	TA	Total	PS	TE	PE		
3 WEEKS COMPULSORY INDUCTION PROGRAM													
1	**KAS201/ KAS202**	Physics/Chemistry	3	1	3	30	20	50	25	100	25	200	5.5
2	**KAS203**	Mathematics II	3	1	0	30	20	50	-	100	-	150	4
3	**KEE 201/ KCS201**	Basic Electrical Engineering/Programming for Problem Solving	3	1	2	30	20	50	25	100	25	200	5
4	**KCE201/ KWS201**	Engineering Graphics & Design/Workshop Practices	1	0	4	-	-	-	25	-	25	50	3
5	**KAS204**	Professional English	2	0	2	30	20	50	-	100	-	150	3
	MOOCs	**(**For B.Tech. Hons. Degree**)***											0
		TOTAL										750	20.5
Mini Project or Internship (3-4 weeks) shall be conducted during summer break after II Semester and will be assessed during III Semester													

*** List of MOOCs (NPTL) Based Recommended Courses for first year B. Tech Students :**

1. Developing Soft Skills and personality-Odd Semester-8 Weeks-3Credits
2. Enhancing Soft Skills and personality-Even Semester-8 Weeks-3Credits

*** AICTE Guidelines in Model Curriculum:**

After successful completion of 160 credits, a student shall be eligible to get Under Graduate degree in Engineering. A student will be eligible to get Under Graduate degree with Honours only, if he/she completes additional university recommended courses only (Equivalent to 20 credits; NPTEL Courses of 4 Weeks, 8 Weeks and 12 Weeks shall be of 2, 3 and 4 Credits respectively) through MOOCs. For registration to MOOCs Courses, the students shall follow NPTEL Site http://nptel.ac.in/ as per the NPTEL policy and norms. The students can register for these courses through NPTEL directly as per the course offering in Odd/Even Semesters at NPTEL. These NPTEL courses (recommended by the University) may be cleared during the B. Tech degree program (not necessary one course in each semester). After successful completion of these MOOCs courses the students, shall, provide their successful completion NPTEL status/certificates to the University (COE) through their college of study only. The student shall be awarded Hons. Degree (on successful completion of MOOCS based 20 credit) only if he/she secures 7.50 or above CGPA and passed each subject of that Degree Programme in single attempt without any grace marks.

PHYSICS

Module - 1 Relativistic Mechanics: **[8]**

Frame of reference, Inertial & non-inertial frames, Galilean transformations, Michelson- Morley experiment, Postulates of special theory of relativity, Lorentz transformations, Length contraction, Time dilation, Velocity addition theorem, Variation of mass with velocity, Einstein's mass energy relation, Relativistic relation between energy and momentum, Massless particle.

Module - 2 Electromagnetic Field Theory: **[8]**

Continuity equation for current density, Displacement current, Modifying equation for the curl of magnetic field to satisfy continuity equation, Maxwell's equations in vacuum and in non-conducting medium, Energy in an electromagnetic field, Poynting vector and Poynting theorem, Plane electromagnetic waves in vacuum and their transverse nature. Relation between electric and magnetic fields of an electromagnetic wave, Energy and momentum carried by electromagnetic waves, Resultant pressure, Skin depth.

Module - 3 Quantum Mechanics: **[8]**

Black body radiation, Stefan's law, Wien's law, Rayleigh – Jeans law and Planck's law, Wave particle duality, Matter waves, Time-dependent and time-independent Schrodinger wave equation, Born interpretation of wave function, Solution to stationary state Schrodinger wave equation for one-Dimensional particle in a box, Comptoneffect.

Module - 4 Wave Optics: **[10]**

Coherent sources, Interference in uniform and wedge shaped thin films, Necessity of extended sources, Newton's Rings and its applications. Fraunhoffer diffraction at single slit and at double slit, absent spectra, Diffraction grating, Spectra with grating, Dispersive power, Resolving power of grating, Rayleigh's criterion of resolution, Resolving power of grating.

Module - 5 Fibre Optics & Laser: **[10]**

Fibre Optics**:** Introduction to fibre optics, Acceptance angle, Numerical aperture, Normalized frequency, Classification of fibre, Attenuation and Dispersion in optical fibres.

Laser: Absorption of radiation, Spontaneous and stimulated emission of radiation, Einstein's coefficients, Population inversion, various levels of Laser, Ruby Laser, He-Ne Laser, Laser applications.

Course Outcomes:

1. To solve the classical and wave mechanics problems.
2. To develop the understanding of laws of thermodynamics and their application in various processes.
3. To formulate and solve the engineering problems on Electromagnetism & Electromagnetic Field Theory.
4. To aware of limits of classical physics & to apply the ideas in solving the problems in their parent streams.

Reference Books:

1. Concepts of Modern Physics –Aurthur Beiser (Mc- Graw Hill)
2. Introduction to Special Theory of Relativity – Robert Resnick (Wiley)
3. Optics –Brijlal & Subramanian (S. Chand)
4. Engineering Physics: Theory and Practical –Katiyar and Pandey (Wiley India)
5. Applied Physics for Engineers –Neeraj Mehta (PHI Learning ,New)
6. Engineering Physics – Malik HK and Singh AK (Mc Graw Hill)

Physics Lab

List of Experiments

Any ten experiments (at least four from each group).

Group A

1. To determine the wavelength of sodium light by Newton's ring experiment.
2. To determine the wavelength of different spectral lines of mercury light using plane transmission grating.
3. To determine the specific rotation of cane sugar solution using polarimeter.
4. To determine the focal length of the combination of two lenses separated by a distance and verify the formula for the focal length of combination of lenses.
5. To measure attenuation in an optical fiber.
6. To determine the wavelength of He-Ne laser light using single slit diffraction.
7. To study the polarization of light using He-Ne laser light.
8. To determine the wavelength of sodium light with the help of Fresnel's Bi-prism.
9. To determine the coefficient of viscosity of a given liquid.
10. To determine the value of acceleration due to gravity (g) using compound pendulum.

Group B

1. To determine the energy band gap of a given semiconductor material.
2. To study Hall Effect and determine Hall coefficient, carrier density and mobility of a given semiconductor material using Hall effect setup.
3. To determine the variation of magnetic field with the distance along the axis of a current carrying coil and estimate the radius of the coil.
4. To verify Stefan's law by electric method.
5. To determine resistance per unit length and specific resistance of a given resistance using Carey Foster's Bridge.
6. To study the resonance condition of a series LCR circuit.
7. To determine the electrochemical equivalent (ECE) of copper.
8. To calibrate the given ammeter and voltmeter by potentiometer.
9. To draw hysteresis (B-H curve) of a specimen in the form of a transformer and to determine its hysteresis loss.
10. To measure high resistance by leakage method.

Reference Books

1. Practical Physics – K. K. Dey & B. N. Dutta (Kalyani Publishers New Delhi)
2. Engineering Physics - Theory and Practical –Katiyar & Pandey (Wiley India)
3. Engineering Physics Practical – S. K. Gupta (Krishna Prakashan Meerut)

Course Outcomes:

1. To determine the wavelength of sodium light by Newton's ring experiment
2. To determine the wave length of sodium light with the help of Fresnel's Bi-prism
3. To determine the variation of magnetic field with the distance along the axis of a current carrying coil and estimate the radius of the coil.
4. To draw hysteresis (B-H curve) of a specimen in the form of a transformer and to determine its hysteresis loss.

CHEMISTRY

Module-1 **[08]**

Atomic and Molecular Structure:

Molecular orbital's of diatomic molecules. Band theory of solids. Liquid crystal and its applications. Point defects in solids. Structure and applications of Graphite and Fullerenes. Concepts of Nanomaterials and its application.

Module-2 **[08]**

Spectroscopic techniques and Applications:

Elementary idea and simple applications of Rotational, Vibrational, Ultraviolet& Visible and Raman spectroscopy.

Module-3 **[08]**

Electrochemistry

Nernst Equation and application, relation of EMF with thermodynamic functions (ΔH, ΔF and Δ S). Lead storage battery.

Corrosion: causes, effects and its prevention.

Phase Rule and its application to water system.

Module-4 **[08]**

Water Analysis: Hardness of water, Techniques for water softening (Lime-soda, Zeolite, Ion exchange resin and Reverse osmosis method).

Fuels: classification of fuels, Analysis of coal, Determination of calorific value (Bomb calorimeter and Dulong's method).

Module-5 **[08]**

Polymer: Basic concepts of polymer-Blend and composites, Conducting and bio-degradable polymers. Preparation and application of some industrially important polymers (Buna-S, Buna-N, Neoprene, Nylon-6, nylon-6,6 and Terylene). General methods of synthesis of organometallic compounds (Grignard reagent) and their applications.

Course Outcomes:

1. Use of different analytical instruments.
2. Measure molecular/system properties such as surface tension, viscosity, conductance of solution, chloride and iron content in water.
3. Measure hardness of water.
4. Estimate the rate constant of reaction.

Reference Books:

1. University Chemistry By B.H.Mahan
2. University Chemistry By C.N.R.Rao
3. Organic Chemistry By I.L.Finar
4. Physical Chemistry By S.Glasstone
5. Engineering Chemistry By S.S.Dara
6. Polymer Chemistry By Fre W. ,Billmeyer
7. Engineering Chemistry By Satya Prakash

CHEMISTRY- PRACTICAL

LIST OF EXPERIMENTS

1. Determination of alkalinity in the given water sample.
2. Determination of temporary and permanent hardness in water sample using EDTA.
3. Determination of iron content in the given solution by Mohr's method.
4. Determination of viscosity of given liquid.
5. Determination of surface tension of given liquid.
6. Determination of chloride content in water sample.
7. Determination of available chlorine in bleaching powder.
8. Determination of pH by pH-metric titration.
9. Preparation of Phenol-formaldehyde and Urea-formaldehyde resin.
10. Determination of Cell constant and conductance of a solution.
11. Determination of rate constant of hydrolysis of esters.
12. Verification of Beer's law.

NOTE: Choice of any 10 experiments from the above. Institute can change any 02 experiments from the aforesaid experiments.

Course Outcomes:

1. Use of different analytical instruments.
2. Measure molecular/system properties such as surface tension, viscosity, conductance of solution, chloride and iron content in water.
3. Measure hardness of water.
4. Estimate the rate constant of reaction.

MATHEMATICS-I

[Common to all B. Tech. Courses except B. Tech. (Biotechnology) & B. Tech. (Agricultural Engineering)]

Module - 1: Matrices [08]

Types of Matrices: Symmetric, Skew-symmetric and Orthogonal Matrices; Complex Matrices, Inverse and Rank of matrix using elementary transformations, Rank-Nullity theorem; System of linear equations, Characteristic equation, Cayley-Hamilton Theorem and its application, Eigen values and eigenvectors; Diagonalisation of a Matrix,

Module - 2: Differential Calculus-I [08]

Introduction to limits, continuity and differentiability, Rolle's Theorem, Lagrange's Mean value theorem and Cauchy mean value theorem, Successive Differentiation (n^{th} order derivatives), Leibnitz theorem and its application, Envelope, Involutes and Evolutes, Curve tracing: Cartesian and Polar co-ordinates

Module - 3: Differential Calculus-II [08]

Partial derivatives, Total derivative, Euler's Theorem for homogeneous functions, Taylor and Maclaurin's theorems for a function of one and two variables, Maxima and Minima of functions of several variables, Lagrange Method of Multipliers, Jacobians, Approximation of errors.

Module - 4: Multi variable Calculus-I [08]

Multiple integration: Double integral, Triple integral, Change of order of integration, Change of variables, Application: Areas and volumes, Center of mass and center of gravity (Constant and variable densities).

Module - 5: Vector Calculus [08]

Vector differentiation: Gradient, Curl and Divergence and their Physical interpretation, Directional derivatives, Tangent and Normal planes.

Vector Integration: Line integral, Surface integral, Volume integral, Gauss's Divergence theorem, Green's theorem, Stoke's theorem (without proof) and their applications.

Course Outcomes

1. Remember the concept of matrices and apply for solving linear simultaneous equations.
2. Understand the concept of limit, continuity and differentiability and apply in the study of Rolle's, Lagrange's and Cauchy mean value theorem and Leibnitz theorems.
3. Identify the application of partial differentiation and apply for evaluating maxima, minima, series and Jacobians.
4. Elaborate the working methods of multiple integral and apply for finding area, volume, centre of mass and centre of gravity.
5. Remember the concept of vector and apply for directional derivatives, tangent and normal planes. Also evaluate line, surface and volume integrals.

Text Books:-

1. B. V. Ramana, Higher Engineering Mathematics, Tata McGraw-Hill Publishing Company Ltd.,2008.
2. B. S. Grewal, Higher Engineering Mathematics, Khanna Publisher,2005.
3. R K. Jain & S R K. Iyenger, Advance Engineering Mathematics, Narosa Publishing House 2002.

Reference Books-

1. E. Kreyszig, Advance Engineering Mathematics, John Wiley & Sons, 2005.
2. Peter V. O'Neil, Advance Engineering Mathematics, Thomson (Cengage) Learning, 2007.
3. Maurice D. Weir, Joel Hass, Frank R. Giordano, Thomas, Calculus, Eleventh Edition,Pearson.
4. D. Poole, Linear Algebra: A Modern Introduction, 2nd Edition, Brooks/Cole, 2005.
5. Veerarajan T., Engineering Mathematics for first year, Tata McGraw-Hill, New Delhi, 2008.
6. Ray Wylie C and Louis C Barret, Advanced Engineering Mathematics, Tata Mc-Graw-Hill; Sixth Edition.
7. P. Sivaramakrishna Das and C. Vijayakumari, Engineering Mathematics, 1st Edition, Pearson India Education Services Pvt. Ltd
8. Advanced Engineering Mathematics. Chandrika Prasad, ReenaGarg,2018.
9. Engineering Mathematics – I. Reena Garg,2018.

BASIC ELECTRICAL ENGINEERING

Module - 1: DC Circuits [08]

Electrical circuit elements (R, L and C), Concept of active and passive elements, voltage and current sources, concept of linearity and linear network, unilateral and bilateral elements, Kirchhoff's laws, Loop and nodal methods of analysis, Star-delta transformation, Superposition theorem, Thevenin theorem, Norton theorem.

Module - 2: Steady- State Analysis of Single Phase AC Circuits [10]

Representation of Sinusoidal waveforms – Average and effective values, Form and peak factors, Concept of phasors, phasor representation of sinusoidally varying voltage and current.

Analysis of single phase AC Circuits consisting of R, L, C, RL, RC, RLC combinations (Series and Parallel), Apparent, active & reactive power, Power factor, power factor improvement. Concept of Resonance in series & parallel circuits, bandwidth and quality factor.

Three phase balanced circuits, voltage and current relations in star and delta connections.

Module - 3: Transformers [08]

Magnetic materials, BH characteristics, ideal and practical transformer, equivalent circuit, losses in transformers, regulation and efficiency. Auto-transformer and three-phase transformer connections.

Module - 4: Electrical machines [08]

DC machines: Principle & Construction, Types, EMF equation of generator and torque equation of motor, applications of DC motors (simple numerical problems)

Three Phase Induction Motor: Principle & Construction, Types, Slip-torque characteristics, Applications (Numerical problems related to slip only)

Single Phase Induction motor: Principle of operation and introduction to methods of starting, applications.

Three Phase Synchronous Machines: Principle of operation of alternator and synchronous motor and their applications.

Module - 5: Electrical Installations [06]

Components of LT Switch gear: Switch Fuse Unit (SFU), MCB, ELCB, MCCB, Types of Wires and Cables, Importance of earthing. Types of Batteries, Important characteristics for Batteries. Elementary calculations for energy consumption and savings, battery backup.

Course Outcomes

1. Apply the concepts of KVL/KCL and network theorems in solving DC circuits.
2. Analyze the steady state behavior of single phase and three phase AC electrical circuits.
3. Identify the application areas of a single phase two winding transformer as well as an auto transformer and calculate their efficiency. Also identify the connections of a three phase transformer.
4. Illustrate the working principles of induction motor, synchronous machine as well as DC machine and employ them in different area of applications.
5. Describe the components of low voltage electrical installations and perform elementary calculations for energy consumption.

Spoken Tutorial (MOOCs):

1. AC DC Circuit Analysis using Ng Spice, Open Source Software (http://spoken- tutorial.org)

Text Books:

1. Ritu Sahdev, “Basic Electrical Engineering”, Khanna Publishing House.
2. S. Singh, P.V. Prasad, “Electrical Engineering: Concepts and Applications” Cengage.
3. D. P. Kothari and I. J. Nagrath, “Basic Electrical Engineering”, Tata McGrawHill.
4. D. C. Kulshreshtha, “Basic Electrical Engineering”, McGrawHill.

Reference Books:

1. E. Hughes, “Electrical and Electronics Technology”, Pearson,2010.
2. L. S. Bobrow, “Fundamentals of Electrical Engineering”, Oxford University Press.
3. V. D. Toro, “Electrical Engineering Fundamentals”, Pearson India.

ELECTRICAL ENGINEERING LABORATORY

LIST OF EXPERIMENTS

Note: A minimum of ten experiments from the following should be performed.

1. Verification of Kirchhoff's laws.
2. Verification of Superposition and Thevenin Theorem.
3. Measurement of power and power factor in a single phase ac series inductive circuit and study improvement of power factor using capacitor.
4. Study of phenomenon of resonance in RLC series circuit and obtain resonant frequency.
5. Connection and measurement of power consumption of a fluorescent lamp (tubelight).
6. Measurement of power in 3- phase circuit by two wattmeter method and determination of its power factor for star as well as delta connected load.
7. Determination of parameters of AC single phase series RLC circuit.
8. To observe the B-H loop of a ferromagnetic material in CRO.
9. Determination of (i) Voltage ratio (ii) polarity and (iii) efficiency by load test of a single phase transformer.
10. Determination of efficiency of a DC shunt motor by load test.
11. To study running and speed reversal of a three phase induction motor and record speed in both directions.
12. Demonstration of cut-out sections of machines: DC machine, three-phase induction machine, single-phase induction machine and synchronous machine.

COURSE OUTCOMES

1. Conduct experiments illustrating the application of KVL/KCL and network theorems to DC electrical circuits.
2. Demonstrate the behavior of AC circuits connected to single phase AC supply and measure power in single phase as well as three phase electrical circuits.
3. Perform experiment illustrating BH curve of magnetic materials.
4. Calculate efficiency of a single phase transformer and DC machine.
5. Perform experiments on speed measurement and reversal of direction of three phase induction motor and Identify the type of DC and AC machines based on their construction.

Programming for Problem Solving

Module - 1: **Introduction to Programming** **[08]**

Introduction to components of a computer system: Memory, processor, I/O Devices, storage, operating system, Concept of assembler, compiler, interpreter, loader and linker.

Idea of Algorithm: Representation of Algorithm, Flowchart, and Pseudo code with examples, From algorithms to programs, source code.

Programming Basics: Structure of C program, writing and executing the first C program, Syntax and logical errors in compilation, object and executable code. Components of C language. Standard I/O in C, Fundamental data types, Variables and memory locations, Storage classes.

Module -2: **Arithmetic expressions &Conditional Branching** **[08]**

Arithmetic expressions and precedence: Operators and expression using numeric and relational operators, mixed operands, type conversion, logical operators, bit operations, assignment operator, operator precedence and associativity.

Conditional Branching: Applying if and switch statements, nesting if and else, use of break and default with switch.

Module - 3: Loops & Functions **[08]**

Iteration and loops: use of while, do while and for loops, multiple loop variables, use of break and continue statements.

Functions: Introduction, types of functions, functions with array, passing parameters to functions, call by value, call by reference, recursive functions.

Module - 4: Arrays & Basic Algorithms **[08]**

Arrays: Array notation and representation, manipulating array elements, using multi dimensional arrays. Character arrays and strings, Structure, union, enumerated data types, Array of structures, Passing arrays to functions.

Basic Algorithms: Searching & Basic Sorting Algorithms (Bubble, Insertion and Selection), Finding roots of equations, Notion of order of complexity.

Module - 5: Pointer & File Handling **[08]**

Pointers: Introduction, declaration, applications, Introduction to dynamic memory allocation (malloc, calloc, realloc, free), Use of pointers in self-referential structures, notion of linked list (no implementation).

File handling: File I/O functions, Standard C preprocessors, defining and calling macros, command-line arguments.

COURSE OUTCOMES

1. To develop simple algorithms for arithmetic and logical problems.
2. To translate the algorithms to programs & execution (in C Language).
3. To implement conditional branching, iteration and recursion.
4. To decompose a problem into functions and synthesize a complete program using divide and conquer approach.
5. To use arrays, pointers and structures to develop algorithms and programs.

Text books:

1. Schum's Outline of Programming with C by Byron Gottfried,McGraw-Hill
2. The C programming by Kernighan Brain W. and Ritchie Dennis M., Pearson Education.
3. Computer Basics and C Programming by V.Rajaraman , PHI Learning Pvt. Limited, 2015.
4. Computer Concepts and Programming in C, R.S. Salaria, Khanna Publishing House
5. Computer Concepts and Programming in C, E Balaguruswami, McGrawHill
6. Computer Science- A Structured Programming Approach Using C, by Behrouz A. Forouzan, Richard F. Gilberg, Thomson, Third Edition , Cengage Learning -2007.
7. Let Us C By Yashwant P.Kanetkar.
8. Problem Solving and Program Design in C, by Jeri R. Hanly, Elliot B. Koffman, Pearson Addison-Wesley, 2006.
9. Programming in C by Kochan Stephen G. Pearson Education –2015.
10. Computer Concepts and Programming in C by D.S. Yadav and Rajeev Khanna, New Age International Publication.
11. Computer Concepts and Programming by Anami, Angadi and Manvi, PHI Publication.
12. Computer Concepts and Programming in C by Vikas Gupta, Wiley India Publication
13. Computer Fundamentals and Programming in C. Reema Thareja, Oxford Publication
14. Problem Solving and Programming in C, R.S. Salaria, Khanna Publishing House

Programming for Problem Solving Lab

Other Reference: -

1. Use C Open Source Software referring Spoken Tutorial MOOC

1. WAP that accepts the marks of 5 subjects and finds the sum and percentage marks obtained by the student.

2. WAP that calculates the Simple Interest and Compound Interest. The Principal, Amount, Rate of Interest and Time are entered through the keyboard.

3. WAP to calculate the area and circumference of a circle.

4. WAP that accepts the temperature in Centigrade and converts into Fahrenheit using the formula C/5= (F-32)/9.

5. WAP that swaps values of two variables using a third variable.

6. WAP that checks whether the two numbers entered by the user are equal or not.

7. WAP to find the greatest of three numbers.

8. WAP that finds whether a given number is even or odd.

9. WAP that tells whether a given year is a leap year or not.

10. WAP that accepts marks of five subjects and finds percentage and prints grades according to the following criteria:
Between90-100% ---------- Print A
80-90% ---------- Print B
60-80% ---------- Print C
Below 60% ---------- Print D

11. WAP that takes two operands and one operator from the user and perform the operation and prints the result by using Switch statement.

12. WAP to print the sum of all numbers up to a given number.

13. WAP to find the factorial of a given number.

14. WAP to print sum of even and odd numbers from 1 to N numbers.

15. WAP to print the Fibonacci series.

16. WAP to check whether the entered number is prime or not.

17. WAP to find the sum of digits of the entered number.

18. WAP to find the reverse of a number.

19. WAP to print Armstrong numbers from 1 to100.

20. WAP to convert binary number into decimal number and vice versa.

21. WAP that simply takes elements of the array from the user and finds the sum of these elements.

22. WAP that inputs two arrays and saves sum of corresponding elements of these arrays in a third array and prints them.

23. WAP to find the minimum and maximum element of the array.

24. WAP to search an element in a array using Linear Search.

25. WAP to sort the elements of the array in ascending order using Bubble Sort technique.

26. WAP to add and multiply two matrices of order n x n.

27. WAP that finds the sum of diagonal elements of a m x n matrix.

28. WAP to implement strlen (), strcat (),strcpy () using the concept of Functions.

29. Define a structure data type TRAIN_INFO. The type contain Train No.: integer type Train name: string Departure Time: aggregate type TIME Arrival Time: aggregate type TIME Start station: string End station: string The structure type Time contains two integer members: hour and minute. Maintain a train timetable and implement the following operations:

(i) List all the trains (sorted according to train number) that depart from a particular section.
(ii) List all the trains that depart from a particular station at a particular time.
(iii) List all he trains that depart from a particular station within the next one hour of a given time.
(iv) List all the trains between a pair of start station and end station.

30. WAP to swap two elements using the concept of pointers.

31. WAP to compare the contents of two files and determine whether they are same or not.

32. WAP to check whether a given word exists in a file or not. If yes then find the number of times it occurs.

COURSE OUTCOMES

1. To write programs for arithmetic and logical problems.
2. To translate the algorithms to programs & execution (in C language).
3. To write programs for conditional branching, iteration and recursion.
4. To write programs using functions and synthesize a complete program using divide and conquer approach.
5. Write programs using arrays, pointers and structures.

Engineering Graphics and Design

Module - 1: Introduction to Engineering Drawing, Orthographic Projections [08]

Principles of Engineering Graphics and their significance, usage of Drawing instruments, lettering, Scales – Plain and Diagonal Scales

Principles of Orthographic Projections – Conventions – Projections of Points and Lines inclined to both planes; Projections of planes inclined Planes – Auxiliary Planes.

Module - 2: Projections and Sections of Regular Solids [08]

Sections in lined to both the Planes – Auxiliary Views; Simple annotation, dimensioning and scale. Floor plans the include: windows, doors and fixtures such as WC, Both, sink, shower, etc.

Prism, Cylinder, Pyramid, Cone – Auxiliary Vies: Development of surfaces of Right Regular Solids – Prism, Pyramid, Cylinder and Cone.

Module - 3: Isometric Projections [08]

Principles of Isometric projection – Isometric Scale, Isometric Views, Conventions; Isometric Views of lines, Planes Simple and compound Solids; Conversion of Isometric Views to Orthographic Views and Vice- versa,Conversions.

Module - 4: Computer Graphics [08]

Listing the computer technologies the impact on graphical communication, Demonstration knowledge of the theory of CAD software [such as: The Menu System, Toolbars (Standard, Object Properties, Draw, Modify and Dimension), Drawing Area (Background, Crosshairs, Coordinate System), Dialog boxes and windows, Shortcut menus (Button Bars), The Command Line (where applicable), The Status Bar, Different methods of zoom as used in CAD, Select and erase objects: Isometric Views of lines, Planes, Simple and compound Solids].

Set up of the drawing page and the printer, including scale settings, Setting up of units and drawing limits; ISO and ANSI standards for coordinate dimensioning and tolerance; Orthographic constraints, Snap to objects manually and automatically; Producing drawings by using various coordinate input entry methods to draw straight lines, Applying various ways of drawing circles: Applying dimensions to objects, applying annotations to drawings; Setting up and use of Layers, layers to create drawings, Create, edit and use customized layers; Changing line lengths through modifying existing lines (extend/lengthen); Printing documents to pater using the print command: orthographic projection techniques; Drawing sectional views of composite right regular geometric solids and project the true shape of the sectioned surface; Drawing annotation, Computer-aided design (CAD) software modelling of parts and assemblies. Parametric and non-parametric solid, surface, and wireframe models.Part editing and two- dimensional documentation of models.Planar projection theory, including sketching of perspective, isometric, Multiview, auxiliary, and section views. Spatial visualization exercises Dimensioning guidelines, tolerance techniques; dimensioning and scale multi views of dwelling.

Module - 5: Demonstration of a simple team design project [08]

Geometry and topology of engineered components: creation of engineering models and their presentation in standard 2D blueprint form and as 3D wire-frame and shaded solids; meshed topologies for engineering analysis and tool-path generation for component manufacture; geometric dimensioning and tolerance; Use of solid-modelling software for creating associative models at the component and assembly levels; floor plans that include: windows, doors, and fixtures such as WC, bath, sink, shower, etc. Applying colour coding according to building drawing practice; Drawing sectional elevation showing foundation to ceiling; Introduction to Building Information Modelling(BIM).

Course Outcomes

1: Understanding of the visual aspects of engineering design
2: Understanding of engineering graphics standards and solid modelling 3:
Effective communication through graphics.
3: Applying modern engineering tools necessary for engineering practice 5:
Appling computer-aided geometric design.
4: Analysis of Isometric views 7:
Creating working drawings.

Suggested Text/ Reference Books:

(i) Bhatt N.D., Panchal V.M. & Ingle P.R. (2014), Engineering Drawing, Charotar Publishing House.
(ii) Shah, M.B. &Rana B.C. (2008), Engineering Drawing and Computer Graphics, Pearson Education
(iii) Agrawal B. &Agrawal C.M. (2012), Engineering Graphics, TMH Publication
(iv) Engineering Graphics & Design, A.P. Gautam & Pradeep Jain, Khanna Publishing House
(v) Narayana, K.L. & P Kannaiah (2008), Text book on Engineering Drawing, Sci-tech Publishers.
(vi) (Corresponding set of) CAD Software Theory and UserManuals.

WORKSHOP PRACTICE

LIST OF EXPERIMENTS

Machine shop:

- Study of machine tools in particular Lathe machine
- Demonstration of different operations on Lathe machine
- Practice of Facing, Plane Turning, step turning, taper turning, knurling and parting.
- Study of Quick return mechanism of Shaper.

Fitting shop:

- Preparation of T-Shape Work piece as per the given specifications.
- Preparation of U-Shape Work piece which contains: Filing, Sawing, Drilling, Grinding.
- Practice marking operations.

Carpentry:

- Study of Carpentry Tools, Equipment and different joints.
- Practice of Cross Half lap joint, Half lap Dovetail joint and Mortise Tenon Joint

Electrical & Electronics:

- Introduction to House wiring, different types of cables. Types of power supply, types of motors, Starters, distribution of power supply, types of bulbs, parts of tube light, Electrical wiring symbols.
- Soldering and desoldering of Resistor in PCB.
- Soldering and desoldering of IC in PCB.
- Soldering and desoldering of Capacitor in PCB.

Welding:

- Instruction of BI standards and reading of welding drawings.
- Butt Joint
- Lap Joint
- TIG Welding
- MIG Welding

Casting:

- introduction to casting processes

Smith:

- Sharpening any arc and edge.
- Preparing small arc and edge,
- Repair of agricultural implements and power plough, use of power hammer etc.

Plastic Moulding & Glass Cutting:

- Introduction to Patterns, pattern allowances, ingredients of moulding sand and melting furnaces. Foundry tools and their purposes
- Demo of mould preparation
- Practice – Preparation of mould
- Glass cutting

COURSE OUTCOMES

1. Study and practice on machine tools and their operations.
2. Practice on manufacturing of components using workshop trades including fitting, carpentry, foundry and welding.
3. Identify and apply suitable tools for machining processes including turning, facing, thread cutting and tapping.
4. Welding and soldering operations.
5. Apply basic electrical engineering knowledge for house wiring practice.

Text Books:

1. Raghuwanshi B.S., Workshop Technology Vol. I & II, Dhanpath Rai & Sons.
2. Kannaiah P. and Narayana K.L., Workshop Manual, 2nd Edition, Sci-tech publishers.
3. John K.C., Mechanical Workshop Practice. 2nd Edition. PHI 2010.
4. Jeyapoovan T. and Pranitha S., Engineering Practices Lab Manual, 3rd Edition. Vikas Pub. 2008.

SEMESTER - II

PHYSICS

Module – 1: Relativistic Mechanics: **[8]**

Frame of reference, Inertial & non-inertial frames, Galilean transformations, Michelson-Morley experiment, Postulates of special theory of relativity, Lorentz transformations, Length contraction, Time dilation, Velocity addition theorem, Variation of mass with velocity, Einstein's mass energy relation, Relativistic relation between energy and momentum, Massless particle.

Module - 2: Electromagnetic Field Theory: **[8]**

Continuity equation for current density, Displacement current, Modifying equation for the curl of magnetic field to satisfy continuity equation, Maxwell's equations in vacuum and in non-conducting medium, Energy in an electromagnetic field, Poynting vector and Poynting theorem, Plane electromagnetic waves in vacuum and their transverse nature. Relation between electric and magnetic fields of an electromagnetic wave, Energy and momentum carried by electromagnetic waves, Resultant pressure, Skin depth.

Module - 3: Quantum Mechanics: **[8]**

Black body radiation, Stefan's law, Wien's law, Rayleigh-Jeans law and Planck's law, Wave particle duality, Matter waves, Time-dependent and time-independent Schrodinger wave equation, Born interpretation of wave function, Solution to stationary state Schrodinger wave equation for one- Dimensional particle in a box, Compton effect.

Module - 4: Wave Optics: **[10]**

Coherent sources, Interference in uniform and wedge shaped thin films, Necessity of extended sources, Newton's Rings and its applications. Fraunhoffer diffraction at single slit and at double slit, Absent spectra, Diffraction grating, Spectra with grating, Dispersive power, Resolving power of grating, Rayleigh's criterion of resolution, Resolving powerof grating.

Module – 5: Fibre Optics & Laser: **[10]**

Fibre Optics**:** Introduction to fibre optics, Acceptance angle, Numerical aperture, Normalized frequency, Classification of fibre, Attenuation and Dispersion in optical fibres.

Laser: Absorption of radiation, Spontaneous and stimulated emission of radiation, Einstein's coefficients, Population inversion, Various levels of Laser, Ruby Laser, He-Ne Laser, Laser applications.

Course Outcomes:

1. To solve the classical and wave mechanics problems
2. To develop the understanding of laws of thermodynamics and their application in various processes
3. To formulate and solve the engineering problems on Electromagnetism &Electromagnetic FieldTheory
4. To aware of limits of classical physics & to apply the ideas in solving the problems in their parentstreams

Reference Books:

1. Concepts of Modern Physics – Aurthur Beiser (Mc-Graw Hill)
2. Introduction to Special Theory of Relativity- Robert Resnick(Wiley)
3. Optics – Brijlal & Subramanian (S. Chand)
4. Engineering Physics: Theory and Practical- Katiyar and Pandey (Wiley India)
5. Applied Physics for Engineers- Neeraj Mehta (PHI Learning, New)
6. Engineering Physics-Malik HK and Singh AK(McGrawHill)

PHYSICS LAB

List of Experiments (Any ten experiments at least four from each group).

Group A

11. To determine the wavelength of sodium light by Newton's ring experiment.
12. To determine the wavelength of different spectral lines of mercury light using plane transmission grating.
13. To determine the specific rotation of cane sugar solution using polarimeter.
14. To determine the focal length of the combination of two lenses separated by a distance and verify the formula for the focal length of combination of lenses.
15. To measure attenuation in an optical fiber.
16. To determine the wavelength of He-Ne laser light using single slit diffraction.
17. To study the polarization of light using He-Ne laserlight.
18. To determine the wavelength of sodium light with the help of Fresnel's Bi-prism.
19. To determine the coefficient of viscosity of a givenliquid.
20. To determine the value of acceleration due to gravity (g) using compound pendulum.

Group B

11. To determine the energy band gap of a given semiconductor material.
12. To study Hall effect and determine Hall coefficient, carrier density and mobility of a given semiconductor material using Hall effect setup.
13. To determine the variation of magnetic field with the distance along the axis of a current carrying coil and estimate the radius of the coil.
14. To verify Stefan's law by electric method.
15. To determine resistance per unit length and specific resistance of a given resistance using Carey Foster's Bridge.
16. To study the resonance condition of a series LCR circuit.
17. To determine the electrochemical equivalent (ECE) ofcopper.
18. To calibrate the given ammeter and voltmeter by potentiometer.
19. To draw hysteresis (B-H curve) of a specimen in the form of a transformer and to determine its hysteresisloss.
20. To measure high resistance by leakage method.

Course Outcomes:

1. To determine the wavelength of sodium light by Newton's ring experiment
2. To determine the wavelength of sodium light with the help of Fresnel's bi-prism
3. To determine the variation of magnetic field with the distance along the axis of a current carrying coil and estimate the radius of the coil.
4. To draw hysteresis (B-H curve) of a specimen in the form of a transformer and to determine its hysteresis loss.

Reference Books

1. Practical Physics- K. K. Dey & B. N. Dutta (Kalyani Publishers New Delhi)
2. Engineering Physics-Theory and Practical- Katiyar & Pandey (Wiley India)
3. Engineering Physics Practical- S K Gupta (Krishna Prakashan Meerut)

CHEMISTRY

Module-1 **[08]**

Atomic and Molecular Structure:

Molecular orbital's of diatomic molecules. Band theory of solids. Liquid crystal and its applications. Point defects in solids. Structure and applications of Graphite and Fullerenes. Concepts of Nanomaterials and its application.

Module-2 **[08]**

Spectroscopic techniques and Applications:

Elementary idea and simple applications of Rotational, Vibrational, Ultraviolet& Visible and Raman spectroscopy.

Module-3 **[08]**

Electrochemistry

Nernst Equation and application, relation of EMF with thermodynamic functions (ΔH, ΔF and Δ S). Lead storage battery.

Corrosion: causes, effects and its prevention.

Phase Rule and its application to water system.

Module-4 **[08]**

Water Analysis: Hardness of water, Techniques for water softening (Lime-soda, Zeolite, Ion exchange resin and Reverse osmosis method).

Fuels: classification of fuels, Analysis of coal, Determination of calorific value (Bomb calorimeter and Dulong's method).

Module-5 **[08]**

Polymer: Basic concepts of polymer-Blend and composites, conducting and bio-degradable polymers. Preparation and application of some industrially important polymers (Buna-S, Buna-N, Neoprene, Nylon-6, nylon-6,6 and Terylene). General methods of synthesis of organometallic compounds (Grignard reagent) and their applications.

Course Outcomes:

1. Use of different analytical instruments.
2. Measure molecular/system properties such as surface tension, viscosity, conductance of solution, chloride and iron content in water.
3. Measure hardness of water.
4. Estimate the rate constant of reaction.

Reference Books:

1. University Chemistry By B.H. Mahan
2. University Chemistry By C.N.R.Rao
3. Organic Chemistry By I.L.Finar
4. Physical Chemistry By S.Glasstone
5. Engineering Chemistry By S.S.Dara
6. Polymer Chemistry By Fre W. ,Billmeyer
7. Engineering Chemistry By Satya Prakash

CHEMISTRY- PRACTICAL

LIST OF EXPERIMENTS

1. Determination of alkalinity in the given water sample.
2. Determination of temporary and permanent hardness in water sample using EDTA.
3. Determination of iron content in the given solution by Mohr's method.
4. Determination of viscosity of given liquid.
5. Determination of surface tension of given liquid.
6. Determination of chloride content in water sample.
7. Determination of available chlorine in bleaching powder.
8. Determination of pH by pH-metric titration.
9. Preparation of Phenol-formaldehyde and Urea-formaldehyde resin.
10. Determination of Cell constant and conductance of a solution.
11. Determination of rate constant of hydrolysis of esters.
12. Verification of Beer's law.

NOTE: Choice of any 10 experiments from the above. Institute can change any 02 experiments from the aforesaid experiments.

Course Outcomes:

1. Use of different analytical instruments.
2. Measure molecular/system properties such as surface tension, viscosity, conductance of solution, chloride and iron content in water.
3. Measure hardness of water.
4. Estimate the rate constant of reaction.

MATHEMATICS-II

(Common to all B. Tech. Courses except B. Tech., Biotechnology and Agricultural Engineering)

Module - 1: Ordinary Differential Equation of Higher Order [10]

Linear differential equation of n^{th} order with constant coefficients, Simultaneous linear differential equations, Second order linear differential equations with variable coefficients, Solution by changing independent variable, Reduction of order, Normal form, Method of variation of parameters, Cauchy-Euler equation, Series solutions (Frobenius Method).

Module - 2: Multivariable Calculus-II [08]

Improper integrals, Beta & Gama function and their properties, Dirichlet's integral and its applications, Application of definite integrals to evaluate surface areas and volume of revolutions.

Module - 3: Sequences and Series [08]

Definition of Sequence and series with examples, Convergence of sequence and series, Tests for convergence of series, (Ratio test, D' Alembert's test, Raabe's test). Fourier series, Half range Fourier sine and cosine series.

Module - 4: Complex Variable–Differentiation [08]

Limit, Continuity and differentiability, Functions of complex variable, Analytic functions, Cauchy- Riemann equations (Cartesian and Polar form), Harmonic function, Method to find Analytic functions, Conformal mapping, Mobius transformation and their properties

Module - 5: Complex Variable – Integration [08]

Complex integrals, Contour integrals, Cauchy- Goursat theorem, Cauchy integral formula, Taylor's series, Laurent's series, Liouvilles's theorem, Singularities, Classification of Singularities, zeros of analytic functions, Residues, Methods of finding residues, Cauchy Residue theorem, Evaluation of real integrals of the type $\int_0^{2\pi} f(\cos\theta, \sin\theta)\, d\theta$ and $\int_{-\infty}^{\infty} f(x)\, dx$.

COURSE OUTCOMES

1. Understand the concept of differentiation and apply for solving differentialequations.
2. Remember the concept of definite integral and apply for evaluating surface areas and volumes.
3. Understand the concept of convergence of sequence and series. Also evaluate Fourier series
4. Illustrate the working methods of complex functions and apply for finding analytic functions.
5. Apply the complex functions for finding Taylor's series, Laurent's series and evaluation of definiteintegrals.

Text Books:-

1. B. V. Ramana, Higher Engineering Mathematics, Tata McGraw-Hill Publishing Company Ltd., 2008.
2. B. S. Grewal, Higher Engineering Mathematics, Khanna Publisher, 2005.
3. R. K. Jain & S. R. K. Iyenger, Advance Engineering Mathematics, Narosa Publishing -House, 2002.

Reference Books:-

1. E. Kreyszig, Advance Engineering Mathematics, John Wiley & Sons, 2005.
2. Peter V. O'Neil, Advance Engineering Mathematics, Thomson (Cengage) Learning, 2007.
3. Maurice D. Weir, Joel Hass, Frank R. Giordano, Thomas, Calculus, Eleventh Edition, Pearson.
4. G.B Thomas, R L Finney, Calculus and Analytical Geometry, Ninth Edition Pearson, 2002.
5. James Ward Brown and Ruel V Churchill, Fourier Series and Boundary Value Problems, 8th Edition-Tata McGraw-Hill
6. D. Poole, Linear Algebra: A Modern Introduction, 2nd Edition, Brooks/Cole, 2005.
7. Veerarajan T., Engineering Mathematics for first year, Tata McGraw-Hill, New Delhi, 2008.
8. Charles E Roberts Jr, Ordinary Differential Equations, Application, Model and Computing, CRC Press T&FGroup.
9. Ray Wylie C and Louis C Barret, Advanced Engineering Mathematics, 6th Edition, TataMcGraw-Hill.
10. James Ward Brown and Ruel V Churchill, Complex Variable and Applications, 8th Edition, TataMcGraw-Hill.
11. P. Sivaramakrishna Das and C. Vijayakumari, Engineering Mathematics, 1st Edition, Pearson India Education Services Pvt. Ltd.
12. Advanced Engineering Mathematics By Chandrika Prasad, Reena Garg Khanna Publishing House, Delhi.

BASIC ELECTRICAL ENGINEERING

Module - 1: DC Circuits [08]

Electrical circuit elements (R, L and C), Concept of active and passive elements, voltage and current sources, concept of linearity and linear network, unilateral and bilateral elements, Kirchhoff's laws, Loop and nodal methods of analysis, Star-delta transformation, Superposition theorem, Thevenin theorem, Norton theorem.

Module - 2: Steady- State Analysis of Single Phase AC Circuits [10]

Representation of Sinusoidal waveforms – Average and effective values, Form and peak factors, Concept of phasors, phasor representation of sinusoidally varying voltage and current.

Analysis of single phase AC Circuits consisting of R, L, C, RL, RC, RLC combinations (Series and Parallel), Apparent, active & reactive power, Power factor, power factor improvement. Concept of Resonance in series & parallel circuits, bandwidth and quality factor.

Three phase balanced circuits, voltage and current relations in star and delta connections.

Module - 3: Transformers [08]

Magnetic materials, BH characteristics, ideal and practical transformer, equivalent circuit, losses in transformers, regulation and efficiency. Auto-transformer and three-phase transformer connections.

Module - 4: Electrical machines [08]

DC machines: Principle & Construction, Types, EMF equation of generator and torque equation of motor, applications of DC motors (simple numerical problems)

Three Phase Induction Motor: Principle & Construction, Types, Slip-torque characteristics, Applications (Numerical problems related to slip only)

Single Phase Induction motor: Principle of operation and introduction to methods of starting, applications.

Three Phase Synchronous Machines: Principle of operation of alternator and synchronous motor and their applications.

Module - 5: Electrical Installations [06]

Components of LT Switch gear: Switch Fuse Unit (SFU), MCB, ELCB, MCCB, Types of Wires and Cables, Importance of earthing. Types of Batteries, Important characteristics for Batteries. Elementary calculations for energy consumption and savings, battery backup.

Course Outcomes

1. Apply the concepts of KVL/KCL and network theorems in solving DC circuits.
2. Analyze the steady state behavior of single phase and three phase AC electrical circuits.
3. Identify the application areas of a single phase two winding transformer as well as an auto transformer and calculate their efficiency. Also identify the connections of a three phase transformer.
4. Illustrate the working principles of induction motor, synchronous machine as well as DC machine and employ them in different area of applications.
5. Describe the components of low voltage electrical installations and perform elementary calculations for energy consumption.

Spoken Tutorial (MOOCs):

1. AC DC Circuit Analysis using Ng Spice, Open Source Software (http://spoken- tutorial.org)

Text Books:

1. Ritu Sahdev, “Basic Electrical Engineering”, Khanna Publishing House.
2. S. Singh, P.V. Prasad, “Electrical Engineering: Concepts and Applications” Cengage.
3. D. P. Kothari and I. J. Nagrath, “Basic Electrical Engineering”, Tata McGrawHill.
4. D. C. Kulshreshtha, “Basic Electrical Engineering”, McGrawHill.

Reference Books:

1. E. Hughes, “Electrical and Electronics Technology”, Pearson, 2010.
2. L. S. Bobrow, “Fundamentals of Electrical Engineering”, Oxford University Press.
3. V. D. Toro, “Electrical Engineering Fundamentals”, Pearson India.

ELECTRICAL ENGINEERING LABORATORY

LIST OF EXPERIMENTS

Note: A minimum of ten experiments from the following should be performed.

1. Verification of Kirchhoff's laws.
2. Verification of Superposition and Thevenin Theorem.
3. Measurement of power and power factor in a single phase ac series inductive circuit and study improvement of power factor using capacitor.
4. Study of phenomenon of resonance in RLC series circuit and obtain resonant frequency.
5. Connection and measurement of power consumption of a fluorescent lamp (tubelight).
6. Measurement of power in 3- phase circuit by two wattmeter method and determination of its power factor for star as well as delta connected load.
7. Determination of parameters of AC single phase series RLC circuit.
8. To observe the B-H loop of a ferromagnetic material in CRO.
9. Determination of (i) Voltage ratio (ii) polarity and (iii) efficiency by load test of a single phase transformer
10. Determination of efficiency of a DC shunt motor by load test.
11. To study running and speed reversal of a three phase induction motor and record speed in both directions.
12. Demonstration of cut-out sections of machines: DC machine, three phase induction machine, single- phase induction machine and synchronous machine.

COURSE OUTCOMES

1. Conduct experiments illustrating the application of KVL/KCL and network theorems to DC electrical circuits.
2. Demonstrate the behavior of AC circuits connected to single phase AC supply and measure power in single phase as well as three phase electrical circuits.
3. Perform experiment illustrating BH curve of magnetic materials.
4. Calculate efficiency of a single phase transformer and DC machine.
5. Perform experiments on speed measurement and reversal of direction of three phase induction motor and Identify the type of DC and AC machines based on their construction.

Programming for Problem Solving

Module - 1: **Introduction to Programming** **[08]**

Introduction to components of a computer system: Memory, processor, I/O Devices, storage, operating system, Concept of assembler, compiler, interpreter, loader and linker.

Idea of Algorithm: Representation of Algorithm, Flowchart, and Pseudo code with examples, From algorithms to programs, source code.

Programming Basics: Structure of C program, writing and executing the first C program, Syntax and logical errors in compilation, object and executable code. Components of C language. Standard I/O in C, Fundamental data types, Variables and memory locations, Storage classes.

Module -2: **Arithmetic expressions &Conditional Branching** **[08]**

Arithmetic expressions and precedence: Operators and expression using numeric and relational operators, mixed operands, type conversion, logical operators, bit operations, assignment operator, operator precedence and associativity.

Conditional Branching: Applying if and switch statements, nesting if and else, use of break and default with switch.

Module - 3: Loops & Functions **[08]**

Iteration and loops: use of while, do while and for loops, multiple loop variables, use of break and continue statements.

Functions: Introduction, types of functions, functions with array, passing parameters to functions, call by value, call by reference, recursive functions.

Module - 4: Arrays & Basic Algorithms **[08]**

Arrays: Array notation and representation, manipulating array elements, using multi dimensional arrays. Character arrays and strings, Structure, union, enumerated data types, Array of structures, Passing arrays to functions.

Basic Algorithms: Searching & Basic Sorting Algorithms (Bubble, Insertion and Selection), Finding roots of equations, Notion of order of complexity.

Module - 5: Pointer & File Handling **[08]**

Pointers: Introduction, declaration, applications, Introduction to dynamic memory allocation (malloc, calloc, realloc, free), Use of pointers in self-referential structures, notion of linked list (no implementation).

File handling: File I/O functions, Standard C preprocessors, defining and calling macros, command-line arguments.

COURSE OUTCOMES

1. To develop simple algorithms for arithmetic and logical problems.
2. To translate the algorithms to programs & execution (in C Language).
3. To implement conditional branching, iteration and recursion.
4. To decompose a problem into functions and synthesize a complete program using divide and conquer approach.
5. To use arrays, pointers and structures to develop algorithms and programs.

Text books:

1. Schum's Outline of Programming with C by Byron Gottfried, McGraw-Hill
2. The C programming by Kernighan Brain W. and Ritchie Dennis M., Pearson Education.
3. Computer Basics and C Programming by V.Rajaraman, PHI Learning Pvt. Limited, 2015.
4. Computer Concepts and Programming in C, R.S. Salaria, Khanna Publishing House
5. Computer Concepts and Programming in C, E Balaguruswami, McGrawHill
6. Computer Science- A Structured Programming Approach Using C, by Behrouz A. Forouzan, Richard F. Gilberg, Thomson, Third Edition , Cengage Learning -2007.
7. Let Us C By Yashwant P.Kanetkar.
8. Problem Solving and Program Design in C, by Jeri R. Hanly, Elliot B. Koffman, Pearson Addison-Wesley, 2006.
9. Programming in C by Kochan Stephen G. Pearson Education –2015.
10. Computer Concepts and Programming in C by D.S. Yadav and Rajeev Khanna, New Age International Publication.
11. Computer Concepts and Programming by Anami, Angadi and Manvi, PHI Publication.
12. Computer Concepts and Programming in C by Vikas Gupta, Wiley India Publication
13. Computer Fundamentals and Programming in C. Reema Thareja, Oxford Publication
14. Problem Solving and Programming in C, R.S. Salaria, Khanna Publishing House

Programming for Problem Solving Lab

Other Reference: -

1. Use C Open Source Software referring Spoken Tutorial MOOC

1. WAP that accepts the marks of 5 subjects and finds the sum and percentage marks obtained by the student.

2. WAP that calculates the Simple Interest and Compound Interest. The Principal, Amount, Rate of Interest and Time are entered through the keyboard.

3. WAP to calculate the area and circumference of a circle.

4. WAP that accepts the temperature in Centigrade and converts into Fahrenheit using the formula C/5= (F-32)/9.

5. WAP that swaps values of two variables using a third variable.

6. WAP that checks whether the two numbers entered by the user are equal or not.

7. WAP to find the greatest of three numbers.

8. WAP that finds whether a given number is even or odd.

9. WAP that tells whether a given year is a leap year or not.

10. WAP that accepts marks of five subjects and finds percentage and prints grades according to the following criteria:
Between90-100% ---------- Print A
80-90% ---------- Print B
60-80% ---------- Print C
Below 60% ---------- Print D

11. WAP that takes two operands and one operator from the user and perform the operation and prints the result by using Switch statement.

12. WAP to print the sum of all numbers up to a given number.

13. WAP to find the factorial of a given number.

14. WAP to print sum of even and odd numbers from 1 to N numbers.

15. WAP to print the Fibonacci series.

16. WAP to check whether the entered number is prime or not.

17. WAP to find the sum of digits of the entered number.

18. WAP to find the reverse of a number.

19. WAP to print Armstrong numbers from 1 to100.

20. WAP to convert binary number into decimal number and vice versa.

21. WAP that simply takes elements of the array from the user and finds the sum of these elements.

22. WAP that inputs two arrays and saves sum of corresponding elements of these arrays in a third array and prints them.

23. WAP to find the minimum and maximum element of the array.

24. WAP to search an element in an array using Linear Search.

25. WAP to sort the elements of the array in ascending order using Bubble Sort technique.

26. WAP to add and multiply two matrices of order n x n.

27. WAP that finds the sum of diagonal elements of a m x n matrix.

28. WAP to implement strlen (), strcat (),strcpy () using the concept of Functions.

29. Define a structure data type TRAIN_INFO. The type contain Train No.: integer type Train name: string Departure Time: aggregate type TIME Arrival Time: aggregate type TIME Start station: string End station: string The structure type Time contains two integer members: hour and minute. Maintain a train timetable and implement the following operations:

(i) List all the trains (sorted according to train number) that depart from a particular section.
(ii) List all the trains that depart from a particular station at a particular time.
(iii) List all he trains that depart from a particular station within the next one hour of a given time.
(iv) List all the trains between a pair of start station and end station.

30. WAP to swap two elements using the concept of pointers.

31. WAP to compare the contents of two files and determine whether they are same or not.

32. WAP to check whether a given word exists in a file or not. If yes then find the number of times it occurs.

COURSE OUTCOMES

1. To write programs for arithmetic and logical problems.
2. To translate the algorithms to programs & execution (in C language).
3. To write programs for conditional branching, iteration and recursion.
4. To write programs using functions and synthesize a complete program using divide and conquer approach.
5. Write programs using arrays, pointers and structures.

Engineering Graphics and Design

Module - 1: Introduction to Engineering Drawing, Orthographic Projections [08]

Principles of Engineering Graphics and their significance, usage of Drawing instruments, lettering, Scales – Plain and Diagonal Scales

Principles of Orthographic Projections – Conventions – Projections of Points and Lines inclined to both planes; Projections of planes inclined Planes – Auxiliary Planes.

Module - 2: Projections and Sections of Regular Solids [08]

Sections in lined to both the Planes – Auxiliary Views; Simple annotation, dimensioning and scale. Floor plans the include: windows, doors and fixtures such as WC, Both, sink, shower, etc.

Prism, Cylinder, Pyramid, Cone – Auxiliary Vies: Development of surfaces of Right Regular Solids – Prism, Pyramid, Cylinder and Cone.

Module - 3: Isometric Projections [08]

Principles of Isometric projection – Isometric Scale, Isometric Views, Conventions; Isometric Views of lines, Planes Simple and compound Solids; Conversion of Isometric Views to Orthographic Views and Vice- versa, Conversions.

Module - 4: Computer Graphics [08]

Listing the computer technologies the impact on graphical communication, Demonstration knowledge of the theory of CAD software [such as: The Menu System, Toolbars (Standard, Object Properties, Draw, Modify and Dimension), Drawing Area (Background, Crosshairs, Coordinate System), Dialog boxes and windows, Shortcut menus (Button Bars), The Command Line (where applicable), The Status Bar, Different methods of zoom as used in CAD, Select and erase objects: Isometric Views of lines, Planes, Simple and compound Solids].

Set up of the drawing page and the printer, including scale settings, Setting up of units and drawing limits; ISO and ANSI standards for coordinate dimensioning and tolerance; Orthographic constraints, Snap to objects manually and automatically; Producing drawings by using various coordinate input entry methods to draw straight lines, Applying various ways of drawing circles: Applying dimensions to objects, applying annotations to drawings; Setting up and use of Layers, layers to create drawings, Create, edit and use customized layers; Changing line lengths through modifying existing lines (extend/lengthen); Printing documents to pater using the print command: orthographic projection techniques; Drawing sectional views of composite right regular geometric solids and project the true shape of the sectioned surface; Drawing annotation, Computer-aided design (CAD) software modelling of parts and assemblies. Parametric and non-parametric solid, surface, and wireframe models. Part editing and two- dimensional documentation of models. Planar projection theory, including sketching of perspective, isometric, Multiview, auxiliary, and section views. Spatial visualization exercises Dimensioning guidelines, tolerance techniques; dimensioning and scale multi views of dwelling.

Module - 5: Demonstration of a simple team design project [08]

Geometry and topology of engineered components: creation of engineering models and their presentation in standard 2D blueprint form and as 3D wire-frame and shaded solids; meshed topologies for engineering analysis and tool-path generation for component manufacture; geometric dimensioning and tolerance; Use of solid-modelling software for creating associative models at the component and assembly levels; floor plans that include: windows, doors, and fixtures such as WC, bath, sink, shower, etc. Applying colour coding according to building drawing practice; Drawing sectional elevation showing foundation to ceiling; Introduction to Building Information Modelling(BIM).

Course Outcomes

1: Understanding of the visual aspects of engineering design
2: Understanding of engineering graphics standards and solid modelling 3:
Effective communication through graphics.
3: Applying modern engineering tools necessary for engineering practice 5:
Appling computer-aided geometric design.
4: Analysis of Isometric views 7:
Creating working drawings.

Suggested Text/ Reference Books:

(i) Bhatt N.D., Panchal V.M. & Ingle P.R. (2014), Engineering Drawing, Charotar Publishing House.
(ii) Shah, M.B. &Rana B.C. (2008), Engineering Drawing and Computer Graphics, Pearson Education
(iii) Agrawal B. &Agrawal C.M. (2012), Engineering Graphics, TMH Publication
(iv) Engineering Graphics & Design, A.P. Gautam & Pradeep Jain, Khanna Publishing House
(v) Narayana, K.L. & P Kannaiah (2008), Text book on Engineering Drawing, Sci-tech Publishers.
(vi) (Corresponding set of) CAD Software Theory and User Manuals.

WORKSHOP PRACTICE

LIST OF EXPERIMENTS

Machine shop:

- Study of machine tools in particular Lathe machine
- Demonstration of different operations on Lathe machine
- Practice of Facing, Plane Turning, step turning, taper turning, knurling and parting.
- Study of Quick return mechanism of Shaper.

Fitting shop:

- Preparation of T-Shape Work piece as per the given specifications.
- Preparation of U-Shape Work piece which contains: Filing, Sawing, Drilling, Grinding.
- Practice marking operations.

Carpentry:

- Study of Carpentry Tools, Equipment and different joints.
- Practice of Cross Half lap joint, Half lap Dovetail joint and Mortise Tenon Joint

Electrical & Electronics:

- Introduction to House wiring, different types of cables. Types of power supply, types of motors, Starters, distribution of power supply, types of bulbs, parts of tube light, Electrical wiring symbols.
- Soldering and desoldering of Resistor in PCB.
- Soldering and desoldering of IC in PCB.
- Soldering and desoldering of Capacitor in PCB.

Welding:

- Instruction of BI standards and reading of welding drawings.
- Butt Joint
- Lap Joint
- TIG Welding
- MIG Welding

Casting:

- introduction to casting processes

Smith:

- Sharpening any arc and edge.
- Preparing small arc and edge,
- Repair of agricultural implements and power plough, use of power hammer etc.

Plastic Moulding & Glass Cutting:

- Introduction to Patterns, pattern allowances, ingredients of moulding sand and melting furnaces. Foundry tools and their purposes
- Demo of mould preparation
- Practice – Preparation of mould
- Glass cutting

COURSE OUTCOMES

1. Study and practice on machine tools and their operations.
2. Practice on manufacturing of components using workshop trades including fitting, carpentry, foundry and welding.
3. Identify and apply suitable tools for machining processes including turning, facing, thread cutting and tapping.
4. Welding and soldering operations.
5. Apply basic electrical engineering knowledge for house wiring practice.

Text Books:

1. Raghuwanshi B.S., Workshop Technology Vol. I & II, Dhanpath Rai & Sons.
2. Kannaiah P. and Narayana K.L., Workshop Manual, 2nd Edition, Sci-tech publishers.
3. John K.C., Mechanical Workshop Practice. 2nd Edition. PHI 2010.
4. Jeyapoovan T. and Pranitha S., Engineering Practices Lab Manual, 3rd Edition. Vikas Pub. 2008.

PROFESSIONAL ENGLISH

Module 1- Basics ofTechnicalEnglish [08]

Technical English: Definition; Extent& Coverage; Dimensions; Reading; Skimming; Scanning; Churning & Assimilation; Writing: Methods: Inductive; Deductive; Exposition; Linear; Interrupted; Spatial & Chronological etc; Technical Communication; Approaches: Brevity; Objectivity; Simplicity; Utility & Clarity. **Listening**: Active; Passive; Thinking strategies: Positive & Logical thinking; Speaking: Essentials Nuances & Modes of Speech Delivery.

Module 2- Components ofTechnicalWriting [08]

Vocabulary Building: Select words; Concept of word formation; Word formation; Root words from foreign languages & their use in English; Prefixes & Suffixes: Derivatives; Synonyms; Antonyms; Abbreviations. Homophones.One word substitutes; Requisites of Sentences.

Module 3- Basic TechnicalWritingSkills [08]

Forms: Business writing: Principle; Purchase & Sales Letters; Drafts; Official Writing: Official Letter; D.O. Letter; Notices; Agenda; Minutes of Meeting; Sentence Structure; Phrases & Clauses in sentences; Coherence; Unity; Emphasis in Writing; Devices; Use of Writing methods in Documents; Techniques of writing.

Module 4- Common Grammatical Errors &TechnicalStyle [08]

Subject-verb agreement; Correct usage: Noun; Pronoun; Agreement; Modifiers; Articles; Prepositions; Cliches; Redundancies; Technical Style: Features; Choice of words; Sentences: Descriptive; Narrative; Expository; Defining & Classifying; Length of paragraph; Writing of Introduction & Conclusion.

Module 5- Presentation Strategies &Oral Communications [08]

Analysis of locale; Audience; Modulating Style & Content; Speaking with confidence; Kinesics; Paralinguistic features of Voice-Dynamics: Pitch; Intonation; Stress & Rhythm; Conversation & dialogues; Communication at work-place;etc.

COURSE OUTCOMES

1. Students will be enabled to **understand** the basic objective of the course by being acquainted with specific dimensions of communication skills i.e. Reading, Writing, Listening, Thinking andSpeaking.
2. Students would be able to **create** substantial base by the formation of strong professional vocabulary for its application at different platforms and through numerous modes as Comprehension, reading, writing and speakingetc.
3. Students will **apply** it at their work place for writing purposes such as Presentation/official drafting/administrative communication and use it for document/project/report/research paperwriting.

4. Students will be made to **evaluate** the correct & error-free writing by being well- versed in rules of English grammar & cultivate relevant technical style of communication & presentation at their work place & also for academicuses.

5. Students will **apply** it for practical and oral presentation purposes by being honed up in presentation skills and voice-dynamics. They will apply techniques for developing inter- personal communication skills and positive attitude leading to their professional competence.

Text Books:

1. Technical Communication – Principles and Practices by Meenakshi Raman & Sangeeta Sharma, Oxford Univ. Press, 2016, NewDelhi.
2. Improve Your Writing ed. V.N. Arora and Laxmi Chandra, Oxford Univ. Press, 2001, New Delhi.

Reference Books:

1. Word Power Made Easy by Norman Lewis, W.R.Goyal Pub. & Distributors, 2009,Delhi.
2. Manual of Practical Communication by L.U.B. Pandey; A.I.T.B.S. Publications India Ltd.; Krishan Nagar, 2013, Delhi.
3. English Grammar and Usage by R.P.Singh, Oxford University Press, 2005, NewDelhi.
4. English Grammar, Composition and Usage by N.K.Agrawal & F.T.Wood, Macmillan India Ltd., New Delhi.
5. Effective Communication Skill, Kulbhusan Kumar, RS Salaria, Khanna Publishing House
6. English Grammar & Composition by Wren & Martin, S.Chand& Co. Ltd., NewDelhi.
7. Communication Skills for Engineers and Scientists, Sangeeta Sharma et.al. PHI Learning Pvt. Ltd, 2011, New Delhi.
8. Personality Development, Harold R. Wallace & L.Ann Masters, Cengage Learning, NewDelhi
9. Personality Development & Soft Skills, Barun K.Mitra, Oxford University Press, 2012 NewDelhi.
10. Business Correspondence and Report Writing by Prof. R.C. Sharma & Krishna Mohan, Tata McGraw Hill & Co. Ltd., 2001, NewDelhi.
11. Developing Communication Skills by Krishna Mohan, Meera Bannerji- Macmillan India Ltd. 1990, Delhi.
12. Spoken English- A manual of Speech and Phonetics by R.K.Bansal & J.B.Harrison, Orient Blackswan, 2013, New Delhi.
13. Business English by Ken Taylor, Orient Blackswan, 2011, New Delhi.