Bachelor of Technology

(1ˢᵗ and 2ⁿᵈ semester)

Batch 2025 & Onwards

(For Main Campus, Constituent Campuses and Affiliated Colleges)

By

Department of Academics

I.K. Gujral Punjab Technical University

I. K. Gujral Punjab Technical University
Bachelor of Technology (B.Tech. 1st Year) Batch 2025 Onwards Onwards)

Bachelors of Technology 1st and 2nd semester
Under Graduate (UG) Programme of 4 Years (8 Semesters) duration
Eligibility for Admission: As per AICTE / Punjab Govt. norms.

First Semester　　　　　　　　***Group-A***　　　　　　　　*Contact Hrs.:25*

Course Code	Course Type	Course Title	Load Allocations			Marks Distribution		Total Marks	Credits
			L	T	P	Internal	External		
BTPH101-23	Basic Science Course	Engineering Physics	3	1	0	40	60	100	4
BTPH102-23	Basic Science Course	Engineering Physics Lab	0	0	2	30	20	50	1
BTAM101-23	Basic Science Course	Engineering Mathematics-I	3*	1	0	40	60	100	4
BTEE101-18	Engineering Science Course	Basic Electrical Engineering	3	1	0	40	60	100	4
BTEE102-18	Engineering Science Course	Basic Electrical Engineering(Lab)	0	0	2	30	20	50	1
BTME101-21	Engineering Science Courses	Engineering Graphics & Design	1	0	5	40	60	100	3
EMC-101-25	Skill Based	Entrepreneurship Setup and Launch**	0	0	4	60	40	100	2
BMPD101-18		Mentoring and Professional Development	0	0	2	Satisfactory / Un-Satisfactory			Non-Credit
TOTAL			**10**	**3**	**15**	**280**	**320**	**600**	**19**

*These are the minimum contact hrs. allocated. The contact hrs. may be increased by an institute as per the requirement of the subject.

**The department of Higher Education and Languages, Government of Punjab endeavor to AI-powdered entrepreneurship learning platform on the said course. The Institute /Campus shall appoint an assistant professor as faculty coordinator.

First Semester　　　　　　　　***Group-B***　　　　　　　　*ContactHrs.:29*

Course Code	Course Type	Course Title	Load Allocations			Marks Distribution		Total Marks	Credits
			L	T	P	Internal	External		
BTCH101-23	Basic Science Course	Chemistry-I	3	1	0	40	60	100	4
BTCH102-18	Basic Science Course	Chemistry-I Lab	0	0	2	30	20	50	1
BTAM101-23	Basic Science Course	Engineering Mathematics-I	3*	1	0	40	60	100	4
BTPS101-18	Engineering Science Course	Programming for Problem Solving	3	0	0	40	60	100	3
BTPS102-18	Engineering Science Course	Programming for Problem Solving(Lab)	0	0	4	30	20	50	2
BTMP101-18	Engineering Science Courses	Workshop / Manufacturing Practices	1	0	4	60	40	100	3
BTHU101-18	Humanities and Social Sciences including Management courses	English	2	0	0	40	60	100	2
BTHU102-18	Humanities and Social Sciences including Management courses	English(Lab)	0	0	2	30	20	50	1
BMPD101-18		Mentoring and Professional Development	0	0	2	Satisfactory / Un-Satisfactory			Non-Credit
TOTAL			**12**	**2**	**14**	**310**	**340**	**650**	**20**

*These are the minimum contact hrs. allocated. The contact hrs. maybe increased by an institute as per the requirement of the subject.

I. K. Gujral Punjab Technical University
Bachelor of Technology (B.Tech. 1st Year) Batch 2025 Onwards Onwards)

Second Semester   *Group-A*   *Contact Hrs.:29*

Course Code	Course Type	Course Title	Load Allocations			Marks Distribution		Total Marks	Credits
			L	T	P	Internal	External		
BTCH101-23	Basic Science Course	Chemistry-I	3	1	0	40	60	100	4
BTCH102-18	Basic Science Course	Chemistry-I Lab	0	0	2	30	20	50	1
BTAM201-23	Basic Science Course	Engineering Mathematics–II	3*	1	0	40	60	100	4
BTPS101-18	Engineering Science Course	Programming for Problem Solving	3	0	0	40	60	100	3
BTPS102-18	Engineering Science Course	Programming for Problem Solving(Lab)	0	0	4	30	20	50	2
BTMP101-18	Engineering Science Courses	Workshop / Manufacturing Practices	1	0	4	60	40	100	3
BTHU101-18	Humanities and Social Sciences including Management Courses	English	2	0	0	40	60	100	2
BTHU102-18	Humanities and Social Sciences including Management courses	English(Lab)	0	0	2	30	20	50	1
BMPD201-18		Mentoring and Professional Development	0	0	2	Satisfactory / Un-Satisfactory			Non-Credit
TOTAL			**12**	**2**	**14**	**310**	**340**	**650**	**20**

*These are the minimum contact hrs. allocated. The contact hrs. may be increased by institute as per the requirement of the subject.

Second Semester   *Group-B*   *Contact Hrs.:25*

Course Code	Course Type	Course Title	Load Allocations			Marks Distribution		Total Marks	Credits
			L	T	P	Internal	External		
BTPH101-23	Basic Science Course	Engineering Physics	3	1	0	40	60	100	4
BTPH102-23	Basic Science Course	Engineering Physics Lab	0	0	2	30	20	50	1
BTAM201-23	Basic Science Course	Engineering Mathematics-II	3*	1	0	40	60	100	4
BTEE101-18	Engineering Science Course	Basic Electrical Engineering	3	1	0	40	60	100	4
BTEE102-18	Engineering Science Course	Basic Electrical Engineering(Lab)	0	0	2	30	20	50	1
BTME101-21	Engineering Science Courses	Engineering Graphics & Design	1	0	5	40	60	100	3
EMC-101-25	Skill Based	Entrepreneurship Setup and Launch**	0	0	4	60	40	100	2
BMPD201-18		Mentoring and Professional Development	0	0	2	Satisfactory / Un-Satisfactory			Non-Credit
TOTAL			**10**	**3**	**15**	**280**	**320**	**600**	**19**

*These are the minimum contact hrs. allocated. The contact hrs. may be increased by institute as per the requirement of the subject.

**The department of Higher Education and Languages, Government of Punjab endeavor to AI-powdered entrepreneurship learning platform on the said course. The Institute /Campus shall appoint an assistant professor as faculty coordinator.

Note: 1.Mentoring and Professional Development will be offered as mandatory Non-Credit course. Mentoring and Professional Development course will have internal evaluation only.

2. This study scheme & syllabus is not applicable for B. Tech Chemical Engineering and B. Tech Petrochem & Petroleum Refinery Engineering. The study scheme and syllabus of B. Tech Chemical Engineering and B. Tech Petrochem & Petroleum Refinery Engineering are separate.

3. There will be an external theory exam for subject code BTME101-21 (Engineering Graphics & Design) For detail evaluation scheme referred to detailed syllabus (Page No.26).

4. The Institutional Summer Vacation Training (4 Weeks) as per IKGPTU/DA/792 dated 21.05.2019.

A. Definition of Credit:

1 Hr. Lecture (L) per week	1 credit
1 Hr. Tutorial (T) per week	1 credit
1 Hr. Practical (P) per week	0.5 credits
2 Hours Practical (Lab)/week	1 credit

B. Range of Credit:

A range of credits from 150 to 160 for a student to be eligible to get Undergraduate degree in Engineering. A student will be eligible to get Undergraduate degree with Honors or additional Minor Engineering, if he/she completes an additional 20 credits. These could be acquired through MOOCs.

C. Structure of Undergraduate Engineering program:

Sr. No.	Category	Suggested Breakup of Credits (Total 160)
1	Humanities and Social Sciences including Management courses	12
2	Basic Science courses	25
3	Engineering Science courses including workshop, drawing, basics of electrical/mechanical/computer etc.	24
4	Professional core courses	48
5	Professional Elective courses relevant to chosen specialization/branch	18
6	Open subjects – Electives from other technical and /or emerging subjects	18
7	Project work, seminar and internship in industry or elsewhere	15
8	Mandatory Courses [Environmental Sciences, Induction training, Indian Constitution, Essence of Indian Traditional Knowledge]	(non-credit)
	Total	**160**

Guidelines regarding Mentoring and Professional Development

The objective of mentoring will be development of:

o   Overall Personality
o   Aptitude (Technical and General)
o   General Awareness (Current Affairs and GK)
o   Communication Skills
o   Presentation Skills

The course shall be split in two sections, i.e. outdoor activities and class activities. For achieving the above, suggestive list of activities to be conducted are:

Part – A
(Class Activities)

1. Expert and video lecturers
2. Aptitude Test
3. Group Discussion
4. Quiz (General/Technical)
5. Presentations by the students
6. Team building Exercises

Part – B
(Class Activities)

1. Sports/NSS/NCC
2. Society Activities of various students chapter i.e. ISTE, SCIE, SAE, CSI, Cultural Club, etc.

Evaluation shall be based on rubrics for Part – A & B

Mentors/Faculty incharges shall maintain proper student record, student wise of each activity conducted and the same shall be submitted to the department.

Induction Programs: A Guide to Induction Program

Introduction:

(Induction Program was discussed and approved for all colleges by AICTE in March 2017. It was discussed and accepted by the Council of IITs for all IITs in August 2016. It was originally proposed by a Committee of IIT Directors and accepted at the meeting of all IIT Directors in March 2016.[1] This guide has been prepared based on the Report of the Committee of IIT Directors and the experience gained through its pilot implementation in July 2016 as accepted by the Council of IITs. Purpose of this document is to help institutions in understanding the spirit of the accepted Induction Program and implementing it.)

Engineering colleges were established to train graduates well in the branch/department of admission, have a holistic outlook, and have a desire to work for national needs and beyond.

The graduating student must have knowledge and skills in the area of his study. However, he must also have broad understanding of society and relationships. Character needs to be nurtured as an essential quality by which he would understand and fulfill his responsibility as an engineer, a citizen and a human being. Besides the above, several meta-skills and underlying values are needed.

There is a mad rush for engineering today, without the student determining for himself his interests and his goals. This is a major factor in the current state of demotivation towards studies that exists among UG students.

The success of gaining admission into a desired institution but failure in getting the desired branch, with peer pressure generating its own problems, leads to a peer environment that is demotivating and corrosive. Start of hostel life without close parental supervision at the same time, further worsens it with also a poor daily routine.

To come out of this situation, a multi-pronged approach is needed. One will have to work closely with the newly joined students in making them feel comfortable, allowing them to explore their academic interests and activities, reduce competition and make them

[1]A Committee of IIT Directors was setup in the 152nd Meeting of IIT Directors on 6th September 2015 at IIT Patna, on how to motivate undergraduate students at IITs towards studies, and to develop verbal ability. The Committee submitted its report on 19th January 2016. It was considered at the 153rd Meeting of all IIT Directors at IIT Mandi on 26 March 2016, and the accepted report came out on 31 March 2016. The Induction Program was an important recommendation, and its pilot was implemented by three IITs, namely, IIT(BHU), IIT Mandi and IIT Patna in July 2016. At the 50th meeting of the Council of IITs on 23 August 2016, recommendation on the Induction Program and the report of its pilot implementation were discussed and the program was accepted for all IITs.

Work for excellence, promote bonding within them, build relations between teachers and students, give a broader view of life, and build character.

Induction Program

When new students enter an institution, they come with diverse thoughts, backgrounds and preparations. It is important to help them adjust to the new environment and inculcate in them the ethos of the institution with a sense of larger purpose. Precious little is done by most of the institutions, except for an orientation program lasting a couple of days.

We propose a 3-week long induction program for the UG students entering the institution, right at the start. Normal classes start only after the induction program is over. Its purpose is to make the students feel comfortable in their new environment, open them up, set a healthy daily routine, create bonding in the batch as well as between faculty and students, develop awarness, sensitivity and understanding of the self, people around them, society at large, and nature[2].

The time during the Induction Program is also used to rectify some critical lacunas, for example, English background, for those students who have deficiency in it.

The following are the activities under the induction program in which the student would be fully engaged throughout the day for the entire duration of the program.

Induction Program as described here borrows from three programs running earlier at different institutions:

1) Foundation Program running at IIT Gadhinagar since July 2011

2) Human Values course running at IIIT Hyderabad since July 2005, and

3) Counselling Service or mentorship running at several IITs for many decades. Contribution of each one is described next.

(1) IIT Gandhinagar was the first IIT to recognize and implement a special 5-week Foundation Program for the incoming 1st year UG students. It took a bold step that the normal classes would start only after the five-week period. It involved activities such as games, art, etc., and also science and other creative workshops and lectures by resource persons from outside.

(2) IIIT Hyderabad was the first one to implement a compulsory course on Human Values. Under it, classes were held by faculty through discussions in small groups of students, rather than in lecture mode. Moreover, faculty from all departments got involved in conducting the group discussions under the course. The content is non-sectarian, and the mode is dialogical rather than sermonising or lecturing. Faculty were trained beforehand, to conduct these discussions and to guide students on issues of life.

(3) Counselling at some of the IITs involves setting up mentor-mentee network under which 1st year students would be divided into small groups, each assigned a senior student as a student guide, and a faculty member as a mentor. Thus, a new student gets connected to a faculty member as well as senior student, to whom he/she could go to in case of any difficulty whether psychological, financial, academic, or otherwise.

The Induction Program defined here amalgamates all the three into an integrated whole, which leads to its high effectiveness in terms of building physical activity, creativity, bonding, and character. It develops sensitivity towards self and one's relationships, builds awareness about others and society beyond the individual, and also in bonding with their own batch-mates and a senior student besides a faculty member

Scaling up the above amalgamation to an intake batch of 1000 plus students was done at IIT(BHU), Varanasi starting from July 2016.

2.1 **PHYSICAL ACTIVITY**

This would involve a daily routine of physical activity with games and sports. It would start with all students coming to the field at 6 am for light physical exercise or yoga. There would also be games in the evening or at other suitable times according to the local climate. These would help develop teamwork. Each student should pick one game and learn it for three weeks. There could also be gardening or other suitably designed activity where labour yields fruits from nature.

2.2 CREATIVE ARTS

Every student would chose one skill related to the arts whether visual arts or performing arts. Examples are painting, sculpture, pottery, music, dance etc. The student would pursue it everyday for the duration of the program.

These would allow for creative expression. It would develop a sense of aesthetics and also enhance creativity which would, hopefully, flow into engineering design later.

2.3 UNIVERSAL HUMAN VALUES

It gets the student to explore oneself and allows one to experience the joy of learning, stand up to peer pressure, take decisions with courage, be aware of relationships with colleagues and supporting staff in the hostel and department, be sensitive to others, etc. The need for character building has been underlined earlier. A module in Universal Human Values provides the base.

Methodology of teaching this content is extremely important. It must not be through do's and don'ts but get students to explore and think by engaging them in a dialogue. It is best taught through group discussions and real-life activities rather than lecturing. The role of group discussions, however, with clarity of thought of the teachers cannot be over emphasized. It is essential for giving exposure, guiding thoughts, and realizing values.

The teachers must come from all the departments rather than only one department like HSS or from outside of the Institute. Experiments in this direction at IIT(BHU) are noteworthy and one can learn from them[3].

Discussions would be conducted in small groups of about 20 students with a faculty mentor each. It is to open thinking towards the self. Universal Human Values discussions could even continue for the rest of the semester as a normal course and not stop with the induction program.

Besides drawing the attention of the student to larger issues of life, it would build relationships between teachers and students which last for their entire 4-year stay and possibly beyond.

[3]The Universal Human Values Course is a result of a long series of experiments at educational institutes starting from IIT-Delhi and IIT Kanpur in the 1980s and 1990s as an elective course, NIT Raipur in late 1990s as a compulsory one-week off campus program. The courses at IIT(BHU) which started from July 2014, are taken and developed from two compulsory courses at IIIT Hyderabad first introduced in July 2005.

2.4 LITERARY

Literary activity would encompass reading, writing and possibly, debating, enacting a play etc.

2.5 PROFICIENCY MODULES

This period can be used to overcome some critical lacunas that students might have, for example, English, computer familiarity etc. These should run like crash courses, so that when normal courses start after the induction program, the student has overcome the lacunas substantially. We hope that problems arising due to lack of English skills, wherein students start lagging behind or failing in several subjects, for no fault of theirs, would, hopefully, become a thing of the past.

2.6 LECTURES BY EMINENT PEOPLE

This period can be utilized for lectures by eminent people, say, once a week. It would give the students exposure to people who are socially active or in public life.

2.7 VISITS TO LOCAL AREA

A couple of visits to the landmarks of the city, or a hospital or orphanage could be organized. This would familiarize them with the area as well as expose them to the under privileged.

2.8 FAMILIARIZATION TO DEPT./BRANCH & INNOVATIONS

The students should be told about different method of study compared to coaching that is needed at IITs. They should be told about what getting into a branch or department means what role it plays in society, through its technology. They should also be shown the laboratories, workshops & other facilities.

3.1 SCHEDULE

The activities during the Induction Program would have an Initial Phase, a Regular Phase and a Closing Phase. The Initial and Closing Phases would be two days each.

Time	Activity
Day 0 Whole Day	Students arrive – Hostel allotment. (Preferably do pre-allotment)
Day-1 09:00 am- 03:00 pm 04:30 pm - 06:00 pm	Academic Registration Orientation
Day-2 09:00 am - 10:00 am	Diagnostic Test (for English etc.)
10:15am - 12:25 pm	Visit to respective depts..
12:30 pm - 01:55 pm	Lunch
02:00 pm -02:55 pm	Director's address
03:00 pm – 05:00 pm	Interaction with parents
03:30 pm – 05:00 pm	Mentor-mentee groups – introduction within group (Same as Universal Human Values groups)

3.2 REGULAR PHASE

After two days the starts the Regular Phase of induction. With this phase there would be regular program to be followed every day.

3.2.1 DAILY SCHEDULE

Some of the activities are on a daily basis, while some others are at specified periods within the Induction Program. We first show a typical daily timetable.

Session	Time	Activity	Remarks
Day 3 onwards			

Session	Time	Activity	Remarks
	06:00 am	*Wake up call*	
I	06:30 am - 07:10 am	Physical activity (mild exercise/yoga)	
	07:15 am - 08:55 am	*Bath, Breakfast, etc.*	
II	09:00 am - 10:55 am	Creative Arts / Universal Human Values	Half the group do creative arts
III	11:00 am - 12:55 pm	Universal Human Values / Creative Arts	Complimentary Alternate
	01:00 pm - 02:25 pm	*Lunch*	
IV	02:30 pm - 03:55 pm	Afternoon Session	See Below
V	04:00 pm - 05:00 pm	Afternoon Session	See Below
	05:00 pm - 05:25 pm	*Break / light tea*	
VI	05:30 pm - 06:45 pm	Games / Special Lectures	
	06:50 pm - 08:25 pm	*Rest and Dinner*	
VII	08:30 pm - 09:25 pm	Informal interactions (in hostels)	

Sundays are off . Saturdays have the same schedule as above or have outings.

3.2.2   AFTERNOON ACTIVITIES (NON-DAILY)

The following five activities are scheduled at different times of the Induction Program, and are not held daily for everyone:

1. Familiarization to Dept. / Branch & Innovations
2. Visits to Local Area
3. Lectures by Eminent People
4. Literary
5. Proficiency Modules

Here is the approximate activity schedule for the afternoons (may be changed to suit local needs):

Activity Session Remarks Familiarization with IV For 3 days (Day 3 to 5) Dept/Branch & Innovations

Visits to Local Area IV, V and For 3 days - interspersed (e.g., III-VI Saturdays)

Lectures by Eminent People IV As scheduled - 3-5 lectures

Literary (Play / Book IV For 3-5 days Reading / Lecture)

Proficiency Modules V Daily, but only for those who need it

3.3 CLOSING PHASE

Time	Activity
Last But One Day	
08:30 am - 12 noon	Discussions and finalization of presentation with each group
02:00 am - 05:00 pm	Presentation by each group in front of 4 other groups besides their own (about 100 students)
Last Day (Whole Day)	Examinations (if any). May be expanded to last 2 days, in case needed.

3.4 FOLLOW UP AFTER CLOSURE

A question comes up as to what would be the follow up program after the formal 3-week Induction Program is over? The groups which are formed should function as mentor-mentee network. A student should feel free to approach his faculty mentor or the student guide, when facing any kind of problem, whether academic or financial or psychological etc. (For every 10 undergraduate first year students, there would be a senior student as a student guide, and for every 20 students, there would be a faculty mentor.) Such a group should remain for the entire 4-5 year duration of the stay of the student. Therefore, it would be good to have groups with the students as well as teachers from the same department/discipline[4].

Here we list some important suggestions which have come up and which have been experimented with.

3.4.1   FOLLOW UP AFTER CLOSURE – SAME SEMESTER

It is suggested that the groups meet with their faculty mentors once a month, within the semester after the 3-week Induction Program is over. This should be a scheduled meeting shown in the timetable. (The groups are of course free to meet together on their own more often, for the student groups to be invited to their faculty mentor's home for dinner or tea, nature walk, etc.)

3.4.2   FOLLOW UP – SUBSEQUENT SEMESTERS

It is extremely important that continuity be maintained in subsequent semesters.

It is suggested that at the start of the subsequent semesters (upto fourth semester), three days be set aside for three full days of activities related to follow up to Induction Program. The students are shown inspiring films, do collective artwork, and group discussions be conducted. Subsequently, the groups should meet at least once a month.

SUMMARY

Engineering institutions were set up to generate well trained manpower in engineering with a feeling of responsibility towards oneself, one's family, and society. The incoming undergraduate students are driven by their parents and society to join engineering without understanding their own interests and talents. As a result, most students fail to link up with the goals of their own institution.

The graduating student must have values as a human being, and knowledge and meta-skills related to his/her profession as an engineer and as a citizen. Most students who get demotivated to study engineering or their branch, also lose interest in learning.

The *Induction Program* is designed to make the newly joined students feel comfortable, sensitize them towards exploring their academic interests and activities, reducing competition and making them work for excellence, promote bonding within them, build relations between teachers and students, give a broader view of life, and building of character.

The *Universal Human Values* component, which acts as an anchor, develops awareness and sensitivity, feeling of equality, compassion and oneness, draw attention to society and

[4]We are aware that there are advantages in mixing the students from different depts. However, in mixing, it is our experience that the continuity of the group together with the faculty mentor breaks down soon after. Therefore, the groups be from the same dept. but hostel wings have the mixed students from different depts. For example, the hostel room allotment should be in alphabetical order irrespective of dept.

nature, and character to follow through. It also makes them reflect on their relationship with their families and extended family in the college (with hostel staff and others). It also connects students with each other and with teachers, so that they can share any difficulty they might be facing and seek help.

REFERENCES:

Motivating UG Students Towards Studies,

Rajeev Sangal, IITBHU Varanasi, Gautam Biswas, IIT Guwahati, Timothy Gonsalves, IIT Mandi, Pushpak Bhattacharya, IIT Patna, (Committee of IIT Directors), 31 March 2016, IIT Directors' Secretariat, IIT Delhi.

Contact: *Prof. Rajeev Sangal* Director, IIT(BHU), Varanasi, (director@iitbhu.ac.in)

BTPH101-23	Engineering Physics	L-3, T-1, P-0	4 Credits

Pre-requisite: (i) High-school education

Course Objectives: The objective of the course is to develop a scientific temper and analytical capability in the engineering graduates through the learning of physical concepts and their application in engineering & technology. Comprehension of some basic physical concepts will enable graduates to think logically the engineering problems that would come across due to rapidly developing new technologies.

Course Outcomes: At the end of the course, the student will be able to

CO1	Acquire knowledge about the Maxwell equation and Electromagnetic spectrum.
CO2	Understand the working, properties and characterization techniques of semiconductor materials and devices.
CO3	Appreciate the need for quantum mechanics, wave particle duality, uncertainty principle etc. and their applications.
CO4	Understand the properties and synthesis of nanomaterials.
CO5	Understand laser system, optical fibre in industries, laboratories and in communication.

Detailed Syllabus:

PART A

1. **Elements of crystallography:** Unit cell, Basis, Space lattice, Crystal Systems, Miller Indices of Planes and directions, bonding in solids, origin of bands in solids (Qualitative idea), Metals, semiconductors & insulators; Continuous & Characteristic X - Rays, X - Ray Diffraction & Bragg's law in Crystals, Bragg's spectrometer. (5)

2. **Semiconductor materials:** Intrinsic and extrinsic semiconductors, p-type, and n-type semiconductors; Fermi level in semiconductors; Current conduction in semiconductors, I-V characteristicsof p-n junction diode, Some special p-n diodes: Zener diode, Tunnel diode, Photo diode, and Light emitting diode. (5)

3. **Magnetic Materials & Superconductivity:** Basic ideas of Dia, Para, Ferro & Ferrimagnetic materials, Ferrites, Hysteresis loop, Magnetic Anisotropy, Superconductivity, Superconductors as ideal diamagnetic materials, Signatures of Superconducting state, Meissner Effect, Type I & Type II superconductors, London Equations. (5)

4. **EM waves & Dielectrics:** Physical significance of Gradient, Divergence & Curl, Relationship between Electric Field & Potential, Dielectric polarization, Displacement current, Maxwell's Equations, electromagnetic wave propagation in free space and isotropic dielectric medium, Poynting vector, Electromagnetic Spectrum (Basic ideas of different region).(5)

PART B

5. **Quantum Theory:** Need and origin of quantum concept, Wave - particle duality, Matter waves,Group & Phase velocities; Wave function and Born interpretation; Uncertainty Principle; Schrodinger wave equations (time independent & dependent);Application to particle in a box. (5).

6. **Lasers:** Concepts of laser, Spontaneous & Stimulated emissions, Einstein's Coefficients, Population Inversion, Pumping Mechanisms, Components of a laser System, Three & four level laser systems; Ruby, He -Ne, and semiconductor Lasers, Introduction to Holography. (5)

7. **Fibre Optics:** Introduction, Acceptance Angle, Numerical Aperture, Normalized frequency, Modes of propagation, material dispersion & pulse broadening in optical fibres, fibre connectors, splices and couplers, Applications of optical fibres. (5)

8. **Nanomaterials:** Nanoscale, Classifications of nanomaterials (3D, 2D, 1D and 0D), electron confinement, Nanocomposites, Carbon nanotubes (CNTs), Properties of nanomaterials, synthesis of nanomaterials, ball milling and sol-gel techniques, Basic characterization techniques for nanomaterials, Applications of nanomaterials. (5)

Suggested Readings/Books:

1. Physics for Scientists & Engineers (Vol. I & II), Serway& Jewett, 6ᵗʰ Edition., Cengage Learning.
2. Engineering Physics, Malik; HK, Singh; AK, Tata McGraw Hill.
3. Materials Science &Engg., Raghvan V., Prentice Hall of India.
4. University Physics with Modern Physics,Young Hugh D. and Freedman Roger A., Pearson
5. Concepts of Modern Physics, Beiser; A., Mahajan; S., Choudhary; SR, Tata McGraw Hill.
6. Solid State Physics, Dan Wei, Cengage Learning.
7. Introduction to Solids, Azaroff LV, Tata Mc Graw Hill.
8. Introduction to Electrodynamics, Griffiths; DJ, Prentice Hall.
9. Lasers & Optical engineering, Dass; P, Narosa Publishers.
10. Optical Fibre system, Technology, Design & Applications, Kao; CK, McGraw Hill.
11. Laser Theory & Applications, Thygrajan; K, Ghatak; AK, Mc Millan India Ltd.

BTPH102-23	Engineering Physics lab	L-0, T-0, P-2	1.0 Credits

Pre-requisite (if any):(i) High-school education

Course Objectives: The aim and objective of the Engineering Physics lab is to provide students the firsthand experience of verifying various theoretical concepts learnt in theory courses so that they can use these in Engineering as per their requirement.

Laboratory Outcomes: At the end of the course, students will be

CO1	Able to verify some of the theoretical concepts learnt in theory courses.
CO2	Trained in carrying out precise measurements and handling sensitive equipment.
CO3	Introduced to the methods used for estimating and dealing with experimental uncertainties and systematic errors.
CO4	Learn to draw conclusions from data and develop skills in experimental design.
CO5	Write a technical report which communicates scientific information in a clear and concise manner.

Detailed Syllabus:

Note: Students are expected to perform about 8-10 experiments from the following list, selecting minimum of 6-7 from the Physical Lab and 2-3 from the Virtual lab.

List of experiments:

1. To study the characteristics of different p-n junction diode - Ge and Si.
2. To analyze the suitability of a given Zener diode as voltage regulator.
3. To find out the intensity response of a solar cell/Photo diode/LED/Tunnel diode.
4. To study the magnetic field of a circular coil carrying current.
5. To find out polarizability of a dielectric substance.
6. To study the laser beam characteristics like; wavelength and grating element using diffraction grating & divergence.
7. To study laser interference using Michelson's Interferometer.
8. To determine numerical aperture, attenuation & propagation losses in optical fibers.
9. To find out the frequency of AC mains using electric vibrator/sonometer.
10. To find the refractive index of a material/liquid using spectrometer.
11. To study B-H curve using CRO.
12. To find the velocity of ultrasound in liquid.
13. To determine the grain size of a material using optical microscope.
14. To determine energy band gap of Semiconductor.
15. To determine the resistivity of semiconductors by Four probe Method.
16. To understand the phenomenon Photoelectric effect and determine Planck's constant.

Suggested readings/Books:

1. Practical Physics, C.L. Arora, S. Chand & Co.
2. Practical Physics, R.S. Sirohi, Wiley Eastern.

BTAM101-23	Engineering Mathematics-I	L-4, T-1, P-0	4.0 Credits
Pre-requisite (if any): Calculus of one variable functions			

Course Objectives: The objective of the Engineering Mathematics-I is to enable the students to understand the concepts of basic mathematical methods for sequence & series of real numbers, improper integrals and multivariable calculus. So that they can apply these techniques to solve engineering problems.

Laboratory Outcomes: At the end of the course, students will be

CO1	able to verify some of the theoretical concepts learnt in the theory courses.
CO2	trained to visualize and conceptualize the engineering problems
CO3	to model the engineering problem mathematically using theory of calculus
CO4	learn to draw conclusions from data and develop skills in industrial problems
CO5	to determine the solution of the studied engineering problem from application point of view.

Detailed Syllabus:

PART-A
Unit-I

Sequences and Series: Sequences, Limits of sequences, Infinite series, series of positive terms, Convergence and divergence of sequence and series, Integral test, Comparison test, Ratio test, Root test, Alternating series, Absolute and Conditional Convergence, Leibnitz test, Power series, radius of convergence of power series.

Unit-II

Integral Calculus: Length of curves, Volume (disk and washer method) and surface areas of revolution.

Improper Integrals: Improper integrals of the First kind, Improper integrals of the second kind, Absolute convergence of Improper integrals, Beta and Gamma functions, their properties, relationship among beta and gamma functions.

PART-B
Unit-III

Functions of Several Variables: Concept of limit and continuity of a function of two and three variables, Partial derivatives, total derivative and differentiability, approximation by total differentials, derivatives of composite function and implicit function, chain rule, homogenous functions, Euler's theorem for homogenous functions, Taylor's theorem (statement only), Maclaurin series, Maxima and minima of a function of two and three variables, Lagrange's method of multipliers.

Unit-IV

Multiple Integral: Double and triple integrals, Change of order of integration, Change of variables in integration, Applications to area and volumes.

RECOMMENDED BOOKS:

1) Maurice D. Weir, Joel Hass, Frank R. Giordano, Thomas, "Calculus" 12th edition, Pearson Education.
2) E. Kreyszig, "Advanced Engineering Mathematics", 8th Edition, John Wiley.
3) Michael D. Greenberg, "Advanced Engineering Mathematics", 2nd edition, Pearson Education.
4) R.K. Jain and S.R.K. Iyengar, "Advanced Engineering Mathematics" Narosa Publications.
5) B. V. Ramana, "Higher Engineering Mathematics", Tata McGraw Hill.
6) R. Garg, "Mathematics – I", Khanna Book Publishing Co. (P) Ltd. https://ekumbh.aicte-india.org/userugbook.php.

BTAM201-23	**Engineering Mathematics-II**	**L-4, T-1, P-0**	**4.0 Credits**
Pre-requisite (if any): Algebra of matrices, differentiation and integration			

Course Objectives: The objective of the Engineering Mathematics-II is to enable the students to understand the concepts of elimination methods for solving linear system of equations, inverse of matrices etc. Students will study concepts of vector spaces, solve ordinary and partial differential equations. So that they can apply these techniques to solve engineering problems.

Laboratory Outcomes: At the end of the course, students will be

CO1	able to verify some of the theoretical concepts learnt in the theory courses.
CO2	trained to visualize and conceptualize the engineering problems
CO3	to model the engineering problem mathematically using theory of matrices, ODE and PDE
CO4	learn to draw conclusions from data and develop skills in industrial problems
CO5	to determine the solution of the studied engineering problem from application point of view.

Detailed Syllabus:
PART-A
Unit-I
System of Linear Equations: Rank of a matrix, Echelon form of matrix, Homogenous and Non-homogenous system of linear equations, consistency and inconsistency of system of equations, Gauss elimination method, Inverse of a matrix, Gauss-Jordon method.
Unit-II
Vector Spaces: Vector spaces, Subspaces, Linear independence and Linear dependence of vectors, Dimension and basis, Linear transformation, rank and nullity theorem (without proof), matrix associated with Linear Transformation, eigen values, eigen vectors, Cayley-Hamilton theorem, algebraic multiplicity, geometric multiplicity, similar and diagonalizable matrices.

PART-B
Unit-III
Ordinary Differential Equations: Formation of Differential Equations, Solution of Differential Equations, Initial and Boundary value problems, Solution of equations in separable form, equations reducible to separable form, Exact differential equations, integrating factors, Linear first order equations, Bernoulli equation, Riccati equation, Clairaut's equation, Higher order differential equation with constant coefficients and variable coefficients, Method of variation of parameters, Method of undetermined coefficients, finding particular integrals. Applications to electric RLC circuit, Deflection of beams, Simple harmonic motion, Simple population decay model, Orthogonal trajectories of a given family of curves.

Unit-IV
Partial Differential Equations: Formation of first and second order equations, solution of first order equations: Lagrange's equation, surfaces orthogonal to a given family of surfaces, non-linear first order equations, Charpit's method, Higher order Linear equations with constant coefficients.

RECOMMENDED BOOKS:

1) Maurice D. Weir, Joel Hass, Frank R. Giordano, Thomas, "Calculus" 12th edition, Pearson Education.
2) E. Kreyszig, "Advanced Engineering Mathematics", 8th Edition, John Wiley.
3) Michael D. Greenberg, "Advanced Engineering Mathematics", 2nd edition, Pearson Education.
4) R.K. Jain and S.R.K. Iyengar, "Advanced Engineering Mathematics" Narosa Publications.
5) B. V. Ramana, "Higher Engineering Mathematics", Tata McGraw Hill.
6) R. Garg, "Mathematics – I", Khanna Book Publishing Co. (P) Ltd. https://ekumbh.aicte-india.org/userugbook.php.

Category	Engineering Science Course			
Course title	Basic Electrical Engineering (Theory & Lab.)			
Scheme and Credits	L	T	P	Credits	Semester –I/II
	3	1	2	5	
Pre-requisites (if any): Nil					

Course code: BTEE-101-18
Course Title: Basic Electrical Engineering (4 credits) [L: 3; T:1; P : 0]
Internal Marks: 40 **External Marks**: 60 **Total Marks**: 100
Course Outcomes: At the end of this course, students will

CO 1	Have the knowledge of DC circuits, AC Circuits, basic magnetic circuits, working principles of electrical machines, and components of low voltage electrical installations
CO 2	Be able to analyze DC circuits, AC Circuits
CO 3	Understand the basic magnetic circuits and apply it to the working of electrical machines
CO 4	Be introduced to types of wiring, batteries, and LT switchgear.

Detailed contents:

Module 1: DC Circuits (9 hours)

Electrical circuit elements (R, L and C), voltage and current sources, Kirchoff's current and voltage laws, analysis of simple circuits with dc excitation. Superposition, Thevenin's and Norton's Theorems. Time-domain analysis of first-order RL and RC circuits.

Module 2: AC Circuits (9 hours)

Representation of sinusoidal waveforms, peak and rms values, phasor representation, real power, reactive power, apparent power, power factor. Analysis of single-phase ac circuits consisting of R, L, C, RL, RC, RLC combinations (series and parallel), resonance. Three- phase balanced circuits, voltage and current relations in star and delta connections.

Module 3: Electrical Machines (16 hours)

Magnetic materials, BH characteristics, ideal and practical transformers, equivalent circuit, losses in transformers, regulation and efficiency. Auto-transformer and three-phase transformer connections. Generation of rotating magnetic fields, Construction and working of a three-phase induction motor, Significance of torque-slip characteristic. Loss components and efficiency, starting and speed control of induction motor. Single-phase induction motor. Construction, working, torque-speed characteristic and speed control of separately excited dc motors. Construction and working of synchronous generators.

Module 4: Electrical Installations (7 hours)

Components of LT Switchgear: Switch Fuse Unit (SFU), Miniature Circuit Breaker (MCB), Earth Leakage Circuit Breaker (ELCB), MCCB, Contactors, Types of Wires and Cables, Earthing. Types of Batteries, Important Characteristics for Batteries. Elementary calculations for energy consumption, power factor improvement and battery backup.

Suggested Text / Reference Books

D. P. Kothari and I. J. Nagrath, "Basic Electrical Engineering", Tata McGraw Hill, 2010. T.K.
Nagsarkar and M.S. Sukhija, "Basic Electrical Engineering", Oxford University Press D. C.
Kulshreshtha, "Basic Electrical Engineering", McGraw Hill, 2009.
L. S. Bobrow, "Fundamentals of Electrical Engineering", Oxford University Press, 2011. E.
Hughes, "Electrical and Electronics Technology", Pearson, 2010.
V. D. Toro, "Electrical Engineering Fundamentals", Prentice Hall India, 1989. B. L.
Theraja, "Electrical Technology", S Chand Publishing
J. B. Gupta, "Basic Electrical Engineering", S.K. Kataria & Sons

Course code: BTEE-102-18
Course Title: Basic Electrical Engineering Laboratory (1 credit) [L: 0; T:0; P : 2]
Internal Marks: 30 **External Marks**: 20 **Total Marks**: 50

LIST OF EXPERIMENTS/DEMONSTRATIONS:

❖ Basic safety precautions. Introduction and use of measuring instruments – voltmeter, ammeter, multi-meter, oscilloscope. Real-life resistors, capacitors and inductors.

❖ Measuring the steady-state and transient time-response of R-L, R-C, and R-L-C circuits to a step change in voltage (transient may be observed on a storage oscilloscope). Sinusoidal steady state response of R-L, and R-C circuits – impedance calculation and verification. Observation of phase differences between current and voltage. Resonance in R-L-C circuits.

❖ Transformers: Observation of the no-load current waveform on an oscilloscope (non-sinusoidal wave-shape due to B-H curve nonlinearity should be shown along with a discussion about harmonics). Loading of a transformer: measurement of primary and secondary voltages and currents, and power.

❖ Three-phase transformers: Star and Delta connections. Voltage and Current relationships (line-line voltage, phase-to-neutral voltage, line and phase currents). Phase-shifts between the primary and secondary side. Cumulative three-phase power in balanced three-phase circuits.

❖ Demonstrate of cut-out sections of machines: dc machine (commutator-brush arrangement), induction machine (squirrel cage rotor), synchronous machine (field winging - slip ring arrangement) and single-phase induction machine.

❖ Torque Speed Characteristic of separately excited dc motor.

❖ Synchronous speed of two and four-pole, three-phase induction motors. Direction reversal by change of phase-sequence of connections. Torque-Slip Characteristic of an induction motor. Generator operation of an induction machine driven at super-synchronous speed.

❖ Synchronous Machine operating as a generator: stand-alone operation with a load. Control of voltage through field excitation.

LABORATORY OUTCOMES

CO 1	The ability to use common electrical measuring instruments and understand the fundamentals of electrical engineering.
CO 2	The ability to make electrical connections, and measure power, power factor using appropriate equipment's.
CO 3	Have knowledge of electrical machines, components and their ratings.
CO 4	Understand the operation of transformers and electrical machines.

EXPERIMENTS

S. No.	Suggested List of Experiments
1.	To verify Ohm's Law and its limitations.
2.	To verify Kirchhoff's Laws.
3.	To measure the resistance and inductance of a coil by ammeter-voltmeter method
4.	To find voltage-current relationship in a R-L series circuit and to determine the power factor of the circuit.
5.	To verify the voltage and current relations in star and delta connected systems.
6.	To measure power and power factor in a single- phase AC circuit.
7.	To verify series and parallel resonance in AC circuits.
8.	To observe the B-H loop of ferromagnetic core material on CRO.
9.	To use a bridge rectifier for full- wave rectification of AC supply and to determine the relationship between RMS and average values of the rectified voltage.
10.	To measure the minimum operating voltage, current drawn, power consumed, and the power factor of a fluorescent tube light, Bulb, Single phase induction motor,
11.	To connect measuring analog and digital instruments to measure current, voltage, power and power factor.
12.	To perform open- and short circuit tests on a single- phase transformer and calculate its efficiency.
13.	To start and reverse the direction of rotation of a (i) DC motor (ii) three phase Induction motor.
14.	Study of starters for (i) DC motor (ii) Induction motor
15.	Study of Cut section of DC Series motor, DC shunt motor and three phase
16.	Calibration of energy meter.

Note: A student to perform any 8-10 Experiments from the above list.

Course code	BTME101-21				
Category	Engineering Science Courses				
Course title	Engineering Graphics & Design (Theory & Lab.)				
Scheme and Credits	**L**	**T**	**P**	**Credits**	**Semester – I**
	1	0	5	3	
Pre-requisites (if any)	-				
	Common to all branches				

COURSE OVERVIEW:

One of the best ways to communicate one's ideas is through some form of picture or drawing. This is especially true for engineers. An engineering drawing course focuses on usage of drawing instruments, lettering, construction of geometric shapes, etc. The students will study the use of dimensioning, shapes and angles or views of such drawings. Dimensions feature prominently, with a focus on interpretation, importance, and accurate reflection of dimensions in engineering drawing. Other areas of study in this course may include projected views and development of surfaces.

COURSE OBJECTIVES:

1. To understand the basic principles of engineering drawing
2. To have the knowledge of generating the pictorial views
3. Use CAD tools for making drawings of machine components and assemblies.
4. To have the knowledge of interpretation of dimensions of different quadrant projections.

COURSE OUTCOMES: On completion of this course students will be able to:

1. Prepare and understand drawings.
2. Use the principles of orthographic projections.
3. By studying projections of solids, students will be able to visualize three dimensional objects and that will enable them to design new products.
4. Design and fabricate surfaces of different shapes.
5. Represent the objects in three dimensional appearances.

NOTE:

The Question paper shall have following structure/weightage:

Section A – Short answer type Questions based upon whole syllabus – 10 questions of 02 marks each. (All questions are compulsory; 10 x 2 =20).

Section B – Questions from unit – I & II.; – 04 questions of 08 marks each

Section C – Questions from unit – III & IV.; – 04 questions of 08 marks each

(02 Question are to be attempted from Section B & C each; 01 question from Section B or C; 5 x 08=40 marks).

DETAILED CONTENTS

UNIT – I (18 Hrs.)

INTRODUCTION TO ENGINEERING DRAWING: Principles of engineering drawing / engineering graphics / technical drawing and their significance –Drawing Instruments: their Standard and uses – symbols and conventions in drawing practice – lettering & numbering – BIS conventions. Types of lines and their uses, Drawing Sheets: sizes and layout, methods of folding drawing sheet, Grades of pencils used, Dimensioning: definition, types and methods of dimensioning, geometrical construction, concept of scales in drawing, types of scales, construction of plane and diagonal scales.

UNIT – II (12 Hrs.)

ORTHOGRAPHIC PROJECTIONS: Relevance of projection, Types of projections, Principles of orthographic projections in reference to quadrants – conventions – first and third angle projections, illustration through simple problems of projection; Projections of points in quadrants. Projections and trace of a line with different possible orientations in a quadrant. Methods to find true length and inclination of a line with principal planes.

UNIT – III (18 Hrs.)

PROJECTIONS OF PLANES AND SOLIDS: Concept of plane and lamina, Projections of a lamina when; parallel to any reference plane, perpendicular to any reference plane, inclined to reference plane. Traces of planes. Definition of solid, types of solids – conventions-different possible orientations of solid in a quadrant. Projections of solid when; axis parallel to reference plane, perpendicular to reference plane, inclined to one and parallel to other reference plane, parallel to both horizontal and vertical planes.

UNIT – IV (12 Hrs.)

ISOMETRIC PROJECTIONS: Principles of Isometric Projections-Isometric Scale- Isometric Views or drawing- Conventions. Isometric drawing / projections of solids such as cube, prisms, pyramids, cylinder, and cone.

UNIT – V (12 Hrs.)

PRACTICE USING COMPUTER AIDED DRAFTING (CAD) TOOLS: Hands on training on any CAD software to strengthen the understanding of the engineering drawing wherein the students will be introduced to a number of assignments as mentioned in the syllabus.

SUGGESTED READING/BOOKS:

A. **TEXT BOOKS:**
   1. Engineering Drawing- Basant Agarwal, TMH
   2. D. M. Kulkarni, A. P. Rastogi, and A. K. Sarkar (2009), Engineering Graphicswith AutoCAD, PHI Learning Private Limited, New Delhi.
   3. P.S Gill, *"Engineering Drawing", S K Kataria and sons*, 18ᵗʰ edition, 2017 reprint
   4. Jolhe, Dhananjay (2006), Engineering Drawing: With an Introduction toCAD, Tata Mc Graw Hill, India.

B. **REFERENCE BOOKS:**
   1. N. D. Bhat (2006), Engineering Drawing, Charotar Publications, New Delhi.
   2. Venugopal (2010), Engineering Drawing and Graphics, 2nd edition, NewAge Publications, New Delhi.
   3. Johle (2009), Engineering Drawing, Tata Mc Graw Hill, New Delhi, India.
   4. Trymbaka Murthy (2007), *Computer Aided Engineering Drawing*, I.K.International Publishers, New Delhi.
   5. R.B. Choudary (2005), *Engineering graphics with Auto CAD*, AnuradhaPublishers, New Delhi.

Course code	EMC-101-25					
Category	Skill Based					
Course title	Entrepreneurship Setup and Launch					
Scheme & credits	**L**	**T**	**P**	**Credits**	**Internal**	**External**
	0	**0**	**4**	**2**	**60**	**40**
Semester	I/II					
Prerequisites (if any)	-					

INTRODUCTION:

This semester lays the foundation for the learner to understand what entrepreneurship is, beyond just starting a business. It introduces key ideas like problem-solving, value creation, and self-awareness. The learner will begin exploring basic business concepts while discovering their own interests and strengths.

LEARNERS OBJECTIVE:

1. Understand the core concepts of entrepreneurship through relatable, real-life examples.
2. Begin to see themselves as problem-solvers and creators.
3. Learn about business paths and choose one to try based on interest or local fit.
4. Launch a micro-hustle (online or offline) to earn their first income.
5. Build confidence and self-belief by doing.

OUTCOME: By the end of this semester, learners will start a simple business activity, earn their first income, and build belief in their ability to do business.

GUIDING PRINCIPLES/APPROACH:

This syllabus is built on principles of **experiential learning, growth mindset development**, and **identity-first learning**. Drawing from learning science and behavior design, the course shifts students from passive learning to *active doing*, where they try out small business activities in real contexts. The design helps students not just learn entrepreneurship but begin to see themselves as entrepreneurs. Emphasis is placed on *small wins, peer collaboration, and locally relevant opportunities* to ensure learning feels achievable and connected to their realities. The curriculum focuses on conceptual understanding without heavy theory, combining *practical action, reflection, and collaboration. By making progress visible and success feels possible, it plants the seeds of self-reliance, initiative, and long-term motivation.*

SEMESTER SYLLABUS:

Format: 12 weeks, 4 hours/week | 2 credits
Revenue Target: ₹10,000

Week	Learning Goal	Measurable Outcome
1	Understand what entrepreneurship is and who can be an entrepreneur	Students define entrepreneurship in their own words and list 2 entrepreneurs from their local area or community
2	Connect personal identity to entrepreneurship (strengths, interests, struggles)	Students create a "value map" showing how a skill/interest/problem from their life could become a business opportunity
3	Learn about 5 business paths: content creation, drop-shipping, cloud kitchen/food business, gig economy and local services	Students explore 1–2 examples from each domain and share one they're most curious to try and why
4	Choose a path and generate a basic business idea	Students write down a clear offer (what, for whom, why) and one way to reach their customer

Week	Learning Goal	Measurable Outcome
5	Take first real action: message, post, pitch, or sell	Students reach out to or serve 1 real potential customer and record what happened
6	Reflect on first attempt and share with peers	Students share their result, a challenge faced, and one idea to improve next time
7	Improve and try again: aim for first ₹100	Students apply a change, try again, and aim to make their first ₹100 or get meaningful response
8	Learn how to identify and understand your target customer	Students talk to 2 potential customers or observe them and list 3 insights about their needs
9	Learn how to serve your target audience better	Students improve one part of their offer (product, delivery, messaging, or interaction) based on customer feedback or need
10	Explore core entrepreneurial values (resilience, honesty, effort)	Students reflect on 1 value they're building and show it in a business task or peer story
11	Focus on earning and staying consistent	Students complete a second earning task and track their consistency (e.g., same product or message for 3 days)
12	Reflect on earnings, grit, and how to keep going	Students record total earnings, one resilience moment, and one support system or habit they'll continue with

WEEKLY COMPONENT:

Component	Duration	Description
Learning Module	~1.5 Hrs	•Introduces key concepts in a simple and engaging way. •Includes, examples, and 1–2 interactive discussions or quizzes
Action Lab	~1.5 Hrs	•Hands-on task on the weekly concept •Includes step-by-step guidance, templates, and worksheets •Ends with a submission (e.g., video, reflection, or proof of action)
Resources	Self-paced	Supplementary videos, short readings, real- life stories, and tools to deepen understanding at their own pace

EVALUATION CRITERIA:

Evaluation Component	Description	Weightage
Weekly Task Completion	Timely submission of weekly tasks including reflections, activities, quizzes etc.	30%
Target Completion	Performance-based evaluation on hitting revenue or profit targets (e.g., generating ₹10,000 revenue)	30%
Final Project	A comprehensive project based on the semester's theme	40%

Week 1: What is Entrepreneurship? Who Can Be an entrepreneur?

INTRODUCTION: Could *You* Be an entrepreneur?

When people hear "entrepreneur," they often think it means having a company, investors, or an MBA. Some even believe it's only for toppers or those with high grades. But entrepreneurship is more about mindset than qualifications: it's about seeing a problem and doing something about it. Like someone who starts selling snacks because their school canteen is always shut, or a friend who fixes broken chargers for others. If you've ever spotted a need and thought, "I can solve this," - you've already taken your first step.

Component 1: Learning Module (~1.5 hours)

Unit 1: What is Entrepreneurship?
1. *Solving problems or creating value in exchange for money.*
2. Entrepreneurship is not just about starting a company: it's about initiative, resourcefulness, and value creation.
3. Different types of entrepreneurs: small shop owners, street vendors, YouTubers, local tailors, mechanics, and more.
4. Entrepreneurs build opportunities instead of waiting for them.

Simple Slide/Visual Aid Tip:
A circle that says "Problem", an arrow pointing to "Solution", then an arrow to "Earn". That's entrepreneurship.
<A video that visually shows how entrepreneurship starts with spotting a problem (e.g., long food lines), creating a solution (e.g., pre-order lunch service), and earning from it: illustrating the simple flow: Problem → Solution → Earn>

MCQ 1
Q: What best describes entrepreneurship?
- A. Getting a job in a company
- B. Solving problems for others and earning from it
- C. Studying business in college
- D. Buying expensive things

Feedback:
1. Correct! Entrepreneurs solve problems or offer value and get paid for it.
2. Not quite! Entrepreneurship is about creating something useful, not just getting a job or studying.

Unit 2: Who Can Be an entrepreneur?
Entrepreneurship starts with spotting a problem, finding a solution, and creating value. Today, anyone with a phone and an internet connection can start a business: money helps, but mindset and initiative matter more at the start.
You just need:
1. A problem to solve
2. A simple skill or product
3. The courage to start small

Examples Carousel (Swipeable cards)

1. **Pooja (India)** – Sells handmade rakhis on Instagram, learned designing on YouTube.
   Problem she saw: *Expensive or generic rakhis in the market; no personal touch*.
2. **Luis (Mexico)** – Repairs used phones in his garage, now has loyal customers.
   Problem he saw: *Many people couldn't afford new phones or didn't trust local repair shops*.
3. **Sana (Kolkata)** – Started tiffin delivery from her home kitchen, now earns ₹500/day.
   Problem she saw: *Office workers struggled to find affordable, homemade meals*.
4. **Sal Khan (USA)** – Started Khan Academy with YouTube lessons to help his cousin.
   Problem he saw: *His cousin needed help with math, but good learning resources were hard to access*.

MCQ

Q: Which of these can be a form of entrepreneurship?
   A. Making reels on skincare tips and selling homemade face packs
   B. Buying new clothes from malls
   C. Studying engineering
   D. Playing games without sharing or streaming

Feedback:
   1. Correct! Sharing useful tips + selling a product = solving a need!
   2. Try again! Entrepreneurship is about creating value and helping others.

Reflection Prompt
   1. If you had to earn ₹100 this week, what would you do?

Component 2: Action Lab (~2 hours) Task

Find & Learn from 2 Entrepreneurs Near You

Steps (Checklist):
1. Look around your neighborhood or online: find 2 people who earn through their own work
2. Ask or observe:
   a) What do they do?
   b) How do they earn?
   c) What makes them entrepreneurial?
3. Use the **Entrepreneur Tracker Template** (available in the resources tab)

Final Deliverable
Learner submits:
1. A short definition of entrepreneurship (in their words)
2. 2 entries from the Entrepreneur Tracker (name, what they do, what learner learned)

→ Submitted in the submissions tab.

Supplementary Resources (Optional)
1. Danny O'Neill - Getting started | Entrepreneurship | Khan Academy
2. The Better India – Stories of local entrepreneurs

Week 2: Can I Be an entrepreneur?

INTRO – What Makes an entrepreneur?

You don't need a suit, a degree, or a lot of money to be an entrepreneur.

You need one thing: a mindset. Entrepreneurs notice problems around them: and do something about it. From the boy fixing bikes outside his house to the girl teaching dance on Instagram, they all started small. What matters most is not what you have: it's how you think and act.

Component 1: Learning Module (~1.5 hours)

Unit 1: What Makes an entrepreneur?

Key Concepts:

1. **Entrepreneurs are driven by curiosity**: they ask questions, explore possibilities, and seek better ways to do things.
2. **They take initiative**: they act, experiment, and create using limited resources with creativity and courage
3. **They learn by doing**: embracing mistakes as stepping stones to progress.
4. **They take full ownership**: one day they're the marketer, the delivery person, and the customer support, all in one.
5. **They are resilient**: they persist through challenges, adapt to change, and keep moving forward with purpose.

Real-Life Examples:

1. Nithin & Nikhil Kamath (Zerodha) – Started India's largest stock brokerage without formal degrees or external funding, just deep curiosity about stock markets and a desire to simplify investing.
2. *Qualities: Took initiative early and stayed persistent through challenges.*
3. Prajakta Koli (MostlySane) – Started by making comedy sketches about everyday
   Indian life: family, school, relationships: and became one of India's top digital creators.
4. *Qualities*: Stayed consistent, adapted over time, and built strong audience trust.
5. Tilak Mehta (Paper n Parcels) – As a teenager, launched a courier startup using Mumbai's dabbawala network for delivery.
6. *Qualities*: Thought creatively and acted with confidence at a young age.

Unit 2: Start Small: Build Ideas from What You Know

In the last unit, you learned that entrepreneurs don't just have ideas: they act, solve problems, and use what they have.
But the big question now is:

<div align="center">"What can I offer?"</div>

That's where the Value Map comes in. It helps you take your first step toward thinking and acting like an entrepreneur: in your own way.

What is a Value Map?

A Value Map connects three simple things:

A. **What people around you need**

→ *Look around: is there something people often struggle with or something that could be better?*

B. **What you enjoy or are willing to try**

→ *You don't need to be an expert. Start with small things you like doing: talking to people, fixing, organizing, helping, designing, or learning something new.*

→ *Even if you're just curious about something: that's enough to begin.*

C. **What solution you can create**

→ *Use what you enjoy or are learning to try solving a real need around you: even in a small way*

Visuals:
3 overlapping circles:
1. "People Need"
2. "I Can"
3. "My Offer"

Examples:

1. **People Need → Affordable meals**

   I Can → Cook + have access to home kitchen My Offer → ₹40 tiffin service

2. **People Need → Study tips in Punjabi I Can → Speak clearly + love teaching**

   My Offer → 3-minute video tips on Instagram

MCQ

Q: What's the first step to being an entrepreneur?

A. Waiting for the perfect idea
B. Solving a problem with your skills
C. Buying a shop
D. Studying for years

Feedback:

1. *Correct! Entrepreneurs start by solving small problems using what they already have.*
2. *Try again! It's not about waiting: it's about starting.*

Reflection Prompt

1. If someone gave you ₹500 and asked you to earn from it, what would you do?

Component 2: Action Lab (~2 hours)

Task: Create Your Personal Value Map Steps (checklist in app):
1. Think of 2–3 problems people face around you (hunger, phone repair, boredom, etc.)
2. List your own skills, interests, or resources.
3. Match each problem with something you could offer.
4. Use the Value Map Template in the resources to organize your ideas.

Final Deliverable (Submitted in App):
1. Your completed **Value Map** (in 3 columns: Need, Skill, Offer)
2. Highlight **1 idea** you'd like to explore for your future hustle

Supplementary Resources (Optional)

1. "Start with Why" by Simon Sinek
2. [10 Characteristics of Successful Entrepreneurs | Business: Explained](#)

I. K. Gujral Punjab Technical University
Bachelor of Technology (B.Tech. 1st Year) Batch 2025 Onwards Onwards)

Course code	BTCH101-23			
Category	Basic Science Course			
Course title	Chemistry-I (Theory)			
Contents	(i) Chemistry-I (Concepts in chemistry for engineering)			
Scheme & credits	**L**	**T**	**P**	**Credits**
	3	**1**	**0**	**4**
Semester	I/II			
Prerequisites (if any)	-			

Unit	Topics	Hours
1	**Unit I Atomic and molecular structure** Schrodinger equation. Particle in a box solution and their applications for conjugated molecules and nanoparticles. Molecular orbitals and energy level diagrams of diatomic molecules. Equations for atomic and molecular orbitals. Pi-molecular orbitals of butadiene and benzene and aromaticity. coordination numbers and geometries, Crystal field theory and the energy level diagrams for transition metal ions (octahedral and tetrahedral environment) and their magnetic properties. Band structure of solids and the role of doping on band structures.	07
2	**Unit II Spectroscopic techniques and applications** Electronic_spectroscopy: Principle and instrumentation, electronic transitions, Chromophores and auxochromes, factors affecting the value of max and intensity of spectral lines. Fluorescence and its applications in medicine. Vibrational and rotational spectroscopy of diatomic molecules: selection rules, expression for energies. Nuclear magnetic resonance (^1H NMR): Principle, instrumentation, chemical shift, coupling (spin-spin coupling), splitting of peaks, interpretation of ^1H NMR of simple molecules; Applications of spectroscopy.	07
3	**Unit III Intermolecular forces and potential energy surfaces** Ionic, dipolar and van Der Waals interactions. Deviations of real gases from ideal behavior, equations of state of real gases (van der Waals equation of state), and critical phenomena (critical constants and their relation with van der Waals constant). Potential energy surfaces of H_3, H_2F and HCN and trajectories on these surfaces.	05
4	**Unit IV Use of free energy in chemical equilibria** Thermodynamic functions: energy, entropy and free energy. Estimations of entropy and free energies. Free energy and emf. Cell potentials, the Nernst equation and applications. Acid base, oxidation reduction and solubility equilibria. Water chemistry: Hardness of water, units of hardness, problems associated with hardwater, softening of hardwater (lime soda process and zeolite process); Corrosion: Introduction, electrochemical & dry corrosion (mechanism & their comparison), rusting of iron, factors affecting the rate of corrosion, protective measures.	07
5	**Unit V Periodic properties** Effective nuclear charge, penetration of orbitals, variations of s, p, d and f orbital energies of atoms in the periodic table, electronic configurations, atomic and ionic sizes, ionization energies, electron affinity and electronegativity, polarizability, oxidation states, hard soft acids and bases, molecular geometries.	06
6	**Unit VI Stereochemistry** Representations of 3 dimensional structures, structural isomers and stereoisomers, configurations and symmetry and chirality, enantiomers, diastereomers, optical activity, absolute configurations, determination of R/S configuration, conformational analysis (ethane, propane & butane molecules).	05

Unit	Topics	Hours
7	**Unit VII Organic reactions and synthesis of a drug molecule**	05
	Introduction; Substitution reactions: Electrophilic, Nucleophilic (S_N1 & S_N2) and free radical substitution reactions, Friedel Craft alkylation reaction, Halogenation of alkanes; addition reactions: Electrophilic, Nucleophilic and free radical addition reactions, Markovnikov's addition, Anti-markovnikov's addition; elimination (E1 & E2); Synthesis of a commonly used drug molecule.	
	Total (Contact Hours)	**42**

SUGGESTED TEXT BOOKS

a. University chemistry, by B. H. Mahan.

b. Chemistry: Principles and Applications, by M. J. Sienko and R.A. Plane.

c. Fundamentals of Molecular Spectroscopy, by C. N. Banwell

d. Engineering Chemistry (NPTEL Web-book), by B. L. Tembe, Kamaluddin and M. S. Krishnan Physical Chemistry, by P. W. Atkins

e. Organic Chemistry: Structure and Function by K. P. C. Volhardt and N. E. Schore, 5th Edition http://bcs.whfreeman.com/vollhardtschore5e/default.asp

COURSE OUTCOMES

The concepts developed in this course will aid in quantification of several concepts in chemistry that have been introduced at the 10+2 levels in schools. Technology is being increasingly based on the electronic, atomic and molecular level modifications.

Quantum theory is more than 100 years old and to understand phenomena at nanometer levels, one has to base the description of all chemical processes at molecular levels. The course will enable the student to:

❖ Analyse microscopic chemistry in terms of atomic and molecular orbitals and intermolecular forces.

❖ Rationalise bulk properties and processes using thermodynamic considerations.

❖ Distinguish the ranges of the electromagnetic spectrum used for exciting different molecular energy levels in various spectroscopic techniques.

❖ Rationalise periodic properties such as ionization potential, electronegativity, oxidation states and electronegativity.

❖ List of major chemical reactions that are used in the synthesis of molecules.

Course code	BTCH102-18			
Category	Basic Science Course			
Course title	Chemistry-I (Lab.)			
Contents	(ii) Chemistry (Laboratory)			
Scheme & credits	**L**	**T**	**P**	**Credits**
	0	**0**	**2**	**1**
Semester	II			
Prerequisites (if any)	-			

Choice of 10-12 experiments from the following

- Determination of surface tension and viscosity

- Thin Layer Chromatography

- Ion exchange column for removal of hardness of water

- Colligative properties using freezing point depression

- Determination of the rate constant of a reaction

- Determination of cell constant and conductance of solutions

- Potentiometry-determination of redox potentials and emf

- Synthesis of a polymer/drug

- Saponification/acid value of an oil

- Chemical analysis of a salt

- Lattice structures and packing of spheres

- Models of potential energy surfaces

- Chemical oscillations- Iodine clock reaction

- Determination of the partition coefficient of a substance between two immiscible liquids

- Adsorption of acetic acid by charcoal

- Use of the capillary viscometers to the demonstrate of the isoelectric point as the pH of minimum viscosity for gelatin sols and/or coagulation of the white part of egg.

LABORATORY OUTCOMES

The chemistry laboratory course will consist of experiments illustrating the principles of chemistry relevant to the study of science and engineering. The students will learn to:

- Estimate rate constants of reactions from concentration of reactants/products as a function of time

- Measure molecular/system properties such as surface tension, viscosity, conductance of solutions, redox potentials, chloride content of water, etc.

- Synthesize a small drug molecule and analyse a salt sample.

Course Code	BTPS101-18				
Category	Engineering Science Course				
Course title	Programming for Problem Solving (Theory)				
Scheme and Credits	L	T	P	Credit	Semester – II
	3	0	0	3	[The lab component should have one hour of tutorial followed or preceded by laboratory assignments.]
Pre-requisites (if any)	-				

(i) Programming for Problem Solving ([L : 3; T:0; P : 0 (3 credits)] [contact Hrs : 40]

DETAILED CONTENTS

Unit 1
- Introduction to Programming **(4 lectures)**
- Introduction to components of a computer system (disks, memory, processor, where a program is stored and executed, operating system, compilers etc.) – **(1 lecture).**
- Idea of Algorithm: steps to solve logical and numerical problems. Representation of Algorithm: Flowchart/Pseudocode with examples. **(1 lecture).**
- From algorithms to programs; source code, variables (with data types) variables and memory locations, Syntax and Logical Errors in compilation, object and executable code- **(2 lectures)**

Unit 2
- Arithmetic expressions and precedence (**2 lectures**)
- Conditional Branching and Loops (**6 lectures**)
- Writing and evaluation of conditionals and consequent branching (**3 lectures**)
- Iteration and loops **(3 lectures)**

Unit 3
- Arrays (**6 lectures**)
- Arrays (1-D, 2-D), Character arrays and Strings

Unit 4
- Basic Algorithms **(6 lectures)**
- Searching, Basic Sorting Algorithms (Bubble, Insertion and Selection), Finding roots of equations, notion of order of complexity through example programs (no formal definition required)

Unit 5
- Function **(5 lectures)**
- Functions (including using built in libraries), Parameter passing in functions, callby value, Passing arrays to functions: idea of call by reference

Unit 6
- Recursion **(4 -5 lectures)**
- Recursion, as a different way of solving problems. Example programs, such as Finding Factorial, Fibonacci series, Ackerman function etc. Quick sort or Merge sort.

Unit 7
- Structure **(4 lectures)**
- Structures, Defining structures and Array of Structures

Unit 8
- Pointers **(2 lectures)**
- Idea of pointers, Defining pointers, Use of Pointers in self-referential structures, notion of linked list (no implementation)

Unit 9
- File handling (only if time is available, otherwise should be done as part of the lab)

SUGGESTED TEXT BOOKS

a) Byron Gottfried, Schaum's Outline of Programming with C, McGraw-Hill

b) Balaguruswamy, Programming in ANSI C, Tata McGraw-Hill

SUGGESTED REFERENCE BOOKS

Brian W. Kernighan and Dennis M. Ritchie, The C Programming Language, Prentice Hall of India.

COURSE OUTCOMES

The students will learn:

a. To formulate simple algorithms for arithmetic and logical problems. To translate the algorithms to programs (in C language).

b. To test and execute the programs and correct syntax and logical errors. To implement conditional branching, iteration and recursion.

c. To decompose a problem into functions and synthesize a complete program using divide and conquer approach.

d. To use arrays, pointers and structures to formulate algorithms and programs. To apply programming to solve matrix addition and multiplication problems and searching and sorting problems.

e. To apply programming to solve simple numerical method problems, namely rot finding of function, differentiation of function and simple integration.

Course Code	BTPS102-18				
Category	Engineering Science Course				
Course title	**Programming for Problem Solving (Lab)**				
Scheme and Credits	**L**	**T**	**P**	**Credit**	**Semester – II**
	0	**0**	**4**	**2**	[The lab component should have one hour of tutorial followed or preceded by laboratory assignments.]
Pre-requisites (if any)	-				

(ii) Laboratory - Programming for Problem Solving [L : 0; T : 0; P : 4 (2 Credits)]

[The laboratory should be preceded or followed by a tutorial to explain the approach or algorithm to be implemented for the problem given.]

Tutorial 1:	Problem solving using computers.
Lab1:	Familiarization with programming environment.
Tutorial 2:	Variable types and type conversions.
Lab 2:	Simple computational problems using arithmetic expressions.
Tutorial 3:	Branching and logical expressions.
Lab 3:	Problems involving if-then-else structures.
Tutorial 4:	Loops, while and for loops.
Lab 4:	Iterative problems e.g., sum of series.
Tutorial 5:	1D Arrays: searching, sorting.
Lab 5:	1D Array manipulation.
Tutorial 6:	2D arrays and Strings.
Lab 6:	Matrix problems, String operations.
Tutorial 7:	Functions, call by value.
Lab 7:	Simple functions.
Tutorial 8 &9:	Numerical methods (Root finding, numerical differentiation, numerical integration):
Lab 8 and 9:	Programming for solving Numerical methods problems
Tutorial 10:	Recursion, structure of recursive calls
Lab 10:	Recursive functions
Tutorial 11:	Pointers, structures and dynamic memory allocation
Lab 11:	Pointers and structures
Tutorial 12:	File handling.
Lab 12:	File operations.

LABORATORY OUTCOMES
- To formulate the algorithms for simple problems
- To translate given algorithms to a working and correct program
- To be able to correct syntax errors as reported by the compilers
- To be able to identify and correct logical errors encountered at run time
- To be able to write iterative as well as recursive programs
- To be able to represent data in arrays, strings and structures and manipulate them through a program
- To be able to declare pointers of different types and use them in defining self referential structures.
- To be able to create, read and write to and from simple text files.

Course Code	BTMP101-18				
Category	Engineering Science Course				
Course title	**Workshop/Manufacturing Practices (Theory & Lab.)**				
Scheme and Credits	**L**	**T**	**P**	**Credit**	**Semester – II** **(Common to all Branches)**
	1	**0**	**4**	**3**	
Pre-requisites (if any)	**-**				

Workshop/Manufacturing Practices [L: 1; T: 0; P: 0 (1 credit)] Lectures & videos: (10 hours)

DETAILED CONTENTS
1. Manufacturing Methods- casting, forming, machining, joining, advanced manufacturing methods (**3 lectures**)
2. CNC machining, Additive manufacturing (**1 lecture**)
3. Fitting operations & power tools (**1 lecture**)
4. Electrical &Electronics (**1 lecture**)
5. Carpentry (**1 lecture**)
6. Plastic moulding, glass cutting (**1 lecture**)
7. Metal casting (**1 lecture**)
8. Welding (arc welding & gas welding), brazing (**1 lecture**)

SUGGESTED TEXT/REFERENCE BOOKS:
a) Hajra Choudhury S.K., Hajra Choudhury A.K. and Nirjhar Roy S.K., "Elements of Workshop Technology", Vol. I 2008 and Vol. II 2010, Media promoters and publishers private limited, Mumbai.
b) Kalpakjian S. And Steven S. Schmid, "Manufacturing Engineering and Technology" , 4ᵗʰ edition, Pearson Education India Edition, 2002.
c) Gowri P. Hariharan and A. Suresh Babu, "Manufacturing Technology – I" Pearson Education, 2008.
d) Roy A. Lindberg, "Processes and Materials of Manufacture", 4ᵗʰ edition, Prentice Hall India, 1998.
e) Rao P.N., "Manufacturing Technology", Vol. I and Vol. II, Tata McGrawHill House, 2017.

COURSE OUTCOMES
Upon completion of this course, the students will gain knowledge of the different manufacturing processes which are commonly employed in industry, to fabricate components using different materials.

WORKSHOP PRACTICE:(60 HOURS)[L : 0; T:0 ; P : 4 (2 CREDITS)]

1. Machine shop (10 hours)
2. Fitting shop (8 hours)
3. Carpentry (6 hours)
4. Electrical & Electronics (8 hours)
5. Welding shop (8 hours (Arc welding 4 hrs + gas welding 4 hrs)
6. Casting (8 hours)
7. Smithy (6 hours)
8. Plastic moulding & Glass Cutting (6 hours)

Examinations could involve the actual fabrication of simple components, utilizing one or more of the techniques covered above.

LABORATORY OUTCOMES

- Up completion of this laboratory course, students will be able to fabricate components with their own hands.
- They will also get practical knowledge of the dimensional accuracies and dimensional tolerances possible with different manufacturing processes.
- By assembling different components, they will be able to produce small devices of their interest.

Course Code	BTHU-101-18				
Category	Humanities and Social Sciences including Management courses				
Course title	**English**				
Scheme and Credits	**L**	**T**	**P**	**Credit**	
	2	**0**	**0**	**2**	
Pre-requisites (if any)	**-**				

COURSE OUTCOMES

- The objective of the course is to help the students become the independent users of English language.
- Students will acquire basic proficiency in reading & listening, comprehension, writing and speaking skills.
- Students will be able to understand spoken and written English language, particularly the language of their chosen technical field.
- They will be able to converse fluently.
- They will be able to produce on their own clear and coherent texts.

DETAILED CONTENTS

Unit-1 Vocabulary Building & Basic Writing Skills

- The concept of Word Formation
- Root words from foreign languages and their use in English
- Acquaintance with prefixes and suffixes from foreign languages in English to form derivatives.
- Synonyms, antonyms, and standard abbreviations.
- Sentence Structures
- Use of phrases and clauses in sentences
- Importance of proper punctuation
- Creating coherence
- Organizing principles of paragraphs in documents
- Techniques for writing precisely

Unit-2 Identifying Common Errors in Writing

- Subject-verb agreement
- Noun-pronoun agreement
- Misplaced modifiers
- Articles
- Prepositions
- Redundancies
- Clichés

Unit-3 Mechanics of Writing

- Writing introduction and conclusion
- Describing
- Defining
- Classifying
- Providing examples or evidence

Unit-4 Writing Practices

- Comprehension
- Précis Writing
- Essay Writing
- Business Writing-Business letters, Business Emails, Report Writing, Resume/CV.

SUGGESTED READINGS:

(i)*Practical English Usage*. Michael Swan. OUP. 1995.

(ii) *Remedial English Grammar*. F.T. Wood. Macmillan.2007

(iii) *On Writing Well*. William Zinsser. Harper Resource Book. 2001

(iv) *Study Writing*. Liz Hamp-Lyons and Ben Heasly. Cambridge University Press. 2006.

(v) *Communication Skills*. Sanjay Kumar and Pushp Lata. Oxford University Press 2011.

(vi) *Exercises in Spoken English*. Parts. I-III. CIEFL, Hyderabad. Oxford University Press.

Course Code	BTHU-102-18
Category	Humanities and Social Sciences including Management courses
Course title	**English Laboratory**

Scheme and Credits	**L**	**T**	**P**	**Credit**	
	0	**0**	**2**	**1**	
Pre-requisites (if any)	**-**				

COURSE OUTCOMES:

- The objective of the course is to help the students become the independent users of English language.
- Students will acquire basic proficiency in listening and speaking skills.
- Students will be able to understand spoken English language, particularly the language of their chosen technical field.
- They will be able to converse fluently
- They will be able to produce on their own clear and coherent texts.

DETAILED CONTENTS

INTERACTIVE PRACTICE SESSIONS IN LANGUAGE LAB ON ORAL COMMUNICATION

- Listening Comprehension
- Self-Introduction, Group Discussion and Role Play
- Common Everyday Situations: Conversations and Dialogues
- Communication at Workplace
- Interviews
- Formal Presentations.

SUGGESTED READINGS:

(i) *Practical English Usage*. Michael Swan. OUP. 1995.
(ii) *Communication Skills*. Sanjay Kumar and Pushp Lata. Oxford University Press. 2011.
(iii) *Exercises in Spoken English*. Parts. I-III. CIEFL, Hyderabad. Oxford University Press.