SUPPORTING DOCUMENT FOR 1.2.1
Percentage of Programmes in which Choice Based Credit System (CBCS)/ elective course system has been implemented.

INDEX

Khalsa College of Engineering & Technology
ਖ਼ਾਲਸਾ ਕਾਲਜ ਆਫ਼ ਇੰਜੀਨੀਅਰਿੰਗ ਐਂਡ ਟੈਕਨੋਲੋਜੀ
{Approved by AICTE, New Delhi & Affiliated to IKG Punjab Technical University, Jalandhar(Govt. of Punjab)}
Accredited by NAAC Grade "A"

University Notifications under CBCS

ਸ. ਨ. ਗੁਜਰਾਲ ਪੰਜਾਬ ਟੈਕਨੀਕਲ ਯੂਨੀਵਰਸਿਟੀ, ਜਲੰਧਰ

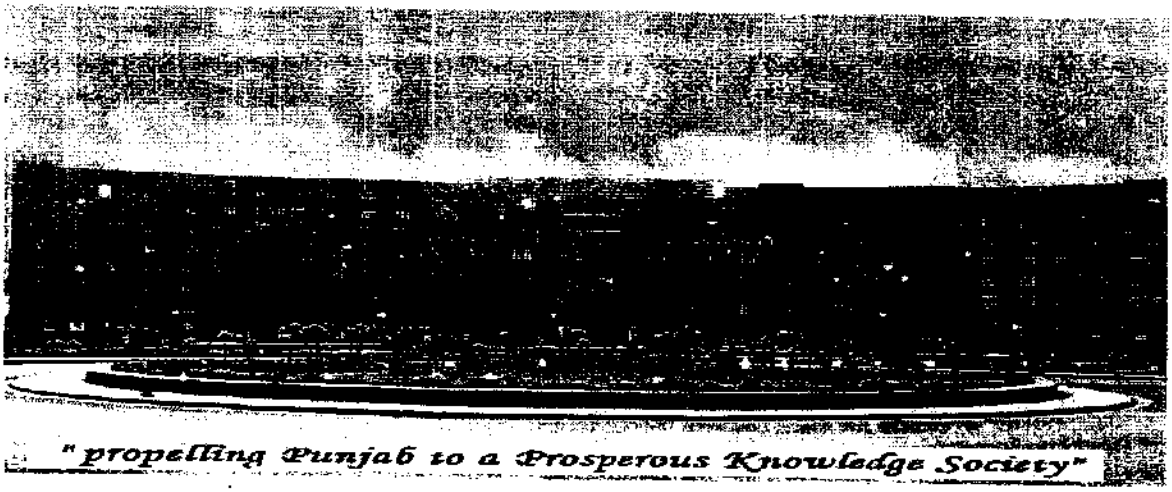
PTU

ਪੰਜਾਬ ਟੈਕਨੀਕਲ ਯੂਨੀਵਰਸਿਟੀ

AGENDA

45th Academic Council Meeting

(29th June, 2015)



I.K. GUJRAL PUNJAB TECHNICAL UNIVERSITY

JALANDHAR-KAPURTHALA HIGHWAY

AGENDA POINTS FOR 45th MEETING OF ACADEMIC COUNCIL SCHEDULED TO BE HELD ON 29 JUNE 2015 AT 12:30 PM AT IKG-PTU CAMPUS MOHALI

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AGENDA POINTS FOR 45th MEETING OF ACADEMIC COUNCIL SCHEDULED TO BE HELD ON 29th JUNE 2015 AT 12:30 PM AT IKG-PTU CAMPUS MOHALI.

A. STATUTORY AGENDA

45.01 To confirm the minutes of 44th Academic Council meeting held on 09th June, 2014.

Minutes of 44th Academic Council meeting held on 09th June, 2014 were circulated to all members and are enclosed at **Annexure – I**. No comments were received.

The item is placed before the Academic Council for its confirmation.

45.02 Action Taken Report (ATR) of the 44th Academic Council Meeting.

The action taken report on the 44th meeting of the Academic council is enclosed as **Annexure – II**.

The item is placed before the Academic Council for information.

45.03 Award of Ph.D.

On the recommendations of the RDC the following candidates have completed the requirement for award of Ph.D. degree.

S. No	Registration No.	Date of Viva-voce	Name	F Name	Branch	Title of Thesis
1.	14.19.04	08-01-15	Harsimarjeet Khurana	A.P.S. Bedi	Computer Science & Engineering	DEVELOPMENT AND IMPLEMENTATION OF NEW PAIRING TECHNIQUE FOR STUDYING THE EFFECTIVENESS OF PAIRS ON PERSONA AND PROGRAMMING CODE.
2.	11.67.09	12-01-15	Sukhwinder Kaur	Kuldeep Singh	Management	PERFORMANCE OF MUTUAL FUNDS IN INDIA.
3.	1111017	15-01-15	Ruchika Bagga	Harjinder Bagga	Physics	RARE EARTH DOPED GLASSES AND GLASS CERAMICS:OPTICAL & PHYSICAL CHARACTERIZATION
4.	01.28.09	19-01-15	Harpreet Gaba	S. Gurbax Singh Gaba	Civil Engineering	STRUCTURAL HEALTH MONITORING AND RETROFITTING OF RCC RECTANGULAR SLABS
5.	02.38.09	23-01-15	Kanika Sharma	Lok Nath Sharma	Electronics and Communication Engineering	MEDIUM ACCESS CONTROL AND ROUTING BASED LIFETIME ENHANCEMENT FOR WIRELESS SENSOR NETWORKS
6.	11.94.09	06-02-15	Parul Khanna	Rajesh Kumar Bhandari	Management	MANAGING NON PERFORMING ASSETS OF COMMERCIAL BANKS IN COMPETITIVE ERA.
7.	14.34.08	16-02-15	Amit Sharma	Subhash Sharma	Computer Science & Engineering	A DYNAMIC INTRUDER ANALYSER FOR INTRUSION DECTECTION SYSTEM.
8.	01.21.08	13-04-15	Neeru Bansal	Sh. Harmesh Kumar Bansal	Civil Engineering	INVESTIGATION OF SFRC CORNERS UNDER OPENING BENDING MOMENT
9.	11.96.09	20-04-15	Sushendra Kumar Misra	Sh. V. D. Mishra	Management	A STUDY OF FACTORS AFFECTING ADOPTION OF INTERNATIONAL FINANCIAL REPORTING STANDARDS IN INDIA
10.	02.46.09	23-04-15	Neeru Malhotra	Sh. Chaman Lal Kochher	Electronics & Communication Engineering	FINITE DIFFERENCE & HIERARCHICAL FINITE ELEMENT BASED FORMULATION OF ELECTROMAGNETIC APPLICATORS

11.	1011010	27-04-15	Vikas Duggal	Sh. Ajay Kumar	Physics	ASSESSMENT OF RADIOLOGICAL RISK DUE TO NATURAL RADIONUCLIDES IN THE ENVIRONS OF NORTHERN RAJASTHAN
12.	11.68.09	05-05-15	Harwinder Pal Kaur	S. Balvir Singh	Management	COMMODITY TRADING IN AGRICULTURE PRODUCTS
13.	05.40.08	11-05-15	Harish Kumar	Sh. Bhasker Datt	Mechanical Engineering	STUDIES IN SURFACE MODIFICATION WITH MAGNETICALLY ASSISTED STAINLESS STEEL PINS
14.	1106010	14-05-15	Jagdeep Singh	Santokh Singh	Mechanical Engineering	A STUDY TO IMPROVE THE PERFORMANCE OF SMALL MEDIUM ENTERPRISES USING CONTINUOUS IMPROVEMENT STRATEGIES
15.	1006023	20-05-15	Amit Handa	Sh. Tilak Raj Handa	Mechanical Engineering	STUDIES OF MECHANICAL PROPERTIES AND HOT CORROSION BEHAVIOUR OF FRICTION WELDED DISSIMILAR STEELS
16.	1003003	21-05-15	Harish Kundra	Kashmir Chand Kundra	Computer Science and Engineering	ESTIMATION OF NATURAL TERRAIN CLASSIFICATION- A NATURAL COMPUTING APPROACH
17.	02.50.10	05-06-15	Monish Gupta	Sh. Pawan Kumar	Electronics & Communication Engineering	MODELLING OF METAMATERIALS FOR RADIO AND MICROWAVE FREQUENCY APPLICATIONS
18.	17.14.09	19-06-15	Akshay Girdhar	Sh. Ranjit Lal Girdhar	Computer Science and Engineering	INVESTIGATIONS OF PRE-PROCESSING TECHNIQUES FOR MEDICAL ULTRASOUND IMAGES

The matter is placed before the Academic Council for its recommendations to the BOG for the approval to award degrees.

B. INFORMATION AGENDA

45.04 To inform about change of name of University to I.K. Gujral Punjab Technical University and establishment of new University MRSSTU, Bathinda

The Government of Punjab has changed the name of the Punjab Technical University to I.K. Gujral Punjab Technical University which has already been notified by PTU vide Notification No PTU/Reg/559-580 dt. 20.05.2015 (Copy attached as **Annexure - III**)

A new University has also been established by the Govt. of Punjab vide Ordinance No. 4 of 2014 dated 15 Dec, 2014 the colleges falling in the Districts Bathinda, Barnala, Faridkot, Fatehgarh Sahib, Fazilka, Ferozepur, Mansa, Moga, Shri Muktsar Sahib, Patiala, Sangrur are being transferred to the new established University.

The item is placed before the council for information.

C. AGENDA FOR DISCUSSION & RECOMMENDATIONS

45.05 To ratify Academic Calendar for session 2015-16.

The Academic Calendar for the session 2015-16 is placed at **Annexure – IV.**

The item is placed before the council for ratification.

45.06 To approve Pre-requisite for Aeronautical Engg.

The BOS Aeronautical Engineering has given recommendations that there is no pre-requisite subject for admission to 4th semester .i.e Lateral Entry to B. Tech. Aeronautical Engg.

The item is placed before the council for approval.

45.07 Relaxation to the deaf and dumb students from appearing in theory examination for the B.Sc. courses in Fashion Design and Textile Design being conducted by NIIFT, Mohali

A proposal has been received from NIIFT regarding granting of relaxation to the deaf and dumb students from appearing in theory examination for the B.Sc. courses in Fashion Design and Textile Design being conducted by NIIFT, Mohali

The college has attached Minutes of the meeting of Faculty of Design and Fine Arts of Punjab University, Chandigarh regarding the same.

The item is placed before the council for discussion and approval.

45.08 Approval for counting the duration of Ph. D. from the date of approval of Ph.D. synopsis instead from the date of enrollment for Ph. D.

There are a number of students who could not complete their PhD thesis in maximum duration of 8 year due to various reasons such as delay in approval of the PhD synopsis from Research degree committee RDC, administrative delays and other personal reasons of the students. Maximum duration for completion of PhD degree after all delay condons from Vice Chancellor is 8 years. However, some of the students have crossed their limit of 8 years due to delay in approving their PhD synopsis from RDC and Administrative delays. Therefore, to protect the interest of PhD students following changes are proposed:

Existing Regulations	Proposed Changes
Maximum duration of PhD degree is 5 years with further extension from Vice Chancellor maximum limit is 8 years	If there is delay of more two years in approval of PhD synopsis due to 1) delay in receipt of evaluation report from subject experts. 2) Administrative delays in conducting RDC meeting. The duration of PhD degree may be counted from the date of approval of PhD synopsis by RDC. However, if candidate wishes to submit his/her thesis early and do not wishes to avail the benefit of this extension he/she can do so after a gap of one year from the date of synopsis approval.

The above proposed option will benefit students enrolled prior to 2010. Proposed change in the guidelines may be incorporated in new PhD guidelines and may be made effective for all Phd Students.

The item is placed before the Council for approval.

45.09 To approve the minutes of various Board of Studies

The meetings of the various Board of Studies were held and the following syllabus were reviewed and available at PTU website. Minutes are placed at **Annexure – V.**

1) **BOS Management/Commerce/Business Economics.**

- Scheme and Syllabus of 1st & 2nd Semester of B.Sc Business Economics, Batch 2014 was finalized.
- Scheme and Syllabus of 1st & 2nd Semester of Bachelor of E-commerce, Batch 2014 was finalized.
- Scheme and Syllabus of 1st & 2nd Semester of BBA (RM), Batch 2014 was finalized.
- Scheme of 1st – 6th Semester and syllabus of 1st-2nd semester of Bachelor of Service Industry Management, Batch 2014 was finalized.
- In view of the change of the pattern of question papers has been revised form 2013 it is advised by the BOS that question papers of December 13 and June 14 sessions should be uploaded on the website for the ease of students.
- Scheme and Syllabus of 1st & 2nd Semester of BRDM, Batch 2014 was finalized.
- BOS is of the view that all courses of Management/Commerce/Economics being professional courses, the scheme and syllabus has been so arranged so that the knowledge is expanded from basic to advanced semester wise. Therefore, 2nd semester cannot be studied directly without studying 1st semester. Hence, BOS is of the opinion that from session 2015-16 onwards direct admissions to 2nd semester should be made but colleges may start separate batches in January Session.
- Scheme of 1st – 4th Semester and syllabus of 1st semester of Regular MBA, Batch 2015 was finalized. The name proposed by PTU Nalanda for the course if MBA(Hons.). The same is sent to Dean Academics for approval.
- In following courses the suggested nomenclature to be changed is as follows:
    - BRDM: BBA (RDM)
    - Bachelor of Service Industry Management: BBA(SIM)
    - Bachelor of E-commerce: BBA (E-commerce)/B.COM (E-commerce)

2) **BOS Food Technology Framed new syllabus**

1) B.Sc. Food Technology Batch 2014, Semester 1st to 2nd
2) B.Tech Food Technology, Batch 2014, semester upto 4th

3) **BOS Agricultural framed new syllabus**

1) B.Sc. Agricultural, Batch 2014 upto 4th semester

4) **BOS Chemical Engg.**

1) Framed new syllabus of B.Tech Petrochem & Petroleum Refinery Engg (3-5 Sem) Batch 2013
2) Revised the syllabus of M.Tech Chemical Engineering Batch 2014, Batch 2015

5) BOS Human Value & Professional Ethics

- Copy attached.

6) BOS Journalism & Mass Communication

1) MoM dated 23/06/2015 is attached.
2) MoM dated 13/03/2015 is attached.
3) Master of Mass communication and Media Management Batch 2015
4) B.Sc. (Media entertainment and Film Technology) Batch 2015
5) M.Sc. (Journalism & Mass Communication) Batch 2015
6) B.Sc. Journalism & Mass Communication, Batch 2015
7) M.A. Journalism & Mass Communication, Batch 2015
8) B.A. Journalism & Mass Communication, Batch 2015
9) M.Sc. Mass Communication, Batch 2015 (PITK)
10) M.Phil Journalism & Mass Communication, Batch 2015 (PITK)
11) Eligibility of M.Sc. and B.Sc. (Journalism & Mass Communication)

7) BOS Computer Science Engg

1) B.Tech 3D Animation & Graphics Engineering, Batch 2012 upto 6th semester
2) M.Sc. (IT), Sem 1 to 4, Batch 2015
3) B.Sc. (IT), Sem 1 to 6, Batch 2015
4) M.Sc. (CS), Sem 3 to 4, Batch 2013
5) B.Sc (CS), Sem 5th to 6, Batch 2013
6) M.Tech CSE Batch 2015, 1st semester
7) BMCI Batch 2014, upto 5th semester
8) MCA Batch 2015 1st to 6th sem

8) BOS Marine Engg.

1) B.Tech Marine Engg Batch 2013 semester 1st to 5th

9) BOS ECE

1) B.Tech ETE, Sem 7 to 8, Batch 2011
2) B.Tech Electronics Engg (7-8 sem) Batch 2012

10) BOS Clinical Research

1) M.Sc. Clinical Research Batch 2014
2) Advance Diploma in Clinical Research Batch 2014
3) Diploma in Clinical Research Batch 2014
4) Question Paper Pattern of above courses.

11) BOS Pharmacy

1) MoM dated 13/04/2015 attached.

12 Syllabus of M.Tech. (Transportation Engineering) and M.Arch. running at PIT, Mohali

The item is placed before the Council for approval.

45.10 To approve the Academic Regulations for B. Tech. (Part-time)

Bachelor of Technology (Part-time)/ Bachelor of Engineering Courses have been approved in some of the colleges under PTU by AICTE.

A committee was constituted to propose the Academic Regulations for Bachelor of Technology (Part-time)/ Bachelor of Engineering Courses. The proposed Academic Regulations for Bachelor of Technology (Part-time)/ Bachelor of Engineering Courses are placed at **Annexure – VI.**

The item is placed before the Council for ratification.

45.11. Credit Based System

The University is introducing Credit Based System for batch 2015-16 onwards. A committee was constituted regarding the same. Recommendations of the committee were discussed in the previous meeting and Dean (Academics) informed that as per the existing system internal and external will continue and only marks will be converted to credits as per the syllabus and the same shall be implemented from 2014-15 batch of admission onwards.

The suggestions / comments were received from various members/academicians. This scheme shall be applicable from the new batch starting from academic session 2015-16.

The final Credit Based System formation is placed at **Annexure –VII.**

The item is placed before the council for approval.

45.12. Revision of Eligibility for MCA (LE), BCA/B.Sc.(IT)/BAMT (LE), M.Sc. IT (LE) and B.Sc. CS (1st Yr)

S.No.	Course	Existing Eligibility	Revised Eligibility
1	MCA (LE)	Recognized Bachelor Degree of minimum 3 yrs duration in BCA, B.Sc (IT/ Computer Science) with Mathematics as a course at 10+2 level or at Graduate Level and have obtained at least 50% (45% in case of candidate belonging to reserved category) at the qualifying Examination	1. Graduation in any stream with 1 year PGDCA/PGDIT or Equivalent (from a recognized university) with mathematics as a course at 10 + 2 level or at a graduation level). Or 2. Bachelors degree in BCA, B Sc. (IT/Computer Science) (from a recognized university) with mathematics as a course at 10 + 2 level or at a graduation level. Or 3. B Tech. in CSE/ IT (or equivalent). or 4. M Sc. IT/ CS with mathematics as a course at 10 + 2 level or at a graduation or PG level.

Annexure-VII

FINAL DRAFT FOR
CHOICE BASED CREDIT SYSTEM (CBCS)
APPLICABLE TO

CAMPUSES, AUTONOMOUS & AFFILIATED
COLLEGES/INSTITUTIONS OF I. K. GUJRAL
PUNJAB TECHNICAL UNIVERSITY

DEPARTMENT OF ACADEMICS
I.K. GUJRAL PUNJAB TECHNICAL UNIVERSITY
JALANDHAR

CONTENTS

1. PREAMBLE

I. K. Gujral Punjab Technical University (IKGPTU) (Formly known as Punjab Technical University), Jalandhar was established in the Year 1997 under the Punjab Technical University Act, 1996 (Punjab Act No. 1 of 1997) to enhance technical education and development thereof in the State of Punjab and for matters connected therewith. The University is aware of the urgent need to move towards Choice-Based Credit System (CBCS) and Grading system as per guide lines of UGC. Constituent Institutes of I. K. Gujral Punjab Technical University viz. Punjab Institute of Technology (PIT) and Punjab Institute of Management (PIM) have already implemented grading system. The University is committed to implement CBCS from the academics session-2015-2016.

2. WHY CHOICE BASED CREDIT SYSTEM

The Choice Based Credit System (CBCS) enables a student to obtain a degree by accumulating required number of credits prescribed for that degree. The student also has choice in selecting courses out of those offered by various departments. The grade points earned for each course reflects the student's proficiency in that course. The CBCS enables the students to earn credits across departments and provides flexibility in duration to complete a Program of study. The CBCS facilitates transfer of credits earned in different Departments/Centers of other recognized / accredited universities or institutions of higher education in India and abroad.

3. APPLICABILITY OF GRADING SYSTEM

The Choice Based Credit System shall apply to all Under Graduate/Post Graduate Courses of IKGPTU's Campuses, Autonomous Institutions and affiliated Colleges/Institutions. Under CBCS the requirement for awarding a degree is prescribed in terms of number of credits to be completed by the student.

4. DEFINITIONS OF KEY WORDS

4.1. Hon' able Vice Chancellor (VC): Means the Hon' able Vice Chancellor (VC) of the I. K. Gujral Punjab Technical University, Jalandhar.

4.2. Dean (Academics): Means the Dean (Academics) of the I. K. Gujral Punjab Technical University, Jalandhar.

4.3. Academic Year: Two consecutive (one odd + one even) semesters constitute one academic year.

4.4. **Choice Based Credit System (CBCS):** The CBCS provides choice for students to select from the prescribed courses (core, elective and inter-disciplinary courses).

4.5. **Program/Discipline:** An educational program/discipline leading to award of a Degree/Diploma/Certificate.

4.6. **Course:** Usually referred to, as 'subject' is a component of a program/discipline. All courses need not carry the same weight. The courses should define learning objectives and learning outcomes. A course may be designed to comprise lectures/ tutorials/laboratory work/ field work/ outreach activities/ project work/ vocational training/viva/ seminars/ term papers/assignments/ presentations/ self-study etc. or a combination of some of these.

4.7. **Credit:** A unit by which the course work is measured. It determines the number of hours of instructions required per week. One credit is equivalent to one hour of teaching (Lecture or Tutorial) or two hours of practical work/field work per week.

4.8. **Credit Point:** It is the product of grade point and number of credits for a course.

4.9. **Credit Based Semester System (CBSS):** Under the CBSS, the requirement for awarding a degree/diploma/certificate is prescribed in terms of number of credits to be completed by the students.

4.10. **Grade Point:** It is a numerical weight allotted to each letter grade on a 10-point scale.

4.11. **Letter Grade:** It is an index of the performance of students in a said course. Grades are denoted by letters O, A^+, A, B^+, B, C, P and F.

4.12. **Semester:** Each semester will consist of 15-18 weeks of academic work equivalent to 90 actual teaching days. The odd semester may be scheduled from July to December and even semester from January to June.

4.13. **Semester Grade Point Average (SGPA):** It is a measure of performance of work done in a semester. It is ratio of total credit points secured by a student in various courses registered in a semester and the total course credits taken during that semester. It shall be expressed up to two decimal places.

4.14. **Cumulative Grade Point Average (CGPA):** It is a measure of overall cumulative performance of a student over all semesters. The CGPA is the ratio of total credit points secured by a student in various courses in all semesters and the sum of the total credits of all courses in all the semesters. It is expressed up to two decimal places.

4.15. **Grade Card or Certificate:** Based on the grades earned, a grade certificate shall be issued to all the registered students after every semester. The grade certificate will display the course details (code, title, number of credits, grade secured) along with SGPA of that semester and CGPA earned till that semester.

4.16. **End Semester Examination:** The examination conducted by the University at the end of the semester.

4.17. **Internal Evaluation:** The Midterm Sessional Tests (MST), quizzes/ group discussion/ class discussion/ attendance/ seminars / projects/ case studies etc. comprise the internal evaluation.

4.18. **Degree :** An award conferred by the University signifying that the student has satisfactorily completed a programme / discipline of study.

5. COURSE STRUCTURE/ PATTERN

The Under Graduate/ Post Graduate degree courses will consist of three major components i.e., Core Courses, Elective Courses and Inter Departmental Courses.

Core courses: These are offered by the parent department and are totally related to the major/discipline course. The core courses also include subjects related to Basic Sciences and Humanity. The components like Practicals, Projects, Group Discussions, Viva, Field Visits etc. will be the part of the core course. The credits for Basic Sciences/Humanity and Core courses will be 10%-20% and 55%-75% of the total credits of a program/discipline respectively.

Elective courses: These are also offered by the parent department. These courses will provide choice and flexibility within the department. The student can choose his/her elective paper. Elective is related to the major course. The difference between core course and elective course is that the core course is a regular course as the part of the curriculum whereas in elective course, there is choice for the student. The credits for Elective courses will be 10%-15% of the total credits of a program/discipline.

Inter Disciplinary Elective courses: The department is at liberty to offer three to four Inter Disciplinary Elective courses and these courses are called as inter-departmental courses. These courses are offered by a department for the students belonging to other departments. The objective is to provide mobility and flexibility outside the parent

department. These courses are introduced to make every course multi and inter-disciplinary in nature. These courses are to be chosen from a list of courses offered by various departments. The credits for Inter Departmental Courses will be 5%-10% of the total credits of a program/discipline.

6. EVALUATION OF ACADEMIC PERFORMANCE OF STUDENTS

The academic performance of student in each course will be evaluated as per Table 1.

Table 1: Structure of grading academic performance

S. No.	Grade	Qualitative Meaning	Grade points
1	O	Outstanding	10
2	A^+	Excellent	9
3	A	Very good	8
4	B^+	Good	7
5	B	Above Average	6
6	C	Average	5
7	P	Marginal/Pass	4
8	F	Failed	0
9	I	Incomplete	--
10	E	Detained	0

Description of Grades:

6.1. "O" Grade stands for outstanding achievement. The "P" grade stands for marginal/Pass performance. It is the minimum passing grade in any course.

6.2. "I" grade denotes incomplete performance. It may be awarded to a student if he/she does not appear in End Semester Examination due to some extraordinary circumstances.

6.3. "E" grade is awarded if student is detained i.e., attendance in theory class/laboratory is less than 75% and the student will have to repeat the course as and when offered.

42.

6.4. "F" grade is given to the student who has appeared in the End Semester Examination but failed to get "minimum qualified marks''. Student will also be awarded "F" grade if he/she is absent in the End Semester Examination without any valid reason.

Corresponding to earned letter grade for each course, the particular grade points are as given in Table 1. The Grade Point Average (GPA) is calculated by taking the number of grade points a student earned in a given period of time divided by the total number of credits undertaken for the studies. Each course is assigned with a weightage called credits. Table 2 shows the procedure to be followed to calculate number of credits for one hour of teaching per week for each course.

Table 2: Credits corresponding to one hour of Lecture/Tutorial/ Practical

S. No.	Teaching component	Credit(s)
1	Lecture	01 credit for 01 lecture hour per week
2	Tutorial	01 credit for 01 tutorial hour per week
3	Practical	01 credit for 02 practical hour per week. Three/four Laboratory hours per week shall be assigned two credits. Five/six Laboratory hours per week shall be assigned three credits. Seven/eight Laboratory hours per week shall be assigned four credits.
4	Seminar	01 credit for 01 practical/study hour per week
5	Project	01 credit for 01 hour per week or as defined in the syllabus
6	Dissertation	01 credit for 01 practical/study hour per week or as prescribed in the program/discipline.
7	Industrial Training	Equivalent to one semester though comprehensive evaluation mechanism as per defined norms.

7. EXAMINATION AND ASSESSMENT

The performance of student in each course shall be evaluated through continuous assessment consisting of examinations/tests/quizzes etc. as per the guide lines given in

Table 3. An academic calendar indicating the schedule of continuous assessment will be notified by the University before the start of the academic session.

Table 3: Continuous Assessment Criterion

Examination (Theory)	**Syllabus to be covered in the examination**	**Time allotted for the examination**	**Weightage (Marks)**	**Remarks**
Midterm Sessional Test (MST) – I	Upto 33%	1.5 Hour	24%	Best two tests shall be considered and in any case no special test will be conducted for the students who remained absent in any of the MST. MST-I, II, III and quizzes etc constitute internal evaluation.
Midterm Sessional Test(MST) – II	33 % to 66 %	1.5 Hour		
Midterm Sessional Test (MST) – III	66% to 100%	1.5 Hour		
Quizzes/Group discussion / Class discussion/ attendance/ seminars / projects/ case studies assignments etc.	As per discretion of teacher	As per discretion of teacher	16%	
End Semester Examination	100% Syllabus	3 Hours	60%	Checking of answer sheets will be done at the University level. This component is called external evaluation.
Total			100%	Marks may be rounded off to nearest integer
Practical				
Daily evaluation of practical records/Assignment/Viva Voce/ Attendance etc.			60%	Internal evaluation
Final Practical Performance + Viva Voce	100% Syllabus	3 Hours	40%	External evaluation
Total			100%	Marks may be rounded off to nearest integer

The marks computed out of 100 shall be used to find grade and grade points for each course/component. Finally grade points of all courses shall be used to compute SGPA and then CGPA.

7.1. All evaluations of different components of a course shall be done in marks for each student. The marks obtained in theory/practical courses or other teaching components shall be scaled to 100 (40 internal evaluation+60 external evaluation for Theory paper and 60 internal evaluation +40 external evaluation for Practical paper) up to next integer value. Finally the grades will be assigned to each student in each course as per following guidelines:

(a) Absolute grading will be used for class having less than 30 (<30) registered students. The criterion is outlined in Table 4.

Table 4: Absolute grading criterion

Sr. No.	Marks	Grade	Grade points
1	≥ 90 &≤100	O	10
2	≥ 80 & <90	A+	9
3	≥ 70 & <80	A	8
4	≥ 60 & <70	B+	7
5	≥ 50 & <60	B	6
6	≥ 45 & <50	C	5
7	≥ 40 & <45	P.	4
8	<40	F	0

Note:-The grade boundaries as indicated above may be marginally adjusted

(b) Relative grading will be used for a class having 30 or more (≥ 30) registered students as statistical distributions are suitable for samples having 30 or more number of elements. The criterion is outlined in Table 5. Workout example for different values of σ and μ and corresponding grades has been given in Annexure-I.

Table 5: Relative grading criterion

Sr. No.	Marks	Grade	Grade points
1	≥ μ+1.5σ	O	10
2	≥ μ+1.2σ and <μ+1.5σ	A+	9
3	≥ μ+0.9σ and <μ+1.2σ	A	8
4	≥ μ+0.6σ and <μ+0.9σ	B+	7
5	≥ μ+0.3σ and <μ+0.6σ	B	6
6	≥ μ and <μ+0.3σ	C	5
7	≥ μ-0.3σ and <μ	P	4
8	<μ-0.3σ	F	0

Note:-

1. μ is mean and σ is standard deviation of marks obtained in the class
2. The grade boundaries as indicated above may be marginally adjusted
3. Lower and higher outliers can be separated before awarding the grades

45.

7.2. "F", "I", and "P" grades:

a) It is compulsory to secure at least 20% marks in End Semester Examination (external evaluation) of each course to be considered for grading. If a student secures less than 20% marks he/she will be awarded "F" grade in that course. It is also compulsory to appear in the End Semester Examination. If student does not appear in the End Semester Examination without the permission of Hon'able Vice Chancellor/ Dean (Academics), he/she will be awarded "F" grade in that course.

b) "I" grade (Incomplete) would be awarded to the student who has not appeared in the End Semester Examination due to a justified reasons in extraordinary circumstances. "I" grade shall be awarded to the student only after approval from Hon'able Vice Chancellor/ Dean (Academics). In case a student get "I" grade, he/she has to appear only in End Semester Examination. His/her internal assessment marks will be freezed and he/she will be given grade as per mean and standard deviation of his/her original class without modification in grades of other students. In case, absolute grading is applicable then fixed thresholds will be used as per Table 4.

c) "P" grade shall not be awarded for percentage of marks less than 35%. Still further, no student having 40% or more marks will be awarded failing grade "F" i.e. any student having 40% or more marks will get atleast "P" grade.

7.3. A student can apply for improvement in grade of any course in which he/she has got "P" grade. He/she will be allowed to appear only in End Semester Examination and will be evaluated as per performance of his original class. In any case grade of other students of his/her original class shall not change. The student can improve to the most in two and maximum grade can be up to "A" grade if CGPA is more than 6.0 at the end of degree. However, student can improve more than two and maximum grade can be up to "A" grade to attain the 6.0 CGPA (or 60% marks) if CGPA is less than 6.0 at the end of the degree.

7.4. A student who secures "F" grade will have an option to appear in End Semester Examination i.e. external component. His/her internal assessment marks will be

freezed and he/she will be given grade as per mean and standard deviation of his/her original class without modification in grades of other students. In case, absolute grading is applicable then fixed thresholds will be used as per Table 4. Moreover he/she will also have the option to repeat the course by re-registering in that course, whenever it is offered next time.

7.5. Every class instructor teaching a class will take attendance till the last instructional day in the semester. The statement of the attendance with marks in MST should be displayed on the notice board and submitted to the department within one week of conduct of the MST. The next day after the last instructional day, a statement of shortage of attendance i.e. detainee student list may be submitted to the department.

7.6. A student shall have to attend 75% of Lectures (including tutorials) of a course(s) otherwise he/she will be detained in that course(s).
Dean (Academics) of the University in case of University/constituent College and Principal/Director in case of affiliated institutions may condone attendance shortage upto 10% in the total for the reasons to be recorded in writing (owning to serious illness, calamity, participation in any game/sports/competitions with the approval of the Institution etc.). However, under no circumstances, a student who has an aggregate attendance of less than 65%, in a semester shall be allowed to appear in the End Semester Examination.

7.7. A student is detained in a course, whatever may be the reason for the shortfall in attendance, will not be permitted to sit for the End Semester Examination in the course. He/she will be awarded E grade for the course. In order to earn credits for this course, the student will have to re-register for the course, whenever it is offered next time. The department will not make any adjustment in time table for such students. In case a student is detained in the elective course, atleast one time in one year such course has to be offered to such student by making appropriate arrangements for conducting the classes.

7.8. There are no grade points for "F", "I" and "E" grades, so they are not considered for SGPA and CGPA. However for calculating total number of credits, all the courses allotted in the semester(s) are considered for calculation of SGPA and CGPA.

7.9. SGPA and CGPA shall be calculated up to two decimal place, after rounding off the third decimal to the nearest second place integer decimal i.e. 0.005 is to be increased to 0.01. CGPA should be computed after every semester.

7.10. To obtain "O", student has to appear in all the teaching/evaluation component of the course. However, in the view of the merit of the student, the teacher may consider to award "O" grade for a student who has not gone through all the component of the course.

7.11. A minimum of 40% of the total credits of the two semesters in each year are required to be earned for entering in the next year of the course, failing which student will not be allowed to register in 3rd of 2nd Year, 5th of 3rd Year, or 7th semester of Final year as per applicability. For example to registered for 3rd semester, 40% credits of 1 semester and 2semester subjects are required. Similarly to register for the 5th semester 40% credits of 3rd and 4th semester subjects are required.

7.12. An honors degree will be conferred at CGPA of 8.0 or above provided student should not have obtained even a single "F" or "E" in any course during whole duration of the course.

8. COMPUTATION OF SGPA and CGPA

The performance of a student will be evaluated in terms of two indices, viz., semester grade point average (SGPA) and cumulative grade point average (CGPA) for the completed semesters at any point in time. SGPA and CGPA shall be calculated up to two decimal places, thus 0.005 to be rounded off to 0.01.

8.1. Semester Grade Point Average (SGPA): The performance of a student in a particular semester will be measured by semester grade point average (SGPA), which is a weighted average of the grades secured in all the courses/teaching components taken in a semester and scaled to a maximum 10.

Let the grade points associated with the letter grades awarded to a student in assigned courses are g_1, g_2, g_3, g_4, g_5 and the corresponding credits are w_1, w_2, w_3, w_4, w_5, the SGPA will be calculated as

$$\text{SGPA} = \frac{w_1 g_1 + w_2 g_2 + w_3 g_3 + w_4 g_4 + w_5 g_5}{w_1 + w_2 + w_3 + w_4 + w_5}$$

In general, it can be written as

$$\text{SGPA} = \frac{\sum_{i=1}^{m} w_i g_i}{\sum_{i=1}^{m} w_i}$$

where w_i is credit of i^{th} course, g_i is grade point of i^{th} course and m is number of courses in one semester.

For instance, suppose a student is registered for one 5-credit course, four 4-credit course and one 3-credit course during a semester i.e., a total 24 (5+4×4+3)-credits. If he/she secures O, A^+, A, B^+, B & P grades respectively in these courses, his/her SGPA can be calculated as follows:

$$\text{SGPA} = \frac{(5\times 10 + 4\times 9 + 4\times 8 + 4\times 7 + 4\times 6 + 3\times 4)}{24}$$

$$= \frac{182}{24} = 7.58$$

SGPA will be calculated up to two decimal place only.

8.2. Cumulative Grade Point Average (CGPA): The cumulative grade point average (CGPA) indicates the overall academic performance of a student in all the courses registered upto and including the latest completed semester. It is computed in the same manner as the SGPA, considering all the courses (say n), and is given by

$$\text{CGPA} = \frac{\sum_{i=1}^{n} w_i g_i}{\sum_{i=1}^{n} w_i}$$

The grades of any and all repeated courses shall be included in the official transcripts. However once a student repeats and passes a course in which he/she had failed earlier, the earlier fail grade do not enter into the computation of CGPA.

9. CONVERSION OF CGPA TO PERCENTAGE

The conversion of SGPA or CGPA to Percent score will be carried out by multiplication of respective SGPA or CGPA by a factor of 10. The equivalence between important percentages in absolute marks system and CGPA is given in Table 6.

Table 6: Equivalence between Percentages in absolute marks system and CGPA

CGPA	4	5	6	7	8	9	9.5
Percentage	40	50	60	70	80	90	95

CGPA of 6 is equivalent to 60 percent for first division.

10. EVALUATION SYSTEM FOR CONSTITUENT AND AFFILIATED COLLEGES/INSTITUTIONS OF IKGPTU

For affiliated Institutions, the End Semester Examination will be held at the University level, as per the pattern followed by the University time to time.

10.1. Grading for Theory courses

a. Internal Evaluation

The grading for internal evaluation will be carried out at the college/institution level following Table 4 or 5. The Grades along with marks obtained, mean, standard deviation and grade range will be submitted to the University.

b. External Evaluation

The grades for End Semester Examination will be carried out at the University level and then overall grading will be prepared by the University giving prescribed weightage to the internal evaluation and End Semester Examination.

10.2. Grading for Practical courses

a. Internal Evaluation

The grading for practical courses will be prepared by respective institution following Table 4 or 5 for internal evaluation and institution will submit the

50.

grades along with marks obtained, standard deviation, mean and grade range to the University.

b. End semester Examination (External evaluation)

The grading for practical courses will also be carried out at the institution with consultation of the External Examiner for external evaluation. The institute will prepare the grades and will submit the grades along with marks obtained, mean, standard deviation and grade range to the University.

c. Overall Grading

The University will prepare overall grading for practical course, giving prescribed weightage to the internal evaluation and external evaluation.

Note:-

1. ***Relative grading for End Semester Examination will be followed by the Institutions having the Academic Autonomy. The grading will be done at Institute level. The grading will be done after showing the Answer sheets to the students and thereafter no re-evaluation will be done for End Semester Examination.***
2. ***Absolute grading will be followed by the University only for the Institutions those are not having the Academic Autonomy for End Semester written Examination (Theory) only. Absolute grading in this case is the only possible solution as the students have to be allowed for re-evaluation for the End Semester Examination.***

Requirement for Number of credits to award a degree has to be deliberated

Jurisdiction: All disputes will be settled under the jurisdiction of Jalandhar Court.

Annexure-I

Workout example for different values of σ and μ and corresponding Grades										
μ	σ	μ+1.5σ	μ+1.2σ <μ+1.5σ	μ+0.9σ <μ+1.2σ	μ+0.6σ <μ+0.9σ	μ+0.3σ <μ+0.6σ	μ+0.0σ <μ+0.3σ	μ-0.3σ <μ-0.0σ	<μ-0.3σ
50	10	65	62<65	59<62	56<59	53<56	50<53	47<50	<47
50	20	80	74<80	68<74	626<8	56<62	50<56	44<50	<44
55	10	70	67<70	64<67	61<64	58<61	55<58	52<55	<52
55	20	85	79<85	73<79	67<73	61<67	55<61	49<55	<49
60	10	75	72<75	69<72	66<69	63<66	60<63	57<60	<57
60	20	90	84<90	78<84	72<78	66<72	60<66	54<60	<54
		O	A^+	A	B^+	B	C	P	F

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Annexure - IV

Draft of

CHOICE BASED CREDIT SYSTEM (CBCS)

DEPARTMENT OF ACADEMICS
I.K. GUJRAL PUNJAB TECHNICAL UNIVERSITY
JALANDHAR

INTRODUCTION

I. K. Gujral Punjab Technical University (IKGPTU) (Formly known as Punjab Technical University), Jalandhar was established in the Year 1997 under the Punjab Technical University Act, 1996 (Punjab Act No. 1 of 1997) to enhance technical education and development thereof in the State of Punjab and for matters connected therewith. The University is aware of the urgent need to move towards Choice-Based Credit System (CBCS) and Grading system as per guide lines of UGC. The university has already implemented Credit Based System from the Academic session- 2015-16. The University is committed to implement CBCS in future.

APPLICABILITY OF CHOICE BASED CREDIT SYSTEM

The Choice Based Credit System (CBCS) shall apply to all Under Graduate/Post Graduate Courses of IKGPTU's Campuses, Autonomous Institutions and affiliated Colleges/Institutions. Under CBCS the requirement for awarding a degree is prescribed in terms of number of credits and students are given choices from the pool of elective courses.

COURSE STRUCTURE/ PATTERN UNDER CBCS

Degree programs will consist of three major components i.e., Core Courses, Elective Courses and Inter Disciplinary Elective Courses.

Core courses: These are offered by the parent department and are totally related to the major/discipline program. The core courses also include subjects related to Basic Sciences/Basic Engineering and Humanities.

The subject to promote the individual development of the student, one course "Innovative Product or Process development" has been proposed in the 6th semester of the B. Tech. program.

Elective courses: These are also offered by the parent department.

The B. Tech programs will have ***FOUR Elective courses***

Inter Disciplinary Elective courses: These courses are to be chosen from a list of courses offered by various departments.

The B. Tech programs will have ***TWO Inter Departmental Courses***.

NUMBER OF CREDITS FRO DIFFERENT PROGRAMS

Under Graduate Program (B. Tech.) and Post Graduate (M. Tech.) programs will have 25 credits/semester and 20 credits/semester respectively. So there will be uniform credits for these programs as per the following guidelines.

Programs	No. of Credits per year
UG Degree Programs (B. Tech.)	50
PG Degree Programs (M. Tech.)	40

SKELETONS FOR STUDY SCHEMES OF DIFFERENT PROGRAMS

Skeletons for Study Schemes of some of the programs have been prepared and will be presented during the meeting.

I. K. Gujral Punjab Technical University
(Registrar Office)

IKGPTU/REG/NAAC/1577 Dated: 31-01-22

List of Programs in Which CBCS / Elective Course System has been Implemented (Programs Offered in the Academic Year of 2020-21)

S. No.	Program Code	Program Name	Year of Implementation of CBCS / Elective System
1	511	B.Sc. (Hons.) Chemistry	2019-20
2	207	M.Sc (Chemistry)	2018-19
3	2723	Ph.D (Chemistry)	2016-17
4	205	M.Sc. Physics	2016-17
5	11001	Ph.D (Physis)	2016-17
6	14	B.Tech (Civil Engineering)	2016-17
7	MTCE	M.Tech (Civil Engineering)	2018-19
8	PHD	Ph.D (Civil Engineering)	2017-18
9	3001	Ph.D (Computer Science & Engineering)	2016-17
10	14001	Ph.D (Computer Applications)	2016-17
11	10	BCA	2019-20
12	29	MCA	2020-21
13	15	B.Tech. (Computer Science & Engineering)	2016-17
14	602	B.Tech. (Computer Engineering)	2019-20
15	506	B.Tech. (Software Engineering)	2019-20
16	163	M.Tech. (Computer Science & Engineering)	2018-19
17	30	B.Tech. (Mechanical Engineering)	2016-17
18	177	M.Tech (Mechanical Engineering)	2017-18
19	102	Ph.D (Mechanical Engineering)	2016-17
20	16	B.Tech. (Electrical Engineering)	2016-17
21	379	M.Tech. (Electrical Engineering Power System)	2014-15
22	4001	Ph.D. (Electrical Engineering)	2016-17
23	601	B.Tech (Electronics and Communication Engineering)	2018-19
24	378	M.Tech Electronics and Communication Engineering (Wireless Communication)	2011-12

Director
IQAC, IKG PTU

Registrar
I.K. Gujral Punjab Technical University
Jalandhar

25	101	Ph.D (Electronics and Communication Engineering)	2016-17
26	400	M.Sc. (Food Technology)	2017-18
27	308	M.Tech. (Food Technology)	2018-19
28	613	M.Sc. (Clinical Research)	2018-19
29	103	Ph.D (Pharmaceutical Sciences)	2016-17
30	657	Ph.D Food Science & Technology	2020-21
31	BHMCT	Bachelors in Hotel Management & Catering Technology	2019-20
32	DFB	Diploma in F&B Service	2019-20
33	9001	PhD (Management)	2013-14
34	28	MBA	2012-13
35	9	BBA	2018-19
36		MBA (Hospital Administration)	2020-21
37	PREPHDJMC	Ph.D (Journalism & Mass Communication)	2016-17
38	MAJMC	M.A. Journalism & Mass Communication	2016-17
39	MPHJMC	Mphil. Journalism & Mass Communication	2018-19
40	BAJMC	B.A. Journalism & Mass Communication	2019-20
41	MPENG	M.Phil (English)	2019-20
42	MPPB	M.Phil (Punjabi)	2019-20
43	PHD(ENG)	Ph.D (English)	2019-20
44	PHD(PBI)	Ph.D (Punjabi)	2019-20
45	599	B. Architecture	2019-20
46	355	M.Arch (Arch. Education and Research)	2020-21
47	523	M. Planning	2019-20
48	-	B.Sc. (Architecture Basics)	2020-21
49	95	Ph.D (Mathematics)	2016-17
50	206	M.Sc.(Mathematics)	2016-17
51	512	B.Sc.(Hons in Mathematics)	2019-20

(Jaspreet Singh, IAS),
Registrar

Registrar
I.K. Gujral Punjab Technical University
Jalandhar

Ref.No. IKGPTU/HM/2022/D-107 Dated. 12/01/2022

List of programs in which Credit Based System / Elective Course Implemented in the Last academic year

Name of the Department: Department of Hotel Management

Program	Year of Implementation
Bachelors in Hotel Management & Catering Technology	2019
Diploma in Food & Beverage Service	2019

12/01/22

Dr. Rajneesh Sachdev
Head (Department of Hotel Management)
I.K.Gujral Punjab Technical University
Main Campus
Kapurthala

Head
Department of Hotel Management
IKG PTU Main Campus
Kapurthala-144603

Study Scheme for all Courses

Scheme & Syllabus of

B. Tech Civil Engineering

Batch 2018 onwards

By

Board of Study CIVIL AND ENVIRONMENTAL SCIENCE

(Affiliated Colleges)

Study scheme

Third Semester										
S. No.	**Category**	**Subject Code**	**Course Title**	**Hours per week**			**Marks**			**Credits**
				L	**T**	**P**	**Int**	**Ext**	**Total**	
1	Professional Core courses	BTCE-301-18	Surveying & Geomatics	3	1	0	40	60	100	4
2	Professional Core courses#	BTCE-302-18	Solid Mechanics#	3	0	0	40	60	100	3
3	Professional Core courses #	BTCE-303-18	Fluid Mechanics#	3	0	0	40	60	100	3
4	Basic Science Course #	BTAM-301-18	Mathematics III # (Transform & Discrete Mathematics)	4	0	0	40	60	100	4
5	Engineering Science Course	BTEC-305-18	Basic Electronics & applications in Civil Engineering	3	0	0	40	60	100	3
6	Humanities and Social Sciences including Management	HSMC-132-18	Civil Engineering-Introduction, Societal & Global Impact	3	0	0	40	60	100	3
7	Professional Core courses	BTCE-306-18	Surveying & Geomatics Lab	0	0	2	30	20	50	1
8	Professional Core courses	BTCE-307-18	Fluid Mechanics Lab	0	0	2	30	20	50	1
9	Professional Core courses	BTCE-308-18	Solid Mechanics Lab	0	0	2	30	20	50	1
10		BMPD-301-18	Mentoring and Professional Development	0	0	2	Satisfactory/ Unsatisfactory			-
11	Pofessional Skill Enhancement	BTCE-332-18	Training – I*	-	-	-	60	40	100	Satisfactory/Unsatisfactory
			Total 28	**19**	**1**	**8**	**390**	**460**	**850**	**23**
*** Students have already completed 3 weeks institutional training and field and market survey in Summer vacation which is to be evaluated by viva-voce conducted along End semester exam of Third semester.**										

Note : # These are the minimum contact hrs. allocated.

The contact hrs. may be increased by institute as per the need based on the content of subject.

Fourth Semester										
S No	**Category**	**Subject Code**	**Course Title**	**Hours Per Week**			**Marks**			**Credits**
				L	**T**	**P**	**Int**	**Ext**	**Total**	
1	Professional Core courses	BTCE-401-18	Concrete Technology	3	0	0	40	60	100	3
2	Professional Core courses	BTCE-402-18	Material, Testing & Evaluation	4	0	0	40	60	100	4
3	Professional Core courses	BTCE-403-18	Hydrology & Water Resources	3	1	0	40	60	100	4
4	Professional Core courses	BTCE-404-18	Transportation Engineering	3	1	0	40	60	100	4
5	Professional Core courses	BTCE-405-18	Disaster Preparedness & Planning	3	0	0	40	60	100	3
6	Basic Sciences (Mandatory Courses)	EVS-101-18	Environment Science (Non- credit)	3	0	0	100	-	100	0
7	Professional Core courses	BTCE-406-18	Concrete Testing Lab	0	0	2	30	20	50	1
8	Professional Core courses	BTCE-407-18	Transportation Lab	0	0	2	30	20	50	1
9	Professional Skill Enhancement		Training –II*	0	0	0	-	-	-	-
10		BMPD-401-18	Mentoring and Professional Development	0	0	2	Satisfactory/ Unsatisfactory			-
			Total 26	**18**	**2**	**6**	**310**	**340**	**650**	**20**
* 2 weeks survey camp and 4 weeks industrial/institutional training for which viva will be conducted along End semester examination of Fifth semester.										

Fifth Semester										
S No	**Category**	**Subject Code**	**Course Title**	**Hours Per Week**			**Marks**			**Credits**
				L	**T**	**P**	**Int**	**Ext**	**Total**	
1	Professional Core courses	BTCE-501-18	Engineering Geology	3	0	0	40	60	100	3
2	Professional Core courses	BTCE-502-18	Elements of Earthquake Engineering	3	0	0	40	60	100	3
3	Professional Core courses	BTCE-503-18	Construction Engineering & Management	3	0	0	40	60	100	3
4	Professional Core courses	BTCE-504-18	Environmental Engineering	4	0	0	40	60	100	4
5	Professional Core courses	BTCE-505-18	Structural Engineering	3	1	0	40	60	100	4
6	Professional Core courses #	BTCE-506-18	Geotechnical Engineering#	3	0	0	40	60	100	3
7	Professional Core courses	BTCE-507-18	Geotechnical Lab	0	0	2	30	20	50	1
8	Professional Core courses	BTCE-508-18	Environmental Engineering Lab	0	0	2	30	20	50	1
9	Professional Core courses	BTCE-509-18	Structural Lab	0	0	2	30	20	50	1
10		BMPD-501-18	Mentoring and Professional	0	0	2	Satisfactory/ Unsatisfactory			-
11	Professional Skill Enhancement	BTCE-532-18	Training – II*	-	-	-	60	40	100	Satisfactory/Unsatisfactory
			Total 28	**19**	**1**	**8**	**390**	**460**	**850**	**23**
* Students have already completed 2 weeks survey camp and 4 weeks summer internship in Summer vacation which is to be evaluated by viva-voce conducted along End semester exam of Fifth semester.										

Note : # These are the minimum contact hrs. allocated.

The contact hrs. may be increased by institute as per the need based on the content of subject.

Sixth Semester										
S No	**Category**	Subject Code	**Course Title**	**Hours Per Week**			**Marks**			**Credits**
				L	**T**	**P**	**Int**	**Ext**	**Total**	
1	Professional Core course	BTCE- 601 -18	Engineering Economics, Estimation & Costing	3	1	0	40	60	100	4
2	Professional Elective courses	PECE-602 X-18	Elective –I	3	1	0	40	60	100	4
3	Professional Elective courses	PECE- 603 Y-18	Elective –II	3	1	0	40	60	100	4
4	Professional Elective courses	PECE- 604 Z-18	Elective – III	3	1	0	40	60	100	4
5	Open Elective Courses	OEZZ-XXX1	Open Elective-I	3	0	0	40	60	100	3
6	Open Elective courses	OEZZ-XXX2	Open Elective – II	3	0	0	40	60	100	3
7	Mandatory Courses (Non-credit)	BTMC-101-18	Constitution of India	3	0	0	100	-	100	0
8		BMPD-601-18	Mentoring and Professional Development	0	0	2	Satisfactory/ Unsatisfactory	S/US		S/US
			Total 27	**21**	**4**	**2**	**290**	**360**	**650**	**22**

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Institute/Department to decide regarding sending students for One Semester Training in 7th or 8th Semester.

Seventh Semester/Eighth Semester										
S No	**Category**	**Subject Code**	**Course Title**	**Hours Per Week**			**Marks**			**Credits**
				L	**T**	**P**	**Int**	**Ext**	**Total**	
1	Professional Elective courses	PECE-701X-18	Elective – IV	3	1	0	40	60	100	4
2	Professional Elective courses	PECE-702Y-18	Elective – V	3	1	0	40	60	100	4
3	Open Elective courses	OECE-701-18	Open Elective – III(Metro system and Engg)*	3	0	0	40	60	100	3
4	Professional Elective courses	PECE-703Z-18	Elective – VI	3	1	0	40	60	100	4
5	Professional core course		Project	0	0	8	40	60	100	7
6	Humanities and Social Sciences including Management courses HSMC255	HSMC-255	Professional Practice, Law & Ethics	2	0	0	40	60	100	2
7	Mandatory Courses (Non-credit)	BTMC-701-18	Management- I (Organizational Behavior)	2	0	0	50	-	50	0
			Total 27	**16**	**3**	**8**	**290**	**360**	**650**	**24**

Note * Metro system and Engg is compulsory open elective for Civil Students

Institute/Department/Student may decide for Industry oriented courses in lieu of One Semester Training in 7th or 8th Semester (Subject to approval from Competent Authority).

Seventh/ Eighth Semester

S No	Category	Subject Code	Course Title	Evaluation Internal			External		Credits
				Institute	Industry		Ext	Total	
1	Training (one semester)	BTCE-801-18	Software Training And Project	100	50		100	250	16
			Industrial training and Project	100	50		100	250	
			Total	**200**	**100**		**200**	**500**	**16**

Or
Students may obtain relevant credits from MOOC/SWAYAM
Or

Seventh/ Eighth semester

S No	Category	Subject Code	Course Title	Hours Per Week			Marks			Credits
				L	T	P	Int	Ext	Total	
1	Professional Core courses	BTCE-802-18	Smart City	3	1	0	40	60	100	4
2	Project		Project	0	0	24	60	40	100	12
3	Mandatory course	BMPD -803-18	Mentoring and Professional Development	0	0	2	Satisfactory/ Unsatisfactory			S/US
			Total 30	**3**	**1**	**26**				**16**

PROFESSIONAL (or PROGRAM) ELECTIVE (PE) COURSES [CIVIL ENGINEERING]

The Professional Electives are categorized into six different tracks viz. : Geotechnical engineering (PE1), Structural Engineering (PE2) and construction Engg and Management (PE3) to offer in 6th semester and the remaining three tracks i.e Transportation Engineering (PE4), Environmental Engg (PE5) & water Resources (PE6) to offer in 7th semester

The Program Elective Groups/courses have been categorized/developed keeping in mind the employment prospects of the students. The Program design in B.Tech. CE aims at providing domain specific knowledge to a student at UG level in progression. The Program/course design has been carried out jointly by the Academia in close coordination with Industry to provide a leading edge to the students and to prepare them as per the Industry needs

Professional Elective Course Tracks –Civil Engineering [PEC-CE]

Track	Code Number	Professional Core Course	Semester	Credits
Track-I	PECE-602X-18	Geotechnical engineering	6	4
Track-II	PECE-603Y-18	Structural Engineering	6	4
Track-III	PECE-604Z-18	Construction Engg and Management	6	4
Track-IV	PECE-701X-18	Transportation Engineering	7	4
Track-V	PECE-702Y-18	Environmental Engg	7	4
Track-VI	PECE-703Z-18	Water Resources	7	4
Total Credits				**24**

Basket of Professional Elective for different Tracks

Tracks	**Basket of Professional Electives**					
Track- I	Foundation Engg PECE-602A-18	Ground Improvement Techniques PECE-602B-18	Advanced Soil Mechanics PECE -602C-18	Geosynthetic Engineering PECE -602D -18	Geo-Environ Ment Engineering PECE -602E-18	Rock Mechanics PECE-602F -18
Track -II	Design of concrete structure PECE -603A-18	Design of steel Structures PECE -603B-18	Advanced Structural Analysi PECE -603C-18	Structure Analysis And Design PECE -603D -18	Prestressed structures PECE -603E-18	Bridge Engg PECE -603F -18
Track -III	Construction Equipment and Automation PECE -604A-18	Sustainable Construction methods PECE -604B-18	Repair and rehabilitation of structures PECE -604C-18	Construction Cost Analysis PECE -604D -18	Contracts Management PECE-604E -18	Construction Engineering Materials PECE -604F -18
Track -IV	Pavement and geometric desig of Highways PECE -701A-18	Airport planning and Design PECE -701B-18	Intelligent Transportation On systems PECE -701C-18	Highway Construction and Management PECE -701D-18	High Speed Rail Engg PECE -701E-18	Traffic Engg And Management PECE -701F -18
Track -V	Environment Lav and Policy PECE-702A-18	Rural water Supply And onsite Sanitation System PECE-702B-18	Water and air Quality Modelling PECE-702C-18	Solid and Hazardous Waste Management PECE-702D-18	EIA and LCA PECE-702E-18	Sustainable Engg and Technologies PECE-702F -18
Track –VI	Design of Hydraulic structur PECE-703A-18	River Engg. PECE-703B-18	Ground Water PECE-703C-18	Hydraulic Modelling PECE-703D-18	Transients in Closed conduits PECE-703E-18	Urban Hydrology a hydraulics PECE-703F -18

LIST OF OPEN ELECTIVE COURSES FOR STUDENTS OF OTHER PROGRAMMS
Offered by Civil Engineering Department for Even Semester

S.No.	Course Title	Subject Code	Semester	Hours Per Week			Credits
				L	T	P	
1	Civil Engineering- Introduction, Societal & Global Impact	HSMC- 132-18	Even	3	0	0	3
2	Disaster Preparedness & Planning	BTCE- 405-18	Even	3	0	0	3
3	Remote Sensing & GIS	OECE-609-18	Even	3	0	0	3
4	Construction Engineering & Management	BTCE- 503-18	Even	3	0	0	3
5	Concrete Technology	BTCE-401-18	Even	3	0	0	3

Odd semester List

S.No.	Course Title	Subject Code	Semester	Hours Per Week			Credits
				L	T	P	
1	Metro system and Engg	OECE-701-18	ODD	3	0	0	3
2	Traffic Management	OECE- 702-18	ODD	3	0	0	3
3	Road Safety	OECE-703-18	ODD	3	0	0	3
4	Environmental Impact Assessment	OECE-704-18	ODD	3	0	0	3
5	Construction Materials	OECE-705-18	ODD	3	0	0	3

Scheme & Syllabus of

Bachelor of Technology

Computer Science & Engineering

Batch 2018 onwards

(3rd -8th Semester)-

Affiliated colleges

By

Department of Academics

IK GujralPunjab Technical University

Bachelor of Technology in Computer Science & Engineering

It is a Graduate (UG) Programme of 4 years duration (8 semesters)

Courses & Examination

Scheme: Third Semester

Course Code	Type of Course	Course Title	Hours per Week			Marks Distribution		Total Marks	Credits
			L	T	P	Internal	External		
BTES 301-18	Engineering Science Course	Digital Electronics	3	0	0	40	60	100	3
BTCS 301-18	Professional Core Courses	Data structure & Algorithms	3	0	0	40	60	100	3
BTCS 302-18	Professional Core Courses	Object Oriented Programming	3	0	0	40	60	100	3
BTAM 304-18	Basic Science Course	Mathematics-III	3	0	0	40	60	100	3
HSMC 101/102-18	Humanities & Social Sciences Including Management \Courses	Foundation Course in Humanities (Development of Societies/Philosophy)	2	1	0	40	60	100	3
BTES 302-18	Engineering Science Course	Digital Electronics Lab	0	0	2	30	20	50	1
BTCS 303-18	Professional Core Courses	Data structure & Algorithms Lab	0	0	4	30	20	50	2
BTCS 304-18	Professional Core Courses	Object Oriented Programming lab.	0	0	4	30	20	50	2
BTCS 305-18	Professional Core Courses	IT Workshop*	0	0	2	30	20	50	1
		Summer Institutional Training	0	0	0	0	0	0	Satisfactory/Unsatisfactory
Total			**14**	**1**	**12**	**320**	**380**	**700**	**21**

*Syllabus to be decided by respective institute internally. It may include latest technologies.

Fourth Semester

Course Code	Type of Course	Course Title	Hours per Week			Marks Distribution		Total Marks	Credits
			L	T	P	Internal	External		
BTCS 401-18	Professional Core Courses	Discrete Mathematics	3	1	0	40	60	100	4
BTES 401-18	Engineering Science Course	Computer Organization & Architecture	3	0	0	40	60	100	3
BTCS 402-18	Professional Core Courses	Operating Systems	3	0	0	40	60	100	3
BTCS 403-18	Professional Core Courses	Design & Analysis of Algorithms	3	0	0	40	60	100	3
HSMC 122-18	Humanities & Social Sciences including Management Courses	Universal Human Values 2	2	1	0	40	60	100	3
EVS101-18	Mandatory Courses	Environmental Sciences	3	-	-	100	-	100	S/US
BTES 402-18	Engineering Science Course	Computer Organization & Architecture Lab	0	0	2	30	20	50	1
BTCS 404-18	Professional Core Courses	Operating Systems Lab	0	0	4	30	20	50	2
BTCS 405-18	Professional Core Courses	Design & Analysis of Algorithms Lab	0	0	4	30	20	50	2
Total			**15**	**2**	**10**	**390**	**360**	**750**	**24**

Students will take up summer internship of 4-6 weeks at industry or organizations of repute after 4th sem, that will be accredited in 5th semester.

Fifth Semester

Course Code	Type of Course	Course Title	Hours per Week			Marks Distribution		Total Marks	Credits
			L	T	P	Internal	External		
BTES 501-18	Engineering Science	Enterprise Resource Planning	3	0	0	40	60	100	3
BTCS 501-18	Professional Core Courses	Database Management Systems	3	0	0	40	60	100	3
BTCS 502-18	Professional Core Courses	Formal Language & Automata Theory	3	0	0	40	60	100	3
BTCS 503-18	Professional Core Courses	Software Engineering	3	0	0	40	60	100	3
BTCS 504-18	Professional Core Courses	Computer Networks	3	0	0	40	60	100	3
BTCS XXX-18	Professional Elective	Elective-I	3	0	0	40	60	100	3
MC	Mandatory Courses	Constitution of India/ Essence of Indian Traditional Knowledge	2	-	-	100	-	100	S/US
BTCS 505-18	Professional Core Courses	Database Management Systems Lab	0	0	4	30	20	50	2
BTCS 506-18	Professional Core Courses	Software Engineering Lab	0	0	2	30	20	50	1
BTCS 507-18	Professional Core Courses	Computer Networks Lab	0	0	2	30	20	50	1
BTCS XXX-18	Professional Elective	Elective-I Lab	0	0	2	30	20	50	1
	Professional Training	Industrial *Training	-	-	-	60	40	100	S/US
Total			**20**	**0**	**10**	**520**	**480**	**1000**	**23**

* 4-6 weeks industrial training undertaken after 4th semester in summer vacations.

Sixth Semester

Course Code	Type of Course	Course Title	Hours per Week			Marks Distribution		Total Marks	Credits
			L	T	P	Internal	External		
BTCS 601-18	Professional Core Courses	Compiler Design	3	0	0	40	60	100	3
BTCS 602-18	Professional Core Courses	Artificial Intelligence	3	0	0	40	60	100	3
BTCS UUU-18	Professional Elective Courses	Elective-II	3	0	0	40	60	100	3
BTCS YYY-18	Professional Elective Courses	Elective-III	3	0	0	40	60	100	3
BTOE ***	Open Elective Courses	Open Elective-I	3	0	0	40	60	100	3
BTCS 603-18	Project	Project-1	0	0	6	60	40	100	3
BTCS 604-18	Professional Core Courses	Compiler Design Lab	0	0	2	30	20	50	1
BTCS 605-18	Professional Core Courses	Artificial Intelligence Lab	0	0	2	30	20	50	1
BTCS UUU-18	Professional Elective Courses	Elective-II lab	0	0	2	30	20	50	1
BTCS YYY-18	Professional Elective Courses	Elective-III lab	0	0	2	30	20	50	1
Total			**15**	**0**	**14**	**380**	**420**	**800**	**22**

Seventh Semester / Eighth Semester

Course Code	Type of Course	Course Title	Hours per Week			Marks Distribution		Total Marks	Credits
			L	T	P	Internal	External		
BTCS 701-18	Professional Core Courses	Network Security and Cryptography	3	0	0	40	60	100	3
BTCS 702-18	Professional Core Courses	Data Mining and Data Warehousing	3	0	0	40	60	100	3
BTOE ***	Open Elective Courses	Open Elective-II	3	0	0	40	60	100	3
BTCS ZZZ-18	Professional Elective	Elective- IV	3	0	0	40	60	100	3
BTCS TTT-18	Professional Elective Courses	Elective-V	3	0	0	40	60	100	3
BTCS 703-18	Project	Project-II	0	0	12	120	80	200	6
BTCS ZZZ-18	Professional Elective	Elective- IV lab	0	0	2	30	20	50	1
BTCS TTT-18	Professional Elective	Elective- V lab	0	0	2	30	20	50	1
Total			**15**	**0**	**14**	**380**	**420**	**800**	**23**

Seventh Semester / Eighth Semester

Course Code	Course Title	Marks Distribution		Total Marks	Credits
		Internal	External		
BTCS 801-18	Semester Training	300	200	500	16

LIST OF ELECTIVES

BTCS XXX-18: Elective-I

BTCS 510-18	Programming in Python
BTCS 513-18	Programming in Python Lab
BTCS 515-18	Computer Graphics
BTCS 518-18	Computer Graphics lab
BTCS 520-18	Web Technologies
BTCS 522-18	Web Technologies lab
BTCS 521-18	Computational Biology
BTCS 523-18	Computational Biology lab

BTCS UUU-18: Elective-II

BTCS 606-18	Simulation and Modelling
BTCS 607-18	Simulation and Modelling Lab
BTCS 608-18	Internet of Things
BTCS 609-18	Internet of Things lab
BTCS 610-18	Digital Image processing
BTCS 611-18	Digital Image processing lab
BTCS 612-18	Cloud computing
BTCS 613-18	Cloud computing lab

BTCS YYY-18: Elective-III

BTCS 614-18	Software Project Management
BTCS 615-18	Software Project Management Lab
BTCS 616-18	Data Science
BTCS 617-18	Data Science lab
BTCS 618-18	Machine Learning
BTCS 619-18	Machine Learning lab
BTCS 620-18	Mobile Application Development
BTCS 621-18	Mobile Application Development lab

BTCS ZZZ-18: Elective-IV

BTCS 704-18	Deep Learning
BTCS 705-18	Deep Learning Lab
BTCS 706-18	Distributed databases
BTCS 707-18	Distributed databases lab
BTCS 708-18	Computer Vision
BTCS 709-18	Computer Vision lab
BTCS 710-18	Agile Software Development
BTCS 711-18	Agile Software Development lab

BTCS TTT-18: Elective-V

BTCS 712-18	Blockchain Technologies
BTCS 713-18	Blockchain Technologies Lab
BTCS 714-18	Parallel Computing
BTCS 715-18	Parallel Computing lab
BTCS 716-18	Adhoc and Wireless sensor networks
BTCS 717-18	Adhoc and Wireless sensor networks lab
BTCS 718-18	Quantum Computing
BTCS 719-18	Quantum Computing lab

Open electives offered by the department:

BTCS301-18 Data Structures & Algorithms

BTCS302-18 Object Oritented Programming

BTES401-18 Computer organisation & Arcitecture

BTCS402-18 Operating system

BTCS501-18 Database Management System

BTCS504-18 Computer Networks

MINOR DEGREE IN COMPUTER SCIENCE ENGG.(Credits required 20 from Core+Electives/MOOCS*)

List of Core Courses:Minimum of 2 courses must be opted, other than studied in regular course

Course Code	Type of Course	Course Title	Hours per Week			Marks Distribution		Total Marks	Credits
			L	T	P	Internal	External		
BTCS301-18& BTCS303-18	PCC	Data structure Theory & Lab	3	0	4	40T+30P	60T+20P	150	5
BTCS302-18 & BTCS304-18	PCC	Object Oriented Programming Theory & Lab	3	0	4	40T+30P	60T+20P	150	5
BTCS504-18 & BTCS507-18	PCC	Computer networks Theory & Lab	3	0	2	40T+30P	60T+20P	150	4
BTCS402-18 & BTCS404-18	PCC	Operating system Theory & Lab	3	0	4	40T+30P	60T+20P	150	5
BTES401-18 & BTCS402-18	ESC	Computer Organisation and architecture Theory & Lab	3	0	2	40T+30P	60T+20P	150	4
BTCS501-18 & BTCS504-18	PCC	Database Management system Theory & Lab	3	0	4	40T+30P	60T+20P	150	5

*List of Courses through MOOCS will be provided every six months through BOS/ MOOCS Coordinator; each course must be of minimum 12 weeks and of 4 credits after submission of successful exam in that course.

List of Electives: 3 courses can be opted, other than studied in regular course

Course Code**	Type of Course	Course Title	Hours per Week			Marks Distribution		Total Marks	Credits
			L	T	P	Internal	External		
	ELECTIVE	Web Technologies Theory & Lab	3	0	2	40T+30 P	60T+20 P	150	4
	ELECTIVE	Machine Learning Theory & Lab	3	0	2	40T+30 P	60T+20 P	150	4
	ELECTIVE	Cloud computing Theory & Lab	3	0	2	40T+30 P	60T+20 P	150	4
	ELECTIVE	Adhoc and Sensor network Theory & Lab	3	0	2	40T+30 P	60T+20 P	150	4
	ELECTIVE	Data Science Theory & Lab	3	0	2	40T+30 P	60T+20 P	150	4
	ELECTIVE	Computer Graphics Theory & Lab	3	0	2	40T+30 P	60T+20 P	150	4
	ELECTIVE	Mobile Application Development Theory & Lab	3	0	2	40T+30 P	60T+20 P	150	4
	ELECTIVE	Data Mining &Warehousing Theory & Lab	3	0	2	40T+30 P	60T+20 P	150	4
	ELECTIVE	Information Theory & Coding Theory & Lab	3	0	2	40T+30 P	60T+20 P	150	4
	ELECTIVE	Soft Computing Theory & Lab	3	0	2	40T+30 P	60T+20 P	150	4

** Refer to the scheme above for the course codes of respective courses.

IKG Punjab Technical University

Syllabus (3rd-8th Semester)

for

Undergraduate Degree Programme

Bachelor of Technology

ELECTRONICS AND COMMUNICATION ENGINEERING

Scheme & Syllabus

2018 & onwards

Structure of Distribution of credits Electronics & Communication Engineering Program as per AICTE Model Curriculum 2018:

Sr. No.	Category	Suggested Breakup of Credits (Total 160)
1	Humanities and Social Science including Management courses	12*
2	Basic Sciences 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 Program, Indian Constitution, Essence of Indian Traditional Knowledge]	(non-credit)
	Total	160*

**Minor Variation is allowed as per need of the respective disciplines.*

VISION

To impart quality education and create skilled technocrats & innovative entrepreneurs that meet to global challenges in the area of Electronics and Communication Engineering (ECE) at under graduate level.

MISSION

1. To impart outcome-based curriculum inculcating comprehensive fundamental domain knowledge meant to meet current industrial expectations.
2. To provide state-of-the-art infrastructure supported with best teaching-learning environment for practical realization of theoretical concepts.
3. To produce technocrats, researchers and entrepreneurs with inherent human values who can tackle challenges of professional career.

PROGRAMME EDUCATIONAL OBJECTIVES

1. Ability to generalize fundamental domain knowledge while working with electronic equipment/systems to handle engineering problems in professional career.
2. Ability to get profound knowledge of modern techniques, EDA tools and to acquire technical skills to innovate new/existing solutions to engineering problems.
3. Graduates will be known leaders in Electronics and Comm. Engineering and associated domains of engineering due their ability solve real-world inter-disciplinary problem.

PROGRAMME OUTCOMES (POS)

1. **Engineering Knowledge**: Apply knowledge of mathematics, science, engineering fundamentals and an engineering specialization to the solution of complex engineering problems.
2. **Problem Analysis**: Identify, formulate, research literature and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences and engineering sciences.
3. **Design/Development of Solutions**: Design solutions for complex engineering problems and design system components or processes that meet specified needs with appropriate consideration for public health and safety, cultural, societal and environmental considerations.
4. **Conduct** investigations of complex problems using research-based knowledge and research methods including design of experiments, analysis and interpretation of data and synthesis of information to provide valid conclusions.
5. **Modern Tool Usage**: Create, select and apply appropriate techniques, resources and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
6. **The Engineer and Society**: Apply reasoning informed by contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to professional engineering practice.
7. **Environment and Sustainability**: Understand the impact of professional engineering solutions in societal and environmental contexts and demonstrate knowledge of and need for sustainable development.

8. **Ethics**: Apply ethical principles and commit to professional ethics and responsibilities and norms of engineering practice.
9. **Individual and Team Work**: Function effectively as an individual, and as a member or leader in diverse teams and in multi-disciplinary settings.
10. **Communication**: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as being able to comprehend and write effective reports and design documentation, make effective presentations and give and receive clear instructions.
11. **Project Management and Finance**: Demonstrate knowledge and understanding of engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
12. **Life-long Learning**: Recognize the need for and have the preparation and ability to engage in independent and life- long learning in the broadest context of technological change.

PROGRAMME SPECIFIC OUTCOMES (PSOS)

1. **Working with Instruments**: Appreciate working of electronic equipment/systems guided by practical experience and theoretical fundamental knowledge of Electronics & Communication Engineering.
2. **Extrapolating Domain Knowledge**: Ability to provide solutions to real-world problems in the field of Electronics & Communication Engineering by extrapolating the fundamental knowledge of electronic devices, circuits, embedded & communication systems.
3. **Innovation and Design Ability**: Innovative thinking and ability to design and/or improve products and/or systems for the society and industry for better utilization, human safety and reduced cost.

Semester III [Second year]										
Branch/Course: B.Tech. Electronics and Communication Engineering										
Sr. No.	**Course code**	**Course Title**	**L**	**T**	**P**	**Hrs**	**Internal Marks**	**External Marks**	**Total**	**Credits**
1	BTEC- 301-18	Electronic Devices	3	0	0	3	40	60	100	3
2	BTEC- 302-18	Digital System Design	3	1	0	4	40	60	100	4
3	BTEC- 303-18	Electromagnetic Waves	3	1	0	4	40	60	100	4
4	BTEC-304-18	Network Theory	3	1	0	4	40	60	100	4
5	BTAMXXX18	Mathematics III	3	1	0	4	40	60	100	4
6	BTEC-311-18	Electronic Devices Laboratory	0	0	2	2	30	20	50	1
7	BTEC-312-18	Digital System Design Laboratory	0	0	2	2	30	20	50	1
8	HSMC101-18 /HSMC102-18*	Foundational Course in Humanities (Development of Societies or Philosophy)	3	0	0	3	40	60	100	3
9	BTEC-321-18	4-Week Institutional Training	0	0	4	4	60	40	100	0
10	BMPD-331-18	Mentoring and Professional Development	0	0	2	2	Satisfactory/Un-satisfactory			Non-credit
		Total	**18**	**4**	**10**	**32**	**360**	**440**	**800**	**24**

Semester IV [Second year]										
Branch/Course: B.Tech. Electronics and Communication Engineering										
Sr. No.	**Course code**	**Course Title**	**L**	**T**	**P**	**Hrs**	**Internal Marks**	**External Marks**	**Total Marks**	**Credits**
1	BTEC-401-18	Analog Circuits	3	1	0	4	40	60	100	4
2	BTEC-402-18	Microprocessors and Microcontrollers	3	1	0	4	40	60	100	4
3	BTCS-301-18	Data Structures & Algorithms	3	0	0	3	40	60	100	3
4	BTEC-403-18	Signals and Systems	3	1	0	4	40	60	100	4
5	HSMC122-18	Universal Human Values – 2: Understanding Harmony	3	0	0	3	40	60	100	3
6	EVS-101-18	Mandatory Course- Environmental Sciences	3	0	0	3	100	0	100	Non-credit
7	BTEC-411-18	Analog Circuits Laboratory	0	0	2	2	30	20	50	1
8	BTEC-412-18	Microprocessors and Microcontrollers Laboratory	0	0	2	2	30	20	50	1
9	BMPD-341-18	Mentoring and Professional Development	0	0	2	2	Satisfactory/Un-satisfactory			Non-credit
		Total	**18**	**2**	**6**	**26**	**360**	**340**	**700**	**20**

Semester V [Third year]										
Branch/Course: B.Tech. Electronics and Communication Engineering										
Sr. No.	**Course code**	**Course Title**	**L**	**T**	**P**	**Hrs.**	**Internal Marks**	**External Marks**	**Total**	**Credit**
1	BTEC-501-18	Analog and Digital Communication	3	1	0	4	40	60	100	4
2	BTEC-502-18	Digital Signal Processing	3	1	0	4	40	60	100	4
3	BTEC-503-18	Linear Integrated Circuits	3	1	0	4	40	60	100	4
4	BTEC-504-18	Control Systems	3	1	0	4	40	60	100	4
5	BTEC-901X-18	Professional Elective-1	3	0	0	3	40	60	100	3
6	BTEC-505-18	Project Management	3	0	0	3	40	60	100	3
7	BTEC-511-18	Analog and Digital Communication Laboratory	0	0	2	2	30	20	50	1
8	BTEC-512-18	Digital Signal Processing Laboratory	0	0	2	2	30	20	50	1
9	BTEC-513-18	Linear Integrated Circuits Laboratory	0	0	2	2	30	20	50	1
10	BTEC-521-18	4-Weeks Industrial Training	0	0	6	6	60	40	100	0
11	BTEC-10X-18	Professional Elective-1 Lab (Optional)**	0	0	2	2	Satisfactory/Un-satisfactory			Non-credit
12	BMPD-351-18	Mentoring and	0	0	2	2	Satisfactory/Un-satisfactory			Non-

		Professional Development								credit
		Total	**18**	**3**	**17**	**38**	**390**	**460**	**850**	**25**

Semester VI [Third year]										
Branch/Course: B.Tech. Electronics and Communication Engineering										
Sr. No.	**Course code**	**Course Title**	**L**	**T**	**P**	**Hrs**	**Internal Marks**	**External Marks**	**Total**	**Credits**
1	BTEC-601-18	Wireless Communication	3	0	0	3	40	60	100	3
2	BTCS-504-18	Computer Networks	3	0	0	3	40	60	100	3
3	BTEC-602-18	Optical Fibers & Communication	3	1	0	4	40	60	100	4
4	BTEC-603-18	Microwave and Antenna Engineering	3	1	0	4	40	60	100	4
5	BTEC-906X-18	Professional Elective-2	3	0	0	3	40	60	100	3
6	BTEC-XXX-18	Open Elective-1	3	0	0	3	40	60	100	3
7	BTEC-611-18	Optical Fibers & Communication Lab	0	0	2	2	30	20	50	1
8	BTEC-612-18	Microwave and Antenna Engineering Laboratory	0	0	2	2	30	20	50	1
9	BTEC-631-18	Project-I	0	0	3	3	60	40	100	3
10	BTEC-11X-18	Professional Elective-2 Lab (Optional)**	0	0	2	2	Satisfactory/Un-satisfactory			Non-credit
11	BMPD-361-18	Mentoring and Professional Development	0	0	2	2	Satisfactory/Un-satisfactory			Non-credit
		Total	**18**	**2**	**11**	**31**	**360**	**440**	**800**	**25**

Semester VII/VIII [Fourth year]										
Branch/Course: Electronics and Communication Engineering										
Sr. No.	**Course code**	**Course Title**	**L**	**T**	**P**	**Hr**	**Int Marks**	**Ext Marks**	**Total**	**Credits**
1	BTEC-907X-18	Professional Elective-3	3	0	0	3	40	60	100	3
2	BTEC-908X-18	Professional Elective-4	3	0	0	3	40	60	100	3
3	BTEC-909X-18	Professional Elective-5	3	0	0	3	40	60	100	3
4	BTEC-YYY-18	Open Elective-2	3	0	0	3	40	60	100	3
5	BTEC-ZZZ-18	Open Elective-3	3	0	0	3	40	60	100	3
6	BTMC-101-18	Indian Constitution-Mandatory Course	3	0	0	3	100	0	100	Non-credit
7	BTMC-102-18	Essence of Indian Traditional Knowledge-Mandatory Course	3	0	0	3	100	0	100	Non-credit
8	BTEC-731-18	Project-II & Report	0	0	12	12	120	80	200	6
9	BTEC-12X-18	Professional Elective 3 or 4 or 5 Lab (Optional)**	0	0	2	2	Satisfactory/Un-satisfactory			Non-credit
10	BMPD-371-18	Mentoring and Professional Development	0	0	2	2	Satisfactory/Un-satisfactory			Non-credit
		Total	**21**	**0**	**16**	**37**	**520**	**380**	**900**	**21**

Semester VII/VIII [Fourth year] B.Tech. Electronics and Communication Engineering						
Sr. No.	**Course code**	**Course Title**	**Internal Marks**	**External Marks**	**Total**	**Credits**
1	BTEC- 801-18	Semester Software/Industrial Training & Project	300	200	500	16
		Total	**300**	**200**	**500**	**16**
Total Marks (including B.Tech. 1st Year)			**2680**	**3020**	**5700**	**169**

OR

If the students (minimum 8 students) of any Institute/College do not opt for semester training, then the students shall be required to study the following:

Semester VII/VIII [Fourth year]										
Branch/Course: Electronics and Communication Engineering										
Sr. No.	**Course Code**	**Course Title**	**L**	**T**	**P**	**Hr**	**Int Marks**	**Ext Marks**	**Total**	**Credits**
1	BTEC-aaaa-18	Professional Elective	3	0	0	3	40	60	100	3
2	BTEC-bbbb-18	Professional Elective	3	0	0	3	40	60	100	3
3	BTEC-cccc-18	Professional Elective	3	0	0	3	40	60	100	3
4	BTEC-dddd-18	Professional Elective	3	0	0	3	40	60	100	3
5	BTEC-802-18	Simulation and Modelling Lab (Minor Project & Report)	0	0	8	8	60	40	100	4
6	BMPD-381-18	Mentoring and Professional Development	0	0	2	2	Satisfactory/Un-satisfactory			Non-credit
		Total	**12**	**0**	**10**	**22**	**220**	**280**	**500**	**16**

1. Four Professional Elective subjects (each of 3 credits) from any one of the Five Professional Elective Groups (excluding the group which the student has opted earlier).
2. The student will undertake and complete a Minor Project using Simulation and Modelling Lab & submit the Report.
3. Student has to complete 16 credits equivalent to that of One semester Industrial training in this course.

* Student may choose any one of these as foundational courses in HUSS group as given in AICTE Model Curriculum 2018.

** Lab pertaining to the Professional Electives is optional and non-credit, however, it can be offered by the Department to its students as per the lab support available and the discretion of the same lies with the Institution.

PROFESSIONAL (or PROGRAM) ELECTIVE (PE) COURSES [ELECTRONICS AND COMMUNICATION ENGINEERING]

The Professional Electives are categorized into five different Groups viz. Information & Communication Technology (ICT), Communication Systems, Electronic Hardware, Software Development and Signal Processing. The Program Elective Groups/courses have been categorized/developed keeping in mind the employment prospects of the students. The Program design in B.Tech. ECE aims at providing domain specific knowledge to a student at UG level in progression. The Program/course design has been carried out jointly by the Academia in close coordination with Industry to provide a leading edge to the students and to prepare them as per the Industry needs.

The student is free to choose any one group out of the five listed groups. It is expected of a student to complete all the six courses from the relevant group. Therefore, the Head and the Faculty of the Department should provide complete guidance and take utmost care to apprise the students in a most diligent manner. Usually, it will not be a case to allow the change of the group, however, in the best interest of the students, a student can be allowed to change the group but the responsibility for teaching the pre requisite courses in the changed group shall rest with the Department/Institute. The permission for the same shall have to be obtained from the University with supporting reasons.

*Sr. No.	Professional Elective Group	Semester	Professional Elective	Course Code	Course Title	Hrs/week	Credits
1.	**ICT Group**	V	PE-1	BTEC-905A-18	Routing and Switching	3L:0T:0P	3
2.		VI	PE-2	BTEC-906A-18	WLAN and Security	3L:0T:0P	3
3.		VII	PE-3	BTEC-907A-18	Internet of Things (IoT) & Cloud Computing	3L:0T:0P	3
4.		VII	PE-4	BTEC-908A-18	Artificial Intelligence	3L:0T:0P	3
5.		VII	PE-5	BTEC-909A-18	Introduction to Big Data	3L:0T:0P	3
6.	**Communication Group**	V	PE-1	BTEC-905B-18	Random Variables and Stochastic Processes	3L:0T:0P	3
7.		VI	PE-2	BTEC-906B-18	Satellite Communication	3L:0T:0P	3
8.		VII	PE-3	BTEC-907B-18	Antenna Radiating Systems	3L:0T:0P	3
9.		VII	PE-4	BTEC-908B-18	Mobile Communication and Networks	3L:0T:0P	3
10.		VII	PE-5	BTEC-909B-18	Information Theory and Coding	3L:0T:0P	3
11.	**Electronics Hardware Group**	V	PE-1	BTEC-905C-18	VLSI/ULSI Technology	3L:0T:0P	3
12.		VI	PE-2	BTEC-906C-18	CMOS and RF Circuits Design	3L:0T:0P	3

13.		VII	PE-3	BTEC-907C-18	Robotics and Embedded systems	3L:0T:0P	3
14.		VII	PE-4	BTEC-908C-18	VLSI Design	3L:0T:0P	3
15.		VII	PE-5	BTEC-909C-18	Embedded System Design	3L:0T:0P	3
16.	**Software Development Group**	V	PE-1	BTEC-905D-18	Programming in JAVA	3L:0T:0P	3
17.		VI	PE-2	BTEC-906D-18	C# AND .NET Programming	3L:0T:0P	3
18.		VII	PE-3	BTEC-907D-18	Python Programming	3L:0T:0P	3
19.		VII	PE-4	BTEC-908D-18	Soft Computing	3L:0T:0P	3
20.		VII	PE-5	BTEC-909D-18	Artificial Intelligence & Machine Learning	3L:0T:0P	3
21.	**Signal processing Group**	V	PE-1	BTEC-905E-18	Speech and Audio Processing	3L:0T:0P	3
22.		VI	PE-2	BTEC-906E-18	Natural language Processing	3L:0T:0P	3
23.		VII	PE-3	BTEC-907E-18	Adaptive Signal Processing	3L:0T:0P	3
24.		VII	PE-4	BTEC-908E-18	Digital Image and Video Processing	3L:0T:0P	3
25.		VII	PE-5	BTEC-909E-18	Biomedical Signal Processing	3L:0T:0P	3

LIST OF OPEN ELECTIVES (OE) COURSES OFFERED BY DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING FOR STUDENTS OF OTHER PROGRAMS

Sr. No	Course Code	Sem	Course Title	L	T	P	Hours/ Week	Credits
1.	BTEC-301-18	Odd	Electronic Devices	3	0	0	3	3
2.	BTEC-302-18	Odd	Digital System Design	3	0	0	3	3
3.	BTEC-402-18	Even	Microprocessors and Microcontrollers	3	0	0	3	3
4.	BTEC-403-18	Even	Signals and Systems	3	0	0	3	3
5.	BTEC-501-18	Odd	Analog and Digital Communication	3	0	0	3	3
6.	BTEC-905A-18	Odd	Routing and Switching	3	0	0	3	3
7.	BTEC-905C-18	Odd	VLSI/ULSI Technology	3	0	0	3	3
8.	BTEC-502-18	Odd	Digital Signal Processing	3	0	0	3	3
9.	BTEC-503-18	Odd	Linear Integrated Circuits	3	0	0	3	3
10.	BTEC-504-18	Odd	Control Systems	3	0	0	3	3
11.	BTEC-601-18	Even	Wireless Communication	3	0	0	3	3
12.	BTEC-906A-18	Even	WLAN and Security	3	0	0	3	3

13.	BTEC-906B-18	Even	Satellite Communication	3	0	0	3	3
14.	BTEC-906C-18	Even	CMOS and RF Circuits Design	3	0	0	3	3
15.	BTEC-907B-18	Odd	Antenna Radiating Systems	3	0	0	3	3
16.	BTEC-907C-18	Odd	Robotics and Automation	3	0	0	3	3
17.	BTEC-908A-18	Odd	Artificial Intelligence	3	0	0	3	3
18.	BTEC-909A-18	Odd	Introduction to Big Data	3	0	0	3	3
19.	BTEC-908B-18	Odd	Mobile Communication and Networks	3	0	0	3	3
20.	BTEC-909B-18	Odd	Information Theory and Coding	3	0	0	3	3
21.	BTEC-908C-18	Odd	VLSI Design	3	0	0	3	3
22.	BTEC-909C-18	Odd	Embedded System Design	3	0	0	3	3
23.	BTEC-908D-18	Odd	Machine Learning	3	0	0	3	3
24.	BTEC-909D-18	Odd	Soft Computing	3	0	0	3	3

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Range of credits for Honors Degree -Minimum credits as per scheme are required by a student to be eligible to get Under Graduate degree in Electronics and Communication Engineering.

1. A student will be eligible to get Under Graduate degree with Honors, if he/she completes an additional 20 credits. These could be acquired through MOOCs and registering in the department.
2.Range of Credits and Courses for Major Degree in B. Tech. (Electronics and Communication Engineering) and Minor Degree in B.Tech. (Other Engineering)
(i) A student admitted in B. Tech (ECE) may opt for Major Degree in B. Tech. (ECE) and Minor Degree in B.Tech. (other Engineering) with effect from 3rd semester onwards.
(ii) The student must clear his/her previous two semesters.
(iii) The student/candidate will require to clear at least five theory subjects for Minor Degree in B.Tech.

Subjects for Minor Degree in B.tech Electronics and Communication Engineering (ECE)

Core Subjects:

S.No.	Subject Code	Course Title	Credits
1.	BTEC-305-18	Basic Electronics	3
2.	BTEC-306-18	Digital Electronics	3
3.	BTEC-401-18	Analog Circuits	4
4.	BTEC-402-18	Microprocessors and Microcontrollers	3
5.	BTEC-403-18	Signals and Systems	4
6.	BTEC-501-18	Analog and Digital Communication	3

7.	BTEC-503-18	Linear Integrated Circuits	3
8.	BTEC-504-18	Control Systems	4
9.	BTEC-601-18	Wireless Communication	3
10.	BTEC-602-18	Digital Signal processing	4
11.	BTEC-603-18	Optical Fibres and Communication	3
12.	BTEC-604-18	Microwave and Antenna Engg.	4

Elective Subjects

S.No.	Subject Code	Course Title	Credits
1.	BTEC-301-18	Electronic Devices	3
2.	BTCS-301-18	Data Structures & Algorithms	3
3.	BTEC-905A-18	Routing and Switching	3
4.	BTEC-906A-18	WLAN and Security	3
5.	BTEC-907A-18	Cloud Computing and Services	3
6.	BTEC-905B-18	Random Variables and Stochastic Processes	3
7.	BTEC-906B-18	Satellite Communication	3
8.	BTEC-907B-18	Antenna Radiating Systems	3
9.	BTEC-906D-18	Mobile Communication and Networks	3
10.	BTEC-906E-18	Satellite Communication	3

11.	BTEC-907A-18	VLSI/ULSI Technology	3
12.	BTEC-907B-18	Embedded System Design	3
13.	BTEC-905C-18	VLSI/ULSI Technology	3
14.	BTEC-906C-18	CMOS and RF Circuits Design	3
15.	BTEC-905D-18	Programming in JAVA	3
16.	BTEC-906D-18	C# AND .NET Programming	3
17.	BTEC-905E-18	Speech and Audio Processing	3
18.	BTEC-906E-18	Natural language Processing	3
19.	BTEC-909C-18	Adaptive Signal Processing	3

MANDATORY COURSES (Non-Credit Courses)

Sr. No.	Mandatory Course	Course Code	Course Title	Hours/Week	Credits
1.	MC-1	BTMC-XXX-18	Environmental Sciences	3L:0T:0P	Nil
2.	MC-2	BTMC-YYY-18	Indian Constitution	3L:0T:0P	Nil
3.	MC-3	BTMC-ZZZ-18	Essence of Indian Traditional Knowledge	3L:0T:0P	Nil

IKGPTU HUSS Courses/Curricular Structure

Semester	L-T-P-C	Course No. & Title
1	2-1-0-3	L-101 Basic English
3	2-1-0-3	HSMC-103/HSMC-104 Foundation Course in Humanities (Development of Societies/Philosophy)
4	2-1-0-3	HSMC122-18 Universal Human Values – 2: Understanding Harmony
5-8	2-1-0-3	Humanities & Social Sciences Management Electives

List of Humanities & Social Sciences Including Management

Sr. No.	Course Code	Course Title	Hours	Credits
1.	HSMC101-18 /HSMC102-18	Foundational Course in Humanities (Development of Societies/Philosophy)	2L:10T:0P	3
2.	HSMC103-18	Education, Technology and Society	2L:10T:0P	3
3.	HSMC104-18	History of Science and Technology in India	2L:10T:0P	3
4.	HSMC105-18	Nyaya Logic Epistemology	2L:10T:0P	3
5.	HSMC106-18	Political and Economic Thought for a Humane Society	2L:10T:0P	3
6.	HSMC107-18	State, Nation Building and Politics in India	2L:10T:0P	3
7.	HSMC108-18	Psychological Process	2L:10T:0P	3
8.	HSMC109-18	Positive Psychology	2L:10T:0P	3
9.	HSMC110-18	Application of Psychology	2L:10T:0P	3
10.	HSMC111-18	Sociology, Society and Culture	2L:10T:0P	3
11.	HSMC112-18	Epochal Shift	2L:10T:0P	3
12.	HSMC113-18	Values and Ethics	2L:10T:0P	3
13.	HSMC114-18	Ethics and Holistic Life	2L:10T:0P	3
14.	HSMC115-18	Folk and Vernacular Expressive Tradition and Popular Culture	2L:10T:0P	3
15.	HSMC116-18	Universal Human Conduct	2L:10T:0P	3
16.	HSMC117-18	Gender Culture and Development	2L:10T:0P	3
17.	HSMC118-18	Introduction to Women's and Gender Studies	2L:10T:0P	3
18.	HSMC118-18	Introduction to Women's and Gender Studies	2L:10T:0P	3
19.	HSMC119-18	Advance Course in Peace Research	2L:10T:0P	3
20.	HSMC120-18	Contemporary India in Globalized Era: Challenges of Democracy and Development	2L:10T:0P	3
21.	HSMC121-18	Making Indian Culture: Epistemic Traditions, Literature and Per formative Arts	2L:10T:0P	3
22.	HSMC122-18	Universal Human Values 2: Understanding Harmony	2L:10T:0P	3
23.	HSMC123-18	Human relations at work	2L:10T:0P	3
24.	HSMC124-18	Sanskrit Bhasa	2L:10T:0P	3
25.	HSMC125-18	Language and Communication	2L:10T:0P	3
26.	HSMC126-18	Language and Linguistics	2L:10T:0P	3

27.	HSMC127-18	Understanding Society and Culture through Literature	2L:10T:0P	3
28.	HSMC128-18	Fundamentals of Linguistics	2L:10T:0P	3
29.	HSMC128-18	Fundamentals of Linguistics	2L:10T:0P	3
30.	HSMC129-18	Elements of Literature	2L:10T:0P	3
31.	HSMC130-18	Humanities and Multiple Dimensions of Ecology	2L:10T:0P	3
32.	HSMC131-18	Film Appreciation	2L:10T:0P	3
33.	HSMC(MIM-472)	Introduction to Industrial Management	2L:10T:0P	3
34.	HSMC (MIM-480)	Macro Economics	2L:10T:0P	3
35.	HSMC (MIM-578)	Quantitative Methods for Decision Making	2L:10T:0P	3
36.	HSMC (MIM-475)	Economics for Engineers	2L:10T:0P	3
37.	HSMC (MME-301)	Fundamentals of Management for Engineers	2L:10T:0P	3
38.	HSMC (MME-302)	Project Management and Entrepreneurship	2L:10T:0P	3
39.	HSMC (MME-303)	Law and Engineering	2L:10T:0P	3
40.	HSMC (MME-304)	Understanding Interpersonal Dynamics	2L:10T:0P	3

Semester III (Second year]

Course Type	Course Code	Course Title	Load Allocations			Marks Distribution		Total Marks	Credits
			L	T	P	Internal	External		
Professional Core courses	BTME301-18	Fluid Mechanics	3	1	0	40	60	100	4
Professional Core courses	BTME302-18	Theory of Machines -I	3	1	0	40	60	100	4
Professional Core courses	BTME303-18	Machine Drawing	1	0	6	40	60	100	4
Professional Core courses	BTME304-18	Strength of Materials-I	3	1	0	40	60	100	4
Engineering Science courses	BTEC305-18	Basic Electronics Engineering	3	0	0	40	60	100	3
Professional Core courses	BTME305-18	Basic Thermodynamics	3	1	0	40	60	100	4
Professional Core courses	BTME306-18	Strength of Material (Lab)	0	0	2	30	20	50	1
Professional Core courses	BTME307-18	Theory of Machine (Lab)	0	0	2	30	20	50	1
Professional Core courses	BTME308-18	Fluid Mechanics (Lab)	0	0	2	30	20	50	1
Mandatory courses	BMPD301-18	Mentoring and Professional Development	0	0	2	Satisfactory / Un-Satisfactory			Non-Credit
Total			16	4	14	330	420	750	26

Semester IV (Second year]

Course Type	Course Code	Course Title	Load Allocations			Marks Distribution		Total Marks	Credits
			L	T	P	Internal	External		
Professional Core courses	BTME401-18	Applied Thermodynamics	3	1	0	40	60	100	4
Professional Core courses	BTME402-18	Fluid Machines	3	1	0	40	60	100	4
Professional Core courses	BTME403-18	Strength of Materials-II	3	1	0	40	60	100	4
Engineering Science courses	BTME404-18	Materials Engineering	3	0	0	40	60	100	3
Professional Core courses	BTME405-18	Theory of Machines-II	3	1	0	40	60	100	4
Mandatory courses	EVS101-18	Environmental Science	3	-	-	100	0	100	0
Professional Core courses	BTME406-18	Applied Thermodynamics (Lab)	0	0	2	30	20	50	1
Professional Core courses	BTME407-18	Fluid Machines (Lab))	0	0	2	30	20	50	1
Professional Core courses	BTME408-18	Material Engineering (Lab)	0	0	2	30	20	50	1
Mandatory courses	BMPD401-18	Mentoring and Professional Development	0	0	2	Satisfactory / Un-Satisfactory			Non-Credit
Total			18	4	8	390	360	750	22

Semester V (Third year)

Course Type	Course Code	Course Title	Load Allocations			Marks Distribution		Total Marks	Credits
			L	T	P	Internal	External		
Professional Core courses	BTME501-18	Heat Transfer	4	1	0	40	60	100	5
Professional Core courses	BTME502-18	Design of Machine Elements	4	1	0	40	60	100	5
Professional Core courses	BTME503-18	Manufacturing Processes	4	0	0	40	60	100	4
Mandatory courses	BTME504-18	Management and Engineering Economics	3	0	0	40	60	100	3
Professional Core courses	BTME505-18	Heat Transfer (Lab)	0	0	2	30	20	50	1
Professional Core courses	BTME506-18	Manufacturing Processes (Lab)	0	0	2	30	20	50	1
Engineering Science courses	BTME507-18	Numerical Methods (Lab)	0	0	3	30	20	50	1.5
Mandatory courses	BTMC102-18	Essence of Indian knowledge Tradition	3	0	0	100	00	100	Non-Credit
	BTME409-18	4-weeks Industrial Training *	0	0	6	60	40	100	Non-credit
Total			18	2	13	410	340	750	20.5

* The grade of Satisfactory/ Un-satisfactory of Industrial/Institutional Training imparted at the end of 4th Semester will be included here.

6th Semester Study Scheme

Course Type	Course Code	Course Title	Load Allocations			Marks Distribution		Total Marks	Credits
			L	T	P	Internal	External		
Professional Core courses	BTME601-18	Refrigeration and Air conditioning	3	1	0	40	60	100	4
Professional Core courses	BTME602-18	Mechanical Measurements & Metrology	4	0	0	40	60	100	4
Professional Core courses	BTME603-18	Automobile Engineering	3	0	0	40	60	100	3
Mandatory courses	BTME604-18	Introduction to Industrial management.	3	1	0	40	60	100	4
Professional Elective		Elective-I	3	0	0	40	60	100	3
Professional Core courses	BTME605-18	Refrigeration and Air conditioning (Lab)	0	0	2	30	20	50	1
Professional Core courses	BTME606-18	Mechanical Measurements & Metrology (Lab)	0	0	2	30	20	50	1
Professional Core courses	BTME607-18	Auto. Engg. (Lab)	0	0	2	30	20	50	1
Professional Core courses	BTME608-18	Minor Project	0	0	2	30	20	50	1
Total			16	2	08	290	380	700	22

The project work will be carried out in parts as minor project in 6th semester and major project in 7/8th semester. The literature survey, problem formulation, assessment for viability of the project, objectives and methodology for the project shall be decided in 6th semester. The same project problem is to be extended in the major project in semester. The minor project may be carried out by a group of students 2 to 4.

List of Elective I, II and III (For 6th, 7th and 8th semester)

Sr. No.	Name of Subject	Subject Code
1)	Internal Combustion Engines.	BTME609-18
2)	Mechatronics Systems.	BTME610-18
3)	Microprocessor in Automation	BTME611-18
4)	Composite Materials	BTME612-18
5)	Computer Aided Design.	BTME613-18
6)	Product Design and Development	BTME614-18
7)	Non-Conventional Energy Resources.	BTME615-18
8)	Operation Research	BTME616-18
9)	Maintenance and Reliability	BTME617-18

Semester 7th / 8th

Course Type	Course Code	Course Title	Load Allocations			Marks Distribution		Total Marks	Credits
			L	T	P	Internal	External		
Professional Core courses	BTME701-18	Mechanical Vibrations	3	1	0	40	60	100	4
Professional Core courses	BTME702-18	Automation in Manufacturing	3	0	0	40	60	100	3
Professional Core courses	BTME703-18	Fundamentals of Management for Engineers	3	0	0	40	60	100	3
Professional Elective courses		Elective-II	3	0	0	40	60	100	3
Professional Elective courses		Elective-III	3	0	0	40	60	100	3
Choose from other department		Open Elective	3	0	0	40	60	100	3
	BTME704-18	Project-II	0	0	8	40	60	100	6
Total			18	1	8	280	420	700	25

Semester 7th / 8th

Course Code	Course Title	Evaluation Internal		External	Total Marks	Credits
		Institute	Industry			
BTME-801	Software Training	100	50	100	250	8
	Industrial Training	100	50	100	250	8
Total		200	100	200	500	16

List of Open Elective Subject offered to other Departments :

Sr. No.	Name of Subject	Subject Code
1)	Internal Combustion Engines.	BTME609-18
2)	Mechatronics Systems.	BTME610-18
3)	Microprocessor in Automation	BTME611-18
4)	Composite Materials	BTME612-18
5)	Computer Aided Design.	BTME613-18
6)	Product Design and Development	BTME614-18
7)	Non-Conventional Energy Resources.	BTME615-18
8)	Operation Research	BTME616-18
9)	Maintenance and Reliability	BTME617-18

Subject offered for Minor Degree in B. Tech. Mechanical Engineering

Core Subjects

Sr. No.	Subject Code	Couse Title	Credits
1	BTME501-18	Manufacturing Processes	4

Elective Subject (Odd Semester)

Sr. No.	Subject Code	Couse Title	Credits
1	BTME301-18	Fluid Mechanics	4
2	BTME302-18	Theory of Machines-I	4
3	BTME304-18	Strength of Materials-I	4
4	BTME305-18	Basic Thermodynamics	4
5	BTME501-18	Heat Transfer	4

Elective Subject (Even Semester)

Sr. No.	Subject Code	Couse Title	Credits
1	BTME603-18	Automobile Engineering	4
2	BTME405-18	Theory of Machines-II	4
3	BTME403-18	Strength of Materials-II	4
4	BTME401-18	Applied Thermodynamics	4
5	BTME601-18	Refrigeration and Air Conditioning	4

Scheme & Syllabus of

Bachelor of Computer Applications

(BCA)

Batch 2019 onwards

By

Board of Study Computer Applications

Department of Academics

IK Gujral Punjab Technical University

I. K. Gujral Punjab Technical University
Bachelor of Computer Applications (BCA)

Bachelors of Computer Applications (BCA):
It is a Under Graduate (UG) Programme of 3 years duration (6 semesters)

Eligibility: All those candidates who have passed the 10+2 or its equivalent examination in any stream conducted by a recognized Board / University / Council.

Or

Those candidates who have passed their Matriculation examination **AND** have also passed three year Diploma in any Trade from Punjab State Board of Technical Education & Industrial Training, Chandigarh or such Examination from any other recognized State Board of Technical Education, or Sant Longowal Institute of Engineering & Technology, Longowal.

BCA (Lateral Entry): It is a Under Graduate (UG) Programme of 2 years duration (4 semesters)
Eligibility: All those candidates who have passed Matriculation examination **AND** have also passed 3 Year Diploma in any Trade from Punjab State Board of Technical Education & Industrial Training, Chandigarh or such Examination from any other recognized State Board of Technical Education, or Sant Longowal Institute of Engineering & Technology, Longowal.

Or

10+2 with 1 year Diploma in Computer Application / IT (or equivalent) from a recognized University with Mathematics as course at 10+2 or DIT / DCA level.

I. K. Gujral Punjab Technical University
Bachelor of Computer Applications (BCA)

PROGRAM OUTCOMES (POs)

Program: BCA

1. **Basic knowledge:** An ability to apply knowledge of basic mathematics, science and domain knowledge to solve the computational problems.

2. **Discipline knowledge**: An ability to apply discipline –specific knowledge to solve core and/or applied computational problems.

3. **Experiments and practice:** An ability to plan and perform experiments and practices and to use the results to solve computational problems.

4. **Tools Usage**: Apply appropriate technologies and tools with an understanding of limitations.

5. **Profession and society**: Demonstrate knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to professional practice.

6. **Environment and sustainability**: Understand the impact of the computational solutions in societal and environmental contexts, and demonstrate the knowledge and need for sustainable development.

7. **Ethics**: Apply ethical principles and commit to professional ethics and responsibilities and norms of the professional practice.

8. **Individual and team work:** Function effectively as an individual, and as a member or leader in diverse/multidisciplinary teams.

9. **Communication:** An ability to communicate effectively.

10. **Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the context of technological changes.

I. K. Gujral Punjab Technical University
Bachelor of Computer Applications (BCA)

First Semester

Course Code	Course Type	Course Title	Load Allocation			Marks Distribution		Total Marks	Credits
			L	T	P	Internal	External		
UGCA1901	Core Theory	Mathematics	3	1	0	40	60	100	4
UGCA1902	Core Theory	Fundamentals of Computer and IT	3	1	0	40	60	100	4
UGCA1903	Core Theory	Problem Solving using C	3	1	0	40	60	100	4
UGCA1904	Practical/Laboratory	Workshop on Desktop Publishing	0	0	4	60	40	100	2
UGCA1905	Core Practical/Laboratory	Problem Solving using C Laboratory	0	0	4	60	40	100	2
UGCA1906	Core Practical/Laboratory	Fundamentals of Computer and IT Laboratory	0	0	4	60	40	100	2
BTHU103/18	Ability Enhancement Compulsory Course (AECC)-I	English	1	0	0	40	60	100	1
BTHU104/18	Ability Enhancement Compulsory Course (AECC)	English Practical/Laboratory	0	0	2	30	20	50	1
HVPE101-18	Ability Enhancement Compulsory Course (AECC)	Human Values, De-addiction and Traffic Rules	3	0	0	40	60	100	3
HVPE102-18	Ability Enhancement Compulsory Course (AECC)	Human Values, De-addiction and Traffic Rules (Lab/ Seminar)	0	0	1	25	--**	25	1
BMPD102-18		Mentoring and Professional Development	0	0	1	25	--**	25	1
	TOTAL		**13**	**3**	**16**	**460**	**440**	**900**	**25**

The Human Values, De-addiction and Traffic Rules (Lab/ Seminar) and Mentoring and Professional Development course will have internal evaluation only. **(See guidelines at the last page of this file)

I. K. Gujral Punjab Technical University
Bachelor of Computer Applications (BCA)

Second Semester

Course Code	Course Type	Course Title	Load Allocation			Marks Distribution		Total Marks	Credits
			L	T	P	Internal	External		
UGCA1907	Core Theory	Fundamentals of Statistics	3	1	0	40	60	100	4
UGCA1908	Core Theory	Computer System Architecture	3	1	0	40	60	100	4
UGCA1909	Core Theory	Object Oriented Programming using C++	3	1	0	40	60	100	4
UGCA1910	Core Practical/Laboratory	Object Oriented Programming using C++ Laboratory	0	0	4	60	40	100	2
UGCA1911	Core Practical/Laboratory	Fundamentals of Statistics Laboratory	0	0	4	60	40	100	2
UGCA1912	Core Practical/Laboratory	Computer System Architecture Laboratory	0	0	4	60	40	100	2
EVS102-18	Ability Enhancement Compulsory Course (AECC) -III	Environmental Studies	2	0	0	40	60	100	2
BMPD202-18		Mentoring and Professional Development	0	0	1	25	--	25	1
	TOTAL		**11**	**3**	**13**	**365**	**360**	**725**	**21**

I. K. Gujral Punjab Technical University
Bachelor of Computer Applications (BCA)

Third Semester

Course Code	Course Type	Course Title	Load Allocation			Marks Distribution		Total Marks	Credits
			L	T	P	Internal	External		
UGCA1913	Core Theory	Computer Networks	3	1	0	40	60	100	4
UGCA1914	Core Theory	Programming in Python	3	1	0	40	60	100	4
UGCA1915	Core Theory	Data Structures	3	1	0	40	60	100	4
UGCA1916	Core Practical/Laboratory	Computer Networks Laboratory	0	0	4	60	40	100	2
UGCA1917	Core Practical/Laboratory	Programming in Python Laboratory	0	0	4	60	40	100	2
UGCA1918	Core Practical/Laboratory	Data Structures Laboratory	0	0	4	60	40	100	2
UGCA1919	Skill Enhancement Course-I	PC Assembly & Troubleshooting	3	0	0	40	60	100	3
UGCA1920	Skill Enhancement Course- Laboratory	PC Assembly & Troubleshooting Laboratory	0	0	2	30	20	50	1
BMPD302-18		Mentoring and Professional Development	0	0	1	25	--	25	1
	TOTAL		**12**	**3**	**15**	**395**	**380**	**775**	**23**

I. K. Gujral Punjab Technical University
Bachelor of Computer Applications (BCA)

Fourth Semester

Course Code	Course Type	Course Title	Load Allocation			Marks Distribution		Total Marks	Credits
			L	T	P	Internal	External		
UGCA1921	Core Theory	Software Engineering	3	1	0	40	60	100	4
UGCA1922	Core Theory	Database Management Systems	3	1	0	40	60	100	4
UGCA1923	Core Theory	Operating Systems	3	1	0	40	60	100	4
UGCA1924	Core Practical/Laboratory	Software Engineering Laboratory	0	0	4	60	40	100	2
UGCA1925	Core Practical/Laboratory	Database Management Systems Laboratory	0	0	4	60	40	100	2
UGCA1926	Core Practical/Laboratory	Operating Systems Laboratory	0	0	4	60	40	100	2
UGCA1927	Skill Enhancement Course-II	Web Designing	3	0	0	40	60	100	3
UGCA1928	Skill Enhancement Course- Laboratory	Web Designing Laboratory	0	0	2	30	20	50	1
BMPD402-18		Mentoring and Professional Development	0	0	1	25	--	25	1
	TOTAL		**12**	**03**	**15**	**395**	**380**	**775**	**23**

Students will undergo 4 weeks Institutional Summer Training* after 4th semester. Examination will be conducted along with 5th semester practical.

I. K. Gujral Punjab Technical University
Bachelor of Computer Applications (BCA)

Fifth Semester

Course Code	Course Type	Course Title	Load Allocation			Marks Distribution		Total Marks	Credits
			L	T	P	Internal	External		
UGCA1929	Skill Enhancement Course-III	Programming in PHP	3	0	0	40	60	100	3
UGCA1930	Skill Enhancement Course-Laboratory	Programming in PHP Laboratory	0	0	2	30	20	50	1
	Open Elective-I		3	1	0	40	60	100	4
	Elective-I		3	1	0	40	60	100	4
	Elective-II		3	1	0	40	60	100	4
	Elective-I Laboratory		0	0	4	60	40	100	2
	Elective-II Laboratory		0	0	4	60	40	100	2
	Project	Minor Project	0	0	2	60	40	100	1
	Institutional Summer Training*		0	0	2	60	40	100	1
BMPD502-18		Mentoring and Professional Development	0	0	1	25	--	25	1
	TOTAL		**12**	**03**	**15**	**455**	**420**	**875**	**23**

Elective -I	
Course Code	Course Title
UGCA1931	Data Warehouse and Mining
UGCA1932	Programming in Java
UGCA1933	Internet of Things

Elective -II	
Course Code	Course Title
UGCA1934	Computer Graphics
UGCA1935	Linux Operating System
UGCA1936	Cloud Computing

Elective-I Laboratory	
Course Code	Course Title
UGCA1937	Data Warehouse and Mining Laboratory
UGCA1938	Programming in Java Laboratory
UGCA1939	Internet of Things Laboratory

Elective-II Laboratory	
Course Code	Course Title
UGCA1940	Computer Graphics Laboratory
UGCA1941	Linux Operating System Laboratory
UGCA1942	Cloud Computing Laboratory

I. K. Gujral Punjab Technical University
Bachelor of Computer Applications (BCA)

Sixth Semester

Course Code	Course Type	Course Title	Load Allocation			Marks Distribution		Total Marks	Credits
			L	T	P	Internal	External		
UGCA1943	Skill Enhancement Course-IV	Android Programming	3	0	0	40	60	100	3
UGCA1944	Skill Enhancement Course-Laboratory	Android Programming Laboratory	0	0	2	30	20	50	1
	Open Elective-II		3	1	0	40	60	100	4
	Elective-III		3	1	0	40	60	100	4
	Elective-IV		3	1	0	40	60	100	4
	Elective-III Laboratory		0	0	4	60	40	100	2
	Elective-IV Laboratory		0	0	4	60	40	100	2
	Project	Major Project	0	0	4	120	80	200	4
BMPD602-18		Mentoring and Professional Development	0	0	1	25	--	25	1
	TOTAL		**10**	**03**	**15**	**455**	**485**	**875**	**25**

Elective -III	
Course Code	**Course Title**
UGCA1945	Artificial Intelligence
UGCA1946	R Programming
UGCA1947	Digital Marketing

Elective -IV	
Course Code	**Course Title**
UGCA1948	Information Security
UGCA1949	Cyber Laws & IPR
UGCA1950	Machine Learning

Elective -III	
Course Code	**Course Title**
UGCA1951	Artificial Intelligence Laboratory
UGCA1952	R Programming Laboratory
UGCA1953	Digital Marketing Laboratory

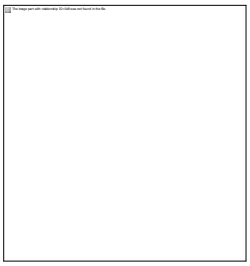
Elective -IV	
Course Code	**Course Title**
UGCA1954	Information Security Laboratory
UGCA1955	Cyber Laws & IPR Laboratory
UGCA1956	Machine Learning Laboratory

Open Electives	
Course Code	**Course Title**
UGCA1902	Fundamentals of Computer and IT
UGCA1903	Problem Solving using C
UGCA1909	Object Oriented Programming using C++
UGCA1913	Computer Networks
UGCA1922	Database Management Systems
UGCA1957	Software Project Management

***The above list of Open Elective Courses is particularly designed to offer to other disciplines such as Physics, Chemistry, Mathematics, Management or any other area of expertise in their Under-Graduate Programs.**

***In case Open Elective-I and Open Elective-II are not offered by any other discipline/branch in the Institute/College, then student may opt Open Elective courses from given lists of Elective courses (Theory only).**

Study Scheme & Syllabus of Bachelor of Business Administration (BBA) Batch 2018 onwards



Department of Academics
I.K. Gujral Punjab Technical University

Courses & Examination Scheme:

First Semester

Course Code	Course Type	Course Title	Load Allocations			Marks Distribution		Total Marks	Credits
			L*	T*	P	Internal	External		
BBA 101-18	Core Theory 1	Principles and Practices of Management	5	1	0	40	60	100	6
BBA 102-18	Core Theory 2	Basic Accounting	5	1	0	40	60	100	6
BBAGE101-18	General Elective 1	Managerial Economics I	5	1	0	40	60	100	6
BTHU103/18	Ability Enhancement Compulsory Course (AECC)	English	1	0	0	40	60	100	1
BTHU104/18	Ability Enhancement Compulsory Course (AECC)	English Practical/Laboratory	0	0	2	30	20	50	1
HVPE101-18	Ability Enhancement Compulsory Course (AECC)	Human Values, De-addiction and Traffic Rules	3	0	0	40	60	100	3
HVPE102-18	Ability Enhancement Compulsory Course (AECC)	Human Values, De-addiction and Traffic Rules (Lab/ Seminar)	0	0	2	25	--**	25	1
BMPD102-18		Mentoring and Professional Development	0	0	2	25	--**	25	1
	TOTAL		**19**	**3**	**6**	**280**	**320**	**600**	**25**

**The Human Values, De-addiction and Traffic Rules (Lab/ Seminar) and Mentoring and Professional Development course will have internal evaluation only.

Note: One each seminar will be organized on Drug De-addiction and Traffic Rules. Eminent scholar and experts of the subject will be called for the seminar at least once during the semester. It will be binding for all students to attend the seminar.

Second Semester

Course Code	Course Type	Course Title	Load Allocations			Marks Distribution		Total Marks	Credits
			L*	T*	P	Internal	External		
BBA201-18	Core Theory 3	Business Statistics	5	1	0	40	60	100	6
BBA 202-18	Core Theory 4	Business Environment	5	1	0	40	60	100	6
BBAGE201-18	General Elective 2	Managerial Economics II	5	1	0	40	60	100	6
EVS102-18	Ability Enhancement Compulsory Course (AECC) - III	Environmental Studies	2	0	0	40	60	100	2
BMPD202-18		Mentoring and Professional Development	0	0	2	25	--**	25	1
		TOTAL	17	3	2	195	240	425	21

Third Semester

Course Code	Course Type	Course Title	Load Allocations			Marks Distribution		Total Marks	Credits
			L*	T*	P	Internal	External		
BBA301-18	Core Theory 5	Organizational Behaviour	5	1	0	40	60	100	6
BBA 302-18	Core Theory 6	Marketing Management	5	1	0	40	60	100	6
BBA 303-18	Core Theory 7	Cost & Management Accounting	5	1	0	40	60	100	6
BBAGE 301-18	General Elective 3	Production and Operation Management	5	1	0	40	60	100	6
BBASEC 301-18	Skill Enhancement Course-1	IT tools for Business	2	0	0	40	60	100	2
BMPD302-18		Mentoring and Professional Development	0	0	2	25	--**	25	1
	TOTAL		**22**	**4**	**2**	**225**	**300**	**525**	**27**

Fourth Semester

Course Code	Course Type	Course Title	Load Allocations			Marks Distribution		Total Marks	Credits
			L*	T*	P	Internal	External		
BBA401-18	Core Theory 8	Business Research Methods	5	1	0	40	60	100	6
BBA 402-18	Core Theory 9	Human Resource Management	5	1	0	40	60	100	6
BBA 403-18	Core Theory 10	Financial Management	5	1	0	40	60	100	6
BBAGE 401-18	General Elective 4	Entrepreneurship Development	5	1	0	40	60	100	6
BBASEC 401-18	Skill Enhancement Course-2	Business Ethics and Corporate Social Responsibility	2	0	0	40	60	100	2
BMPD402-18		Mentoring and Professional Development	0	0	2	25	--**	25	1
	TOTAL		**22**	**4**	**2**	**425**	**300**	**525**	**27**

Fifth Semester

Course Code	Course Type	Course Title	Load Allocations			Marks Distribution		Total Marks	Credits
			L*	T*	P	Internal	External		
BBA501-18	Core Theory 11	Operation Research	5	1	0	40	60	100	6
BBA502-18	Core Theory 12	Mercantile Law	5	1	0	40	60	100	6
	Discipline Specific Elective 1	Elective – I	5	1	0	40	60	100	6
	Discipline Specific Elective 2	Elective – II	5	1	0	40	60	100	6
BMPD502-18		Mentoring and Professional Development	0	0	2	25	--**	25	1
	TOTAL		**20**	**4**	**2**	**225**	**240**	**425**	**25**

SPECIALISATIONS

Any of the following groups each having two papers in Semester V can be chosen as specialization by the students.

1. Marketing

BBA 511-18	Consumer Behaviour
BBA 512-18	Advertising and Sales Management

2. Finance

BBA 521-18	Corporate Accounting
BBA 522-18	Financial Markets & Services

3. Human Resource Management

BBA 531-18	Industrial Relations & Labour Law
BBA 532-18	Organisation Change & Development

Sixth Semester

Course Code	Course Type	Course Title	Load Allocations			Marks Distribution		Total Marks	Credits
			L*	T*	P	Internal	External		
BBA601-18	Core Theory 13	Strategy Management	5	1	0	40	60	100	6
BBA602-18	Core Theory 14	Company Law	5	1	0	40	60	100	6
	Discipline Specific Elective 3	Elective – III	5	1	0	40	60	100	6
	Discipline Specific Elective 4	Elective – IV	5	1	0	40	60	100	6
BMPD602-18		Mentoring and Professional Development	0	0	2	25	--**	25	1
	TOTAL		**20**	**4**	**2**	**185**	**240**	**425**	**25**

SPECIALISATIONS:

Any of the following groups each having two papers in Semester VI can be chosen as specialization by the students.

1. Marketing

BBA 611-18	Services Marketing
BBA 612-18	Retailing and Logistics Management

2. Finance

BBA 621-18	Personal Financial Planning
BBA 622-18	Direct and Indirect Tax Laws

3. Human Resource Management

BBA-631	Training & Development
BBA-632	Cross Cultural Human Resource Management

Study Scheme & Syllabus of
Bachelor of Hotel Management & Catering Technology
(BHMCT)

Batch 2018 Onwards

By

Board of Study HMCT

Department of Academics
I. K. Gujral Punjab Technical University

Bachelors of Hotel Management & Catering Technology (BHMCT):
It is an Under Graduate (UG) Programme of 4 years duration (8 semesters)
Eligibility for Admission: 10+2 Pass in any Stream.

Courses & Examination Scheme:
First Semester

Course Code	Course Type	Course Title	Load Allocations			Marks Distribution		Total Marks	Credits
			L*	T*	P	Internal	External		
BHMCT101-18	Core Theory	Food ProductionFoundation-I	3	0	0	40	60	100	3
BHMCT102-18	Practical	Food ProductionFoundation-I	0	0	4	60	40	100	2
BHMCT103-18	Core Theory	Food & BeverageService Foundation-I	3	0	0	40	60	100	3
BHMCT104-18	Practical	Food & BeverageService Foundation-I	0	0	4	60	40	100	2
BHMCT105-18	Core Theory	Front OfficeFoundation-I	3	0	0	40	60	100	3
BHMCT106-18	Practical	Front OfficeFoundation-I	0	0	2	60	40	100	1
BHMCT107-18	Core Theory	AccommodationOperations-I	3	0	0	40	60	100	3
BHMCT108-18	Practical	AccommodationOperations-I	0	0	2	60	40	100	1
BTHU103-18	Ability EnhancementCompulsory Course(AECC)-I	English	1	0	0	40	60	100	1
BTHU104-18	Ability EnhancementCompulsory Course(AECC)	English Practical/ Laboratory	0	0	2	30	20	50	1
HVPE101-18	Ability EnhancementCompulsory Course(AECC)	Human Values, De-addiction and Traffic Rules	3	0	0	40	60	100	3
HVPE-102-18	Ability EnhancementCompulsory Course(AECC)	Human Values, De-addiction and Traffic Rules (Lab/ Seminar)	0	0	1	25	--**	25	1
BMPD102-18		Mentoring and Professional Development	0	0	1	25	--**	25	1
	TOTAL		**16**	**0**	**16**	**560**	**540**	**1100**	**25**

*A course can either have four Hrs Lecture or Three Hrs Lecture + One Hrs Tutorial as per requirement
**The Human Values, De-addiction and Traffic Rules (Lab/ Seminar) and Mentoring and Professional Development course will have internal evaluation only.

Second Semester

Course Code	Course Type	Course Title	Load Allocations			Marks Distribution		TotalMarks	Credits
			L*	T*	P	Internal	External		
BHMCT201-18	Core Theory	Food Production Foundation-II	3	0	0	40	60	100	3
BHMCT202-18	Practical	Food Production Foundation-II	0	0	4	60	40	100	2
BHMCT203-18	Core Theory	Food & Beverage Service Foundation-II	3	0	0	40	60	100	3
BHMCT204-18	Practical	Food & Beverage Service Foundation-II	0	0	4	60	40	100	2
BHMCT205-18	Core Theory	Front Office Foundation-II	3	0	0	40	60	100	3
BHMCT206-18	Practical	Front Office Foundation-II	0	0	2	60	40	100	1
BHMCT207-18	Core Theory	Accommodation Operations-II	3	0	0	40	60	100	3
BHMCT208-18	Practical	Accommodation Operations-II	0	0	2	60	40	100	1
EVS102-18	Ability Enhancement Compulsory Course (AECC) - III	Environmental Science	2	0	0	40	60	100	2
BMPD202-18		Mentoring and Professional Development	0	0	1	25	--	25	1
	TOTAL		**14**	**0**	**13**	**465**	**460**	**925**	**21**

*A course can either have four Hrs Lecture or Three Hrs Lecture + One Hrs Tutorial as per requirement

Third Semester

Course Code	Course Type	Course Title	Load Allocations			Marks Distribution		TotalMarks	Credits
			L*	T*	P	Internal	External		
BHMCT301-18	Practical	Food Production Operations- Industry Exposure-1	0	0	12	60	40	100	6
BHMCT302-18	Practical	Food & Beverage Service Operations- Industry Exposure-1	0	0	12	60	40	100	6
BHMCT303-18	Practical	Front Office Operations- Industry Exposure-1	0	0	12	60	40	100	6
BHMCT304-18	Practical	Accommodation Operations Industry Exposure- I	0	0	12	60	40	100	6
BHMCT305-18	Practical	Log Book & Training Report on Industry Exposure	0	0	4	60	40	100	2
BMPD302-18		Mentoring and Professional Development	0	0	1	25	--	25	1
	TOTAL		**0**	**0**	**53**	**325**	**200**	**525**	**27**

*A course can either have four Hrs Lecture or Three Hrs Lecture + One Hrs Tutorial as per requirement

Fourth Semester

Course Code	Course Type	Course Title	Load Allocations			Marks Distribution		Total Marks	Credits
			L*	T*	P	Internal	External		
BHMCT401-18	Core Theory	Introduction to Indian Cookery	3	0	0	40	60	100	3
BHMCT402-18	Practical	Introduction to Indian Cookery	0	0	4	60	40	100	2
BHMCT403-18	Core Theory	Food & Beverage Service Operations-II	3	0	0	40	60	100	3
BHMCT404-18	Practical	Food & Beverage Service Operations-II	0	0	4	60	40	100	2
BHMCT405-18	Core Theory	Front Office Operations-II	3	0	0	40	60	100	3
BHMCT406-18	Practical	Front Office Operations-II	0	0	2	60	40	100	1
BHMCT407-18	Core Theory	Accommodation Operations-III	3	0	0	40	60	100	3
BHMCT408-18	Practical	Accommodation Operations-III	0	0	2	60	40	100	1
BHMCT409-18	Elective	Accounting Skills for Hospitality	2	0	0	40	60	100	2
BMPD402-18		Mentoring and Professional Development	0	0	1	25	--	25	1
	TOTAL		**14**	**0**	**13**	**465**	**460**	**925**	**21**

*A course can either have four Hrs Lecture or Three Hrs Lecture + One Hrs Tutorial as per requirement

Fifth Semester

Course Code	Course Type	Course Title	Load Allocations			Marks Distribution		Total Marks	Credits
			L*	T*	P	Internal	External		
BHMCT501-18	Core Theory	Larder & Kitchen practices	3	0	0	40	60	100	3
BHMCT502-18	Practical	Larder & Kitchen practices	0	0	4	60	40	100	2
BHMCT503-18	Core Theory	Bar operations & Management	3	0	0	40	60	100	3
BHMCT504-18	Practical	Bar operations & Management	0	0	4	60	40	100	2
BHMCT505-18	Core Theory	Front Office Operations & Management	3	0	0	40	60	100	3
BHMCT506-18	Practical	Front Office Operations & Management	0	0	2	60	40	100	1
BHMCT507-18	Core Theory	Accommodation Operations & Management	3	0	0	40	60	100	3
BHMCT508-18	Practical	Accommodation Operations & Management	0	0	2	60	40	100	1
BHMCT509-18	Elective	Food & Beverage controls and Management	2	0	0	40	60	100	2
BMPD502-18		Mentoring and Professional Development	0	0	1	25	--	25	1
	TOTAL		**14**	**0**	**13**	**465**	**460**	**925**	**925**

*A course can either have four Hrs Lecture or Three Hrs Lecture + One Hrs Tutorial as per requirement

Sixth Semester

Course Code	Course Type	Course Title	Load Allocations			Marks Distribution		Total Marks	Credits
			L*	T*	P	Internal	External		
BHMCT601-18	Core Theory	International cuisine- An Exploration	3	0	0	40	60	100	3
BHMCT602-18	Practical	International cuisine- An Exploration	0	0	4	60	40	100	2
BHMCT603-18	Core Theory	Banquet and restaurant operations & Management	3	0	0	40	60	100	3
BHMCT604-18	Practical	Banquet and restaurant operations & Management	0	0	4	60	40	100	2
BHMCT605-18	Core Theory	Front Office Management	3	0	0	40	60	100	3
BHMCT606-18	Practical	Front Office Management	0	0	2	60	40	100	1
BHMCT607-18	Core Theory	Accommodation Management	3	0	0	40	60	100	3
BHMCT608-18	Practical	Accommodation Management	0	0	2	60	40	100	1
BHMCT609-18	Elective	Principles of Management	2	0	0	40	60	100	2
BMPD602-18		Mentoring and Professional Development	0	0	1	25	--	25	1
	TOTAL		**14**	**0**	**13**	**465**	**460**	**925**	**21**

*A course can either have four Hrs Lecture or Three Hrs Lecture + One Hrs Tutorial as per requirement

Seventh Semester

Course Code	Course Type	Course Title	Load Allocations			Marks Distribution		Total Marks	Credits
			L*	T*	P	Internal	External		
BHMCT701-18	Core Theory	Specialization-I	3	0	0	40	60	100	3
BHMCT702-18	Practical	Specialization-I	0	0	4	60	40	100	2
BHMCT703-18	Core Theory	Specialization-II	3	0	0	40	60	100	3
BHMCT704-18	Practical	Specialization-II	0	0	4	60	40	100	2
BHMCT705-18	Core Theory	Principles of Marketing	3	0	0	40	60	100	3
BHMCT706-18	Core Theory	Financial Management	3	0	0	60	40	100	3
BHMCT707-18	Core Theory	Entrepreneurship	3	0	0	40	60	100	3
BHMCT708-18	Practical	Project Report	0	0	2	00	100	100	1
BHMCT709-18	Elective	Facility Planning	2	0	0	40	60	100	2
BMPD702-18		Mentoring and Professional Development	0	0	1	25	--	25	1
	TOTAL		**17**	**0**	**11**	**405**	**520**	**925**	**23**

*A course can either have four Hrs Lecture or Three Hrs Lecture + One Hrs Tutorial as per requirement

NOTE: Student has to choose one group out of following as Specialization –I and Specialization-II
NOTE: Student has to choose one group out of following as Specialization –I and Specialization-II

	SPECIALIZATION – I	SPECIALIZATION-II
GROUP A –	Food Production Management	Tandoor-Principle, concept and application
GROUP B	Food& Beverage Service Management	Event Management
GROUP C	Front Office Management	Tour & Travel Management
GROUP D	Accommodation Management	Interior Decoration

Eighth Semester

Course Code	Course Type	Course Title	Load Allocations			Marks Distribution		Total Marks	Credits
			L*	T*	P	Internal	External		
BHMCT801-18	Practical	Specialized HospitalityTraining	0	0	16 week	00	200	200	8
BHMCT802-18	Practical	Project Report on emergingtrends in hospitality Industry	0	0	05	00	100	100	4
BMPD802-18		Mentoring and Professional Development	0	0	01	25	-	25	1
	TOTAL		**0**	**0**		**25**	**300**	**325**	**13**

*A course can either have four Hrs Lecture or Three Hrs Lecture + One Hrs Tutorial as per requirement

Study Scheme & Syllabus of B. Sc. (Hons) Agriculture

Batch 2019 onwards

By

Board of Studies Agriculture

Department of Academics

IK Gujral Punjab Technical University Jalandhar

B.Sc. (Hons) Agriculture Syllabus Batch 2019 Onwards

Semester – First

Course code	Course Title	Load Allocation		Marks Distribution		Total	Credits
		L	P	Internal	External		
BSAG-101-19	Fundamentals of Horticulture	1	0	40	60	100	1
BSAG-102-19	Fundamentals of Soil Science	2	0	40	60	100	2
BSAG-103-19	Introduction to Forestry	1	0	40	60	100	1
BSAG-104-19	Comprehension & Communication Skills in English	1	0	40	60	100	1
BSAG-105-19	Fundamentals of Agronomy	2	0	40	60	100	2
BSAG-106-19 (A)	Introductory Biology*	2	0	40	60	100	2
BSAG-106-19 (B)	Elementary Mathematics**	2	0	40	60	100	2
BSAG-107-19	Agricultural Heritage	1	0	40	60	100	1
BSAG-108-19	Rural Sociology & Educational Psychology	1	0	40	60	100	1
BSAG-109-19	Human Values & Ethics	1	0	Satisfactory / Un Satisfactory			Non-Credit
BSAG-110-19	Fundamentals of Horticulture (Practical)	0	2	20	30	50	1
BSAG-111-19	Fundamentals of Soil Science (Practical)	0	2	20	30	50	1
BSAG-112-19	Introduction to Forestry (Practical)	0	2	20	30	50	1
BSAG-113-19	Comprehension & Communication Skills in English (Practical)	0	2	20	30	50	1
BSAG-114-19	Fundamentals of Agronomy (Practical)	0	2	20	30	50	1
BSAG-115-19	Introductory Biology (Practical)	0	2	20	30	50	1
BSAG-116-19	NSS /NCC / Physical Education & Yoga Practices	0	2	Satisfactory / Un Satisfactory			Non-Credit
Total		14	14	480	720	1200	19

***Remedial course for students who had studied non-medical in 10+2**

**** Remedial course for students who had studied medical in 10+2**

B.Sc. (Hons) Agriculture Syllabus Batch 2019 Onwards

Semester–Third

Course code	Course Title	Load Allocation		Marks Distribution		Total	Credits
		L	P	Internal	External		
BSAG-301-19	Crop Production Technology – I (Kharif Crops)	1	0	40	60	100	1
BSAG-302-19	Fundamentals of Plant Breeding	2	0	40	60	100	2
BSAG-303-19	Agricultural Finance and Cooperation	2	0	40	60	100	2
BSAG-304-19	Agri- Informatics	1	0	40	60	100	1
BSAG-305-19	Farm Machinery and Power	1	0	40	60	100	1
BSAG-306-19	Production Technology for Vegetables and Spices	1	0	40	60	100	1
BSAG-307-19	Environmental Studies and Disaster Management	3	0	40	60	100	3
BSAG-308-19	Statistical Methods	1	0	40	60	100	1
BSAG-309-19	Livestock and Poultry Management	2	0	40	60	100	2
BSAG-310-19	Crop Production Technology – I (Kharif Crops) (Practical)	0	2	20	30	50	1
BSAG-311-19	Fundamentals of Plant Breeding (Practical)	0	2	20	30	50	1
BSAG-312-19	Agricultural Finance and Cooperation (Practical)	0	2	20	30	50	1
BSAG-313-19	Agri- Informatics (Practical)	0	2	20	30	50	1
BSAG-314-19	Farm Machinery and Power (Practical)	0	2	20	30	50	1
BSAG-315-19	Production Technology for Vegetables and Spices (Practical)	0	2	20	30	50	1
BSAG-316-19	Environmental Studies and Disaster Management (Practical)	0	2	20	30	50	1
BSAG-317-19	Statistical Methods (Practical)	0	2	20	30	50	1
BSAG-318-19	Livestock and Poultry Management (Practical)	0	2	20	30	50	1
Total		14	18	540	810	1350	23

B.Sc. (Hons) Agriculture Syllabus Batch 2019 Onwards

Semester– Fourth

Course code	Course Title	Load Allocation		Marks Distribution		Total	Credits
		L	P	Internal	External		
BSAG-401-19	Crop Production Technology –II (Rabi Crops)	1	0	40	60	100	1
BSAG-402-19	Production Technology for Ornamental Crops, MAP and Landscaping	1	0	40	60	100	1
BSAG-403-19	Renewable Energy and Green Technology	1	0	40	60	100	1
BSAG-404-19	Problematic Soils and their Management	2	0	40	60	100	2
BSAG-405-19	Production Technology for Fruit and Plantation Crops	1	0	40	60	100	1
BSAG-406-19	Principles of Seed Technology	1	0	40	60	100	1
BSAG-407-19	Farming System & Sustainable Agriculture	1	0	40	60	100	1
BSAG-408-19	Agricultural Marketing Trade & Prices	2	0	40	60	100	2
BSAG-409-19	Introductory Agro-meteorology & Climate Change	1	0	40	60	100	1
BSAG-XXX-19	Elective Course-I*	2	0	40	60	100	2
BSAG-410-19	Crop Production Technology –II (Rabi Crops) (Practical)	0	2	20	30	50	1
BSAG-411-19	Production Technology for Ornamental Crops, MAP and Landscaping (Practical)	0	2	20	30	50	1
BSAG-412-19	Renewable Energy and Green Technology (Practical)	0	2	20	30	50	1
BSAG-413-19	Production Technology for Fruit and Plantation Crops (Practical)	0	2	20	30	50	1
BSAG-414-19	Principles of Seed Technology (Practical)	0	4	20	30	50	2
BSAG-415-19	Agricultural Marketing Trade & Prices (Practical)	0	2	20	30	50	1
BSAG-416-19	Introductory Agro-meteorology & Climate Change (Practical)	0	2	20	30	50	1
BSAG-XXX-19	Elective Course-I (Practical)*	0	2	20	30	50	1
Total		13	18	560	840	1400	22

*Student has to select one elective group and accordingly elective courses has to be cleared in 4th, 5th and 6th Semester.

Semester– Fifth

Course code	Course Title	Load Allocation		Marks Distribution		Total	Credits
		L	P	Internal	External		
BSAG-501-19	Principles of Integrated Pest and Disease Management	2	0	40	60	100	2
BSAG-502-19	Manures, Fertilizers and Soil Fertility Management	2	0	40	60	100	2
BSAG-503-19	Pests of Crops, Stored Grains and their Management	2	0	40	60	100	2
BSAG-504-19	Diseases of Field and Horticultural Crops and their Management -I	2	0	40	60	100	2
BSAG-505-19	Crop Improvement-I (Kharif Crops)	1	0	40	60	100	1
BSAG-506-19	Entrepreneurship Development and Business Communication	1	0	40	60	100	1
BSAG-507-19	Geo-informatics, Nano-technology and Precision Farming	1	0	40	60	100	1
BSAG-508-19	Intellectual Property Rights	1	0	40	60	100	1
BSAG-XXX-19	Elective Course-II*	2	0	40	60	100	2
BSAG-509-19	Principles of Integrated Pest and Disease Management (Practical)	0	2	20	30	50	1
BSAG-510-19	Manures, Fertilizers and Soil Fertility Management (Practical)	0	2	20	30	50	1
BSAG-511-19	Pests of Crops, Stored Grains and their Management (Practical)	0	2	20	30	50	1
BSAG-512-19	Diseases of Field and Horticultural Crops and their Management -I (Practical)	0	2	20	30	50	1
BSAG-513-19	Crop Improvement-I (Kharif Crops) (Practical)	0	2	20	30	50	1
BSAG-514-19	Entrepreneurship Development and Business Communication (Practical)	0	2	20	30	50	1
BSAG-515-19	Geo-informatics, Nano-technology and Precision Farming (Practical)	0	2	20	30	50	1
BSAG-516-19	Practical Crop Production ‑ I (Kharif crops) (Practical)	0	4	20	30	50	2
BSAG-XXX-19	Elective Course-II (Practical)*	0	2	20	30	50	1
Total		14	20	540	810	1350	24

One compulsory educational tour will be conducted in the semester break.

ELECTIVE COURSE AND THEIR PRACTICAL

	Group A **Horticulture**	**Group B** **Plant Breeding**	**Group C** **Plant Protection**	**Group D** **Agricultural Business and management**
4th Semester	Protected Cultivation BSAG-417-19	Commercial Plant Breeding BSAG-419-19	Agrochemicals BSAG-421-19	Agri-business Management BSAG-423-19
	Protected Cultivation (Practical) BSAG-418-19	Commercial Plant Breeding (Practical) BSAG-420-19	Agrochemicals (Practical) BSAG-422-19	Agri-business Management (Practical) BSAG-424-19
5th Semester	Landscaping BSAG-517-19	Micro propagation Technologies BSAG-519-19	Biopesticides & Biofertilizers BSAG-521-19	System Simulation and Agro-advisory BSAG-523-19
	Landscaping (Practical) BSAG-518-19	Micro propagation Technologies (Practical) BSAG-520-19	Biopesticides & Biofertilizers (Practical) BSAG-522-19	System Simulation and Agro-advisory (Practical) BSAG-524-19
6th Semester	Hi-tech. Horticulture	Food Safety and Standards	Weed Management	Agricultural Journalism
	Hi-tech. Horticulture (Practical)	Food Safety and Standards (Practical)	Weed Management (Practical)	Agricultural Journalism (Practical)

B.Sc. (Hons) Agriculture Syllabus Batch 2019 Onwards

Semester– Sixth

Course code	Course Title	Load Allocation		Marks Distribution		Total	Credits
		L	P	Internal	External		
BSAG-601-19	Rainfed Agriculture & Watershed Management	1	0	40	60	100	1
BSAG-602-19	Protected Cultivation and Secondary Agriculture	1	0	40	60	100	1
BSAG-603-19	Diseases of Field and Horticultural Crops and their Management-II	2	0	40	60	100	2
BSAG-604-19	Post-harvest Management and Value Addition of Fruits and Vegetables	1	0	40	60	100	1
BSAG-605-19	Management of Beneficial Insects	1	0	40	60	100	1
BSAG-606-19	Crop Improvement-II (*Rabi* crops)	1	0	40	60	100	1
BSAG-607-19	Principles of Organic Farming	1	0	40	60	100	1
BSAG-608-19	Farm Management, Production & Resource Economics	1	0	40	60	100	1
BSAG-609-19	Principles of Food Science and Nutrition	2	0	40	60	100	2
BSAG-XXX-19	Elective Course	2	0	40	60	100	2
BSAG-610-19	Rainfed Agriculture & Watershed Management (Practical)	0	2	20	30	50	1
BSAG-611-19	Protected Cultivation and Secondary Agriculture (Practical)	0	2	20	30	50	1
BSAG-612-19	Diseases of Field and Horticultural Crops and their Management-II (Practical)	0	2	20	30	50	1
BSAG-613-19	Post-harvest Management and Value Addition of Fruits and Vegetables (Practical)	0	2	20	30	50	1
BSAG-614-19	Management of Beneficial Insects (Practical)	0	2	20	30	50	1
BSAG-615-19	Crop Improvement-II (*Rabi* crops) (Practical)	0	2	20	30	50	1
BSAG-616-19	Crop Production ‑II (*Rabi* crops) (Practical)	0	4	20	30	50	2
BSAG-617-19	Principles of Organic Farming (Practical)	0	2	20	30	50	1
BSAG-618-19	Farm Management, Production & Resource Economics (Practical)	0	2	20	30	50	1
BSAG-XXX-19	Elective Course-II (Practical)*	0	2	20	30	50	1
Total		13	22	600	900	1500	24

Semester– Seventh

Course code	Course Title	Load Allocation		Marks Distribution		Total	Credits
		L	P	Internal	External		
BSAG-701-19	General orientation & On campus training by different faculties	0	2	100	-	100	1
BSAG-702-19	Village attachment (RAWE Component I)	0	16	100	-	100	8
BSAG-703-19	Unit attachment in Univ./ College, KVK/ Research Station, State Agricultural Extension Services	0	10	100	-	100	5
BSAG-704-19	Plant clinic	0	4	100	-	100	2
BSAG-705-19	Agro-Industrial Attachment (RAWE Component II)	0	8	100	-	100	4
BSAG-706-19	Project Report Preparation, Presentation and Evaluation	0	1	100	-	100	1
Total		0	41	600	-	600	21

Village Attachment Training Programme (RAWE Component-I)

Orientation and Survey of Village (1 week)

Agronomical Interventions (1 week)

Plant Protection Interventions (1 week)

Soil Improvement Interventions (Soil sampling and testing) (1 week)

Fruit and Vegetable production interventions (1 week)

Food Processing and Storage interventions (1 week)

Livestock Production Interventions (1 week)

Extension and Transfer of Technology activities (1 week)

Agro Industrial Attachment (RAWE Component –II)

Students shall be placed in Agro-and Cottage industries and Commodities Boards for 03 weeks. Industries include Seed/Sapling production, Pesticides-insecticides, Post harvest-processing value addition, Agri finance institutions, etc.

Activities and Tasks during Agro-Industrial Attachment Programme

Acquaintance with industry and staff

Study of structure, functioning, objective and mandates of the industry

Study of various processing units and hands-on trainings under supervision of industry staff

Ethics of industry

Employment generated by the industry

Semester– Eighth

Course code	Course Title	Load Allocation		Marks Distribution		Total	Credits
		L	P	Internal	External		
BSAG-801-19	Fundamentals of Plant Biochemistry and Biotechnology	2	0	40	60	100	2
BSAG-802-19	Fundamentals of Plant Biochemistry and Biotechnology (Practical)	0	2	20	30	50	1
BSAG-803-19	Module I for Skill Development and Entrepreneurship	0	10	100	-	100	10
BSAG-804-19	Module II for Skill Development and Entrepreneurship	0	10	100	-	100	10
Total		2	22	260	90	350	23

Scheme & Syllabus of

Bachelor of Technology

Computer Science Engg. (Artificial Intelligence & Machine Learning)

Batch 2020 onwards (3rd -8th Semester)

By

Department of Academics

IK Gujral Punjab Technical University

Bachelor of Technology in Computer Science Engg. (AI & ML)

It is a Graduate (UG) Programme of 4 years duration (8 semesters)

Courses & Examination

Scheme: Third Semester

Course Code	Type of Course	Course Title	Hours per Week			Marks Distribution		Total Marks	Credits
			L	T	P	Internal	External		
BTES 301-18	Engineering Science Course	Digital Electronics	3	0	0	40	60	100	3
BTCS 301-18	Professional Core Courses	Data structure & Algorithms	3	0	0	40	60	100	3
BTCS 302-18	Professional Core Courses	Object Oriented Programming	3	0	0	40	60	100	3
BTAM 304-18	Basic Science Course	Mathematics-III	3	0	0	40	60	100	3
HSMC 101/102-18	Humanities & Social Sciences Including Management \Courses	Foundation Course in Humanities (Development of Societies/Philosophy)	2	1	0	40	60	100	3
BTES 302-18	Engineering Science Course	Digital Electronics Lab	0	0	2	30	20	50	1
BTCS 303-18	Professional Core Courses	Data structure & Algorithms Lab	0	0	4	30	20	50	2
BTCS 304-18	Professional Core Courses	Object Oriented Programming lab.	0	0	4	30	20	50	2
BTCS 305-18	Professional Core Courses	IT Workshop*	0	0	2	30	20	50	1
		Summer Institutional Training	0	0	0	0	0	0	Satisfactory/Unsatisfactory
Total			**14**	**1**	**12**	**320**	**380**	**700**	**21**

*Syllabus to be decided by respective institute internally. It may include latest technologies.

Fourth Semester

Course Code	Type of Course	Course Title	Hours per Week			Marks Distribution		Total Marks	Credits
			L	T	P	Internal	External		
BTCS 401-18	Professional Core Courses	Discrete Mathematics	3	1	0	40	60	100	4
BTES 401-18	Engineering Science Course	Computer Organization & Architecture	3	0	0	40	60	100	3
BTCS 402-18	Professional Core Courses	Operating Systems	3	0	0	40	60	100	3
BTCS 403-18	Professional Core Courses	Design & Analysis of Algorithms	3	0	0	40	60	100	3
HSMC 122-18	Humanities & Social Sciences including Management Courses	Universal Human Values 2	2	1	0	40	60	100	3
EVS101-18	Mandatory Courses	Environmental Sciences	3	-	-	100	-	100	S/US
BTES 402-18	Engineering Science Course	Computer Organization & Architecture Lab	0	0	2	30	20	50	1
BTCS 404-18	Professional Core Courses	Operating Systems Lab	0	0	4	30	20	50	2
BTCS 405-18	Professional Core Courses	Design & Analysis of Algorithms Lab	0	0	4	30	20	50	2
Total			**15**	**2**	**10**	**390**	**360**	**750**	**24**

Students will take up summer internship of 4-6 weeks at industry or organizations of repute after 4th sem, that will be accredited in 5th semester.

Fifth Semester

Course Code	Type of Course	Course Title	Hours per Week			Marks Distribution		Total Marks	Credits
			L	T	P	Internal	External		
BTES 501-20	Engineering Science	Statistical Computing Techniques using R	3	0	0	40	60	100	3
BTCS 501-18	Professional Core Courses	Database Management Systems	3	0	0	40	60	100	3
BTCS 502-18	Professional Core Courses	Formal Language & Automata Theory	3	0	0	40	60	100	3
BTAIML 501-20	Professional Core Courses	Programming in Python	3	0	0	40	60	100	3
BTAIML 502-20	Professional Core Courses	Artificial Intelligence	3	0	0	40	60	100	3
BTAIML ***	Professional Elective	Elective-I	3	0	0	40	60	100	3
MC	Mandatory Courses	Constitution of India/ Essence of Indian Traditional Knowledge	2	-	-	100	-	100	S/US
BTES 502-20	Engineering Science	Statistical Computing Techniques using R lab	0	0	2	30	20	50	1
BTCS 505-18	Professional Core Courses	Database Management Systems lab	0	0	2	30	20	50	1
BTAIML 503-20	Professional Core Courses	Programming in Python Lab	0	0	2	30	20	50	1
BTAIML 504-20	Professional Core Courses	Artificial Intelligence Lab	0	0	2	30	20	50	1
BTAIML ***	Professional Elective	Elective-I Lab	0	0	2	30	20	50	1
	Professional Training	Industrial *Training	-	-	-	60	40	100	S/US
Total			**20**	**0**	**10**	**460**	**440**	**900**	**23**

* 4-6 weeks industrial training undertaken after 4th semester in summer vacations.

Elective I

BTAIML 505-20 Data Visualization using tableau
BTAIML 506-20 Data Visualization using tableau lab
BTAIML 507-20 User Interface development
BTAIML 508-20 User Interface development lab
BTAIML 509-20 Java Programming
BTAIML 510-20 Java Programming lab

FACULTY OF MEDICAL & ALLIED SCIENCES

SYLLABUS

FOR

B.Sc. in RADIOLOGY IMAGING & TECHNOLOGY

(SEMESTER: I-II)

(Under Choice based Credit System)

Examinations: 2021 Onwards

I K GUJRAL PUNJAB TECHNICAL UNIVERSITY KAPURTHALA

Note:

(i) Subject to change in the syllabi at any time. Please visit the University website time to time.

SCHEME OF THE PROGRAM:

Semester-I

Sr. No.	Course Code	Course Type	Course Title	L-T-P*	Credits	Marks Distribution		Marks
						Internal	External	
1.	BRIT-101-21	Core Theory	Basics of Anatomy-I	3-1-0	4	40	60	100
2.	BRIT-102-21	Core Theory	Basics of Physiology-I	3-1-0	4	40	60	100
3.	BRIT-103-21	Core Theory	Radiographic Photography-I	3-1-0	4	40	60	100
4.	BRIT-104-21	Core Practical/Lab	Basics of Anatomy-I Practical	0-0-4	2	60	40	100
5.	BRIT-105-21	Core Practical/Lab	Basics of Physiology-I Practical	0-0-4	2	60	40	100
6.	BRIT-106-21	Core Practical/Lab	Radiographic Photography Practical	0-0-4	2	60	40	100
7.	BTHU 103-18	Ability Enhancement Compulsory Course (AECC)-I	English	1-0-0	1	40	60	100
8.	BTHU 104-18	Ability Enhancement Compulsory Course-(AECC)	English Practical/Laboratory	0-0-2	1	30	20	50
9.	HVPE-101-18	Ability Enhancement Compulsory Course-(AECC)	Human Values, De-addiction & Traffic Rules	3-0-0	3	40	60	100
10.	HVPE-102-18	Ability Enhancement Compulsory Course-(AECC)	Human Values, De-addiction & Traffic Rules (Lab/Seminar)	0-0-1	1	25	--**	25
11.	BMPD 102-18		Mentoring & Professional Development	0-0-1	1	25	--**	25
		Total		13-3-16	25	460	440	900

*A course can either have four Hrs Lecture or Three Hrs Lecture + One Hrs Tutorial as per requirement

**The Human Values, De-addiction and Traffic Rules (Lab/ Seminar) and Mentoring and Professional Development course will have internal evaluation only.

Semester-II

Sr. No.	Course Code	Course Type	Course Title	L-T-P*	Credits	Marks Distribution		Marks
						Internal	External	
1.	BRIT-201-21	Core Theory	Basics of Anatomy-II	3-1-0	4	40	60	100
2.	BRIT-202-21	Core Theory	Basics of Physiology-II	3-1-0	4	40	60	100
3.	BRIT-203-21	Core Theory	Radiology graphic Photography-II	3-1-0	4	40	60	100
4.	BRIT-204-21	Core Practical/Lab	Basics of Anatomy-II Practical	0-0-4	2	60	40	100
5.	BRIT-205-21	Core Practical/Lab	Basics of Physiology-II Practical	0-0-4	2	60	40	100
6.	BRIT-206-21	Core Practical/Lab	Radiology graphic Photography-II Practical	0-0-4	2	60	40	100
7.	EVS102-18	Ability Enhancement Compulsory Course (AECC)-III	Environmental Studies	2-0-0	2	40	60	100
8.	BMPD 202-18		Mentoring & Professional Development	0-0-1	1	25	--	25
		Total		11-3-13	25	365	360	725

*A course can either have four Hrs Lecture or Three Hrs Lecture + One Hrs Tutorial as per requirement

Scheme & Syllabus of

Bachelor of Science in Medical Technology (Anesthesia & Operation Theatre Technology)

(B.Sc. MT (AOTT))

Batch 2021 onwards

By

Board of Study Tariq Ahmad

Department of Academics

IK Gujral Punjab Technical University

IK Gujral Punjab Technical University
B.Sc. Medical Technology (Anesthesia & Operation Theatre Technology)

Bachelors of Science in Medical Technology - Anesthesia & Operation Theatre Technology (B.Sc. AOTT):
It is an Under Graduate (UG) Programme of 3 years duration (6 semesters)
Eligibility for Admission: 10+2 with Physics, Chemistry & Biology as main subjects.

Courses & Examination Scheme:

First Semester

Course Code	Course Type	Course Title	Load Allocations			Marks Distribution		Total Marks	Credits
			L*	T*	P	Internal	External		
BAOTT 101-22	Core Theory	Human Anatomy & Physiology-I	3	1	0	40	60	100	4
BAOTT 102-22	Core Theory	Basic Anesthesia Technology	3	1	0	40	60	100	4
BAOTT 103-22	Core Theory	General Microbiology	3	1	0	40	60	100	4
BAOTT 104-22	Core Practical/Laboratory	Human Anatomy & Physiology-I Laboratory	0	0	4	60	40	100	2
BAOTT 105-22	Core Practical/Laboratory	Basic Anesthesia Technology Laboratory	0	0	4	60	40	100	2
BAOTT 106-22	Core Practical/Laboratory	General Microbiology Laboratory	0	0	4	60	40	100	2
BTHU 103-18	Ability Enhancement Compulsory Course (AECC)-I	English	1	0	0	40	60	100	1
BTHU 104-18	Ability Enhancement Compulsory Course (AECC)	English Practical/Laboratory	0	0	2	30	20	50	1
HVPE 101-18	Ability Enhancement Compulsory Course (AECC)	Human Values, De-addiction and Traffic Rules	3	0	0	40	60	100	3
HVPE 102-18	Ability Enhancement Compulsory Course (AECC)	Human Values, De-addiction and Traffic Rules (Lab/ Seminar)	0	0	1	25	--**	25	1
	TOTAL		**13**	**03**	**15**	**435**	**440**	**875**	**24**

*A course can either have four Hrs Lecture or Three Hrs Lecture + One Hrs Tutorial as per requirement
**The Human Values, De-addiction and Traffic Rules (Lab/ Seminar) and Mentoring and Professional Development course will have internal evaluation only.

IK Gujral Punjab Technical University

B.Sc. Medical Technology (Anesthesia & Operation Theatre Technology)

Second Semester

Course Code	Course Type	Course Title	Load Allocations			Marks Distribution		Total Marks	Credits
			L*	T*	P	Internal	External		
BAOTT 201-22	Core Theory	Human Anatomy & Physiology-II	3	1	0	40	60	100	4
BAOTT 202-22	Core Theory	Surgical Equipments & Technology	3	1	0	40	60	100	4
BAOTT 203-22	Core Theory	Biochemistry & Pathology	3	1	0	40	60	100	4
BAOTT 204-22	Core Practical/Laboratory	Human Anatomy & Physiology-II Laboratory	0	0	4	60	40	100	2
BAOTT 205-22	Core Practical/Laboratory	Surgical Equipments & Technology Laboratory	0	0	4	60	40	100	2
BAOTT 206-22	Core Practical/Laboratory	Biochemistry & Pathology Laboratory	0	0	4	60	40	100	2
EVS 102-18	Ability Enhancement Compulsory Course (AECC) -III	Environmental Science	2	0	0	40	60	100	2
BMPD 202-18		Mentoring and Professional Development	0	0	1	25	--	25	1
	TOTAL		**11**	**03**	**13**	**365**	**360**	**725**	**21**

*A course can either have four Hrs Lecture or Three Hrs Lecture + One Hrs Tutorial as per requirement

Third Semester

Course Code	Course Type	Course Title	Load Allocations			Marks Distribution		Total Marks	Credits
			L*	T*	P	Internal	External		
BAOTT 301-22	Core Theory	General Anesthesia	3	1	0	40	60	100	4
BAOTT 302-22	Core Theory	General Pharmacology	3	1	0	40	60	100	4
BAOTT 303-22	Core Theory	Surgical Instrumentation	3	1	0	40	60	100	4
BAOTT 304-22	Core Practical/Laboratory	General Anesthesia Laboratory	0	0	4	60	40	100	2
BAOTT 305-22	Core Practical/Laboratory	General Pharmacology Laboratory	0	0	4	60	40	100	2
BAOTT 306-22	Core Practical/Laboratory	Surgical Instrumentation Laboratory	0	0	4	60	40	100	2

QPS 307-22	Skill Enhancement Course-I	Introduction to Quality & Patient Safety	2	1	0	40	60	100	3
	TOTAL		**11**	**04**	**12**	**340**	**360**	**700**	**21**

*A course can either have four Hrs Lecture or Three Hrs Lecture + One Hrs Tutorial as per requirement

Fourth Semester

Course Code	Course Type	Course Title	Load Allocations			Marks Distribution		Total Marks	Credits
			L*	T*	P	Internal	External		
BAOTT 401-22	Core Theory	Obstetrics & Gynaecology	3	1	0	40	60	100	4
BAOTT 402-22	Core Theory	Surgical Procedures	3	1	0	40	60	100	4
BAOTT 403-22	Core Theory	Regional Anesthesia Techniques	3	1	0	40	60	100	4
BAOTT 404-22	Core Practical/Laboratory	Obstetrics & Gynaecology Laboratory	0	0	4	60	40	100	2
BAOTT 405-22	Core Practical/Laboratory	Surgical Procedures Laboratory	0	0	4	60	40	100	2
BAOTT 406-22	Core Practical/Laboratory	Regional Anesthesia Techniques Laboratory	0	0	4	60	40	100	2
CIS 407-22	Skill Enhancement Course-II	Basic in Computers and Information Science	2	1	0	40	60	100	3
CIS 408-22	Skill Enhancement Course-Laboratory	Basic in Computers and Information Science Practical	0	0	2	60	40	100	1
	TOTAL		**11**	**04**	**14**	**400**	**400**	**800**	**2 2**

*A course can either have four Hrs Lecture or Three Hrs Lecture + One Hrs Tutorial as per requirement

Punjab Technical University
B.Sc. Medical Laboratory Sciences

First Semester

Course Code.	Course Name	L	T	P	Marks		Total	Cr.
					Int.	Ext		
BMLS-101	Essential Biology	3	-	-	40	60	100	3
BMLS-102	General Microbiology	4	-	-	40	60	100	4
BMLS-103	Basic Haematology & Haematological	4	-	-	40	60	100	4
BMLS-104	Human Anatomy & Physiology-I	4	-	-	40	60	100	4
BMLS-105	Basics of Biochemistry	4	-	-	40	60	100	4
BMLS-106	Essential Biology – Practical	-	-	3	40	60	100	2
BMLS-107	General Microbiology – Practical	-	-	5	40	60	100	3
BMLS-108	Basic Haematology & Haematological	-	-	4	40	60	100	2
BMLS-109	Human Anatomy & Physiology-1-	-	-	3	40	60	100	2
BMLS-110	Basics of Biochemistry – Practical	-	-	3	40	60	100	2
Guest Lecture/ Tutorial/ Seminar/visit to any medical research institution or reputed clinical laboratory (Compulsory)		-	2	-				
Total					**400**	**600**	**1000**	**30**

Second Semester

Course Code.	Course Name	L	T	P	Marks		Total	Cr.
					Int.	Ext.		
HVPE-101	Human Values and Professional Ethics	3	-	-	40	60	100	3
BMLS-202	Systematic Bacteriology	4	-	-	40	60	100	4
BMLS-203	Basic Haematology Techniques –II	4	-	-	40	60	100	4
	Human Anatomy & Physiology –II	4	-	-	40	60	100	4
BMLS-205	Biochemical Metabolism	4	-	-	40	60	100	4
HVPE-102	Human Values and Professional Ethics – Practical	-	-	3	40	60	100	2
BMLS-207	Systematic Bacteriology- Practical	-	-	5	40	60	100	3
BMLS-208	Basic Haematology Techniques – II Practical	-	-	4	40	60	100	2
BMLS-209	Human Anatomy & Physiology –II –	-	-	3	40	60	100	2
BMLS-210	Biochemical Metabolism – Practical	-	-	3	40	60	100	2
Guest Lecture/ Tutorial/ Seminar/visit to any medical research institution or reputed clinical laboratory (Compulsory)		-	2	-				
Total					**400**	**600**	**1000**	**30**

Third Semester

Course Code.	Course Name	L	T	P	Marks		Total	Cr. hr
					Int.	Ext		
BMLS-301	Communication Skills	3	-	-	40	60	100	3
BMLS-302	Applied Bacteriology	4	-	-	40	60	100	4
BMLS-303	Applied Haematology-I	4	-	-	40	60	100	4
BMLS-304	Basic Cellular Pathology	4	-	-	40	60	100	4
BMLS-305	Analytical Biochemistry	4	-	-	40	60	100	4
BMLS-306	Communication Skills - Practical	-	-	3	40	60	100	2
BMLS-307	Applied Bacteriology - Practical	-	-	5	40	60	100	3
BMLS-308	Applied Haematology-I - Practical	-	-	4	40	60	100	2
BMLS-309	Basic Cellular Pathology – Practical	-	-	3	40	60	100	2
BMLS-310	Analytical Biochemistry –	-	-	3	40	60	100	2
Guest Lecture/ Tutorial/ Seminar/visit to any medical research institution or reputed clinical laboratory (Compulsory)		-	2	-				
Total					**400**	**600**	**1000**	**30**

Fourth Semester

Course No.	Course Name	L	T	P	Marks		Total	Cr. Hr
					Int.	Ext		
BMLS-401	Fundamentals of Computers	2	-	-	40	60	100	2
BMLS-402	Immunology &Mycology	4	-	-	40	60	100	4
BMLS-403	Applied Haematology-II	4	-	-	40	60	100	4
BMLS-404	Histotechnology-I	4	-	-	40	60	100	4
BMLS-405	Clinical Biochemistry-I	4	-	-	40	60	100	4
BMLS-406	Fundamentals of Computers – Practical	-	-	3	40	60	100	2
BMLS-407	Immunology & Mycology –	-	-	5	40	60	100	3
BMLS-408	Applied Haematology-II – Practical	-	-	4	40	60	100	2
BMLS-409	Histotechnology-I - Practical	-	-	3	40	60	100	2
BMLS-410	Clinical Biochemistry-I - Practical	-	-	3	40	60	100	2
Guest Lecture/ Tutorial/ Seminar/visit to any medical research institution or reputed clinical laboratory (Compulsory)		-	2	-				
Total					**400**	**600**	**1000**	**29**

Fifth Semester

Course No.	Course Name	L	T	P	Marks		Total	Cr. Hr
					Int.	Ext		
BMLS-501	Medical Laboratory Management	3	-	-	40	60	100	3
BMLS-502	Parasitology & Virology	4	-	-	40	60	100	4
BMLS-503	Blood Banking	4	-	-	40	60	100	4
BMLS-504	Histotechnology-II & Cytology	4	-	-	40	60	100	4
BMLS-505	Clinical Biochemistry-II	4	-	-	40	60	100	4
BMLS-506	Medical Laboratory Management - Practical	-	-	3	40	60	100	2
BMLS-507	Parasitology & Virology - Practical	-	-	5	40	60	100	3
BMLS-508	Blood Banking - Practical	-	-	4	40	60	100	2
BMLS-509	Histotechnology-II & Cytology – Practical	-	-	3	40	60	100	2
BMLS-510	Clinical Biochemistry-II –	-	-	3	40	60	100	2
Guest Lecture/ Tutorial/ Seminar/visit to any medical research institution or reputed clinical laboratory (Compulsory)		-	2	-				
Total					**400**	**600**	**1000**	**30**

Sixth Semester

Course No.	Course Name	L	T	P	Marks		Total	Cr. Hr
					Int.	Ext.		
BMLS-601	Environmental Sciences	4	1	-	40	60	100	5
BMLS-602	Professional Training (Three Months)	Three Months -			0	200	200	25
BMLS-603	Environmental Sciences - Practical	2			40	60	100	2
BMLS-604	Internal assessment				100	0	100	
	Project/Practical file				0	200	200	
	Practical (Performance) and viva				0	300	300	
	Total Marks				180	820	1000	32

For evaluation of Professional Training, out of 700 marks, 200 will be awarded by the healthcare industry where the candidate has taken training. After taking 3 months training from healthcare industry the candidate shall report back to parent institute where he/she will submit his/her project report and will attend the institute for rest of the semester period. Then at the end of the semester he/she will appear for the Practical examinations in the presence of Internal & external Examiners. Out of rest 500 marks 200 will be for Project/Practical file and 300 for Practical and *Viva voce* (by external examiner)

FACULTY OF ALLIED HEALTH SCIENCES

SYLLABUS

FOR

M.Sc. RADIOLOGY & IMAGING TECHNOLOGY (SEMESTER I-IV)

(Under Choice based Credit System)

Examinations: 2021 Onwards

Department of Allied Health Sciences

I K GUJRAL PUNJAB TECHNICAL UNIVERSITY KAPURTHALA

Note:

(i) Subject to change in the syllabi at any time. Please visit the University website time to time.

IK Gujral Punjab Technical University

VISION

To be an institution of excellence in the domain of higher technical education that serves as the fountainhead for nurturing the future leaders of technology and techno- innovation responsible for the techno-economic, social, cultural and environmental prosperity of the people of the State of Punjab, the Nation and the World.

MISSION

To provide seamless education through the pioneering use of technology, in partnership with industry and society with a view to promote research, discovery and entrepreneurship and

To prepare its students to be responsible citizens of the world and the leaders of technology and techno-innovation of the 21st Century by developing in them the desirable knowledge, skill and attitudes base for the world of work and by instilling in them a culture for seamlessness in all facets of life.

OBJECTIVES

- To offer globally-relevant, industry-linked, research-focused, technology- enabled seamless education at the graduate, postgraduate and research levels in various areas of engineering & technology and applied sciences keeping in mind that the manpower so spawned is excellent in quality, is relevant to the global technological needs, is motivated to give its best and is committed to the growth of the Nation;
- To foster the creation of new and relevant technologies and to transfer them to industry for effective utilization;
- To participate in the planning and solving of engineering and managerial problems of relevance to global industry and to society at large by conducting basic and applied research in the areas of technologies. To develop and conduct continuing education programmes for practicing engineers and managers with a view to update their fundamental knowledge base and problem-solving capabilities in the various areas of core competence of the University;
- To develop strong collaborative and cooperative links with private and public sector industries and government user departments through various avenues such as undertaking

of consultancy projects, conducting of collaborative applied research projects, manpower development programmes in cutting-edge areas of technology, etc;

- To develop comprehensive linkages with premier academic and research institutions within the country and abroad for mutual benefit;
- To provide leadership in laboratory planning and in the development of instructional resource material in the conventional as well as in the audio- visual, the video and computer-based modes;
- To develop programmes for faculty growth and development both for its own faculty as well as for the faculty of other engineering and technology institutions;
- To anticipate the global technological needs and to plan and prepare to cater to them;
- To interact and participate with the community/society at large with a view to inculcate in them a feel for scientific and technological thought and endeavour; and
- To actively participate in the technological development of the State of Punjab through the undertaking of community development programmes including training and education programmes catering to the needs of the unorganized sector as well as that of the economically and socially weaker sections of society.

ACADEMIC PHILOSOPHY

The philosophy of the education to be imparted at the University is to awaken the **"deepest potential"** of its students as holistic human beings by nurturing qualities of self-confidence, courage, integrity, maturity, versatility of mind as well as a capacity to face the challenges of tomorrow so as to enable them to serve humanity and its highest values in the best possible way.

Department of Allied Health Sciences

VISION

- To impart knowledge of health & medical education & help in making India a centre of Medical Education & Health Care.
- To establish & develop world class self-reliant institute for imparting Medical and other Health Science education at under-graduate & post-graduate levels of the global competence.
- To serve & educate the public, establish guidelines & treatment protocols to be followed by professionals while treating in hospitals.
- To develop and provide professionally qualified health workers for augmenting the nation's human resources through Bio-Medico-Socio-epidemiological scientific research.

MISSION

- To strive incessantly to achieve the goals of the Institution.
- To impart academic excellence in Allied Health Education.
- To practice medicine ethically in line with the global standard protocols.
- Having a revolutionary impact on students by focusing on deep inter-disciplinary knowledge, getting technical as well as Theoretical concept of Health Sciences, focusing on leadership, communication and interpersonal skills, personal health and well-being.
- Creating best of educational experience by engaging with partners outside the traditional borders of University campus. By engaging in a network of Hospitals & other Healthcare providing facilities to create a job oriented
- Cultivating productive community by attracting and retaining diverse, best talent and such an environment where research, innovation, creativity and entrepreneurship can flourish.
- To give students the best knowledge by the most innovative methods and also provide hospital exposure to work in different fields of Paramedical Sciences.
- To create a well-qualified and highly trained world class Technicians & Assistants who will aid in delivering high-class care & helping in betterment of mankind.

TITLE OF THE PROGRAM: M.Sc. RADIOLOGY & IMAGING TECHNOLOGY

YEAR OF IMPLIMENTATION: New Syllabus will be implemented from July 2021 onwards.

DURATION: The course shall be two years, with semester system (4 semesters, with two semesters in a year). The Choice based credit system will be applicable to all the semesters.

ELGIBILITY FOR ADMISSION: Candidates with 50% marks (5% relaxation for reserved categories) in Bachelor's Degree in Radiology & Imaging Technology are eligible for admission to this course.

INTAKE CAPACITY: 30 (Thirty)

MEDIUM OF INSTRUCTION: English.

PROGRAM EDUCATIONAL OBJECTIVES:

The Program Educational Objectives are the knowledge skills and attitudes which the students will acquire during post-graduation.

PEO1	Those who choose this stream are going to study about Radiological & Imaging Technology such as MRI, CT Scan, USG etc.
PEO2	Ability to do various Radiological procedures which are necessary for diagnostic purposes.
PEO3	Understand the fundamentals and applications of Radiological Equipments such as MRI Machine, CT Scan Machine, X-ray Machine etc.
PEO4	To explore the foundation science and safety principles in Medical Imaging Technology.
PEO5	Enhance knowledge from clinical experience, interactions & discussions and research to improve the quality of training and education in Medical Imaging.
PEO6	Explore the subject in depth and develop high degree of expertise to contribute to advancement of knowledge in Medical Imaging.
PEO7	Develop teaching and presentation skills necessary to become efficient teachers utilizing state-of-the art facilities and equipments.
PEO8	To provide with the skills and knowledge to apply for critical appraisal of day to day practice.

PROGRAM OUTCOMES: At the end of the program, the student will be able to:

PO1	On completion of the program, Technologists can advance to supervisory position in Diagnostic Centers and hospitals.
PO2	They can also earn key posts in academic institutions including teaching and research.
PO3	In industry, Imaging technologists are needed for Application and Software development for Medical Imaging equipment.
PO4	This Program will build technical knowledge in the student so that he/she will be able to assist an Anesthetist/Surgeon in every aspect of Anaesthesia, Surgery & other related fields.
PO5	Engage in lifelong learning and adapt to changing professional and societal needs.
PO6	The Candidates can join Private, Military and public health services.

PROGRAM SPECIFIC OUTCOMES:

At the end of the program,

PSO1	Students will be competent to work in Hospital Radiology Suites, MRI Units and other related sections.
PSO2	Students will be skilled in problem solving, critical thinking and will be able to assist the Radiologist in various procedures.
PSO3	This course provides medical imaging technologists with an understanding of the physical principles as well as theories involved in diagnostic imaging modalities.
PSO4	Students will be able to have all the relevant knowledge of Radiology & Imaging Sciences and will be able to do various procedures required.
PSO5	This Program will create a great source of manpower which can aid in our health sector especially in MRI, CT Scan, X-ray & Ultrasonography sections.
PSO6	Students will be able to explore new areas of research in Radiology and can also go for research as well.
PSO7	Students will be able to integrate knowledge of various types of Radiological & Imaging procedures along with their in-depth knowledge.

SCHEME OF THE PROGRAM:

Semester-I								
Sr No	**Code**	**Theory Papers**	**Hours**	**L-T-P**	**Credits**	**Marks Distribution**		**Marks**
						Internal	External	
1.	MRIT 101-21	RADIOGRAPHIC PROCEDURES & PRINCIPLES OF RADIOGRAPHIC EXPOSURE	45	4-0-0	4	30	70	100
2.	MRIT 102-21	MODERN IMAGING TECHNIQUES INCLUDING FUSION & HYBRID IMAGING TECHNOLOGIES	45	4-0-0	4	30	70	100
3.	MRIT 103-21	ADVANCED PHYSICS OF RADIOLOGY & IMAGING	45	4-0-0	4	30	70	100
4.	MRIT 104-21	INSTRUMENTATION OF CONVENTIONAL X-RAY & SPECIALIZED RADIOLOGY EQUIPMENTS	45	4-0-0	4	30	70	100
5	MRIT 105-21	RADIOGRAPHIC PROCEDURES & PRINCIPLES OF RADIOGRAPHIC EXPOSURE LAB	30	0-0-3	2	50	25	75
6.	MRIT 106-21	MODERN IMAGING TECHNIQUES INCLUDING FUSION & HYBRID IMAGING TECHNOLOGIES LAB	30	0-0-3	2	50	25	75
7.	MRIT 107-21	ADVANCED PHYSICS OF RADIOLOGY & IMAGING LAB	30	0-0-3	2	50	25	75
8.	MRIT 108-21	INSTRUMENTATION OF CONVENTIONAL X-RAY & SPECIALIZED RADIOLOGY EQUIPMENTS LAB	30	0-0-3	2	50	25	75
		Total	**25 (Theory 19, Practical 6)**			**300**	**425**	**725**

Semester-II								
Sr. No	**Code**	**Theory Papers**	**Hours**	**L-T-P**	**Credits**	**Marks Distribution**		**Marks**
						Internal	External	
1.	MRIT 201-21	MODERN RADIOLOGICAL & IMAGING EQUIPMENTS	45	4-0-0	4	30	70	100
2.	MRIT 202-21	CARE OF PATIENT IN DIAGNOSTIC RADIOLOGY	45	4-0-0	4	30	70	100
3.	MRIT 203-21	ADVANCED TECHNIQUES & INSTRUMENTATION OF ULTRASONOGRAPHY	45	4-0-0	4	30	70	100
4.	MRIT 204-21	ADVANCED TECHNIQUES & INSTRUMENTATION OF COMPUTED TOMOGRAPHY	45	4-0-0	4	30	70	100
5.	**MRIT** 205-21	MODERN RADIOLOGICAL & IMAGING EQUIPMENTS LAB	30	0-0-3	2	50	25	75
6.	MRIT 206-21	CARE OF PATIENT IN DIAGNOSTIC RADIOLOGY LAB	30	0-0-3	2	50	25	75
7.	MRIT 207-21	ADVANCED TECHNIQUES & INSTRUMENTATION OF ULTRASONOGRAPHY LAB	30	0-0-3	2	50	25	75
8.	MRIT 208-21	ADVANCED TECHNIQUES & INSTRUMENTATION OF COMPUTED TOMOGRAPHY LAB	30	0-0-3	2	50	25	75

		Total	**24 (Theory 16, Practical 8)**	**320**	**380**	**700**

Semester-III								
Sr. No	**Code**	**Theory Papers**	**Hours**	**L-T-P**	**Credits**	**Marks Distribution**		**Marks**
						Internal	External	
1.	MRIT 301-21	ADVANCED TECHNIQUES & INSTRUMENTATION OF MRI	45	4-0-0	4	30	70	100
2.	MRIT 302-21	INTERVENTIONAL RADIOLOGY TECHNIQUES	45	4-0-0	4	30	70	100
3.	MRIT 303-21	NUCLEAR MEDICINE IMAGING TECHNIQUES	45	4-0-0	4	30	70	100
4.	MRIT 304-21	QUALITY CONTROL IN RADIOLOGY AND RADIATION SAFETY	45	4-0-0	4	30	70	100
5	MRIT 305-21	ADVANCED TECHNIQUES & INSTRUMENTATION OF MRI LAB	30	0-0-3	2	50	25	75
6.	**MRIT** 306-21	INTERVENTIONAL RADIOLOGY TECHNIQUES LAB	30	0-0-3	2	50	25	75
7.	MRIT 307-21	NUCLEAR MEDICINE IMAGING TECHNIQUES LAB	30	0-0-3	2	50	25	75
+		**Total**	**22 (Theory 16, Practical 6)**			**270**	**355**	**625**

Semester-IV								
Sr. No	**Code**	**Theory Papers**	**Hours**	**L-T-P**	**Credits**	**Marks Distribution**		**Marks**
						Thesis	Viva	
1.		INTERNSHIP*	6 Month	0-0-30	15	-	-	-
2.		DISSERTATION/THESIS SUBMISSION**		-	-	50	50	100
		Total	**15 (Theory 0, Practical 15)**					**100**

** Dissertation work will be held in fourth semester. In fourth semester, students will go to Hospitals for Internship and along with that, they will prepare their respective thesis and submit it after completing their Internship. There will be a Presentation/Viva before a panel of teachers from the department after submission of thesis.

EXAMINATION AND EVALUATION

THEORY				
S.No.		Weightage in Marks		Remarks
1	Mid-Semester Examination	20	15	MSTs, Quizzes, assignments, attendance, etc. Constitute internal evaluation. Average of two mid-semester exams will be considered for evaluation
2	Attendance	5	5	
3	Assignments	5	5	
4	End-Semester Examination	70	50	Conduct and checking of the answer sheets will be at the department level in case of university teaching department of Autonomous institutions. For affiliated colleges examination will be conducted at the university level
	Total	**100**	**75**	
PRACTICAL				
1	Daily evaluation of practical performance/ record/ viva voce	30		Internal Evaluation
2	Attendance	5		
3	Internal Practical Examination	15		
4	Final Practical Examination	25		External Evaluation
	Total	**75**		

PATTERN OF END-SEMESTER EXAMINATION

I. **Part A** will be One Compulsory question consisting of short answer type questions [Q No. 1(a-j)] covering whole syllabus. There will be no choice in this question. It will be of 20 marks comprising of **10 questions of 2 marks each**.

II. **Part B** will be comprising of eight questions [2-9]. Student will have to attempt any six questions from this part. It will be of 30 marks with **6 questions of 5 marks each**.

III. **Part C** will be comprising of two compulsory questions with internal choice in both these questions [10-11]. It will be of 20 marks with **2 questions of 10 marks each**.

SYLLABUS OF THE PROGRAM

The syllabus has been upgraded as per provision of the UGC module and demand of the academic environment. The contents of the syllabus have been duly arranged unit wise and included in such a manner so that due importance is given to requisite intellectual and laboratory skills. The application part of the respective contents has been appropriately emphasized.

FACULTY OF ALLIED HEALTH SCIENCES

SYLLABUS

FOR

M.Sc. MEDICAL TECHNOLOGY (ANESTHESIA & OPERATION THEATRE TECHNOLOGY) (SEMESTER I-IV)

(Under Choice based Credit System)

Examinations: 2021 Onwards

Department of Allied Health Sciences

I K GUJRAL PUNJAB TECHNICAL UNIVERSITY KAPURTHALA

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MISSION

To provide seamless education through the pioneering use of technology, in partnership with industry and society with a view to promote research, discovery and entrepreneurship and

To prepare its students to be responsible citizens of the world and the leaders of technology and techno-innovation of the 21st Century by developing in them the desirable knowledge, skill and attitudes base for the world of work and by instilling in them a culture for seamlessness in all facets of life.

OBJECTIVES

- To offer globally-relevant, industry-linked, research-focused, technology- enabled seamless education at the graduate, postgraduate and research levels in various areas of engineering & technology and applied sciences keeping in mind that the manpower so spawned is excellent in quality, is relevant to the global technological needs, is motivated to give its best and is committed to the growth of the Nation;
- To foster the creation of new and relevant technologies and to transfer them to industry for effective utilization;
- To participate in the planning and solving of engineering and managerial problems of relevance to global industry and to society at large by conducting basic and applied research in the areas of technologies. To develop and conduct continuing education programmes for practicing engineers and managers with a view to update their fundamental knowledge base and problem-solving capabilities in the various areas of core competence of the University;
- To develop strong collaborative and cooperative links with private and public sector industries and government user departments through various avenues such as undertaking

of consultancy projects, conducting of collaborative applied research projects, manpower development programmes in cutting-edge areas of technology, etc;

- To develop comprehensive linkages with premier academic and research institutions within the country and abroad for mutual benefit;
- To provide leadership in laboratory planning and in the development of instructional resource material in the conventional as well as in the audio- visual, the video and computer-based modes;
- To develop programmes for faculty growth and development both for its own faculty as well as for the faculty of other engineering and technology institutions;
- To anticipate the global technological needs and to plan and prepare to cater to them;
- To interact and participate with the community/society at large with a view to inculcate in them a feel for scientific and technological thought and endeavour; and
- To actively participate in the technological development of the State of Punjab through the undertaking of community development programmes including training and education programmes catering to the needs of the unorganized sector as well as that of the economically and socially weaker sections of society.

ACADEMIC PHILOSOPHY

The philosophy of the education to be imparted at the University is to awaken the **"deepest potential"** of its students as holistic human beings by nurturing qualities of self-confidence, courage, integrity, maturity, versatility of mind as well as a capacity to face the challenges of tomorrow so as to enable them to serve humanity and its highest values in the best possible way.

Department of Allied Health Sciences

VISION

- To impart knowledge of health & medical education & help in making India a centre of Medical Education & Health Care.
- To establish & develop world class self-reliant institute for imparting Medical and other Health Science education at under-graduate & post-graduate levels of the global competence.
- To serve & educate the public, establish guidelines & treatment protocols to be followed by professionals while treating in hospitals.
- To develop and provide professionally qualified health workers for augmenting the nation's human resources through Bio-Medico-Socio-epidemiological scientific research.

MISSION

- To strive incessantly to achieve the goals of the Institution.
- To impart academic excellence in Allied Health Education.
- To practice medicine ethically in line with the global standard protocols.
- Having a revolutionary impact on students by focusing on deep inter-disciplinary knowledge, getting technical as well as Theoretical concept of Health Sciences, focusing on leadership, communication and interpersonal skills, personal health and well-being.
- Creating best of educational experience by engaging with partners outside the traditional borders of University campus. By engaging in a network of Hospitals & other Healthcare providing facilities to create a job oriented
- Cultivating productive community by attracting and retaining diverse, best talent and such an environment where research, innovation, creativity and entrepreneurship can flourish.
- To give students the best knowledge by the most innovative methods and also provide hospital exposure to work in different fields of Paramedical Sciences.
- To create a well-qualified and highly trained world class Technicians & Assistants who will aid in delivering high-class care & helping in betterment of mankind.

TITLE OF THE PROGRAM: M.Sc. MEDICAL TECHNOLOGY (Anesthesia & Operation Theatre Technology)

YEAR OF IMPLIMENTATION: New Syllabus will be implemented from July 2021 onwards.

DURATION: The course shall be two years, with semester system (4 semesters, with two semesters in a year). The Choice based credit system will be applicable to all the semesters.

ELGIBILITY FOR ADMISSION: Candidates with 50% marks (5% relaxation for reserved categories) in Bachelors Degree in Anaesthesia & Operation Theatre Technology are eligible for admission to this course.

INTAKE CAPACITY: 30 (Thirty)

MEDIUM OF INSTRUCTION: English.

PROGRAM EDUCATIONAL OBJECTIVES:

The Program Educational Objectives are the knowledge skills and attitudes which the students will acquire during post-graduation.

PEO1	Those who choose this stream are going to study about Anaesthesia & Surgical Equipments, Critical Care, Pain Management etc.
PEO2	Ability to analyse, Monitor & give care to a Surgical/Anaesthetized patient.
PEO3	Understand the fundamentals and applications of Anaesthesia, Surgical & Critical Care Equipments.
PEO4	Ability to Assist an Anaesthesiologist through General or Regional Anaesthesia.
PEO5	Ability to have knowledge of BLS & ACLS and ability to deliver it whenever required.
PEO6	Able to detect any Changes in patient's physiological status & able to tackle all types of Complications.
PEO7	Learn and Understand different Anesthetic & Surgical Procedures & their benefits as well as complications.
PEO8	Ability to Assist the Surgeon throughout Surgery & other important procedures.

PROGRAM OUTCOMES: At the end of the program, the student will be able to:

PO1	Have a lifelong knowledge of Anaesthesia, Surgery & all the Equipments used in it along with basic knowledge of applied science.
PO2	Anaesthesia & Surgical Technicians/Assistants will work in Operation Theatres, ICUs etc. along with Anesthetists and Surgeons & thus will be having a great & Important role in Healthcare.
PO3	After completion students can go for Academics as well by joining different Colleges and Universities as Lecturers/Tutors.
PO4	This Program will build technical knowledge in the student so that he/she will be able to assist an Anesthetist/Surgeon in every aspect of Anaesthesia, Surgery & other related fields.
PO5	Engage in lifelong learning and adapt to changing professional and societal needs.
PO6	This Program can do an overall development of the student to be able to have all the technical aspects about Anaesthesia, Surgery along with their advanced knowledge.

PROGRAM SPECIFIC OUTCOMES:

At the end of the program,

PSO1	Students will be competent to work in Hospital Operation Theatres, Critical Care Units and Emergency sections.
PSO2	Students will be skilled in problem solving, critical thinking and will be able to assist the Surgeon or Anesthetist.
PSO3	The students will acquire in-depth knowledge of Anesthesia, Surgery, Critical care and pain Management.
PSO4	Students will be able to have all the relevant knowledge of Anesthesia & Surgery and will be able to do various procedures required.
PSO5	This Program will create a great source of manpower which can aid in our health sector especially in Trauma, Emergency, ICU & Operation Theatres.
PSO6	Students will be able to explore new areas of research in both Anesthesia & Surgery and can also go for research as well.
PSO7	Students will be able to integrate knowledge of various types of Surgical Procedures & Anesthetic procedures along with their in-depth knowledge.

SCHEME OF THE PROGRAM:

Semester-I								
Sr. No	**Code**	**Theory Papers**	**Hours**	**L-T-P**	**Credits**	**Marks Distribution**		**Marks**
						Internal	External	
1.	MAOTT 101-21	PRINCIPLES OF ANESTHESIA TECHNOLOGY	45	4-0-0	4	30	70	100
2.	MAOTT 102-21	SURGICAL EQUIPMENTS & TECHNOLOGY	45	4-0-0	4	30	70	100
3.	MAOTT 103-21	APPLIED ANATOMY & PHYSIOLOGY	45	4-0-0	4	30	70	100
4.	MAOTT 104-21	FUNDAMENTAL OPERATION THEATRE SKILLS	45	4-0-0	4	30	70	100
5	MAOTT 105-21	GENERAL PRINCIPLES OF HOSPITAL PRACTICES	35	3-0-0	3	30	70	100
6.	MAOTT 106-21	APPLIED ANATOMY & PHYSIOLOGY LAB	30	0-0-3	2	50	25	75
7.	MAOTT 107-21	PRINCIPLES OF ANESTHESIA TECHNOLOGY LAB	30	0-0-3	2	50	25	75
8.	MAOTT 108-21	SURGICAL EQUIPMENTS & TECHNOLOGY LAB	30	0-0-3	2	50	25	75
		Total	**25 (Theory 19, Practical 6)**			**300**	**425**	**725**

Semester-II								
Sr. No	**Code**	**Theory Papers**	**Hours**	**L-T-P**	**Credits**	**Marks Distribution**		**Marks**
						Internal	External	
1.	MAOTT 201-21	ANESTHESIA EQUIPMENTS & TECHNOLOGY	45	4-0-0	4	30	70	100
2.	MAOTT 202-21	SURGICAL TOOLS & TECHNIQUES	45	4-0-0	4	30	70	100
3.	MAOTT 203-21	SURGICAL PROCEDURES	45	4-0-0	4	30	70	100
4.	MAOTT 204-21	SURGICAL INSTRUMENTS & TRAYS	45	4-0-0	4	30	70	100
5.	MAOTT 205-21	ANESTHESIA EQUIPMENTS & TECHNOLOGY LAB	30	0-0-3	2	50	25	75
6.	MAOTT 206-21	SURGICAL TOOLS & TECHNIQUES LAB	30	0-0-3	2	50	25	75
7.	MAOTT 207-21	SURGICAL PROCEDURES LAB	30	0-0-3	2	50	25	75
8.	MAOTT 208-21	SURGICAL INSTRUMENTS & TRAYS LAB	30	0-0-3	2	50	25	75
		Total	**24 (Theory 16, Practical 8)**			**320**	**380**	**700**

Semester-III								
Sr. No	**Code**	**Theory Papers**	**Hours**	**L-T-P**	**Credits**	**Marks Distribution**		**Marks**
						Internal	External	
1.	MAOTT 301-21	ANESTHESIA FOR SPECIAL SURGERIES	45	4-0-0	4	30	70	100
2.	MAOTT 302-21	INTENSIVE CARE UNIT	45	4-0-0	4	30	70	100
3.	MAOTT 303-21	ADVANCED SURGICAL TECHNIQUES	45	4-0-0	4	30	70	100
4.	MAOTT 304-21	APPLIED PHARMACOLOGY FOR ANESTHESIA	45	4-0-0	4	30	70	100
5	MAOTT 305-21	ANESTHESIA FOR SPECIAL SURGERIES LAB	30	0-0-3	2	50	25	75
6.	MAOTT 306-21	INTENSIVE CARE UNIT LAB	30	0-0-3	2	50	25	75
7.	MAOTT 307-21	ADVANCED SURGICAL TECHNIQUES LAB	30	0-0-3	2	50	25	75
+		**Total**	**22 (Theory 16, Practical 6)**			**270**	**355**	**625**

Semester-IV								
Sr. No	**Code**	**Theory Papers**	**Hours**	**L-T-P**	**Credits**	**Marks Distribution**		**Marks**
						Thesis	Viva	
1.		INTERNSHIP*	6 Month	0-0-30	15	-	-	-
2.		DISSERTATION/THESIS SUBMISSION**		-	-	50	50	100
		Total	**15 (Theory 0, Practical 15)**					**100**

** Dissertation work will be held in fourth semester. In fourth semester, students will go to Hospitals for Internship and along with that, they will prepare their respective thesis and submit it after completing their Internship. There will be a Presentation/Viva before a panel of teachers from the department after submission of thesis.

EXAMINATION AND EVALUATION

THEORY				
S.No.		Weightage in Marks		Remarks
1	Mid-Semester Examination	20	15	MSTs, Quizzes, assignments, attendance, etc. Constitute internal evaluation. Average of two mid-semester exams will be considered for evaluation
2	Attendance	5	5	
3	Assignments	5	5	
4	End-Semester Examination	70	50	Conduct and checking of the answer sheets will be at the department level in case of university teaching department of Autonomous institutions. For affiliated colleges examination will be conducted at the university level
	Total	**100**	**75**	
PRACTICAL				
1	Daily evaluation of practical performance/ record/ viva voce	30		Internal Evaluation
2	Attendance	5		
3	Internal Practical Examination	15		
4	Final Practical Examination	25		External Evaluation
	Total	**75**		

PATTERN OF END-SEMESTER EXAMINATION

I. **Part A** will be One Compulsory question consisting of short answer type questions [Q No. 1(a-j)] covering whole syllabus. There will be no choice in this question. It will be of 20 marks comprising of **10 questions of 2 marks each**.

II. **Part B** will be comprising of eight questions [2-9]. Student will have to attempt any six questions from this part. It will be of 30 marks with **6 questions of 5 marks each**.

III. **Part C** will be comprising of two compulsory questions with internal choice in both these questions [10-11]. It will be of 20 marks with **2 questions of 10 marks each**.

SYLLABUS OF THE PROGRAM

The syllabus has been upgraded as per provision of the UGC module and demand of the academic environment. The contents of the syllabus have been duly arranged unit wise and included in such a manner so that due importance is given to requisite intellectual and laboratory skills. The application part of the respective contents has been appropriately emphasized.

Study Scheme & Syllabus of

Bachelor of Cardiac Care Technology

Batch 2021 Onwards

By

Board of Studies

I K GUJRAL PUNJAB TECHNICAL UNIVERSITY KAPURTHALA

INDEX

Program Educational Objectives: At the end of the Program, the student will be able to: -	
PEO1	To cover all aspects of cardiovascular disease management and care.
PEO2	To learn the complex diagnostic and therapeutic procedures that involve use of various catheterization equipment, computer hardware, tools, machines and pharmacological agents.
PEO3	To acquire skills for management of various cardiac disorders.
PEO4	To learn how to study, interpret and care for anatomical specimens.

Program Outcomes: At the end of the Program, the student will be able to: -	
PO1	Fundamental knowledge of human anatomy.
PO2	Detailed knowledge of cardiovascular system.
PO3	Developing effective communication skills.
PO4	Developing empathy and counseling skills.
PO5	Learning technical skills of cardiology.
PO6	Providing higher education opportunity.
PO7	Developing capabilities of medical diagnosis and research.
PO8	Problem solving skills and ability to analyze.
PO9	Developing leadership skills and working in diverse environment.
PO10	Developing medical ethics and moral values.
PO11	Basic knowledge on research methodology.

Program Specific Outcomes: At the end of the Program, the student will be able to: -	
PSO1	Detailed subject knowledge of anatomy, physiology with awareness and comprehending along with all related ailments.
PSO2	Developing understanding of counselling, intensive care and resuscitation.
PSO3	Becoming expert as an associate to all interventional cardiology procedures and machinery.
PSO4	Introduction to advancement in cardiac care.

Semester		**First (1st)**									
Course Code	**Group**	**Course Type**	**Course Name / Title**	**Lord Allocation**				**Marks Distribution**		**Total Marks**	**Credit**
				Lecture	**Tutorial**	**Practical***	**Studio (If Applicable)**	**Internal**	**External**		
BCCT101-21	Allied Health Sciences	Core Theory	Basics of Anatomy-I	3	1	0	0	40	60	100	4
BCCT102-21	Allied Health Sciences	Core Theory	Basics of Physiology-I	3	1	0	0	40	60	100	4
BCCT103-21	Allied Health Sciences	Core Theory	Basics of Biochemistry-I	3	1	0	0	40	60	100	4
BCCT104-21	Allied Health Sciences	Core Practical/ Lab	Basics of Anatomy-I	0	0	4	0	60	40	100	2
BCCT105-21	Allied Health Sciences	Core Practical/ Lab	Basics of Physiology-I	0	0	4	0	60	40	100	2
BCCT106-21	Allied Health Sciences	Core Practical/ Lab	Basics of Biochemistry-I	0	0	4	0	60	40	100	2
BTHU-103-18	Allied Health Sciences	Ability Enhancement Compulsory Course (AECC)	English	1	0	0	0	40	60	100	1
BTHU-104-18	Allied Health Sciences	Ability Enhancement Compulsory Course	English	0	0	2	0	30	20	50	1

		(AECC)									
HVPE-101-18	Allied Health Sciences	Ability Enhancement Compulsory Course (AECC)	Human Values, De-addiction & Traffic Rules	3	0	0	0	40	60	100	3
HVPE-102-18	Allied Health Sciences	Ability Enhancement Compulsory Course (AECC)	Human Values, De-addiction & Traffic Rules (Lab/ Seminars)	0	0	1	0	25	**	25	1
BMPD-102-18	Allied Health Sciences	Ability Enhancement Compulsory Course (AECC)	Mentoring & Professional Development	0	0	1	0	25	**	25	1

*A course can either have four Hrs Lecture or Three Hrs Lecture + One Hrs Tutorial as per requirement

** Mentoring and Professional Development course will have internal evaluation only

Semester		**Second (2nd)**									
Course Code	**Group**	**Course Type**	**Course Name / Title**	**Lord Allocation**				**Marks Distribution**		**Total Marks**	**Credit**
				Lecture	**Tutorial**	**Practical**	**Studio (If Applicable)**	**Internal**	**External**		
BCCT201-21	Allied Health Sciences	Core Theory	Basics of Anatomy-II	3	1	0	0	40	60	100	4
BCCT202-21	Allied Health Sciences	Core Theory	Basics of Physiology-II	3	1	0	0	40	60	100	4
BCCT203-21	Allied Health Sciences	Core Theory	Basics of Biochemistry-II	3	1	0	0	40	60	100	4
BCCT204-21	Allied Health Sciences	Core Practical/ Lab	Basics of Anatomy-II	0	0	4	0	60	40	100	2
BCCT205-21	Allied Health Sciences	Core Practical/ Lab	Basics of Physiology-II	0	0	4	0	60	40	100	2
BCCT206-21	Allied Health Sciences	Core Practical/ Lab	Basics of Biochemistry-II	0	0	4	0	60	40	100	2
EVS102-18	Allied Health Sciences	Ability Enhancement Compulsory Course (AECC)	Environmental Studies	2	0	0	0	40	60	100	1
BMPD-102-18	Allied Health Sciences	Ability Enhancement Compulsory Course (AECC)	Mentoring & Professional Development	0	0	1	0	25	**	25	1

*A course can either have four Hrs Lecture or Three Hrs Lecture + One Hrs Tutorial as per requirement

** Mentoring and Professional Development course will have internal evaluation only

Semester		**Third (3rd)**									
Course Code	**Group**	**Course Type**	**Course Name / Title**	**Lord Allocation**				**Marks Distribution**		**Total Marks**	**Credit**
				Lecture	**Tutorial**	**Practical***	**Studio (If Applicable)**	**Internal**	**External**		
BCCT301-21	Allied Health Sciences	Core Theory	Anatomy and Physiology of Cardiovascular system	3	1	0	0	40	60	100	4
BCCT302-21	Allied Health Sciences	Core Theory	Applied Microbiology	3	1	0	0	40	60	100	4
BCCT303-21	Allied Health Sciences	Core Theory	General Pharmacology	3	1	0	0	40	60	100	4
BCCT304-21	Allied Health Sciences	Core Theory	Electrocardiography (ECG)	3	1	0	0	40	60	100	4
BCCT305-21	Allied Health Sciences	Core Theory	Life Style Diseases	3	1	0	0	40	60	100	4
BCCT306-21	Allied Health Sciences	Core Practical/ Lab	Anatomy and Physiology of Cardiovascular system	0	0	4	0	60	40	100	3
BCCT307-21	Allied Health Sciences	Core Practical/ Lab	Applied Microbiology	0	0	3	0	60	40	100	3
BCCT308-21	Allied Health Sciences	Core Practical/ Lab	General Pharmacology	0	0	4	0	60	40	100	3
BCCT309-21	Allied Health Sciences	Core Practical/ Lab	Electrocardiography (ECG)	0	0	4	0	60	40	100	4

BCCT310-21	Allied Health Sciences	Core Practical/ Lab	Life Style Diseases	0	0	4	0	60	40	100	3
BCCT311-21	Allied Health Sciences	Core Theory	Non-invasive Diagnosis Cardiovascular system	2	0	0	0	40	60	100	2

*A course can either have four Hrs Lecture or Three Hrs Lecture + One Hrs Tutorial as per requirement

Semester		**Fourth (4th)**									
Course Code	**Group**	**Course Type**	**Course Name / Title**	**Lord Allocation**				**Marks Distribution**		**Total Marks**	**Credit**
				Lecture	**Tutorial**	**Practical***	**Studio (If Applicable)**	**Internal**	**External**		
BCCT401-21	Allied Health Sciences	Core Theory	Basic Patient care	3	1	0	0	40	60	100	4
BCCT402-21	Allied Health Sciences	Core Theory	Basics Cardiac Evaluation	3	1	0	0	40	60	100	4
BCCT403-21	Allied Health Sciences	Core Theory	Cardiac Catheterization	3	1	0	0	40	60	100	4
BCCT404-21	Allied Health Sciences	Core Theory	Cardiac Medical Instrumentation	3	1	0	0	40	60	100	4
BCCT405-21	Allied Health Sciences	Core Practical/ Lab	Basic Patient care	0	0	2	0	60	40	100	2
BCCT406-21	Allied Health	Core Practical/ Lab	Basics Cardiac	0	0	4	0	60	40	100	2

	Sciences		Evaluation								
BCCT407-21	Allied Health Sciences	Core Practical/ Lab	Cardiac Catheterization	0	0	4	0	60	40	100	2
BCCT408-21	Allied Health Sciences	Core Practical/ Lab	Cardiac Medical Instrumentation	0	0	4	0	60	40	100	2

*A course can either have four Hrs Lecture or Three Hrs Lecture + One Hrs Tutorial as per requirement

FACULTY OF CHEMICAL SCIENCES

SYLLABUS

FOR

B.Sc. in Optometry

(SEMESTER – I & II)

(Under Choice based Credit System)

Examinations: 2021 Onwards

I K GUJRAL PUNJAB TECHNICAL UNIVERSITY KAPURTHALA

Note:

(i) Subject to change in the syllabi at any time. Please visit the University website time to time.

IK Gujral Punjab Technical University

VISION

To be an institution of excellence in the domain of higher technical education that serves as the fountainhead for nurturing the future leaders of technology and techno- innovation responsible for the techno-economic, social, cultural and environmental prosperity of the people of the State of Punjab, the Nation and the World.

MISSION

To provide seamless education through the pioneering use of technology, in partnership with industry and society with a view to promote research, discovery and entrepreneurship and
To prepare its students to be responsible citizens of the world and the leaders of technology and techno-innovation of the 21st Century by developing in them the desirable knowledge, skill and attitudes base for the world of work and by instilling in them a culture for seamlessness in all facets of life.

OBJECTIVES

To offer globally-relevant, industry-linked, research-focused, technology- enabled seamless education at the graduate, postgraduate and research levels in various areas of engineering & technology and applied sciences keeping in mind that the manpower so spawned is excellent in quality, is relevant to the global technological needs, is motivated to give its best and is committed to the growth of the Nation;

To foster the creation of new and relevant technologies and to transfer them to industry for effective utilization;

To participate in the planning and solving of engineering and managerial problems of relevance to global industry and to society at large by conducting basic and applied research in the areas of technologies. To develop and conduct continuing education programmes for practicing engineers and managers with a view to update their fundamental knowledge base and problem-solving capabilities in the various areas of core competence of the University;

To develop strong collaborative and cooperative links with private and public sector industries and government user departments through various avenues such as undertaking

of consultancy projects, conducting of collaborative applied research projects, manpower development programmes in cutting-edge areas of technology, etc;

To develop comprehensive linkages with premier academic and research institutions within the country and abroad for mutual benefit;

To provide leadership in laboratory planning and in the development of instructional resource material in the conventional as well as in the audio- visual, the video and computer-based modes;

To develop programmes for faculty growth and development both for its own faculty as well as for the faculty of other engineering and technology institutions;

To anticipate the global technological needs and to plan and prepare to cater to them;

To interact and participate with the community/society at large with a view to inculcate in them a feel for scientific and technological thought and endeavour; and

To actively participate in the technological development of the State of Punjab through the undertaking of community development programmes including training and education programmes catering to the needs of the unorganized sector as well as that of the economically and socially weaker sections of society.

ACADEMIC PHILOSOPHY

The philosophy of the education to be imparted at the University is to awaken the **"deepest potential"** of its students as holistic human beings by nurturing qualities of self-confidence, courage, integrity, maturity, versatility of mind as well as a capacity to face the challenges of tomorrow so as to enable them to serve humanity and its highest values in the best possible way.

TITLE OF THE PROGRAM: B.Sc. OPTOMETRY

YEAR OF IMPLEMENTATION: New Syllabus will be implemented from June 2021 onwards.

DURATION: The course shall be three years, with semester system (6 semesters, with two semesters in a year). The Choice based credit system will be applicable to all the semesters.

ELGIBILITY FOR ADMISSION: Candidates with 50% marks (5% relaxation for SC/ST) in aggregate in 10+2 with Medical (Physics, Chemistry & Biology)/ Diploma in Optometry with minimum aggregate of 50% marks.

INTAKE CAPACITY: 30 (Thirty)

MEDIUM OF INSTRUCTION: English.

SCHEME OF THE PROGRAM:

Semester-I

Sr. No.	Course Code	Course Type	Course Title	L-T-P*	Credits	Marks Distribution		Marks
						Internal	External	
1.	BOPT 101-21	Core Theory	Basics of Anatomy-I	3-1-0	4	40	60	100
2.	BOPT 102-21	Core Theory	Basics of Physiology-I	3-1-0	4	40	60	100
3.	BOPT 103-21	Core Theory	Basics of Biochemistry-I	3-1-0	4	40	60	100
4.	BOPT 104-21	Core Practical/Lab	Basics of Anatomy-I Practical	0-0-4	2	60	40	100
5.	BOPT 105-21	Core Practical/Lab	Basics of Physiology-I Practical	0-0-4	2	60	40	100
6.	BOPT 106-21	Core Practical/Lab	Basics of Biochemistry-I Practical	0-0-4	2	60	40	100
7.	BTHU 101-18	Ability Enhancement Compulsory Course (AECC)-I	English	1-0-0	1	40	60	100
8.	BTHU 102-18	Ability Enhancement Compulsory Course-(AECC)	English Practical/Laboratory	0-0-2	1	30	20	50
9.	HVPE-101-18	Ability Enhancement Compulsory Course-(AECC)	Human Values, De-addiction & Traffic Rules	3-0-0	3	40	60	100
10.	HVPE-102-18	Ability Enhancement Compulsory Course-(AECC)	Human Values, De-addiction & Traffic Rules (Lab/Seminar)	0-0-1	1	25	--**	25
11.	BMPD 102-18		Mentoring & Professional Development	0-0-1	1	25	--**	25
		Total		13-3-16	25	460	440	900

Semester-II

Sr. No.	Course Code	Course Type	Course Title	L-T-P*	Credits	Marks Distribution		Marks
						Internal	External	
1.	BOPT 201-21	Core Theory	Basics of Anatomy-II	3-1-0	4	40	60	100
2.	BOPT 202-21	Core Theory	Basics of Physiology-II	3-1-0	4	40	60	100
3.	BOPT 203-21	Core Theory	Basics of Biochemistry-II	3-1-0	4	40	60	100
4.	BOPT 204-21	Core Practical/Lab	Basics of Anatomy-II Practical	0-0-4	2	60	40	100
5.	BOPT 105-21	Core Practical/Lab	Basics of Physiology-II Practical	0-0-4	2	60	40	100
6.	BOPT 206-21	Core Practical/Lab	Basics of Biochemistry-II Practical	0-0-4	2	60	40	100
7.	EVS 102-18	Ability Enhancement Compulsory Course (AECC)	Environmental Studies	2-0-0	2	40	60	100
8.	BMPD 102-18		Mentoring & Professional Development	0-0-1	1	25	--**	25
		Total		11-3-13	21	365	360	725

*A course can either have four Hrs Lecture or Three Hrs Lecture + One Hrs Tutorial as per requirement

**The Human Values, De-addiction and Traffic Rules (Lab/ Seminar) and Mentoring and Professional Development course will have internal evaluation only.

EXAMINATION AND EVALUATION

THEORY					
S.No.			Weightage in Marks		Remarks
1	Internal Evaluation	Mid-Semester Examination	30	10	MSTs, Quizzes, assignments, attendance, etc. Constitute internal evaluation. Best of two mid-semester exams will be considered for evaluation
2		Attendance	5	5	
3		Assignments	5	5	
4	External Evaluation	End-Semester Examination	60	30	Conduct and checking of the answer sheets will be at the university level.
	Total		**100**	**50**	
PRACTICAL					
1	Internal Evaluation	Daily evaluation of practical performance/ record/ viva voce	15		
2		Attendance	5		
3		Internal Practical Examination	10		
4	External Evaluation	Final Practical Examination	20		
		Total	**50**		

PATTERN OF END-SEMESTER EXAMINATION

I. **Part A** will be One Compulsory question consisting of short answer type questions [Q No. 1(a-h)] covering whole syllabus. There will be no choice in this question. It will be of 16 marks comprising of **8 questions of 2 marks each**.

II. **Part B** will be comprising of eight questions [2-9]. Student will have to attempt any six questions from this part. It will be of 24 marks with **6 questions of 4 marks each**.

III. **Part C** will be comprising of two compulsory questions with internal choice in both these questions [10-11]. It will be of 20 marks with **2 questions of 10 marks each**.

SYLLABUS OF THE PROGRAM

The syllabus has been upgraded as per provision of the UGC module and demand of the academic environment. The contents of the syllabus have been duly arranged unit wise and included in such a manner so that due importance is given to requisite intellectual and laboratory skills. The application part of the respective contents has been appropriately emphasized.

SYLLABUS

FOR

M.Sc. MEDICAL Microbiology (SEMESTER I & II)

(Under Choice based Credit System)

Examinations: 2021 Onwards

Board of Studies of Medical Laboratory Technology & Sciences

I K GUJRAL PUNJAB TECHNICAL UNIVERSITY KAPURTHALA

Note:

(i) Subject to change in the syllabi at any time. Please visit the University website time to time.

IK Gujral Punjab Technical University

VISION

To be an institution of excellence in the domain of higher technical education that serves as the fountainhead for nurturing the future leaders of technology and techno- innovation responsible for the techno-economic, social, cultural and environmental prosperity of the people of the State of Punjab, the Nation and the World.

MISSION

To provide seamless education through the pioneering use of technology, in partnership with industry and society with a view to promote research, discovery and entrepreneurship and To prepare its students to be responsible citizens of the world and the leaders of technology and techno-innovation of the 21st Century by developing in them the desirable knowledge, skill and attitudes base for the world of work and by instilling in them a culture for seamlessness in all facets of life.

OBJECTIVES

- To offer globally-relevant, industry-linked, research-focused, technology- enabled seamless education at the graduate, postgraduate and research levels in various areas of engineering & technology and applied sciences keeping in mind that the manpower so spawned is excellent in quality, is relevant to the global technological needs, is motivated to give its best and is committed to the growth of the Nation;
- To foster the creation of new and relevant technologies and to transfer them to industry for effective utilization;
- To participate in the planning and solving of engineering and managerial problems of relevance to global industry and to society at large by conducting basic and applied research in the areas of technologies. To develop and conduct continuing education programmes for practicing engineers and managers with a view to update their fundamental knowledge base and problem-solving capabilities in the various areas of core competence of the University;
- To develop strong collaborative and cooperative links with private and public sector industries and government user departments through various avenues such as undertaking

of consultancy projects, conducting of collaborative applied research projects, manpower development programmes in cutting-edge areas of technology, etc;

- To develop comprehensive linkages with premier academic and research institutions within the country and abroad for mutual benefit;
- To provide leadership in laboratory planning and in the development of instructional resource material in the conventional as well as in the audio- visual, the video and computer-based modes;
- To develop programmes for faculty growth and development both for its own faculty as well as for the faculty of other engineering and technology institutions;
- To anticipate the global technological needs and to plan and prepare to cater to them;
- To interact and participate with the community/society at large with a view to inculcate in them a feel for scientific and technological thought and endeavour; and
- To actively participate in the technological development of the State of Punjab through the undertaking of community development programmes including training and education programmes catering to the needs of the unorganized sector as well as that of the economically and socially weaker sections of society.

ACADEMIC PHILOSOPHY

The philosophy of the education to be imparted at the University is to awaken the **"deepest potential"** of its students as holistic human beings by nurturing qualities of self-confidence, courage, integrity, maturity, versatility of mind as well as a capacity to face the challenges of tomorrow so as to enable them to serve humanity and its highest values in the best possible way.

TITLE OF THE PROGRAM: M.Sc. MEDICAL Microbiology

YEAR OF IMPLIMENTATION: New Syllabus will be implemented from October, 2021 onwards.

DURATION: The course shall be two years, with semester system (4 semesters, with two semesters in a year). The Choice based credit system will be applicable to all the semesters.

ELGIBILITY FOR ADMISSION: Candidates with 50% marks (5% relaxation for reserved categories) in Bachelors Degree in Medical/B.Sc. (Hons.) in Microbiology/ B.Sc. MLT are eligible for admission to this course.

INTAKE CAPACITY: 30 (Thirty)
MEDIUM OF INSTRUCTION: English.

SCHEME OF THE PROGRAM: Semester-I

Course Code	Course Type	Course Title	Load Allocation			Marks Distribution		Total Marks	Credits
			L*	T*	P	Internal	External		
MMB-101-21	Core theory	Human Anatomy and Physiology	3	1	--	30	70	100	4
MMB-102-21	Core theory	Clinical Microbiology	3	1	0	30	70	100	4
MMB-103-21	Core theory	Clinical Biochemistry	3	1	0	30	70	100	4
MMB-104-21	Core theory	Immunology	3	1	0	30	70	100	4
MMB-105-21	Core Practical/Laboratory	Human Anatomy and Physiology Lab	0	0	6	25	50	75	3
MMB-106-21	Core practical/ laboratory	Clinical Microbiology Lab	0	0	6	25	50	75	3
MMB-107-21	Core practical/ laboratory	Clinical Biochemistry Lab	0	0	6	25	50	75	3
MMB-108-21	Elective practical	Seminar/Presentations	0	0	1	-	-	25	1
	TOTAL					195	430	650	26

SECOND SEMESTER M.Sc. Medical Microbiology

Course Code	Course Type	Course Title	Load Allocation			Marks Distribution		Total Marks	Credits
			L*	T*	P	Internal	External		
MMB-201-21	Core theory	Systemic bacteriology	4	0	0	30	70	100	4
MMB-202-21	Core theory	Hematology	3	1	0	30	70	100	4
MMB-203-21	Core theory	Medical biotechniques	3	1	0	30	70	100	4
MMB-204-21	Core theory	Elements of Molecular biology	3	1	0	30	70	100	4
MMB-205-21	Elective theory	Parasitology	3	0	0	30	70	100	3
MMB-206-21	Core practical/ laboratory	Systemic bacteriology laboratory	0	0	4	25	75	100	2
MMB-207-21	Core practical/ laboratory	Medical biotechniques laboraory	0	0	4	25	75	100	2
MMB-208-21	Core practical/ laboratory	Hematology laboratory	0	0	2	25	75	100	1
MMB-209-21	Elective practical	Seminar/ workshops	0	0	2	---	---	100	1
	TOTAL		16	3	12	225	575	900	25

EXAMINATION AND EVALUATION

THEORY				
S.No.		Weightage in Marks		Remarks
1	Mid-Semester Examination	20	15	MSTs, Quizzes, assignments, attendance, etc. Constitute internal evaluation. Average of two mid-semester exams will be considered for evaluation
2	Attendance	5	5	
3	Assignments	5	5	
4	End-Semester Examination	70	50	Conduct and checking of the answer sheets will be at the department level in case of university teaching department of Autonomous institutions. For affiliated colleges examination will be conducted at the university level
	Total	**100**	**75**	
PRACTICAL				
1	Daily evaluation of practical performance/ record/ viva voce	30		Internal Evaluation
2	Attendance	5		
3	Internal Practical Examination	15		
4	Final Practical Examination	25		External Evaluation
	Total	**75**		

PATTERN OF END-SEMESTER EXAMINATION

I. **Part A** will be One Compulsory question consisting of short answer type questions [Q No. 1(a-j)] covering whole syllabus. There will be no choice in this question. It will be of 20 marks comprising of **10 questions of 2 marks each**.

II. **Part B** will be comprising of eight questions [2-9]. Student will have to attempt any six questions from this part. It will be of 30 marks with **6 questions of 5 marks each**.

III. **Part C** will be comprising of two compulsory questions with internal choice in both these questions [10-11]. It will be of 20 marks with **2 questions of 10 marks each**.

SYLLABUS OF THE PROGRAM

The syllabus has been upgraded as per provision of the UGC module and demand of the academic environment. The contents of the syllabus have been duly arranged unit wise and included in such a manner so that due importance is given to requisite intellectual and laboratory skills. The application part of the respective contents has been appropriately emphasized.