MANIPAL
ACADEMY of HIGHER EDUCATION
(Deemed to be University under Section 3 of the UGC Act, 1956)

International Centre for Applied Sciences

(A Constituent Unit of MAHE Manipal, India)

B. Sc. (APPLIED SCIENCES)

A Bachelors Degree Programme under MAHE, Manipal

ACADEMIC REGULATIONS AND COURSE STRUCTURE OF FIRST TO FOURTH SEMESTER

(2022 - 2024)

Applicable for the 2022 Admission Batch

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BACHELOR OF SCIENCE PROGRAMME IN ENGINEERING
RULES & REGULATIONS

1. INTERNATIONAL TRANSFER PROGRAM (ITP) IN ENGINEERING:

International Centre for Applied Sciences (ICAS), Manipal is offering a full time, B.Sc.(Applied Sciences) Degree program **with a provision for credit transfer to any of the foreign universities at the end of second year of studies.**

It is a unique program where the students usually spend the first two years in ICAS, Manipal and the following two years in a university abroad, of their choice (the full time, international engineering degree awarded by the foreign university only). The credit transfer will depend upon the academic policy of the respective foreign universities and can be up to 100%. This is made possible by adopting the high quality curriculum, teaching and evaluation methodologies that are followed by top universities abroad.

Since 1994, more than 2,000 students have entered about 100 foreign universities (spread across USA, UK, Australia, Germany, Canada & the like countries) through acceptable credit transfer from ICAS, pursuing their Bachelor/Master Degree in Applied Sciences/Engineering.

The following streams are offered at ICAS under the International Transfer Program:

- Aeronautical
- Chemical
- Civil
- Computer Science & Engineering with Specializations in
  - Artificial Intelligence & Machine Learning (AI&ML)
  - Big Data Analytics (BDA)
- Electrical & Electronics
- Mechanical
- Mechatronics

Students opting for Aeronautical stream only can take credit transfer after the first year. All other students are required to complete two years of study at ICAS before getting their credits transferred to foreign universities. The academic year at ICAS is divided into two Semesters. Each semester academic term is of approximately 16 weeks duration. During the first semester, the students of all the branches study common subjects. Adequate importance is given to English Communication, Basic Sciences and Humanities during the entire period of two years at ICAS, as required by the foreign Universities.

Credit Based System: Each subject/course, theory as well as practical, is expressed in terms of a certain number of credits. The credits are determined by the number of contact hours per week. For theory courses, 1 hour of lecture/tutorial per week is assigned 1 credit. For laboratory/practical courses, 3 contact hours per week is assigned 1 credit. A student earns full credits and passes a subject if he/she secures letter grade C or higher in the 4 point fixed grading system, as explained in section 5.6

2. CREDIT TRANSFER FLEXIBILITY:

Students can switch over from the above mentioned core streams to any of the allied streams/specializations at the university abroad, during credit transfer. For example, the students who studied at ICAS in the stream Computer Science can continue in the same discipline or can switch over to Computer Engineering or Information Science or related fields. Similarly, from Electrical & Electronics stream to core Electrical Engineering or Electronics & Communication specializations and from Mechanical to core Mechanical or Automobile or Production/Manufacturing/Industrial Engineering streams at the foreign university.

3. ELIGIBILITY FOR ADMISSION

Pass in 10+2 (CBSE, ICSE, "A" level, IB, HSC, OSSD, American High School Diploma or Equivalent Examination) with a minimum of 60% (aggregate) or 'C' grade in English, Physics and Mathematics with Chemistry or Biology or Computer Science or Biotechnology or Electronics as optional subjects in the 12th standard.

4. ACADEMIC CALENDAR

The academic calendar will be prepared by ICAS in line with the academic calendar of MAHE, Manipal before the commencement of the classes for both Odd Semester and Even Semester of the Academic Year, containing the dates for:

- Commencement of the classes
- Internal Assessment tests and Student Feedback
- Last instructional day
- Starting and Ending of the end semester examination
- Result declaration
- Paper seeing & Revaluation
- Make-up examination
- General Holidays and Co-curricular & Extra-curricular Events

5. ACADEMIC/EXAMINATION REGULATIONS

5.1 Attendance Requirement

- All students must attend every lecture, tutorial and practical (laboratory) classes.
- A minimum of 75% attendance is compulsory to the classes (both theory & laboratory) of any subject under any circumstances.
- If a student is unable to satisfy this minimum attendance requirement, he/she will not be permitted to attend the end semester examination of that subject (both theory & practicals) and will get detained, as per the institute/university attendance regulations.
- In case of laboratory classes, completing all the experiments is a pre-requisite for in-semester/end-semester assessment.

5.2 In-Semester Assessment

- A total weightage of 50 marks is reserved for In-semester Assessment (IA) in theory subjects.
- Two internal tests, each for 20 marks, are conducted for all the courses registered in a semester.
- First test will be conducted after five weeks of the commencement of the program and the second test will be conducted after ten weeks of the commencement of the program.
- Ten marks are reserved for two assignments to be given during the program (each assignment carries five marks). The assignments will be given between the first test and the make-up test.
- If a student is unable to attend any one of the tests because of ill health or other genuine reasons or is desirous of improving his IA marks, a make-up test may be given after the second test.
- In case of laboratory courses, In-semester Assessment is for 60 marks, reflecting the performance of the student in the conduct of the experiment, regularity and timely

submission of records/reports. If the laboratory course has a mini-project component, then 20 marks (out of 60) will be earmarked for project report submission & presentation.

5.3 End-Semester Assessment

- The maximum marks for the theory examination are 100. Out of this, 50 marks are for the in-semester assessment and 50 for the end-semester examination.
- The minimum marks (cut-off) for passing a subject is 50% of the total, when the end-semester theory (or practical) & the in-semester assessment marks are put together. Further, in case of theory subjects, a minimum of 35% marks is to be scored in each subject (18 marks out of 50), in the end semester examination, to pass the subject and there will be no choices in the end-semester exam. Question paper, as per MAHE university norms.
- The student performance in laboratory (practical) courses is evaluated out of a maximum of 100 marks. Out of this, 60 marks are for the in-semester assessment and 40 for the end-semester lab. Examination component. Completing all the prescribed experiments and attending the lab. Examination at the end of the semester on the specified date & time, is mandatory. No change of date & time for the lab. Examination is permitted, once notified.

5.4 Duration of the Examination & Tests

The end-semester examination will be of three hours duration and the in-semester assessment tests will be of one hour duration each. All the tests and examinations will be conducted in digital mode using e-pads, as per the university norms.

5.5 Mini Projects

Students need to take-up mini projects under the guidance of faculty in minimum one of their third as well as fourth semester laboratory courses.

5.6 Grading System

- Four Point, Fixed Grading system is followed in each course, as follows:

Letter Grade	Percent Equivalent Marks	Grade Value
A (Outstanding)	100 – 90	**4.0**
B+ (Very Good)	89 – 80	**3.5**
B (Good)	79 – 70	**3.0**
C+ (Above Average)	69 – 60	**2.5**
C (Average)	59 – 50	**2.0**
F (Fails)	Below 50	**0.0**

F: Failure **I:** Incomplete **DT:** Detained due to Attendance Shortage

- **Grade Point Average (GPA) and Cumulative Grade Point Average (CGPA):**
  Each course grade is converted into a specific number of points associated with the grade. These points are weighted in accordance with the number of credits assigned to a course. The overall performance of a student in each semester is indicated by the Grade Point Average (GPA) which is the weighted average of the grade points earned. The weighted average of GPAs of all semesters that the student has completed at any point of time is the Cumulative Grade Point Average (CGPA) at that point of time. CGPA is updated after every semester the student completes.

- Sample Calculation of GPA and CGPA:

Subjects	Credits	Letter Grade	Grade Value	Credit x Value	Grade Points
MATHS	4	C+	2.5	4x2.5	10
PHYSICS	3	C	2	3x2	6
CHEMISTRY	3	B+	3.5	3x3.5	10.5
MOS	4	B	3	4x3	12
TOTAL	14				38.5

In this case, GPA = $\frac{\text{total grade points}}{\text{total credits}}$

$= \frac{38.5}{14} = 2.75$

Suppose the GPA in four consecutive semesters are 3.0, 2.91, 2.80 and 3.95 with 22, 22, 18 and 19 as the respective course credits, then the
CGPA = (3.0x22+2.91x22+2.80×18+3.95×19) / (22+22+18+19) = 3.15

Generally:

$$GPA = \frac{\sum_{i=1}^{n} Ci\,Gi}{\sum_{i=1}^{n} Ci} \quad \text{and} \quad CGPA = \frac{\sum_{j=1}^{N} GPAj \times (\Sigma Ci)j}{\sum_{j=1}^{N} (\Sigma Ci)j}$$

where n = number of courses
Ci = course credit
N = number of semesters
Gi = corresponding grade value

5.7 Appeal Process

- A student may apply for the revaluation of regular end-semester examination courses (for theory subjects of regular semester, one chance only), by submitting an application along with the specified fee, before the notified deadline.
- Such students may be allowed to see their answer scripts along with the scheme of evaluation, physically on a scheduled date.
- ICAS will assign a different examiner for revaluation, as far as possible.
- However, the marks scored in the revaluation of such theory subjects will be final and a binding on the student.
- Fees will be refunded in case of grade improvement.
- There will be no paper seeing/revaluation option for the repeat/supplementary exams.

5.8 Make-up Examination

- Make-up examination in Theory subjects will be held during every semester break (after the announcement of revaluation results) to help the regular students to pass those theory subjects, in which they have got F/I grade only, during the same semester.
- Actual or a maximum of B grade only will be awarded in the make-up examination.
- Make-up examination will be conducted on continuous days and there will be no paper seeing/revaluation options.
- Make-up examination provision is only for the regular students of a particular semester, only once after their end-semester theory examinations.

5.9 Handling Malpractice Cases

Any malpractice case reported during the IA tests / End-semester examination / Make-up examination will be dealt with, as per university/institute guidelines.

5.10 Re-registration of Courses

- A student has to re-register for those subjects in which he/she was not allowed to write the end-semester examination due to shortage of attendance (less than 75% of the classes conducted for the subject), by paying the prescribed fees.
- The re-registered student has to make up for the shortage of attendance in order to fulfill the minimum attendance requirement (75%) to be eligible to write the end semester examination, by attending classes along with the next batch regular students of that particular semester/year (Odd in Odd and Even in Even semesters, respectively). He/she has to re-build in-semester assessment (IA) marks along with the regular students during this period.
- Such a student cannot claim to revert to the old in-semester assessment marks if the new marks are lower than those of the former attempt.
- Students are eligible to get actual grades in re-registered courses.

5.11 Withholding of Results

Examination results will be withheld when a student has not paid his/her outstanding dues or there is a case of disciplinary action pending against him/her.

5.12 Maximum Academic Duration

- The maximum duration for a student for passing/re-registering in any subject offered, is twice the duration of the academic programme at ICAS, from the date of joining. This applies also to the students who discontinue the academic programme for any reason and rejoins the programme at a later date.
- After the expiry of the above validity period, the student may get admitted afresh to the programme and repeat all semesters from the beginning. In such cases, the student will be governed by the rules, regulations, fee structure, courses of study and syllabi in force, at the time of re-admission.

5.13 Change of Branch

Change of branch is allowed on prior written request, against vacancies, before the commencement of the second semester, based on the academic performance in the first semester at ICAS.

5.14 Improvement of Grades

- Any student who has passed but desirous of improving grades in the theory subject(s) of the previous semesters or has obtained F(failure)/I(incomplete) grades, even after the make-up examination, has to reject the particular theory subject(s) of

that semester/year and has to re-appear for the IA tests/submit assignments and write the end-semester exam. along with the next batch regular students of that particular semester/year (Odd in Odd and Even in Even semesters, respectively) by paying the prescribed fees. Such a student cannot claim to revert to the old IA marks/end exam. marks if the new marks are lower than those of the former attempt. Such rejection case students are entitled to actual grades.

- The student who has F/I grade in any theory subject but doesn't want to reject it, may retain the earlier IA marks and clear the backlog paper (Odd in Odd and Even in Even semester examinations, respectively) by paying the prescribed fees. In such a case, the student is entitled to actual or a maximum of B grade only.
- The student who has got F/I grade in any laboratory/practical subject in the regular semester, will be given one more chance to clear the subject along with the next batch regular students of that particular semester/year (Odd in Odd and Even in Even semesters, respectively) by paying the prescribed fees.

6. STUDENT ATTENDANCE REGULATION

All the students are expected to attend all the classes in each subject. However, it is mandatory for a student to have a minimum of 75% attendance in individual subjects (both theory & practicals), for being eligible to write the end-semester examination, in compliance with the MAHE Norms. In case of Laboratory classes, completing all the experiments is a pre-requisite for in-semester/end-semester assessment.

The above 25% condoning of the attendance takes care of his/her absence due to any medical/personal reasons/purposes including writing eligibility exams, attending passport/visa related works, emergency & hospitalization cases etc. and there is no question of considering any medical certificate when a student has deficiency of attendance beyond 25%. Students are advised to take eligibility exams. like TOEFL/IELTS/SAT during vacation period only.

Generally, the above 25% condoning of the attendance includes his/her absence in the class on account of representing the institute/university in the co-curricular/extra-curricular activities also. However, as an encouragement to the students involving in such activities, further condoning of attendance up to a maximum limit of 10% of the total classes held in the individual course in that semester may be permitted (not applicable to re-registered courses), subject to the following conditions:

(1) The desirous student must apply for the same and obtain prior permission (in writing, in the forms available in ICAS Office) from the Associate Director, without which no request for condoning of attendance will be entertained.
(2) The student has to obtain authentication/endorsement in the same form, from the concerned authorities (listed below) authenticating his/her participation in the said activity and has to produce it at the ICAS office strictly within two weeks after the event. No letter received after this duration will be entertained for condoning of attendance.
(3) Associate Director will further instruct the concerned teachers handling the course to consider such cases for condoning of attendance, subject to a maximum ceiling of 10% of the total classes held in that course, at the end of the semester.

Sl. No.	Nature of Event	Authority for Endorsement
01	Representing Inter-Institute / Inter-University Sports activity	Director of Physical Education, (MIT/MAHE)
02	Representing Inter-Institute / Inter-University Cultural activity / competitions	Faculty Coordinator of Student Activities, ICAS / Director/Deputy

		Director, Student Affairs, MAHE
03	Presenting papers in Conferences / Tech. Fests / Research Colloquiums etc.	Faculty Coordinator of Student Activities, ICAS
04	Writing Eligibility Exams like SAT/ TOEFL/IELTS etc. and/or attending Passport/Visa related activities (only in exceptional cases, only for the days of exam/meeting, with proof)	Associate Director, ICAS

Students are advised to check their attendance position regularly from the respective teachers and make up for the attendance shortage, if any by attending all the remaining classes.

Branch Faculty Coordinators / Subject Teachers shall display the student attendance position along with IA test marks, a week after the first & second tests respectively, monitor the attendance position of irregular students and initiate appropriate remedial measures.

7. TEACHER GUARDIANSHIP (TG) and FACULTY ADVISER (FA) SCHEMES

In order to monitor the academic progress of the students and to supervise their welfare, ICAS has arranged teacher guardianship/faculty adviser scheme. A batch of 10 to 15 students will be allotted to a subject handling teacher who will act as a friend, philosopher and guide to these students. The TGs will be in touch with the parents/guardians of the students to inform them the progress/welfare of these students.

In the second year, 20 to 25 students are allotted to each faculty handling respective branch classes and will act as Faculty Adviser (FA). The role of FA is almost same as TG, but in addition they advise / guide them towards their future academic plans in their respective chosen branches.

The parents/guardians are also advised to keep in touch with the respective TGs/FAs of their wards, to monitor academic progress.

The Associate Director of ICAS along with the Faculty Coordinator of Student Welfare will monitor these schemes and will counsel the students from time to time.

COURSE STRUCTURE

B.Sc. (AERONAUTICAL)

FIRST YEAR - I SEMESTER

SUBJECT CODE	SUBJECT	THEORY/TUTORIAL/LAB./ CREDITS
IMA 111	MATHEMATICS –I	3–1-0–4
IPH 111	PHYSICS- I	3–0-0–3
ICE 111	MECHANICS OF SOLIDS	3–1-0–4
ICS 111	PROBLEM SOLVING USING COMPUTERS	3–1-3–5
IHS 111	A COURSE ON PSYCHOLOGY FOR ENGINEERS	3–0-0–3
IHS 112	COMMUNICATION SKILLS IN ENGLISH	3–0-0–3
IME 111	ENGINEERING GRAPHICS - I	0–0-3–1
		18–3-6-23

SECOND SEMESTER

SUBJECT CODE	SUBJECT	THEORY/TUTORIAL/LAB./ CREDITS
IMA 121	MATHEMATICS – II	3 – 1 – 0 – 4
IPH 121	PHYSICS – II	3 – 0 – 3 – 4
ICH 121	CHEMISTRY	3 – 0 – 3 – 4
IME 121	ENGINEERING GRAPHICS - II	0 – 0 – 3 – 1
IME 123	STRENGTH OF MATERIALS	3 – 1 – 0 – 4
IAV 121	INTRODUCTION TO AEROSPACE ENGINEERING AND AVIONICS	3 – 1 – 0 - 4
		15 – 3 – 9 – 21

SECOND YEAR – THIRD SEMESTER

SUBJECT CODE	SUBJECT	THEORY/TUTORIAL/LAB./ CREDITS
IMA 231	MATHEMATIC-III	3 – 1 – 0 - 4
IME 231	THERMAL ENGINEERING	3 – 1 – 0 - 4
IME 232	MANUFACTURING PROCESS ENGINEERING	4 - 0 - 0 - 4
IME 233	MATERIAL SCIENCE AND METALLURGY	3 – 0 – 0 - 3
IME 234	FLUID MECHANICS	3 - 0 - 0 -3
IMET 232	KINEMATICS OF MACHINES	2 – 1 – 0 -3
IAE 231	GEOMETRICAL MODELLING LAB	0 – 0 - 6 - 2
IAE 232	AVIONICS LAB	0 – 0 – 3 -1
		18-3-9-24

FOURTH SEMESTER

SUBJECT CODE	SUBJECT	THEORY/TUTORIAL/LAB./ CREDITS
IHS 241	ENGINEERING ECONOMICS & MANAGEMENT	3-1-0-4
ICE 241	LINEAR CONTROL THEORY	2-1-0-3
IAE 241	AIRCRAFT DESIGN	3-1-0-4
IAE 242	AERODYNAMICS	3-1-0-4
IAE 243	AIRCRAFT PROPULSION	3-1-0-4
IAE 244	AERO DYNAMICS AND PROPULSION LAB	0-0-3-1
IAE 245	NUMERICAL COMPUTATION LAB	0-0-6-2
		14-5-9-22

B.Sc. (CHEMICAL)

FIRST YEAR - I SEMESTER

SUBJECT CODE	SUBJECT	THEORY/TUTORIAL/LAB./ CREDITS
IMA 111	MATHEMATICS –I	3–1-0–4
IPH 111	PHYSICS- I	3–0-0–3
ICE 111	MECHANICS OF SOLIDS	3–1-0–4
ICS 111	PROBLEM SOLVING USING COMPUTERS	3–1-3–5
IHS 111	A COURSE ON PSYCHOLOGY FOR ENGINEERS	3–0-0–3
IHS 112	COMMUNICATION SKILLS IN ENGLISH	3–0-0–3
IME 111	ENGINEERING GRAPHICS - I	0–0-3–1
		18–3-6-23

SECOND SEMESTER

SUBJECT CODE	SUBJECT	THEORY/TUTORIAL/LAB./ CREDITS
IMA 121	MATHEMATICS – II	3–1-0–4
IPH 121	PHYSICS – II	3–0-3–4
ICH 121	CHEMISTRY	3–0-3–4
IME 121	ENGINEERING GRAPHICS - II	0–0-3–1
ICHM 121	CHEMICAL PROCESS CALCULATIONS	3–1-0–4
ICHM 122	CHEMICAL ENGINEERING THERMODYNAMICS-I	3–1-0–4
		15–3–9-21

SECOND YEAR - THIRD SEMESTER

SUBJECT CODE	SUBJECT	THEORY/TUTORIAL/LAB./ CREDITS
IMA 231	MATHEMATICS - III	3–1-0–4
ICHM 231	FLUID FLOW OPERATIONS	3-0-6-5
ICHM 232	CHEMICAL ENGINEERING THERMODYNAMICS-II	3-1-0-4
ICHM 233	PROCESS PLANT MATERIALS	3-0-0-3
ICH 231	ORGANIC CHEMISTRY-I	4-0-0-4
ICH 232	ORGANIC CHEMISTRY-II	3-0-0-3
		19- 2 -6 –23

FOURTH SEMESTER

SUBJECT CODE	SUBJECT	THEORY/TUTORIAL/LAB./ CREDITS
IHS 241	ENGINEERING ECONOMICS & MANAGEMENT	3–1-0–4
ICHM 241	CHEMICAL REACTION ENGINEERING	3-1-0-4
ICHM 242	HEAT TRANSFER OPERATIONS	3-0-6-5
ICHM 243	MASS TRANSFER-I	3-0-0-3
ICH 241	INSTRUMENTAL METHODS OF CHEMICAL ANALYSIS	3-0-0-3
IBT 231	BIO-CHEMISTRY	3-0-3-4
		18-2- 9– 23

B.Sc. (CIVIL)

FIRST YEAR - I SEMESTER

SUBJECT CODE	SUBJECT	THEORY/TUTORIAL/LAB./ CREDITS
IMA 111	MATHEMATICS –I	3–1-0–4
IPH 111	PHYSICS- I	3–0-0–3
ICE 111	MECHANICS OF SOLIDS	3–1-0–4
ICS 111	PROBLEM SOLVING USING COMPUTERS	3–1-3–5
IHS 111	A COURSE ON PSYCHOLOGY FOR ENGINEERS	3–0-0–3
IHS 112	COMMUNICATION SKILLS IN ENGLISH	3–0-0–3
IME 111	ENGINEERING GRAPHICS - I	0–0-3–1
		18–3-6-23

SECOND SEMESTER

SUBJECT CODE	SUBJECT	THEORY/TUTORIAL/LAB./ CREDITS
IMA 121	MATHEMATICS – II	3–1-0–4
IPH 121	PHYSICS – II	3–0-3–4
ICH 121	CHEMISTRY	3–0-3–4
IME 121	ENGINEERING GRAPHICS - II	0–0-3–1
ICE 121	BUILDING SCIENCE AND TECH.	3–1-0–4
ICE 122	MECHANICS OF STRUCTURES	3–1-0–4
		15–3–9-21

SECOND YEAR - THIRD SEMESTER

SUBJECT CODE	SUBJECT	THEORY/TUTORIAL/LAB./ CREDITS
IMA 231	MATHEMATICS – III	3–1-0–4
ICE 231	BASIC REINFORCED CONCRETE DESIGN	3-1-0-4
ICE 232	FLUID MECHANICS	3-1-0-4
ICE 233	GEOTECHNICAL ENGG.	3-1-0-4
ICE 234	SURVEYING	3-1-0-4
ICE 235	SURVEYING PRACTICE	0-0-3-1
ICE 236	MATERIAL TESTING LABORATORY	0-0-6-2
		15-5-9-23

FOURTH SEMESTER

SUBJECT CODE	SUBJECT	THEORY/TUTORIAL/LAB./ CREDITS
IHS 241	ENGINEERING ECONOMICS & MANAGEMENT	3–1-0–4
ICE 241	HIGHWAY ENGG.	3-1-0-4
ICE 242	BUILDING DESIGN AND DRAWING	0-0-3-1
ICE 243	WATER SUPPLY ENGG.	4-0-0-4
ICE 244	BASIC STRUCTURAL STEEL DESIGN	3-1-0-4
ICE 245	ANALYSIS OF INDETERMINATE STRUCTURES	3-1-0-4
ICE 246	FLUID MECHANICS LABORATORY	0-0-6-2
		16-4-9-23

B.Sc. (COMPUTER SCIENCE & ENGINEERING)

FIRST YEAR - I SEMESTER

SUBJECT CODE	SUBJECT NAME	THEORY/TUTORIAL/LAB./ CREDITS
IMA 111	MATHEMATICS –I	3–1–0–4
IPH 111	PHYSICS- I	3–0–0–3
ICE 111	MECHANICS OF SOLIDS	3–1–0–4
ICS 111	PROBLEM SOLVING USING COMPUTERS	3–1–3–5
IHS 111	A COURSE ON PSYCHOLOGY FOR ENGINEERS	3–0–0–3
IHS 112	COMMUNICATION SKILLS IN ENGLISH	3–0–0–3
IME 111	ENGINEERING GRAPHICS – I	0–0–3–1
		18–3–6–23

SECOND SEMESTER

SUBJECT CODE	SUBJECT NAME	THEORY/TUTORIAL/LAB./ CREDITS
IMA 121	MATHEMATICS – II	3–1-0–4
IPH 121	PHYSICS – II	3–0-3–4
ICH 121	CHEMISTRY	3–0-0–3
ICS 121	DATA STRUCTURES	3–1-0–4
ICS 122	SWITCHING CIRCUITS AND LOGIC DESIGN	3–0-0–3
ICS 123	COMPUTER ORGANIZATION AND ARCHITECTURE	3–0-0–3
ICS 124	DATA STRUCTURES LABORATORY	0–0–3–1
ICS 125	SWITCHING CIRCUITS AND LOGIC DESIGN LABORATORY	0–0–3–1
		18–2–9-23

SECOND YEAR - THIRD SEMESTER

SUBJECT CODE	SUBJECT NAME	THEORY/TUTORIAL/LAB./ CREDITS
IMA 231	MATHEMATICS - III	3–1-0–4
IEC 231	ANALOG ELECTRONIC CIRCUITS	3–1-0–4
ICS 231	DATABASE MANAGEMENT SYSTEMS	3–0-0–3
ICS 232	SOFTWARE DESIGN USING OBJECT ORIENTED PARADIGM	3–0-0–3
ICS 233	DATABASE MANAGEMENT SYSTEMS LABORATORY	0–0-6–2
ICS 234	SOFTWARE DESIGN USING OBJECT ORIENTED PARADIGM LABORATORY	0–0-3–1
ICS ***	PROGRAM ELECTIVE - 1	2–1–0–3
ICS ***	PROGRAM ELECTIVE - 2	3–0–0–3
		17–3–9-23

FOURTH SEMESTER

SUBJECT CODE	SUBJECT NAME	THEORY/TUTORIAL/LAB./ CREDITS
IEE 241	SIGNALS AND SIGNAL PROCESSING	3–1-0–4
ICS 241	EMBEDDED SYSTEMS	3–0-0–3
ICS 242	OPERATING SYSTEMS	2–1-0–3
ICS 243	DESIGN AND ANALYSIS OF ALGORITHMS	2–1-0–3
ICS 244	EMBEDDED SYSTEMS LABORATORY	0–0-3–1
ICS ***	PROGRAM ELECTIVE - 3	3–0-0–3
ICS ***	PROGRAM ELECTIVE - 4	3–0-0–3
ICS ***	PROGRAM ELECTIVE - 5	0-0-6-2
		16–3–9-22

PROGRAM ELECTIVES:

ICS 235 : INTRODUCTION TO DATA ANALYTICS WITH PYTHON
ICS 236 : ARTIFICIAL INTELLIGENCE
ICS 237 : MACHINE LEARNING
ICS 245 : BIG DATA ANALYTICS
ICS 246 : ARTIFICIAL NEURAL NETWORK
ICS 247 : DATAWAREHOUSING AND DATA MINING
ICS 248 : MACHINE LEARNING LABORATORY
ICS 249 : BIG DATA ANALYTICS LABORATORY

PROGRAM ELECTIVE BASED STREAM SPECIALIZATIONS:

1. **ARTIFICIAL INTELLIGENCE & MACHINE LEARNING :**

   THIRD SEMESTER: ICS 235, ICS 236
   FOURTH SEMESTER: ICS 237, ICS 246, ICS 248

2. **BIG DATA ANALYTICS :**

   THIRD SEMESTER: ICS 235, ICS 237
   FOURTH SEMESTER: ICS 245, ICS 247, ICS 249

B.Sc. (ELECTRICAL & ELECTRONICS)

FIRST YEAR - FIRST SEMESTER

SUBJECT CODE	SUBJECT	THEORY/TUTORIAL/LAB./ CREDITS
IMA 111	MATHEMATICS –I	3–1-0–4
IPH 111	PHYSICS- I	3–0-0–3
ICE 111	MECHANICS OF SOLIDS	3–1-0–4
ICS 111	PROBLEM SOLVING USING COMPUTERS	3–1-3–5
IHS 111	A COURSE ON PSYCHOLOGY FOR ENGINEERS	3–0-0–3
IHS 112	COMMUNICATION SKILLS IN ENGLISH	3–0-0–3
IME 111	ENGINEERING GRAPHICS - I	0–0-3–1
		18–3-6-23

SECOND SEMESTER

SUBJECT CODE	SUBJECT	THEORY/TUTORIAL/LAB./ CREDITS
IMA 121	MATHEMATICS – II	3–1-0–4
IPH 121	PHYSICS – II	3–0-3–4
ICH 121	CHEMISTRY	3–0-3–4
IME 121	ENGINEERING GRAPHICS - II	0–0-3–1
IEE 121	ELEMENTS OF ELECTRICAL AND ELECTRONICS ENGINEERING	3–1-0–4
IEC 121	LOGIC DESIGN	3–1-0–4
		15–3–9-21

SECOND YEAR - THIRD SEMESTER

SUBJECT CODE	SUBJECT	THEORY/TUTORIAL/LAB./ CREDITS
IMA 231	MATHEMATICS - III	3–1-0–4
IEC 231	ANALOG ELECTRONICS CIRCUITS	3–1-0–4
IEC 233	ELECTROMAGNETIC THEORY	3–1-0–4
IEE 231	NETWORK ANALYSIS	3–1-0–4
IEE 234	MICROCONTROLLERS	3–1-0–4
IEC 232	DIGITAL ELECTRONICS LABORATORY	0–0-6–2
IEE 232	CIRCUITS SIMULATION LABORATORY	0–0-3–1
		15–5–9-23

FOURTH SEMESTER

SUBJECT CODE	SUBJECT		THEORY/TUTORIAL/LAB./ CREDITS
IHS 241	ENGINEERING ECONOMICS & MANAGEMENT		3–1-0–4
IEC 241	IC SYSTEMS		3–1-0–4
IEE 241	SIGNALS AND SIGNAL PROCESSING		3–1-0–4
IEC/IEE 243	ELECTIVE-I	VLSI DESIGN POWER SYSTEM ANALYSIS	3–1-0–4
IEC/IEE 244	ELECTIVE-II	DSD USING VERILOG ELECTRICAL MACHINES	3–1-0–4
IEC 242	LINEAR IC LABORATORY		0–0-3–1
IEE 242	MICROCONTROLLER LABORATORY		0–0-6–2
			15–5–9-23

B.Sc. (MECHANICAL)

FIRST YEAR - I SEMESTER

SUBJECT CODE	SUBJECT	THEORY/TUTORIAL/LAB./ CREDITS
IMA 111	MATHEMATICS – I	3 – 1 – 0 – 4
IPH 111	PHYSICS- I	3 – 0 – 0 – 3
ICE 111	MECHANICS OF SOLIDS	3 – 1 – 0 – 4
ICS 111	PROBLEM SOLVING USING COMPUTERS	3 – 1 – 3 – 5
IHS 111	A COURSE ON PSYCHOLOGY FOR ENGINEERS	3 – 0 – 0 – 3
IHS 112	COMMUNICATION SKILLS IN ENGLISH	3 – 0 – 0 – 3
IME 111	ENGINEERING GRAPHICS – I	0 – 0 – 3 – 1
		18 – 3 – 6 – 23

SECOND SEMESTER

SUBJECT CODE	SUBJECT	THEORY/TUTORIAL/LAB./ CREDITS
IMA 121	MATHEMATICS – II	3 – 1 – 0 – 4
IPH 121	PHYSICS – II	3 – 0 – 3 – 4
ICH 121	CHEMISTRY	3 – 0 – 3 – 4
IME 121	ENGINEERING GRAPHICS - II	0 – 0 – 3 – 1
IME 122	BASIC MECHANICAL ENGINEERING	3 – 1 – 0 – 4
IME 123	STRENGTH OF MATERIALS	3 – 1 – 0 – 4
		15 – 3 – 9 – 21

SECOND YEAR - THIRD SEMESTER

SUBJECT CODE	SUBJECT	THEORY/TUTORIAL/LAB./ CREDITS
IMA 231	MATHEMATICS – III	3 – 1 – 0 – 4
IME 231	THERMAL ENGINEERING	3 – 1 – 0 – 4
IME 232	MANUFACTURING PROCESS ENGINEERING	4 – 0 – 0 – 4
IME 233	MATERIAL SCIENCE AND METALLURGY	3 – 0 – 0 – 3
IME 234	FLUID MECHANICS	3 – 0 – 0 – 3
IME 235	AUTOMOBILE ENGINEERING	3 – 0 – 0 – 3
IME 236	COMPUTER AIDED MECHANICAL DRAWING	0 – 0 – 6 – 2
IME 237	STRENGTH OF MATERIALS LABORATORY	0 – 0 – 3 – 1
		19 – 2 – 9 – 24

FOURTH SEMESTER

SUBJECT CODE	SUBJECT	THEORY/TUTORIAL/LAB./ CREDITS
IHS 241	ENGINEERING ECONOMICS & MANAGEMENT	3 – 1 – 0 – 4
IME 241	THEORY OF MACHINES	3 – 1 – 0 – 4
IME 242	DESIGN OF MACHINE ELEMENTS	3 – 1 – 0 – 4
IME 243	INTERNAL COMBUSTION ENGINES	3 – 0 – 0 – 3
IME 244	METROLOGY AND MEASUREMENTS	3 – 1 – 0 – 4
IME 245	FLUID MECHANICS LABORATORY	0 – 0 – 3 – 1
IME 246	WORKSHOP PRACTICE	0 – 0 – 3 – 1
IME 247	THERMAL ENGINEERING LABORATORY	0 – 0 – 3 – 1
		15 – 4 – 9 – 22

B.Sc. (MECHATRONICS)

FIRST YEAR - I SEMESTER

SUBJECT CODE	SUBJECT	THEORY/TUTORIAL/LAB./ CREDITS
IMA 111	MATHEMATICS –I	3–1-0–4
IPH 111	PHYSICS- I	3–0-0–3
ICE 111	MECHANICS OF SOLIDS	3–1-0–4
ICS 111	PROBLEM SOLVING USING COMPUTERS	3–1-3–5
IHS 111	A COURSE ON PSYCHOLOGY FOR ENGINEERS	3–0-0–3
IHS 112	COMMUNICATION SKILLS IN ENGLISH	3–0-0–3
IME 111	ENGINEERING GRAPHICS - I	0–0-3–1
		18–3-6-23

SECOND SEMESTER

SUBJECT CODE	SUBJECT	THEORY/TUTORIAL/LAB./ CREDITS
IMA 121	MATHEMATICS – II	3–1-0–4
IPH 121	PHYSICS – II	3–0-3–4
ICH 121	CHEMISTRY	3–0-3–4
IME 121	ENGINEERING GRAPHICS - II	0–0-3–1
IME 122	BASIC MECHANICAL ENGINEERING	3–1-0–4
IEE 121	ELEMENTS OF ELECTRICAL AND ELECTRONICS ENGINEERING	3–1-0–4
		15–3–9-21

SECOND YEAR - THIRD SEMESTER

SUBJECT CODE	SUBJECT	THEORY/TUTORIAL/LAB./ CREDITS
IMA 231	MATHEMATICS - III	3–1-0–4
IMET 231	ELEMENTS OF MECHATRONICS SYSTEMS	3–0–0–3
IMET 232	KINEMATICS OF MACHINES	2–1–0–3
IMET 233	MATERIAL SCIENCE AND ENGINEERING	3–0–0–3
IMET 234	ANALOG AND DIGITAL SYSTEM DESIGN	3–0–0–3
IEC 231	ANALOG ELECTRONICS CIRCUITS	3–1–0–4
IMET 235	CAD LABORATORY	0–0–3–1
IEC 232	DIGITAL ELECTRONICS LABORATORY	0–0–6–2
		17–3–9-23

FOURTH SEMESTER

SUBJECT CODE	SUBJECT	THEORY/TUTORIAL/LAB./ CREDITS
IHS 241	ENGINEERING ECONOMICS & MANAGEMENT	3–1-0–4
IMET 241	MICROCONTROLLER AND APPLICATIONS	3–0–0–3
IMET 242	PROGRAMMABLE LOGIC CONTROLLER	3–0–3–4
IMET 243	AUTOMATED MANUFACTURING SYSTEMS	3–0–0–3
IMET 244	INDUSTRIAL ROBOTICS	3–0–0–3
IEE 241	SIGNALS AND SIGNAL PROCESSING	3–1-0–4
IEE 242	MICROCONTROLLER LABORATORY	0–0-6–2
		18–2–9–23