Integrated MSc Electronics

Regulations

These regulations shall govern the award of
Five-Year Integrated Master's Programme (FYIMP) in Electronics under NEP 2020
These regulations have to be interpreted with Statutes governing Five-Year Integrated Master's Programme under NEP 2020

1. Offering Department

The programme shall be offered in the **Department of Electronics and Instrumentation Technology**, University of Kashmir, at its main campus under the School of Applied Sciences and Technology.

2. Introduction

The **Five-Year MSc Electronics** Programme, aligned with the NEP 2020 scheme, offers a comprehensive five-year curriculum designed to equip students with the knowledge and skills to excel in the ever-evolving field of Electronics. This innovative program comprises a unique Multiple Entry Multiple Exit (MEME) structure. Students can enter in semesters 1, 7, or 9 and exit with qualifications like a certificate, diploma, Bachelor's degree (honors or regular with or without research), PG Diploma, One-Year Master's degree, Two-Year's Master's Degree or Five-Year Integrated Master's degree, depending on the entry and exit points. There is also an option to re-enter the program within three (03) years after exit.

This program offers a rich tapestry of coursework, fostering a well-rounded understanding of the field. Students gain a strong foundation in core electronics through dedicated courses. The programme allows specializations in emerging areas of Electronics such as VLSI, Signal Processing, Communications, Embedded Systems, Computing, Image Processing, Nanoelectronics, Wireless Communications, Wearable Electronics, Internet of Things, Multimedia Signal Coding, Neuromorphic Computing, etc. The programme also includes contemporary courses in ever-evolving fields of computation and Artificial Intelligence. Skill-oriented courses equip them with practical abilities valued by the industry. Multidisciplinary courses encourage a holistic approach by integrating knowledge from various disciplines. Additionally, ability enhancement

courses hone communication, critical thinking, and problem-solving skills – essential assets for success.

The curriculum incorporates the latest trends and in-demand skills the electronics industry seeks. This ensures graduates are well-prepared for a successful career path. Furthermore, the program equips students with the necessary skills and knowledge to pursue further research endeavors after graduation.

The program emphasizes practical learning through internships, projects, and problem-based learning methodologies. The curriculum stays at the forefront of the field, ensuring graduates possess in-depth knowledge of contemporary developments in electronics.

This comprehensive and industry-oriented education empowers graduates to become future leaders in the dynamic field of electronics. Graduates can pursue rewarding careers in various sectors, including industry, academia, and business entrepreneurship. Graduates in Electronic Sciences can go on to serve in industries or may opt to establish their Start-Ups. They can also be recruited directly in MNCs after their completion.

The Five-Year MSc Electronics Programme positions graduates for success, opening doors to a future brimming with exciting possibilities.

3. Programme Outcomes

PO1. ***Engineering Knowledge:*** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to solve complex engineering problems.

PO2. ***Problem Analysis:*** Identify, formulate, review research literature, and analyze complex engineering problems, reaching substantiated conclusions using the first principles of mathematics, natural sciences, and engineering sciences.

PO3. ***Design/Development of Solutions***: Design solutions for engineering problems & design system components or processes that meet the specified needs with appropriate consideration for public health, safety, and cultural, societal, and environmental considerations.

PO4. ***Conduct Investigation of Complex Problems***: Use research-based knowledge and research methods, including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

PO5. ***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.

PO6. ***The Engineer and Society***: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal, and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

PO7. ***Environment and Sustainability***: Understand the impact of professional engineering solutions in societal and environmental contexts and demonstrate the knowledge of and need for sustainable development.

PO8. ***Ethics***: Apply ethical principles and commit to professional ethics, responsibilities, and norms of engineering practice.

PO9. ***Individual and Teamwork***: Function effectively as an individual, member, or leader in diverse teams and multidisciplinary settings.

PO10. ***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.

PO11. ***Project Management and Finance***: Demonstrate knowledge and understanding of engineering and management principles and apply these to one's work as a member and leader in a team, as well as to manage projects and multidisciplinary environments.

PO12. ***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.

4. Programme Specific Outcomes

PSO1. An ability to use the techniques, skills, and modern electronic gadgets necessary for instrumental development practice.

PSO2. Successfully engage in careers in a broad range of areas to serve the needs of both private and public sectors.

PSO3. An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental,

social, political, ethical, health and safety, manufacturability, and sustainability

PSO4. An ability to use the techniques, skills, and modern electronic tools necessary for daily applications.

PSO5. Detailed understanding of engineering programming in common languages, such as MATLAB, LabVIEW, embedded C, and C++.

PSO6. Fundamental and advanced theory and application of digital signal processing concepts, methods, and algorithms with fuzzy logic and neural network.

PSO7. Theory and practice of digital electronics logic systems design, operation, and system identification.

PSO8. Theory and practice of electronics network analysis power systems in dynamical behavior.

PSO9. Detailed understanding of Advanced Microprocessors, Microcontrollers, Embedded Systems, and the Internet of Things with laboratory practices.

PSO10. Theory and practice of Communication Electronics and Wireless Communications.

PSO11. Specializations in emerging areas of Electronics such as Neuromorphic Computing, Embedded Systems and Security, Digital Image processing, Computational Intelligence & Wireless Communications, Multimedia Signal Coding, Wearable Electronics, nanoelectronics, etc.

PSO12. Give an oral scientific presentation, report on a research project, and produce research reports.

5. Entry, Exit, and Re-entry

i. The five-year Master's Degree Programme shall have multiple entries and exits.

ii. Admission shall be made in the 1st semester (1st year), 7th semester (4th Year), and 9th semester (5th year) with appropriate qualifications as depicted in a later clause of these regulations.

iii. After the first year (completing two semesters, i.e., a minimum of 48 credits), a candidate can receive a **Certificate in ELECTRONICS**.

iv. After the second year (successful completion of four semesters, i.e., a minimum of 88 credits), a candidate is eligible to receive a **Diploma in ELECTRONICS**.

v. After the third year (successful completion of six semesters, i.e., a minimum of 128 credits), a candidate is eligible to receive **Bachelor's Degree in ELECTRONICS**.

vi. After four years (completing eight semesters, i.e., a minimum of 168 credits), a candidate can receive **Bachelors' (Honors) Degree in ELECTRONICS with/without Research**.

vii. A candidate entering the programme in the 4th year and exiting after completion of the 4th year shall be eligible to receive **PG Diploma in ELECTRONICS**.

viii. After completion of 5 years (successful completion of ten semesters), a candidate is eligible to receive a **Five-Year Integrated Master's Degree** in **ELECTRONICS** or a **Master's Degree** in **ELECTRONICS,** depending upon the admission into the programme. A candidate who joins the programme in the 7th semester shall be awarded Two Year **Master's Degree in ELECTRONICS,** and those who in 9th semester shall be awarded One Year **Master's Degree in ELECTRONICS**.

ix. A candidate availing exit option shall have the option to reenter the programme within three years of exit at the beginning of any academic year to complete the degree with the prevailing syllabi, subject to the condition that the candidate completes the degree within a maximum period of 9 years from the date admitted in the first semester.

x. The entry and exit points, with credits earned during the programme are depicted in the following table:

Entry Year	Exit After	MINIMUM Credits Studied							Certificate/Diploma/Degree Awarded
		Major	Minor	Multi-D	AECs	VACs	SEC	Total	
1st	1st	12	8	6	6	8	8	48	**Certificate** in Electronics
	2nd	34	16	9	9	8	12	88	**Diploma** in Electronics
	3rd	66	24	9	9	8	12	128	**Bachelor's Degree** in Electronics

Entry Year	Exit After	MINIMUM Credits Studied							Certificate/Diploma/Degree Awarded
		Major	Minor	Multi-D	AECs	VACs	SEC	Total	
	4th	98	32	9	9	8	12	168	**Bachelor's Degree** (Honours) with/without Research in Electronics
	5th	142	32	9	9	8	12	212	**Five-Year Integrated Master's Degree** in Electronics
4th	4th	32	8	-	-	-	-	40	**PG Diploma** in Electronics
	5th	76	8	-	-	-	-	84	**Two Years Master's Degree** in Electronics
5th	5th	44	0	-	-	-	-	44	**One Year Master's Degree** in Electronics

6. Eligibility for Admission

Subject to the University of Kashmir Policy from time to time, eligibility to enter the programme at different levels shall be as follows:

1st Year (Semester I): Candidates who have Passed the 10+2 examination (Science Subjects) with a minimum of 45% marks in case of general category and 40% marks in case of reserved category candidates from the Jammu and Kashmir Board of School Education or from any other recognized board/institution whose examinations have been recognized as equivalent to that by the Jammu and Kashmir Board of School Education.

4th Year (Semester VII): Three-year Bachelors' Degree in Electronics from any recognized University under NEP 2020 with a minimum of 45% marks in case of general category and 40% marks in case of reserved category candidates.

5th Year (Semester IX): Four-Year Honors' Degree in Electronics under NEP 2020 or B.E./B.Tech. in Electronics or equivalent with a minimum of 45% marks in case of general category and 40% marks in case of reserved category candidates.

7. Mode of Selection

Admission shall be made through Entrance Test and admission shall be granted on the basis of the merit obtained in the entrance test, conducted by the University.

Further, if the number of available seats is more than the total number of applicants, then Entrance Test shall not be conducted.

8. Intake

First Year (1st Semester): 20 students excluding self-finance, foreign nationals, supernumerary, and other similar categories.

Fourth Year (7th Semester): 10 students excluding self-finance, foreign nationals, supernumerary, and other similar categories and exits after 3rd year.

Fifth Year (9th Semester): 5 students excluding self-finance, foreign nationals, supernumerary, and other similar categories and exits after 4th year.

The intake for self-finance, foreign nationals, supernumerary, and other similar categories shall follow the University policy.

9. Fee Structure

The fee shall be as follows:

(i) **General Category:** Rs. 11,375/= per year.

(ii) **Self-Finance Category:** A self-finance fee of Rs. 11,375/= per year in addition to fee mentioned for general category.

(iii) **Foreign Nationals Category:** Rs.30,000/= per semester.

(iv) In addition, an Industrial Training Fee of Rs. 10,000/= shall be charged in the 5th year (9th semester). This Fee component shall be payable by students admitted under all categories.

(v) Examination Fees, Hostel Fees, etc., shall be charged extra as per the University policy in Vogue.

(vi) Any change in fee shall be notified from time to time by the University.

10. Programme Structure

The programme structure of the Five-Year Integrated Master's Degree Programme in Electronics shall be as follows:

<table>
<tr><td colspan="2" rowspan="2">Course Type</td><td colspan="10">Semester & Credits (T+L)</td></tr>
<tr><td>1st</td><td>2nd</td><td>3rd</td><td>4th</td><td>5th</td><td>6th</td><td>7th</td><td>8th</td><td>9th</td><td>10th</td></tr>
<tr><td rowspan="3">Major Subject ELECTRONICS</td><td>Major CT1</td><td>4+2</td><td>4+2</td><td>4+2</td><td>3+1</td><td>3+1</td><td>3+1</td><td>3+1</td><td>3+1</td><td>-</td><td>-</td></tr>
<tr><td>Major CT2</td><td>-</td><td>-</td><td>-</td><td>4+2</td><td>4+2[1]</td><td>4+2</td><td>4+2</td><td>4+2[2]</td><td>-</td><td>-</td></tr>
<tr><td>Major CT3</td><td>-</td><td>-</td><td>-</td><td>4+2</td><td>4+2</td><td>4+2</td><td>4+2</td><td>4+2[2]</td><td>22</td><td>22</td></tr>
<tr><td>Minor Subject*</td><td>Minor</td><td>4 to 6</td><td>4 to 6</td><td>4 to 6</td><td>4</td><td>4</td><td>4</td><td>4</td><td>4</td><td>-</td><td>-</td></tr>
<tr><td colspan="2">Internship/ Research</td><td colspan="10">[1]2 credits of Summer/Winter Internship
[2]12 credits of Research Project for Research otherwise Honours</td></tr>
<tr><td colspan="2">Multi-Disciplinary Courses**</td><td>3</td><td>3</td><td>3</td><td>-</td><td>-</td><td>-</td><td>-</td><td>-</td><td>-</td><td>-</td></tr>
<tr><td colspan="2">Ability Enhancement Courses (AECs)**</td><td>3</td><td>3</td><td>3</td><td>-</td><td>-</td><td>-</td><td>-</td><td>-</td><td>-</td><td>-</td></tr>
<tr><td colspan="2">Value-Added Courses (VACs)**</td><td>2x2 = 4</td><td>2x2 = 4</td><td>-</td><td>-</td><td>-</td><td>-</td><td>-</td><td>-</td><td>-</td><td>-</td></tr>
<tr><td colspan="2">Skill Enhancement Course Vertical (SEC)**</td><td>2+2 = 4</td><td>2+2 = 4</td><td>2+2 = 4</td><td>-</td><td>-</td><td>-</td><td>-</td><td>-</td><td>-</td><td>-</td></tr>
<tr><td colspan="2">Total Credits (Semester)</td><td>24 to 26</td><td>24 to 26</td><td>20 to 22</td><td>20</td><td>20</td><td>20</td><td>20</td><td>20</td><td>22</td><td>22</td></tr>
<tr><td colspan="2">Total Credits (Certificate)</td><td colspan="2">48 to 52 Credits</td><td colspan="8">➔ Exit with a Certificate in Electronics</td></tr>
<tr><td colspan="2">Total Credits (Diploma)</td><td colspan="4">88 to 94 Credits</td><td colspan="6">➔ Exit with Diploma in Electronics</td></tr>
<tr><td colspan="2">Total Credits (Bachelor's Degree)</td><td colspan="6">128 to 134 Credits</td><td colspan="4">➔ Exit with a Bachelor's Degree in Electronics</td></tr>
<tr><td colspan="2">Total Credits (Bachelor's Degree Honours with/without research)</td><td colspan="8">168 to 174 Credits</td><td colspan="2">Exit with Bachelor's Degree with H/R in Electronics</td></tr>
<tr><td colspan="2">Total Credits (Five-Year Master's Degree)</td><td colspan="10">212 to 218 Credits (Five-Year Integrated Master's Degree in Electronics)</td></tr>
<tr><td colspan="12">*Minor subject should be from allied subjects, e.g., Artificial Intelligence, Information Technology, Computer Sciences, Physics, Mathematics, Statistics, etc.
**The course list will, as per the available basket for each course type, updatable with the introduction/availability of new courses in the respective baskets.</td></tr>
</table>

11. Courses Layout and Titles

11.1. Foundation Courses: 1st and 2nd Semesters

These zero-credit foundation courses are used in the first year to strengthen students' fundamentals and enable them to cope with the degree programmes better. Foundation courses will not carry any credit; however, they are mandatory courses with a pass/fail grade. These courses shall be offered to the students enrolled at the Department for Five-Year Integrated Master's Degree Programme in Electronics.

Semester	Course Type & Credits	Course Code	Course Title	Hours		Credits	Marks		
				Theory	Lab		Internal	End Term	Total
1	Preparatory	MAT122J	Mathematics	3	2	0	20	80	100
2	Preparatory	PHY122J	Physics	4	0	0	20	80	100

11.2. Major Courses: 1st to 10th Semesters

Discipline Centric Courses (Major) are courses from the major discipline and are divided into three types. Course Type 1 (CT1), Course Type 2 (CT2) and Course Type 3 (CT3). CT1 courses are foundation/core courses of the major discipline, and CT2 courses are intermediate courses of the major discipline. CT3 courses are the advanced courses of the major discipline. The Department shall offer these courses to the students enrolled at the Department in the Five-Year Master's Degree Programme in Electronics.

Semester	Course Type & Credits	Course Code	Course Title	Hours		Credits	Marks		
				Theory	Lab		Internal	End Term	Total
1	Major CT1 *(4+2 Credits)*	ELE122J	Network Analysis & Analog Electronics	4	4	0	30	120	150
2	Major CT1 *(4+2 Credits)*	ELE222J	Digital Integrated Electronics	4	4	6	30	120	150
3	Major CT1 *(4+2 Credits)*	ELE322J	Operational Amplifier & Applications	4	4	6	30	120	150
4	Major CT1 *(3+1 Credits)*	ELE422J1	Signals and Systems	3	2	4	20	80	100
	Major CT2 *(4+2 Credits)*	ELE422J2	Applied Mathematics and Programming	4	4	6	30	120	150
	Major CT3 *(4+2 Credits)*	ELE422J3	Electromagnetic Waves and Antennas	4	4	6	30	120	150
5	Major CT1 *(3+1 Credits)*	ELE522J1	Microprocessors & Microcontrollers	3	2	4	20	80	100

Semester	Course Type & Credits	Course Code	Course Title	Hours		Credits	Marks		
				Theory	Lab		Internal	End Term	Total
	Major CT2 *(4+2 Credits)*	ELE522J2	Digital System Design and VHDL	4	4	6	30	120	150
	Major CT3 *(4+2 Credits)*	ELE522J3	Microwave Engineering	4	4	6	30	120	150
6	Major CT1 *(3+1 Credits)*	ELE622J1	Communication Electronics – I	3	2	4	20	80	100
	Major CT2 *(4+2 Credits)*	ELE622J2	Advanced Microprocessors and Microcontrollers	4	4	6	30	120	150
	Major CT3 *(4+2 Credits)*	ELE622J3	Artificial Intelligence & Machine Learning	4	4	6	30	120	150
7	Major CT1 *(3+1 Credits)*	ELE722J1	Electronic Instrumentation	3	2	4	20	80	100
	Major CT2 *(4+2 Credits)*	ELE722J2	Embedded Systems and Internet of Things	4	4	6	30	120	150
	Major CT3 *(4+2 Credits)*	ELE722J3	Communication Electronics – II	4	4	6	30	120	150
8	Major CT1 *(3+1 Credits)*	ELE822J1	Power Electronics & Photonics	3	2	4	20	80	100
	Honors								
	Major CT2 *(4+2 Credits)*	ELE822J2	Control Systems	4	4	6	30	120	150
	Major CT3 *(4+2 Credits)*	ELE822J3	Material Sciences and VLSI Technology	4	4	6	30	120	150
	Research								
	Major CT3 *(0+12 Credits)*	ELE822JP	Research Project	0	24	12	60	240	300
9	Major CT3 *(3+1 Credits)*	ELE922J1	Physics of Semiconductor Devices	3	2	4	20	80	100
	Major CT3 *(3+1 Credits)*	ELE922J2	Digital Signal Processing	3	2	4	20	80	100
	Major CT3 *(3+1 Credits)*	ELE922J3	Mobile Communication and Networks	3	2	4	20	80	100
	Major CT3 *(2+2 Credits)*	ELE922J4	Industrial Training and Seminar Work	2	4	4	20	80	100
	Specialization S1 (Elective E1)								
	Major CT3 *(4+2 Credits)*	ELE922J5E1	Neuromorphic Computing	4	4	6	30	120	150
		ELE922J5E2	Embedded System Design with ARM Cortex Microcontrollers	4	4	6	30	120	150
		ELE922J5E3	Digital Image Processing	4	4	6	30	120	150
		ELE922J5E4	Computational Intelligence and Wireless Communications	4	4	6	30	120	150
10	Major CT3 *(3+1 Credits)*	ELE1022J1	Digital and Analog IC Design	3	2	4	20	80	100
	Specialization S2 (Elective E2)								
	Major CT3 *(4+2 Credits)*	ELE1022J2E1	Nanoelectronics	4	4	6	30	120	150
		ELE1022J2E2	Cyber Security, Cryptography, and the Internet of Things	4	4	6	30	120	150
		ELE1022J2E3	Multimedia Signal Coding and Communication	4	4	6	30	120	150

Semester	Course Type & Credits	Course Code	Course Title	Hours		Credits	Marks		
				Theory	Lab		Internal	End Term	Total
		ELE1022J2E4	Wearable Electronics and Antennas	4	4	6	30	120	150
	Major CT3 *(0+12Credits)*	ELE922JP3	Research Project/Internship	0	24	12	60	240	300

11.3. Minor Courses: 1st to 8th Semesters

Related Discipline Centric Courses (Minor) courses are chosen from any other discipline/subject, intending to seek exposure beyond Electronics subject courses. Ordinarily, all minor courses shall be offered by the related department. In the absence of a university department offering Minor Courses, the Department shall float minor courses/make appropriate arrangements to make these courses available to the students from either Information Technology or Artificial Intelligence Subject. Also, the students can take permissible minor credits from other universities or institutions or online as permitted under NEP2020.

Semester	Course Type & Credits	Course Code	Course Title	Hours		Credits	Marks		
				Theory	Lab		Internal	End Term	Total
Option 1 (Artificial Intelligence Minor)									
1	Minor *(4+2 Credits)*	AI122N	Computing and Information Technology	4	4	6	30	120	150
2	Minor *(4+2 Credits)*	AI222N	Introduction to Artificial Intelligence	4	4	6	30	120	150
3	Minor *(4+2 Credits)*	AI322N	Programming Through Python Language	4	4	6	30	120	150
4	Minor *(3+1 Credits)*	AI422N	Applied Statistics and Data Science	3	2	4	20	80	100
5	Minor *(3+1 Credits)*	AI522N	Machine Learning	3	2	4	20	80	100
6	Minor *(3+1 Credits)*	AI622N	Artificial Intelligence	3	2	4	20	80	100
7	Minor *(3+1 Credits)*	AI722N	Neural Networks and Deep Learning	3	2	4	20	80	100
8	Minor *(3+1 Credits)*	AI822N	Applications of AI	3	2	4	20	80	100
Option 2 (Information Technology Minor)									
1	Minor *(4+2 Credits)*	IT122N	Basics of Information Technology	4	4	6	30	120	150
2	Minor *(4+2 Credits)*	IT222N	Programming Through C Language	4	4	6	30	120	150
3	Minor *(4+2 Credits)*	IT322N	Understanding OOPs Through Java	4	4	6	30	120	150

4	Minor *(3+1 Credits)*	IT422N	Database Management Systems	3	2	4	20	80	100
5	Minor *(3+1 Credits)*	IT522N	Operating Systems	3	2	4	20	80	100
6	Minor *(3+1 Credits)*	IT622N	Data Communications and Networking	3	2	4	20	80	100
7	Minor *(3+1 Credits)*	IT722N	Front End Web Development	3	2	4	20	80	100
8	Minor *(3+1 Credits)*	IT822N	Cloud Technologies	3	2	4	20	80	100

Note: These courses shall be modified/revised with the revision/availability as per the four-year BSc programme offered in their respective majors.

11.4. Multi-Disciplinary Courses: 1st to 3rd Semesters

Multi-disciplinary Courses are courses from disciplines other than Electronics or the related discipline (Minor) to acquire knowledge in various other fields. Those courses can be chosen if a student has neither studied at the +2 level nor has taken any of these subjects as a major or minor in the programme. Ordinarily, all Multi-disciplinary Courses shall be offered by the other Departments/Institutions of the University. In the absence of a university department offering Multi-disciplinary Courses, the Department shall float/make appropriate arrangements to make the following multi-disciplinary courses available to the students. Also, the students can opt for permissible minor credits from other universities or institutions or online as permitted under NEP2020.

Semester	Course Type & Credits	Course Code	Course Title	Hours		Credits	Marks		
				Theory	Lab		Internal	End Term	Total
1	Multidisciplinary *(3 Credits)*	GIF0221	Geoinformatics 2022	3	0	3	15	60	75
2	Multidisciplinary *(3 Credits)*	BIM022I	Bioinformatics: Foundations in Cell Biology for Bioinformatics (2022)	3	0	3	15	60	75
3	Multidisciplinary *(3 Credits)*	BTG022I	Bio-Technology	3	0	3	15	60	75
4	Multidisciplinary *(3 Credits)*	NTY0221	Nanotechnology	3	0	3	15	60	75

Note: The syllabus for these courses shall be the same as the one notified for the respective course under FYIMP by the University. The course list shall be updated with the introduction/availability of new courses in the multi-disciplinary basket.

11.5. Ability Enhancement Courses (AECs): 1st to 3rd Semesters

Ability Enhancement Courses help students enhance their communication, language, and personality skills. They also promote a deeper understanding of subjects like social sciences and ethics, culture and human behaviour, and human rights and law. Ordinarily, university departments offer Ability Enhancement

Courses. In the absence of a university department offering Ability Enhancement Courses, the Department shall float these courses/make appropriate arrangements to make these courses available to the students. Also, the students can opt for permissible minor credits from other universities or institutions or online as permitted under NEP2020. Every student must study one of the three courses in each of the 1st three Semesters so that every student studies all three courses.

Semester	Course Type & Credits	Course Code	Course Title	Hours		Credits	Marks		
				Theory	Lab		Internal	End Term	Total
1	AECs *(3 Credits)*	CNS022A (Comm. Skill/ Eng Lang)	COMMUNICATION SKILL (2022)	3	0	3	15	60	75
2	AECs *(3 Credits)*	ENL022A (Eng Lang / Comm. Skill)	ENGLISH LANGUAGE (2022)	3	0	3	15	60	75
3	AECs *(3 Credits)*	PRM022A (MIL)	PERSIAN LANGUAGE (2022)	3	0	3	15	60	75

Note: The syllabus for these courses shall be the same as the one notified for the respective course under FYIMP by the University. The list is based on current availability. The course list shall be updated with the introduction/availability of new courses in the multi-disciplinary basket.

11.6. Value Added Courses (VACs): 1st to 3rd Semesters

Value-added courses are designed to enhance the standard of the learners beyond those levels specified in major or related disciplines. These courses are intended to enhance employability opportunities for the learners. Ordinarily, these courses shall be offered by other university departments. The department will offer these courses if no other University department offers these courses. Every student shall have to study two of the four courses in each of the first two semesters so that every student can study all four courses in the first two semesters.

Semester	Course Type & Credits	Course Code	Course Title	Hours		Credits	Marks		
				Theory	Lab		Internal	End Term	Total
1	VACs *(2 Credits)*	ESE022V	ENVIRONMENTAL SCIENCE EDUCATION (2022)	2	0	2	10	40	50
	VACs *(2 Credits)*	HYS022V	HEALTH AND WELLNESS (2022)	2	0	2	10	40	50
2	VACs *(2 Credits)*	DTS022V	DIGITAL AND TECHNOLOGICAL SOLUTIONS (2022)	2	0	2	10	40	50
	VACs *(2 Credits)*	UIN022V	UNDERSTANDING INDIA (2022)	2	0	2	10	40	50

Note: The syllabus for these courses shall be the same as notified for the respective course under FYIMP by the University. The list is based on current availability. The course

list shall be updated with the introduction/availability of new courses in the Value-Added Course basket.

11.7. Skill Enhancement Courses (SECs): 1st to 3rd Semesters

Skill Enhancement Courses provide the opportunity and knowledge to develop and strengthen the necessary skills to gain, maintain, and advance in a chosen area. The conditions to opt for these courses in the first three semesters shall be that no course will be repeated and the student should have neither studied any of the opted courses (subjects) under this category at the +2 level nor has s/he taken any of these subjects as a major or minor at the undergraduate level. These courses are preferably aligned to major or minor subjects. Students can choose these courses from either parent or related departments. The department will offer the following courses to the enrolled students and students of allied departments.

Semester	Course Type & Credits	Course Code	Course Title	Hours		Credits	Marks		
				Theory	Lab		Internal	End Term	Total
1	SECs *(2+2 Credits)*	CEL122S	CONSUMER ELECTRONICS (HOME APPLIANCES) (2022)	2	4	4	20	80	100
2	SECs *(2+2 Credits)*	CEL222S	CONSUMER ELECTRONICS (OFFICE APPLIANCE) (2022)	2	4	4	20	80	100
3	SECs *(2+2 Credits)*	CEL322S	CONSUMER ELECTRONICS (COMMUNICATION APPLIANCES) (2022)	2	4	4	20	80	100

Note: The syllabus for these courses shall be the same as notified for the respective course under FYIMP by the University. The list is based on current availability. The course list shall be updated with the introduction/availability of new courses in the Skill Enhancement Course basket.

11.8. Minor Courses for ALLIED DEPARTMENTS: 1st to 8th Semesters

The department will offer the following minor courses to the Five-Year Master's Degree students of other allied departments of the University.

Semester	Course Type & Credits	Course Code	Course Title	Hours		Credits	Marks		
				Theory	Lab		Internal	End Term	Total
1	Minor *(4+2 Credits)*	ELE122J	Analog Electronics	4	4	6	30	120	150
2	Minor *(4+2 Credits)*	ELE222J	Digital Integrated Electronics	4	4	6	30	120	150
3	Minor *(4+2 Credits)*	ELE322J	Microprocessors & Microcontrollers	4	4	6	30	120	150
4	Minor *(3+1 Credits)*	ELE422J1	Communication Electronics	3	2	4	20	80	100

5	Minor *(3+1 Credits)*	ELE522J1	Advanced Microprocessors and Microcontrollers	3	2	4	20	80	100
6	Minor *(3+1 Credits)*	ELE622J1	Embedded Systems and Internet of Things	3	2	4	20	80	100
7	Minor *(3+1 Credits)*	ELE722J1	Embedded System Design with ARM Cortex Microcontrollers	3	2	4	20	80	100
8	Minor *(3+1 Credits)*	ELE822J1	Cyber Security, Cryptography, and the Internet of Things	3	2	4	20	80	100

The course structure and list shall be updated by introducing new five-year Integrated Master's programmes at the university.

11.9. Multi-Disciplinary Courses for OTHER DEPARTMENTS: 1st to 3rd Semesters

The department will offer the following multi-disciplinary courses to students from other university departments. The conditions to opt for these courses in the first three semesters shall be that no course will be repeated and the student should have neither studied any of the opted courses (subjects) under this category at the +2 level nor has s/he taken any of these subjects as a major or minor at the undergraduate level.

Semester	Course Type & Credits	Course Code	Course Title	Hours		Credits	Marks		
				Theory	Lab		Internal	End Term	Total
1, 2 & 3	Multidisciplinary *(3 Credits)*	EEM022I	INTRODUCTION TO ELECTRONICS(2022)	3	0	3	15	60	75
1, 2 & 3	Multidisciplinary *(3 Credits)*	ELT022I	ELECTRONICS(2022)	3	0	3	15	60	75

Note: The syllabus for these courses shall be the same as notified for the respective course under FYIMP by the University. The list is based on current availability. The course list shall be updated with the introduction/availability of new courses in the multi-disciplinary basket.

If required, the Department may appoint guest faculty/visiting faculty/contractual faculty to offer a course in minor discipline, multi-disciplinary courses, Ability Enhancement Courses, or other non-electronics courses.

Further, the students can take permissible credits from other universities or institutions or online as permitted under NEP2020.

12. Format of Question Paper

12.1. Courses with Four (4) Theory Credits, *e.g., 4+2 credit courses*

The question paper shall have to be answered in 3 Hours and shall contain questions across three sections as described below:

Section A: Eight very short answer type questions (two from each unit of the syllabus) will be answered in about 20 words each and carry TWO (2) marks each. i.e. 8×2marks=16 marks. This section shall have no choice.
Section B: Four short answer type questions (one from each unit of the syllabus) are to be answered in about 250 words each and carry EIGHT (8) marks each. i.e. 4×8marks=32 marks. This section shall have no choice.
Section C: Four long answer type questions (one from each unit of the syllabus), out of which two have to be answered in about 500 words each, carrying Twelve (16) marks each. i.e., 2×16=32 marks.
The question paper shall carry a total marks of 80.

12.2. Courses with three (3) Theory Credits (*e.g., 3+1 credit courses)*

The question paper shall have to be answered in 2 Hours and shall contain questions across three sections as described below:
Section A: Six very short answer-type questions (two from each unit of the syllabus) will be answered in about 20 words each and carry TWO (2) marks each. i.e. 6×2marks=12 marks. This section shall have no choice.
Section B: Three short answer type questions (one from each unit of the syllabus) are to be answered in about 250 words each and carry EIGHT (8) marks each. i.e. 3×8marks=24marks. This section shall have no choice.
Section C: Four long answer type questions (at least one from each unit of the syllabus), out of which two have to be answered in about 500 words each and carrying Twelve (12) marks each. i.e. 2×12marks=24 marks.
The question paper shall carry a total marks of 60.

12.3. Courses with two (2) Theory Credits, *e.g., 2+0 credit courses*

The question paper shall have to be answered in 1.5 Hours and shall contain questions across three sections as described below:
Section A: Four very short answer-type questions (two from each unit of the syllabus) will be answered in about 20 words each and carry TWO (2) marks each. i.e., 4×2marks = eight marks. This section shall have no choice.
Section B: Two short answer type questions (one from each unit of the syllabus) are to be answered in about 250 words each and carry EIGHT (8) marks each. i.e. 2×8marks = 16 marks. This section shall have no choice.
Section C: Two long answer type questions (one from each unit of the syllabus), out of which one has to be answered in about 500 words each and carrying Sixteen (16) marks each. i.e., 1×16=16 marks.
The question paper shall carry a total mark of 40.

12.4. Courses with Laboratory Credits

Each laboratory credit shall be examined for 30 minutes of experimental work and an additional 15 minutes of viva voce examination about the course, assigned experiment, or both. Each laboratory credit has an end-term weightage of 20 Marks.

12.5. Project/Research Project and Internship

A thesis committee comprising the head of the Department, external expert, supervisor (assigned to each project student), and at least two more faculty members will serve as thesis and oral examiners for each student pursuing the thesis. A soft copy of the thesis in PDF format (in a specific style) should be sent to the thesis committee before its final submission. The Thesis committee shall examine it for suitability of publication (including any possible plagiarism) before the thesis goes into print and for binding. Any publication must be the sole work of the student and shall be adequately awarded, but it shall not be a compulsory requirement for the thesis submission. Further, the student should produce a presentation certificate for conference publication to the thesis committee.

The head of the Department and counselor (assigned to each internship student) will collect mid-term feedback to ensure smooth progress toward the completion of an internship. A certificate (satisfactory/unsatisfactory) and marks from the concerned person of the organization shall be collected by the head of the Department. An Internship committee comprising the Head of the Department, an External Expert, a counselor, and two department faculty members shall collect the report from the student, evaluate it, and conduct a viva voce examination. The certificate from the organization where the internship was carried out will be considered. If the certificate is unsatisfactory, the Internship committee will review the matter. If they agree with the given certificate, the student must continue the internship at the same or different place.

13. Removal of Difficulties

If any difficulty arises in giving effect to the provisions of these regulations after commencement or otherwise, the University may submit proposed provisions/ regulations as appear to it necessary or expedient for removing difficulties to the competent authority and/or Bodies for approval in anticipation or ratification depending upon the exigency of the situation as the case may be.

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