

Academic Regulations Program Structure and Detailed Syllabus

Master of Technology in Power Electronics

(Two Year Regular Programme)

(Applicable for Batches admitted from 2022)



**GOKARAJU RANGARAJU
INSTITUTE OF ENGINEERING AND TECHNOLOGY**

(Autonomous)

Bachupally, Kukatpally, Hyderabad- 500 090

**GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY
HYDERABAD**

**Academic Regulations for M.Tech. (Regular) under GR22
(Applicable for Batches Admitted from 2022-23)**

Post Graduate Degree Programme in Engineering and Technology (PG)

Gokaraju Rangaraju Institute of Engineering & Technology (GRIET) offers a 2-year (4 Semesters) Master of Technology (M.Tech.) degree programme. The following programmes are offered in GRIET.

S.No	Department	Programme Code	Programme
1	Civil Engineering	20	M.Tech. Structural Engineering
2	Electrical and Electronics Engineering	43	M.Tech. Power Electronics
3	Mechanical Engineering	52	M.Tech. Design for Manufacturing
4	Electronics and Communication Engineering	57	M.Tech. VLSI
5	Computer Science and Engineering	58	M.Tech. Computer Science and Engineering
6	Information Technology	B0	M.Tech. Data Science

GR22 Regulations shall govern the above programmes offered by the Departments with effect from the students admitted to the programmes in 2022-23 academic year is given below

- 1. Medium of Instruction:** The medium of instruction (including examinations and reports) is English.
- 2. Admission:** Admission into the M.Tech. Programme in any discipline shall be made subject to the eligibility and qualifications prescribed by the University from time to time. Admissions shall be made either on the basis of the merit rank obtained by the student in GATE, PG CET conducted by the APS CHE for M.Tech. Programmes or on the basis of any other order of merit approved by the University, subject to reservations as prescribed by the Government from time to time.
- 3. Programme Pattern:**
 - a) Each Academic year of study is divided into two semesters.
 - b) Minimum number of instruction days in each semester is 90.

- c) The total credits for the Programme are 68.
- d) Grade points, based on percentage of marks awarded for each course will form the basis for calculation of SGPA (Semester Grade Point Average) and CGPA (Cumulative Grade Point Average).
- e) A student has a choice of registering for credits from the courses offered in the programme.
- f) All the registered credits will be considered for the calculation of final CGPA.
- g) Each Semester shall have 'Continuous Internal Evaluation (CIE)' and 'Semester End Examination (SEE)'. Choice Based Credit System (CBCS) and Credit Based Semester System (CBSS) are taken as 'references' for the present set of Regulations. The terms 'SUBJECT' and 'COURSE' imply the same meaning here and refer to 'Theory Subject', or 'Lab Course', or 'Design/Drawing Subject', or 'Mini Project with Seminar', or 'Dissertation', as the case may be.
- h) Course Classification:** All courses offered for all undergraduate programmes in M.Tech. degree programmes are broadly classified as follows.

S. No.	Broad Course Classification	Course Group/ Category	Course Description
1	PC	Professional Core	Includes Core Courses related to the parent discipline/department/ branch of Engineering
2	PE	Professional Elective	Includes Elective Courses related to the parent discipline/ department/ branch of Engineering
3	OE	Open Elective	Elective Courses from other technical and/or emerging subjects
4	Audit	Audit Courses	Mandatory non creditable courses
5	PW	Project Work/Dissertation	Mini Project work, Dissertation Phase-I, II.

4. Award of M.Tech. Degree: A student will be declared eligible for the award of the M.Tech. Degree if he/she fulfills the following academic requirements:

- a) A student shall be declared eligible for the award of M.Tech. degree, if he/she pursues the course of study and completes it successfully in not less than two academic years and not more than four academic years.
- b) A Student, who fails to fulfill all the academic requirements for the award of the degree within four academic years from the date of admission, shall forfeit his/her seat in M.Tech. programme.
- c) The Degree of M.Tech. shall be conferred by Jawaharlal Nehru Technological University Hyderabad (JNTUH), Hyderabad, on the students who are admitted to the programme and fulfilled all the requirements for the award of the degree.

5. Attendance Requirements

- a) A student shall be eligible to appear for the semester end examinations if he/she puts in a minimum of 75% of attendance in each course concerned in the semester.
- b) Condonation of shortage of attendance up to 10% (65% and above and below 75%) in a semester may be granted. A committee headed by Dean (Academic Affairs) shall be the deciding authority for granting the condonation.
- c) Students who have been granted condonation shall pay a fee as decided by the Academic Council.
- d) Students whose attendance is less than 65% in any course are detained and are not eligible to take their end examination of that course. They may seek re-registration for that course when offered next with the academic regulations of the batch into which he/she gets re-registered.
- e) A student shall put in a minimum required attendance in at least three theory subjects (excluding audit (non-credit course) in first Year I semester for promotion to first Year II Semester.
- f) A student shall put in a minimum required attendance in at least three theory subjects (excluding audit (non-credit course) in first Year II semester for promotion to second Year I Semester.

6. Paper Setting, Evaluation of Answer Scripts, Marks and Assessment

- a) Paper setting and Evaluation of the Answer Scripts shall be done as per the procedures laid down by the Academic Council of the College from time to time.
- b) The following is the division of marks between internal and external evaluations.

S. No	Components	Internal Evaluation	External Evaluation	Total
1	Theory	40	60	100
2	Practical	40	60	100
3	Mini Project	100	--	100
4	Dissertation	50	50	100

- c) **Continuous Internal Evaluation and Semester End Examinations:** The assessment of the student's performance in each course will be based on Continuous Internal Evaluation (CIE) and Semester-End Examination (SEE). The marks for each of the component of assessment are fixed as shown in the following Table.

Assessment Procedure

S. No	Component of Assessment	Marks Allotted	Type of Assessment	Scheme of Examinations
1	Theory	40	Internal Examination & Continuous Evaluation	<p>1) Two mid semester examination shall be conducted for 30 marks each for a duration of 120 minutes. Average of the two mid exams shall be considered</p> <p>i) Subjective – 20 marks ii) Objective – 10 marks</p> <p>2) Continuous Evaluation is by conducting Assignments and Quiz exams at the end of each unit</p> <p>i) Assignment – 5 marks ii) Quiz/Subject Viva-voce/PPT/Poster Presentation/ Case Study on a topic in the concerned subject – 5 marks</p>
		60	Semester end examination	The semester-end examination is for a duration of 3 hours
2	Practical	40	Internal Examination & Continuous Evaluation	<p>One internal lab examination towards the end of course for a duration of 90 minutes with a viva of 5 minutes.</p> <p>i) Internal Exam-10 marks ii) Viva voce – 10 marks iii) Continuous Assessment- 10 marks iv) G-Lab on Board(G-LOB) (Case study inter threading of all experiments of lab)/ Laboratory Project/Prototype Presentation/App Development - 10 marks</p>
		60	Semester end examination	<p>The semester-end examination is for a duration of 3 hours.</p> <p>i) write-up (algorithm/flowchart/procedure) as per the task/experiment/program - 10 marks ii) task/experiment/program-15 marks iii) evaluation of results -15 marks iv) write-up (algorithm/flowchart/procedure) for another task/experiment/program- 10 marks v) viva-voce on concerned laboratory course - 10 marks</p>

d) Project Review Committee: For approval and evaluating mini project, Dissertation-I and Dissertation-II, a Project Review Committee (PRC) will be constituted by the Head of the Department. The composition of PRC is as follows

- i) Head of the Department
- ii) One senior faculty relevant to the specialization
- iii) Coordinator of the specialization.

e) Mini Project: The Mini Project is to be taken up with relevance to Industry and is evaluated for 100 marks. Student shall carryout the mini project in consultation with the mini project supervisor. The Project Review Committee (PRC) along with supervisor will review the progress of the mini project during the internal evaluation for 50 marks. Mini Project Viva Voce will be evaluated by the PRC for another 50 marks before the semester end examinations. The student must secure a minimum of 50% of marks in i) internal evaluation and ii) mini project viva voce, to be declared successful. If he fails to obtain the minimum marks, he/she must reappear for the same as and when scheduled.

Internal Evaluation: Tentative presentation dates and marks distribution of the mini project.

S.No	Date	Review	Marks
Internal Marks (50)			
1	First week of the semester	Abstract submission*	10
2	Fourth week of the semester	First Review	10
2	Mid of the semester	Second Review	10
3	Last week of the semester	Last Review	20

Following are the guidelines for the abstract submission

The faculty are requested to check the document submitted in the first review and should contain following:

1. Title of the project and Literature review.
2. Schematic/Block diagram which gives the broad idea of the entire project.
3. Timeline or milestone of the project. It should clearly indicate deliverables/outcomes of the project.
4. Components required with approximate cost.
5. References.
6. Plagiarism check is compulsory for mini project report as per the plagiarism policy of GRIET.

External Evaluation: (50 Marks) The mini project report is presented before PRC along with the supervisor.

Guidelines to award 50 marks:

S. No	Date	Review/ PRC report	Marks
External Evaluation Marks (50)			
1	Last week of the semester	Final Presentation and report Submission	10
2	Project report: Project report should be written as per IEEE guidelines.	Verified by PRC	10
3	Project Deliverables <ul style="list-style-type: none"> • Hardware prototype • Simulation in any authorized software • Submission of research articles in any Scopus Indexed conference /Journal 	Verified by PRC	20
4	Results and Discussion	Verified by PRC	10

f) Dissertation (Phase I & Phase II): Every candidate shall be required to submit a dissertation on a topic approved by the Project Review Committee (PRC).

- The candidate must present in **Dissertation Work Review - I**, in consultation with his/her Dissertation Supervisor, the title, objective and plan of action of his/her Dissertation work to the PRC for approval *within four weeks* from the commencement of **Second year First Semester**. Only after obtaining the approval of the PRC can the student initiate the Dissertation work.
- If a candidate wishes to change his/her supervisor or topic of the Dissertation, he/she can do so with the approval of the PRC. However, the PRC shall examine whether or not the change of topic/supervisor leads to a major change of his/her initial plans of Dissertation proposal. If yes, his/her date of registration for the project work starts from the date of change of Supervisor or topic as the case may be.
- The candidate shall submit his/her Dissertation progress report in two stages at least with a gap of **three** months between them.
- The work on the Dissertation shall be initiated at the beginning of the II year and the duration of the Dissertation is two semesters. A candidate is permitted to submit Dissertation Thesis only after successful completion of all theory and practical courses with the approval of PRC *not earlier than 40 weeks* from the date of approval of the Dissertation work. For the approval of PRC, the candidate shall submit the draft copy of thesis to the Head of the Department and make an oral presentation before the PRC.
- **The Dissertation Work Review - II** in II Year I Semester carries 100 internal marks. Evaluation should be done by the PRC for 50 marks and the Supervisor will evaluate the work for the other 50 marks. The Supervisor and DRC will examine the Problem Definition, Objectives, Scope of Work, Literature Survey in the same domain and progress of the Dissertation Work. A candidate must secure a minimum of 50% of marks to be declared successful in Dissertation Work Review - II. If he/she fails to obtain the minimum required marks, he has to reappear for Dissertation Work Review - II as and when conducted.

- **The Dissertation Work Review - III** in II Year II Sem. carries 100 internal marks. Evaluation should be done by the PRC for 50 marks and the Supervisor will evaluate it for the other 50 marks. The PRC will examine the overall progress of the Dissertation Work and decide whether the Dissertation is eligible for final submission. A candidate must secure a minimum of 50% of marks to be declared successful in Dissertation Work Review - III. If he/she fails to obtain the required minimum marks, he/she must reappear for Dissertation Work Review - III as and when conducted. For Dissertation Evaluation (Viva Voce) in II Year II Semester there are external marks of 100 and it is evaluated by the external examiner. The candidate must secure a minimum of 50% marks in Dissertation Evaluation (Viva- Voce) examination.
 - Dissertation Work Reviews - II and III shall be conducted in Phase I (Regular) and Phase II (Supplementary). Phase II will be conducted only for unsuccessful students in Phase I. The unsuccessful students in Dissertation Work Review - II (Phase II) shall reappear for it at the time of Dissertation Work Review - III (Phase I). These students shall reappear for Dissertation Work Review- III in the next academic year at the time of Dissertation Work Review - II only after completion of Dissertation Work Review - II, and then Dissertation Work Review - III follows. The unsuccessful students in Dissertation Work Review - III (Phase II) shall reappear for Dissertation Work Review – III in the next academic year only at the time of Dissertation Work Review - II (Phase I).
 - A student shall present the progress of the dissertation through Dissertation Reviews II and III with at least a gap of three months between the reviews.
 - After approval from the DRC, a soft copy of the thesis should be submitted for ANTI-PLAGIARISM Check from the approved agency with a similarity index not more than 24% and the plagiarism report and be included in the final thesis. If the similarity index has more than the required percentage, the student is advised to modify accordingly and resubmit the soft copy of the thesis after one month. The maximum number of re-submissions of thesis after plagiarism check is limited to **TWO**. The candidate must register for the Dissertation work and work for two semesters. After three attempts, the admission is liable to be cancelled.
 - Three copies of the Dissertation Thesis certified by the supervisor shall be submitted to the Institute, after submission of a research paper related to the Dissertation work in a SCOPUS/Web of Science/UGC approved journal. A copy of the submitted research paper shall be attached to thesis.
 - The thesis shall be adjudicated by an external examiner selected by the University. For this, the Principal of the Institute shall submit a panel of **three** examiners from among the list of experts in the relevant specialization as submitted by the supervisor concerned and Head of the Department.
 - If the report of the external examiner is unsatisfactory, the candidate shall revise and resubmit the Thesis. If the report of the examiner is unsatisfactory again, the thesis shall be summarily rejected. Subsequent actions for such dissertations may be considered, only on the specific recommendations of the external examiner and /or Dissertation Review Committee. No further correspondence in this matter will be entertained if there is no specific recommendation for resubmission.
 - If the report of the examiner is satisfactory, the Head of the Department shall coordinate and decide for the conduct of Dissertation Viva-Voce examination. The Dissertation Viva-Voce examination shall be conducted by a board consisting of the Supervisor, Head of the Department and the external examiner who adjudicated the Thesis. The candidate must secure a minimum of 50% of marks in Dissertation Evaluation (Viva-Voce) examination.
 - If he/she fails to fulfill the requirements of minimum 50% of marks, he/she will reappear for the Dissertation Viva-Voce examination **only after three months**. In the reappeared examination also, if he/she fails to fulfill the requirements, he/she will not be eligible for the award of the degree, unless he/she is asked to revise and resubmit his/her Dissertation Work by the board within a specified time period (within **four** years from the date of commencement of his/her first year first semester).
- 7. Recounting of Marks in the End Examination Answer Books:** A student can request for re-counting of his/her answer book on payment of a prescribed fee.

8. **Re-evaluation of the End Examination Answer Books:** A student can request for re-evaluation of his/her answer book on payment of a prescribed fee.
9. **Supplementary Examinations:** A student who has failed in an end semester examination can appear for a supplementary examination, as per the schedule announced by the College/Institute.
10. **Malpractices in Examinations:** Disciplinary action shall be taken in case of malpractice during Mid/ End-examinations as per the rules framed by the Academic Council.

11. Academic Requirements:

- a) A student shall be deemed to have secured the minimum academic requirement in a subject if he / she secures a minimum of 40% of marks (i.e.,16 marks out of 40 marks) in CIE, 40% of marks (i.e.,24 marks out of 60 marks) in SEE and a minimum aggregate of 50%(i.e.,50 marks out of 100 marks) of the total marks in the Semester-end examination (SEE) and Internal Evaluation (CIE) taken together.
The student is eligible to write Semester End Examination of the concerned subject, if the student scores \geq 40% (16 marks) of 40 Continuous Internal Examination (CIE) marks.
In case, the student appears for Semester End Examination (SEE) of the concerned subject but not scored minimum 40% of CIE marks (16 marks out of 40 internal marks), his performance in that subject in SEE shall stand cancelled inspite of appearing the SEE.
- b) A student shall be promoted to the next semester only when he/she satisfies the requirements of all the previous semesters.
- c) In order to qualify for the award of M.Tech. Degree, the student shall complete the academic requirements of passing in all the Courses as per the course structure including Seminars and Project if any.
- d) In case a student does not secure the minimum academic requirement in any course, he/she has to reappear for the Semester-end Examination in the course, or re-register for the same course when next offered or re-register for any other specified course, as may be required. However, one more additional chance may be provided for each student, for improving the internal marks provided the internal marks secured by a student are less than 50% and he/she failed finally in the course concerned. In the event of taking another chance for re-registration, the internal marks obtained in the previous attempt are nullified. In case of re-registration, the student has to pay the re-registration fee for each course, as specified by the Dean Admissions of College.
- e) **Grade Points: A 10- point grading system with corresponding letter grades and percentage of marks, as given below, is followed:**

Letter Grade	Grade Points	Percentage of marks
O (Outstanding)	10	Marks \geq 90
A+ (Excellent)	9	Marks \geq 80 and Marks < 90
A (Very Good)	8	Marks \geq 70 and Marks < 80
B+ (Good)	7	Marks \geq 60 and Marks < 70
B (Above Average)	6	Marks \geq 50 and Marks < 60
F (Fail)	0	Marks < 50
Ab (Absent)	0	

Earning of Credit:

A student shall be considered to have completed a course successfully and earned the credits if he/she secures an acceptable letter grade in the range O-B. Letter grade 'F' in any Course implies failure of the student in that course and no credits earned.

Computation of SGPA and CGPA:

The UGC recommends the following procedure to compute the Semester Grade Point Average (SGPA) and Cumulative Grade Point Average (CGPA):

- i) S_k the SGPA of k^{th} semester (1 to 4) is the ratio of sum of the product of the number of credits and grade points to the total credits of all courses registered by a student, i.e.,

$$SGPA (S_k) = \frac{\sum_{i=1}^n (C_i * G_i)}{\sum_{i=1}^n C_i}$$

Where C_i is the number of credits of the i^{th} course and G_i is the grade point scored by the student in the i^{th} course and n is the number of courses registered in that semester.

- ii) The CGPA is calculated in the same manner taking into account all the courses m , registered by a student over all the semesters of a programme, i.e., upto and inclusive of S_k , where $k \geq 2$.

$$CGPA = \frac{\sum_{i=1}^m (C_i * G_i)}{\sum_{i=1}^m C_i}$$

- iii) The SGPA and CGPA shall be rounded off to 2 decimal points.

12. **Award of Class:** After a student satisfies all the requirements prescribed for the completion of the Degree and becomes eligible for the award of M.Tech. Degree by JNTUH, he/she shall be placed in one of the following four classes:

S. No	Class Awarded	CGPA Secured
1	First Class with Distinction	$CGPA \geq 7.75$
2	First Class	$CGPA \geq 6.75$ and $CGPA < 7.75$
3	Second Class	$CGPA \geq 6.00$ and $CGPA < 6.75$

Equivalence of grade to marks

$$\text{Marks \%} = (CGPA - 0.75) * 100$$

13. **Withholding of Results:** If the student has not paid dues to the Institute/ University, or if any case of indiscipline is pending against him, the result of the student (for that Semester) may be withheld and he will not be allowed to go into the next Semester. The award or issue of the Degree may also be withheld in such cases.

14. **Re-Admission/Re-Registration (Re-Admission for Discontinued Student)**

- A student, who has discontinued the M. Tech. degree programme due to any reason whatsoever, may be considered for 'readmission' into the same degree programme (with the same specialization) with the academic regulations of the batch into which he gets readmitted, with prior permission from the authorities concerned.
- If a student is detained in a subject (s) due to shortage of attendance in any semester, he/she may be permitted to re-register for the same subject(s) in the same category (core or elective group) or equivalent subject, if the same subject is not available, as suggested by the Board of Studies of that department, as and when offered in the subsequent semester(s), with the academic regulations of the batch into which he/she seeks re-registration, with prior permission from the authorities concerned
- A candidate shall be given only one-time chance to re-register and attend the classes for a maximum of two subjects in a semester, if the internal marks secured by a candidate are less than 40% and failed in those subjects but fulfilled the attendance requirement. A candidate must re-register for failed subjects within four weeks of commencement of the class work, in the next academic year and secure the required minimum

attendance. In the event of the student taking this chance, his Continuous Internal Evaluation (internal) marks and Semester End Examination marks obtained in the previous attempt stand cancelled.

15. Transfer of students from the Constituent Colleges of JNTUH or from other Colleges/Universities:

Transfer of students from the Constituent Colleges of JNTUH or from other Colleges/Universities shall be considered only on case-to-case basis by the Academic Council of the Institute.

16. Transitory Regulations: Students who have discontinued or have been detained for want of attendance, or who have failed after having undergone the PG degree Programme, may be considered eligible for readmission to the same or equivalent subjects as and when they are offered.

17. General Rules

- a) The academic regulations should be read as a whole for the purpose of any interpretation.
- b) In the case of any doubt or ambiguity in the interpretation of the above rules, the decision of the Academic Council is final.
- c) In case of any error in the above rules and regulations, the decision of the Academic Council is final.
- d) The college may change or amend the academic regulations or syllabi at any time and the changes or amendments made shall be applicable to all the students with effect from the dates notified by the college.

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Bachupally, Kukatpally, Hyderabad-500090, India

Power Electronics

M. Tech (PE) GR22 Course Structure

I YEAR - I SEMESTER

S. No.	Group	Course Code	Subject	Credits			Total Credits	Hours			Total Hours	Int. Marks	Ext. Marks	Total Marks
				L	T	P		L	T	P				
1	PC	GR22D5025	Modelling and Analysis of Electrical Machines	3	0	0	3	3	0	0	3	40	60	100
2	PC	GR22D5026	Modelling and Simulation of Power Electronic Converters	3	0	0	3	3	0	0	3	40	60	100
3	PE I	GR22D5027	Power Quality & FACTS	3	0	0	3	3	0	0	3	40	60	100
		GR22D5028	Switched Mode Power Supplies											
		GR22D5029	Optimal and Adaptive Control											
4	PE II	GR22D5030	High Voltage DC Transmission	3	0	0	3	3	0	0	3	40	60	100
		GR22D5031	PWM Techniques for Power Electronic Converters											
		GR22D5032	Electric and Hybrid Vehicles											
5	PC	GR22D5033	Power Quality Lab	0	0	2	2	0	0	4	4	40	60	100
6	PC	GR22D5034	Power Electronics Lab	0	0	2	2	0	0	4	4	40	60	100
7	PC	GR22D5011	Research Methodology and IPR	2	0	0	2	2	0	0	2	40	60	100
Total				14	0	4	18	14	0	8	22	280	420	700
8	AC		Audit Course I	0	0	0	0	2	0	0	2	40	60	100

I YEAR - II SEMESTER

S. No	Group	Course Code	Subject	Credits			Total Credit	Hours			Total Hours	Int. Marks	Ext. Marks	Total Marks
				L	T	P		L	T	P				
1	PC	GR22D5035	Electric Drives System	3	0	0	3	3	0	0	3	40	60	100
2	PC	GR22D5036	Modern and Digital Control of Power Electronic and Drive Systems	3	0	0	3	3	0	0	3	40	60	100
3	PE III	GR22D5037	Advanced Power Electronic Converters	3	0	0	3	3	0	0	3	40	60	100
		GR22D5038	Dynamics of Electrical Machines											
		GR22D5039	DSP based Control of Power Electronic Converters											
4	PE IV	GR22D5040	AI and Machine Learning Techniques for Power Electronic Applications	3	0	0	3	3	0	0	3	40	60	100
		GR22D5041	Wide Bandgap Power Devices											
		GR22D5042	Distributed Generation & Smart Grids											
5	PC	GR22D5043	Electrical Drives Lab	0	0	2	2	0	0	4	4	40	60	100
6	PC	GR22D5044	DSP and Microcontroller Lab	0	0	2	2	0	0	4	4	40	60	100
7	PW	GR22D5144	Mini Project	2	0	0	2	0	0	2	2	50	50	100
Total				14	0	4	18	12	0	10	22	280	420	700
8	AC		Audit Course II	0	0	0	0	2	0	0	2	40	60	100

II YEAR - I SEMESTER

S. No	Group	Course Code	Subject	Credits			Total Credits	Hours			Total Hours	Int. Marks	Ext. Marks	Total Marks
				L	T	P		L	T	P				
1	PE V	GR22D5045	Power Electronics for Renewable Energy Systems											
		GR22D5046	Non-Linear Control For Power Electronic Converters	3	0	0	3	3	0	0	3	40	60	100
		GR22D5047	Design and Development of LED Lighting											
2	OE	GR22D5147	Cost Management of Engineering Projects											
		GR22D5148	Industrial Safety											
		GR22D5149	Operations Research											
		GR22D5150	Artificial Neural Networks and Fuzzy Systems	3	0	0	3	3	0	0	3	40	60	100
		GR22D5151	Cyber Security											
		GR22D5152	Internet of Things Architecture and Design Principles											
3	PW	GR22D5145	Dissertation Phase – I	0	0	10	10	0	0	20	20	100		100
Total				6	0	10	16	6	0	20	26	180	120	300

II YEAR - II SEMESTER

S.No	Group	Course Code	Subject	Credits			Total Credits	Hours			Total Hours	Int. Marks	Ext. Marks	Total Marks
				L	T	P		L	T	P				
1	PW	GR22D5146	Dissertation Phase – II	0	0	16	16	0	0	32	32	100	100	200
Total				0	0	16	16	0	0	32	32	100	100	200

Audit Courses I & II

1	GR22D5153	English for Research Paper Writing
2	GR22D5154	Disaster Management
3	GR22D5155	Sanskrit for Technical Knowledge
4	GR22D5156	Value Education
5	GR22D5157	Indian Constitution
6	GR22D5158	Pedagogy Studies
7	GR22D5159	Stress Management by Yoga
8	GR22D5160	Personality Development through Life Enlightenment Skills