## **Course Structure**

for

## 2-Years M.Tech. in Electrical Engineering (Control, Power and Electric Drives)

Effective from 2019-2020 Academic Session



Department of Electrical and Electronics Engineering
National Institute of Technology Sikkim
South Sikkim - 737 139

Theory Subjects   Theory Subject	Sl. No.	Subject Code	Subject	L-T-P	Credit(s)			
Total Credits   Power System Analysis and Operation   3-0-0   3								
Total Credits   Power System Analysis and Operation   3-0-0   3								
Second Control Systems   3-0-0   3   4   EE211**   Elective I   3-0-0   3   5   EE211**   Elective II   3-0-0   3   5   EE211**   Elective II   3-0-0   3   5   EE211**   Elective II   3-0-0   3   5   EE21201   Programming Laboratory   0-0-3   2   7   EE21202   Power Systems Laboratory   0-0-3   2   8   EE21203   Power Electronics Laboratory   0-0-3   2   9   EE21204   Control Systems Laboratory   0-0-3   2   2   EE21204   Control Systems Laboratory   0-0-3   2   2   EE21204   EE22101   Power System Stability and Control   3-0-0   3   2   EE22102   Advanced Electric Drives   3-0-0   3   3   EE22103   Intelligent Control Systems   3-0-0   3   3   EE221**   Elective III   3-0-0   3   3   EE221**   Elective IV   3-0-0   3   3   EE22202   Power Systems Laboratory   0-0-3   2   EE22202   Drives Laboratory   0-0-3   2   EE22202   EE22202   Intelligent Control Systems Laboratory   0-0-3   2   EE22204   Laboratory I   0-0-3   2   EE22204   EE22204   EE2204	1	EE21101		3-0-0	3			
Section   Sect	2	EE21102	Advanced Power Electronics	3-0-0	3			
Section   Practical Subjects   Practical Subjects	3	EE21103	Advanced Control Systems	3-0-0	3			
Practical Subjects   G	4	EE211**	Elective I	3-0-0	3			
6         EE21201         Programming Laboratory I         0-0-3         2           7         EE21202         Power Systems Laboratory I         0-0-3         2           8         EE21203         Power Electronics Laboratory         0-0-3         2           Total Credits         15-0-12         23           Zad Semester           Theory Subjects           1         EE22101         Power System Stability and Control         3-0-0         3           2         EE22102         Advanced Electric Drives         3-0-0         3           3         EE22103         Intelligent Control Systems         3-0-0         3           4         EE221**         Elective III         3-0-0         3           Practical Subjects           6         EE22201         Power Systems Laboratory II         0-0-3         2           7         EE22202         Drives Laboratory         0-0-3         2           9         EE22204         Laboratory I         0-0-3         2           9         EE22204         Laboratory I         0-0-3         2           Total Credits         15-0-12         23           Total Cre	5	EE211**	Elective II	3-0-0	3			
Total Credits   Power Systems Laboratory   Pour Systems Laboratory   Pour Systems Laboratory   Pour Systems Laboratory   Power Systems Laboratory   Pour Systems Laboratory   Power Systems Laboratory   Power Systems Stability and Control   Power System Stability and Systems   Power Systems   Power Systems   Power Systems   Power Systems   Power Systems   Power Systems Systems   Power Systems Systems Systems   Power Systems Laboratory   Power	Practical Subjects							
Total Credits   Power Systems Laboratory   Pour Systems Laboratory   Pour Systems Laboratory   Pour Systems Laboratory   Power Systems Laboratory   Pour Systems Laboratory   Power Systems Laboratory   Power Systems Stability and Control   Power System Stability and Systems   Power Systems   Power Systems   Power Systems   Power Systems   Power Systems   Power Systems Systems   Power Systems Systems Systems   Power Systems Laboratory   Power	6	EE21201	Programming Laboratory	0-0-3	2			
B   EE21203   Power Electronics Laboratory   0-0-3   2	7	EE21202		0-0-3	2			
Total Credits   15-0-12   23	8	EE21203	<u> </u>	0-0-3	2			
Theory Subjects   3-0-0   3   2   EE22102   Advanced Electric Drives   3-0-0   3   3   EE22103   Intelligent Control Systems   3-0-0   3   3   4   EE221**   Elective III   3-0-0   3   5   EE221**   Elective IV   3-0-0   3   5   EE221**   Elective IV   3-0-0   3   5   EE221**   Elective IV   3-0-0   3   5   EE22201   Power Systems Laboratory II   0-0-3   2   7   EE22202   Drives Laboratory   0-0-3   2   2   7   EE22202   Drives Laboratory   0-0-3   2   2   2   8   EE22203   Intelligent Control Systems Laboratory   0-0-3   2   2   2   2   2   2   2   2   2	9	EE21204	Control Systems Laboratory	0-0-3	2			
Theory Subjects   1	Total Credits				23			
Total Credits   Dissertation Part II   EE24201   Dissertation Part II   EE24201   Dissertation Part II   Control Systems   Control Syste	2 <sup>nd</sup> Semester							
2       EE22102       Advanced Electric Drives       3-0-0       3         3       EE22103       Intelligent Control Systems       3-0-0       3         4       EE221**       Elective III       3-0-0       3         5       EE221**       Elective IV       3-0-0       3         Practical Subjects         6       EE22201       Power Systems Laboratory II       0-0-3       2         7       EE22202       Drives Laboratory       0-0-3       2         8       EE22203       Intelligent Control Systems Laboratory       0-0-3       2         9       EE22204       Laboratory I       0-0-3       2         Total Credits 15-0-12       23         3rd Semester         1       EE23101       Literature Review and Report Writing       0-0-2       4         2       EE231**       Dissertation Related Tools and Technologies       0-0-2       3         3       EE23201       Dissertation Part I       6         Total Credits       13         4th Semester         1       EE24201       Dissertation Part II       -       16	Theory Subjects							
3	1	EE22101	Power System Stability and Control	3-0-0	3			
A	2	EE22102	Advanced Electric Drives	3-0-0	3			
Fractical Subjects           Practical Subjects           6         EE22201         Power Systems Laboratory II         0-0-3         2           7         EE22202         Drives Laboratory         0-0-3         2           8         EE22203         Intelligent Control Systems Laboratory         0-0-3         2           9         EE22204         Laboratory I         0-0-3         2           Total Credits         15-0-12         23           3rd Semester           1         EE23101         Literature Review and Report Writing         0-0-2         4           2         EE231**         Dissertation Related Tools and Technologies         0-0-2         3           3         EE23201         Dissertation Part I         6           Total Credits          13           4th Semester           1         EE24201         Dissertation Part II         -         16	3	EE22103	Intelligent Control Systems	3-0-0	3			
Practical Subjects           6         EE22201         Power Systems Laboratory II         0-0-3         2           7         EE22202         Drives Laboratory         0-0-3         2           8         EE22203         Intelligent Control Systems Laboratory         0-0-3         2           9         EE22204         Laboratory I         0-0-3         2           Total Credits         15-0-12         23           3rd Semester           1         EE23101         Literature Review and Report Writing         0-0-2         4           2         EE231**         Dissertation Related Tools and Technologies         0-0-2         3           3         EE23201         Dissertation Part I         6           Total Credits          13           4th Semester           1         EE24201         Dissertation Part II         -         16	4	EE221**	Elective III	3-0-0	3			
6         EE22201         Power Systems Laboratory II         0-0-3         2           7         EE22202         Drives Laboratory         0-0-3         2           8         EE22203         Intelligent Control Systems Laboratory         0-0-3         2           9         EE22204         Laboratory I         0-0-3         2           Total Credits         15-0-12         23           3rd Semester           1         EE23101         Literature Review and Report Writing         0-0-2         4           2         EE231**         Dissertation Related Tools and Technologies         0-0-2         3           3         EE23201         Dissertation Part I         6           Total Credits          13           4th Semester           1         EE24201         Dissertation Part II         -         16	5	EE221**	Elective IV	3-0-0	3			
7         EE22202         Drives Laboratory         0-0-3         2           8         EE22203         Intelligent Control Systems Laboratory         0-0-3         2           9         EE22204         Laboratory I         0-0-3         2           Total Credits 15-0-12         23           3rd Semester           1         EE23101         Literature Review and Report Writing         0-0-2         4           2         EE231**         Dissertation Related Tools and Technologies         0-0-2         3           3         EE23201         Dissertation Part I         6           Total Credits         13           4th Semester           1         EE24201         Dissertation Part II         -         16	Practical Subjects							
8         EE22203         Intelligent Control Systems Laboratory         0-0-3         2           Total Credits         15-0-12         23           3rd Semester           1         EE23101         Literature Review and Report Writing         0-0-2         4           2         EE231**         Dissertation Related Tools and Technologies         0-0-2         3           3         EE23201         Dissertation Part I         6           Total Credits          13           4th Semester           1         EE24201         Dissertation Part II         -         16	6	EE22201	Power Systems Laboratory II	0-0-3	2			
9 EE22204 Laboratory I         0-0-3         2           Total Credits         15-0-12         23           3rd Semester           1         EE23101 Literature Review and Report Writing         0-0-2         4           2         EE231** Dissertation Related Tools and Technologies         0-0-2         3           3         EE23201 Dissertation Part I         6           Total Credits          13           4th Semester           1         EE24201 Dissertation Part II         -         16	7	EE22202	Drives Laboratory	0-0-3	2			
Total Credits   15-0-12   23     3 <sup>rd</sup> Semester   1	8	EE22203	Intelligent Control Systems Laboratory	0-0-3	2			
3rd Semester           1         EE23101         Literature Review and Report Writing         0-0-2         4           2         EE231**         Dissertation Related Tools and Technologies         0-0-2         3           3         EE23201         Dissertation Part I         6           Total Credits 13           4th Semester           1         EE24201         Dissertation Part II         -         16	9	EE22204	Laboratory I	0-0-3	2			
1         EE23101         Literature Review and Report Writing         0-0-2         4           2         EE231**         Dissertation Related Tools and Technologies         0-0-2         3           3         EE23201         Dissertation Part I         6           Total Credits          13           4 <sup>th</sup> Semester           1         EE24201         Dissertation Part II         -         16	•		<b>Total Credits</b>	15-0-12	23			
2         EE231**         Dissertation Related Tools and Technologies         0-0-2         3           3         EE23201         Dissertation Part I         6           Total Credits          13           4 <sup>th</sup> Semester           1         EE24201         Dissertation Part II         -         16	3 <sup>rd</sup> Semester							
3         EE23201         Dissertation Part I         6           Total Credits          13           4th Semester           1         EE24201         Dissertation Part II         -         16			1 0					
Total Credits          13           4 <sup>th</sup> Semester           1         EE24201         Dissertation Part II         -         16				0-0-2				
4 <sup>th</sup> Semester           1         EE24201         Dissertation Part II         -         16	3	EE23201						
1 EE24201 Dissertation Part II - 16			13					
EBE 1201 Dissortation Fut II	1	FF24201		_	16			
	-	LL27201	Total Credits	-	16			

- Laboratory I will be assigned in accordance to the elective subjects offered in respective semester or may be related to some advanced software/ hardware tools/ techniques as decided by the department.
- Literature Review will be based on research papers / selected topics from books, etc as directed by the supervisor(s).
- Evaluation of the Dissertation consists of two parts, 1) internal evaluation- by the departmental committee, 2) external evaluation- the department committee shall consist of at least one external member. There should be at least two mid-term evaluations by the department and one external evaluation.

Tentative List of Electives**								
Sl. No.	Subject Code	Subject	L-T-P	Credit(s)				
1.	EE2*111	Optimization Techniques and Algorithms	3-0-0	3				
2.	EE2*112	Flexible AC Transmission Systems	3-0-0	3				
3.	EE2*113	Power System Deregulation	3-0-0	3				
4.	EE2*114	Machine Learning and Robotics	3-0-0	3				
5.	EE2*115	Electric Vehicles	3-0-0	3				
6.	EE2*116	System Identification and Parameter Estimation	3-0-0	3				
7.	EE2*117	High Voltage Direct Current Transmission	3-0-0	3				
8.	EE2*118	Optimal and Adaptive Control	3-0-0	3				
9.	EE2*119	Power Quality	3-0-0	3				
10.	EE2*120	Switched Mode Power Supplies	3-0-0	3				
11.	EE2*121	Wide Area Monitoring and Control of Power Systems	3-0-0	3				
12.	EE2*122	Digital Control Systems	3-0-0	3				
13.	EE2*123	Soft Computing Techniques	3-0-0	3				
14.	EE2*124	Nature Inspired Optimization Techniques	3-0-0	3				
15.	EE2*125	Internet of Things and Applications	3-0-0	3				
16.	EE2*126	Deep Learning	3-0-0	3				
17.	EE2*127	Renewable Energy Systems and Applications	3-0-0	3				
18.	EE2*128	Research Methodology	3-0-0	3				

<sup>\*</sup> The semester number in which the subject is offered.

<sup>\*\*</sup> May be taken from department/institute and/or online resources e.g. MOOCS, SWAYAM, NPTEL as advised by the Department. Final evaluation will be at NIT Sikkim.

<sup>\*\*</sup>More electives may be offered on advanced and recent topics as per availability of resources.