

Batch, 4-3-6

(5)

**COMSATS Institute of Information Technology**  
**Registrar Office, Principal Seat, Islamabad**  
\*\*\*\*\*

June 23, 2015

No: CIIT-Reg/Notif-998/15/1331

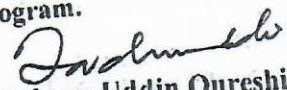
**NOTIFICATION**

**Scheme of Studies of Bachelor of Science in Electrical Engineering**  
The Academic Council in its 22<sup>nd</sup> meeting held on May 19, 2015 approved the following Scheme of Studies of Bachelor of Science in Electrical Engineering effective from Fall 2015 semester.

- |     |   |    |
|-----|---|----|
| i.  | Minimum Duration:   |    |
|     | a. No of Years: 04  |    |
|     | b. No of Semesters: 08  |    |
| ii. | <b>Core Courses:</b>  | 21 |
|     | c. Engineering Courses<br>(List Attached: Final Year Projects I and II<br>are considered as two separate courses) | 12 |
|     | d. Non-Engineering Courses (List Attached)  | 4  |
| iv. | <b>Elective Courses:</b>  | 1  |
|     | e. Major Electives (I, II, III and IV)****  | 1  |
|     | f. Major Elective V (Optional) or EE Open II *  | 1  |
|     | g. EE Open I (Optional)*  | 1  |
|     | h. Interdisciplinary Elective***<br>or Non Engineering Elective (Optional)  | 1  |
|     |   | 40 |
| v.  | Total No of Courses:  |    |
| vi. | Total No of Credit Hours:   |    |

**133-140 Credit Hours**

**Note:** The Regulations relating to Undergraduate Degree Programs approved by the Competent Authority and amended from time to time shall also be applicable to this program.

  
**Nadeem Uddin Qureshi**  
Additional Registrar

**Encl : (Total 17 pages, including this page)**

**Distribution:**

1. All Directors, CIIT System
2. Dean, Faculty of Engineering, CIIT.
3. Chairman, Department of Electrical Engineering, CIIT.
4. All HoDs/In-charges, Department of Electrical Engineering, CIIT Campuses
5. Controller of Examinations, CIIT.
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7. Incharges, Examination Section, CIIT Campuses.

- CC:**
1. PS to Rector, CIIT
  2. PA to Registrar, CIIT

## List of Core Courses:

## Engineering Domain Courses:

Sr No	Course Code	Course Title	Credit Hours <sup>1</sup>	Prerequisite(s) <sup>†</sup>
1	CSC141	Introduction to Computer Programming	4(3, 1)	
2	CSC241	Object Oriented Programming	4(3, 1)	CSC141
3	EEE113	Engineering Drawing	1(0, 1)	
4	EEE121	Electric Circuits Analysis I	4(3, 1)	PHY121
5	EEE222	Electric Circuits Analysis II	4(3, 1)	MTH241, EEE121
6	EEE223	Signals and Systems	4(3, 1)	MTH241
7	EEE231	Electronics I	4(3, 1)	EEE121
8	EEE232	Electronics II	4(3, 1)	EEE231
9	EEE241	Digital Logic Design	4(3, 1)	
10	EEE251	Probability Methods in Engineering	3(3, 0)	MTH104, MTH231
11	EEE261	Electromagnetic Theory	3(3, 0)	MTH105
12	EEE281	Introduction to Power Engineering	3(3, 0)	
13	EEE324	Digital Signal Processing	4(3, 1)	EEE223
14	EEE325	Control Systems	4(3, 1)	EEE223
15	EEE342	Microprocessor Systems and Interfacing	4(3, 1)	EEE241
16	EEE351 / EEE352	Principles of Communication Systems (For all majors except telecom) OR Analog Communication Systems (For Telecom only)	4(3, 1)	EEE223  OR EEE223, EEE251
17	EEE371	Electric Machines	4(3, 1)	EEE222
18	EEE374	Electrical Measurements and Instrumentation	4(3, 1)	EEE121
19	EEE490	Final Year Project (Part I)**	1(0, 1)	
20	EEE490	Final Year Project (Part II)**	5(0, 5)	EEE490 Final Year Project (Part I) **
21	MEE102	Engineering Mechanics and Thermodynamics	3(3, 0)	

## Non-Engineering Courses

Sr No	Course Code	Course Title	Credit Hours <sup>1</sup>	Prerequisite(s) <sup>†</sup>
1	BCO300	Engineering Economics	3(3, 0)	
2	HUM100	English Comprehension and Composition	3(3, 0)	
3	HUM102	Report Writing Skills	3(3, 0)	HUM100
4	HUM110	Islamic Studies	3(3, 0)	

5	HUM111	Pakistan Studies	3(3, 0)	
6	MGT462	Project Planning and Management	3(3, 0)	
7	MTH104	Calculus and Analytic Geometry	3(3, 0)	
8	MTH105	Multivariable Calculus	3(3, 0)	MTH104
9	MTH231	Linear Algebra	3(3, 0)	
10	MTH241	Ordinary Differential Equations	3(3, 0)	MTH104
11	MTH375	Numerical Computations	3(2, 1)	MTH104, CSC141
12	PHY121	Applied Physics for Engineers	4(3, 1)	

Note: The student has the flexibility of selecting between Major Elective and EE Open Electives, Non Engineering Elective and Inter Disciplinary Electives from the list of elective courses.

Non-Muslim students can opt for HUM114 Ethics 3(3, 0) course in lieu of HUM100 Islamic Studies, if they wish.

#### \*\*\*\* Major Elective Courses:

##### Electives Power

Sr No	Course Code	Course Title	Credit Hours <sup>1</sup>	Prerequisite(s) <sup>†</sup>
1	EEE338	Power Electronics	4(3, 1)	EEE232
2	EEE375	Power Distribution and Utilization	4(3, 1)	EEE222
3	EEE381	Power Transmission	4(3, 1)	EEE222
4	EEE382	Power Generation	3(3, 0)	
5	EEE435	Industrial Electronics	4(3, 1)	EEE374, EEE232
6	EEE481	Design of Electrical Machines	3(3, 0)	EEE371
7	EEE483	Power System Operation and Control	3(3, 0)	EEE222
8	EEE484	High Voltage Engineering	4(3, 1)	EEE375
9	EEE485	Power System Protection	3(3, 0)	EEE484
10	EEE486	Power System Analysis	3(3, 0)	EEE222
11	EEE488	Renewable and Alternate Energy Systems	3(3, 0)	
12	EEE489	Power Plant Engineering	3(3, 0)	EEE222

##### Electives Telecommunications

Sr. No	Course Code	Course Title	Credit Hours	Prerequisite(s) <sup>†</sup>
1	CSC336	Web Engineering	4(3, 1)	CSC141
2	CSC341	Network Programming	4(3, 1)	EEE314, CSC141

3	EEE314	Data Communication and Computer Networks	4(3, 1)	
4	EEE353	Digital Communication Systems	4(3, 1)	EEE351 or EEE352
5	EEE354	Telecommunication Systems Engineering	3(3, 0)	EEE351 or EEE352
6	EEE362	Microwave Engineering	4(3, 1)	EEE261, EEE232
7	EEE448	RF System Design	3(3, 0)	EEE232
8	EEE454	Transmission and Switching Systems	3(3, 0)	EEE353
9	EEE455	Optical Fiber Communications	3(3, 0)	EEE362
10	EEE456	Broadband Technologies	3(3, 0)	EEE314
11	EEE463	Antenna and Radio Wave Propagation	4(3, 1)	EEE261
12	EEE464	Wireless Communication Systems	3(3, 0)	EEE351 or EEE353
13	EEE465	Microwave and Satellite Communication Systems	3(3, 0)	EEE353
14	EEE466	Radars and Navigation Aids	3(3, 0)	EEE463
15	EEE467	Telecommunication Policies Standards and Regulations	3(3, 0)	

### Electives Electronics

Sr No.	Course Code	Semester Course Title	Credit Hours	Prerequisite(s)†
1	EEE333	Analog Integrated Circuits, Analysis and Design	4(3, 1)	EEE232
2	EEE338	Power Electronics	4(3, 1)	EEE232
3	EEE344	Digital System Design	4(3, 1)	EEE241, CSC141
4	EEE362	Microwave Engineering	4(3, 1)	EEE261, EEE232
5	EEE434	VLSI Design	4(3, 1)	EEE241, EEE232
6	EEE435	Industrial Electronics	4(3, 1)	EEE374, EEE232
7	EEE436	Applied Optoelectronics	3(3, 0)	EEE232
8	EEE437	Analog Filter Design	4(3, 1)	EEE232
9	EEE438	RF Electronics	3(3, 0)	EEE232
10	EEE446	Real Time Embedded Systems	4(3, 1)	EEE342

### Electives Computer

Sr. No	Course Code	Course Title	Credit Hours†	Prerequisite(s)†
1	CSC112	Algorithms and Data Structures	4(3, 1)	CSC141
2	CSC253	Computer Graphics	3(3, 0)	CSC141
3	CSC271	Database Systems	4(3, 1)	CSC112
4	CSC322	Operating Systems Concepts	3(3, 0)	CSC141

5	CSC334	Distributed Computing	4(3, 1)	EEE314, CSC141
6	CSC421	Systems Programming	4(3, 1)	CSC141
7	CSC492	Software Engineering	4(3, 1)	
8	EEE314	Data Communication and Computer Networks	4(3, 1)	
9	EEE324	Digital Signal Processing	4(3, 1)	EEE223
10	EEE343	Computer Organization	4(3, 1)	EEE241
11	EEE415	Digital Image Processing	4(3, 1)	EEE324
12	EEE434	VLSI Design	4(3, 1)	EEE241, EEE232
13	EEE440	Computer Architecture	3(3, 0)	EEE343
14	EEE446	Real Time Embedded Systems	4(3, 1)	EEE342
15	EEE461	Neural Networks	3(3, 0)	
16	EEE462	Artificial Intelligence	3(2, 1)	CSC141

**Electives Control**

Sr. No	Course Code	Course Title	Credit Hours	Prerequisite(s)†
1	CSC461	Neural Networks	3(3, 0)	
2	CSC462	Artificial Intelligence	3(2, 1)	CSC141
3	EEE421	Introduction to Digital Control Systems	4(3, 1)	EEE325
4	EEE422	Fuzzy Logic	4(3, 1)	EEE325
5	EEE423	Applied Control Systems	4(3, 1)	EEE325
6	EEE424	Optimal Control	4(3, 1)	EEE325
7	EEE425	Introduction to Adaptive Control	4(3, 1)	EEE325
8	EEE426	Stochastic Control	4(3, 1)	EEE325
9	EEE427	Multivariable Control	4(3, 1)	EEE325
10	EEE428	Introduction to Non-linear Control	3(3, 0)	EEE325
11	EEE447	Robotics	3(3, 0)	EEE325

**Non-Engineering Electives and Interdisciplinary Elective**

Sr No.	Course Code	Course Title	Credit Hours <sup>1</sup>	Prerequisite(s)†
1	CEE104	Civil Engineering Materials	3(3, 0)	
2	CEE425	Geo Informatics	3(3, 0)	

3	HUM200	Business Communication Workshop	3(3, 0)	HUM100
4	HUM202	Creative Thinking and Decision Making	3(3, 0)	
5	HUM220	Introduction to Psychology	3(3, 0)	
6	HUM320	Introduction to Sociology	3(3, 0)	
7	HUM400	Business Communication	3(3, 0)	
8	HUM432	Arabic	3(3, 0)	
9	LAW300	Corporate Law	3(3, 0)	
10	MGT131	Financial Accounting	3(3, 0)	
11	MGT330	Financial Management	3(3, 0)	
12	MGT350	Human Resource Management	3(3, 0)	
13	MGT403	Entrepreneurship	3(3, 0)	
14	MGT450	HRM Policies and Practices	3(3, 0)	
15	MGT460	Operations Management	3(3, 0)	
16	MGT522	Marketing of IT and Telecom Products	3(3, 0)	
17	MTH374	Optimization	3(3, 0)	MTH104
18	MTH467	Operations Research	3(3, 0)	MTH104

<sup>1</sup> 1 credit hour of theory is equivalent to 1 contact hour, whereas 1 credit hour of lab is equivalent to 3 hours of lab session. All the lab sessions are graded. Students have to pass both theory and lab to earn the course credits.

† Courses with prerequisites can only be allowed if all prerequisite courses have been passed.

\* With the consent of the Departmental Head, the students can take any course of EE which he has not taken before (including the electives of TE, EPE, CE, EL) according to his/her aptitude/future plans and further requirement (if any) of his final year project.

\*\* Students must clear all the engineering subjects in the first five semesters as given in the tentative plan to be eligible for the Final year project.

\*\*\* With the advice and consent of the Department, the student may select Non Engineering Elective course and any interdisciplinary elective course from the list of courses and the student may select any approved course of EE, which he/she has not taken before.

\*\*\*\* With the consent of the department, the students can select an elective course in their area of specialization (chosen Major) according to their aptitudes and requirements of the final year project.

## Bachelor of Science in Electrical Engineering

### Introduction

The Electrical Engineering program is designed to provide its graduates with a solid educational foundation on which they can build successful and sustainable careers in electrical engineering and related fields. The curriculum of Bachelor of Science in Electrical Engineering is developed with the objective to facilitate the teaching of common core courses and selection of courses of a particular major area depending upon the interest of the student. The curriculum offers following major areas:

- Power
- Telecommunication
- Electronics
- Computer
- Control

### Program Objectives:

The objective of this program is:

- To equip students with the sound knowledge of Engineering
- To produce well-trained, skilled and efficient professional engineers
- To develop their communication skills
- To develop their analysis, synthesis and design skills
- To produce graduates with the necessary background and technical skills to work professionally in one or more of the following areas: Power, Telecommunication, Electronics, Computer and Control
- To prepare graduates who are capable of entering and succeeding in an advanced degree program in their field of study
- To create an excellent environment for research and development activities

### Program Outcomes:

The graduates of the program will be able to:

- Possess essential engineering knowledge for meeting the requirements of industries and other organizations needing graduate engineers
- Do planning, specification, design, implementation, and operation of systems
- Apply engineering knowledge, mathematical tools and probabilistic/statistical methods to solve technical problems
- Function effectively in a multi-disciplinary team



### Course Distribution

Domain	Knowledge Area	Total Courses	Total Credits	Overall %age
Non-Engineering	Humanities	4	12	32.5%
	Management Sciences	2	6	
	Natural Sciences	6	19	
	Non-Engineering (Optional)***	1	3	
	<b>Sub Total</b>	<b>12-13</b>	<b>37-40</b>	
Engineering	Computing	2	8	67.5%
	Engineering Foundation	10	36	
	Major Engg Core (Breadth)	5	18	
	Major Engg Core (Depth)	6	19-24	
	Minor Engg Courses	1-2	3-4 to 6-8	
	Inter-Disciplinary Elective***	1-2	6-7	
	Final Year Project**	2	6	
	<b>Sub Total</b>	<b>28-29</b>	<b>96-100</b>	
<b>Grand Total</b>		<b>40-42</b>	<b>133-140</b>	<b>100%</b>

### Courses of Non-Engineering Domain

Knowledge Area	Course Title	Credit Hrs.	Total Courses	Total Credit Hrs.	%age
Humanities	English Comprehension and Composition	3(3, 0)	4	12	10%
	Report Writing Skills	3(3, 0)			
	Islamic Studies	3(3, 0)			
	Pakistan Studies	3(3, 0)			
Management Sciences	Engineering Economics	3(3,0)	2	6	5%
	Project Planning and Management	3(3, 0)			

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Natural Sciences	Applied Physics for Engineers	4(3, 1)	6	19	15%
	Calculus and Analytic Geometry	3(3, 0)			
	Linear Algebra	3(3, 0)			
	Multivariable Calculus	3(3, 0)			
	Ordinary Differential Equations	3(3, 0)			
	Numerical Computations	3(2, 1)			
Non-Engineering	Non – Engineering Elective (optional)***	3(3, 0)	1	3	2.5%
<b>Total</b>			<b>12-13</b>	<b>37-40</b>	<b>32.5%</b>

### Courses of Engineering Domain

Knowledge Area	Course Title	Credit Hrs.	Total Courses	Total Credit Hrs.	%age
Computing	Introduction to Computer Programming	4(3, 1)	2	8	5%
	Object Oriented Programming	4(3, 1)			
Engineering Foundation	Engineering Drawing	1(0, 1)	10	36	25%
	Signals and Systems	4(3, 1)			
	Digital Logic Design	4(3, 1)			
	Electric Circuits Analysis I	4(3, 1)			
	Electric Circuits Analysis II	4(3, 1)			
	Electronics I	4(3, 1)			
	Electronics II	4(3, 1)			
	Electrical Measurements and Instrumentation	4(3, 1)			
	Electric Machines	4(3, 1)			
	Probability Methods in Engineering	3(3, 0)			
Major Engineering Core Courses (Breadth)	Principles of Communication Systems (for all majors except Telecom) /	4(3, 1)	5	18	12.5%
	Analog Communication Systems (for Telecom Only)				

	Introduction to Power Engineering	3(3, 0)			
	Electromagnetic Theory	3(3, 0)			
	Control Systems	4(3, 1)			
	Microprocessor Systems and Interfacing	4(3, 1)			
Major Engineering Core Courses (Depth)	Digital Signal Processing	4(3, 1)	6	19-24	15%
	Major Electives I, II, III, IV****	3(3, 0) / 4(3, 1)			
	Major Elective V (Optional)	3(3, 0) / 4(3, 1)			
Minor Engineering Courses	EE Open I* (Optional)*	3(3, 0) / 4(3, 1)	1-2	3-4 to 6-8	2.5%
	EE Open II	3(3, 0) / 4(3, 1)			
Inter-Disciplinary Course	Engineering Mechanics and Thermodynamics	3(3, 0)	1-2	6-7	2.5%
	IDEE II (Optional)***	3(3, 0) / 4(3, 1)			
Final Year Design Project	Final Year Project (Part I)**	1(0, 1)	2	6	5%
	Final Year Project (Part II)**	5(0, 5)			
	<b>Total</b>		<b>28-29</b>	<b>96-100</b>	<b>67.5%</b>

**Note:** The student has the flexibility of selecting between Major Elective and EE Open Electives, Non Engineering Elective and Inter Disciplinary Engineering Electives.

\*With the consent of the Departmental Head, the students can take any course of EE which he has not taken before (including the electives of TE, EPE, CE, EL) according to his/her aptitude/future plans and further requirement (if any) of his final year project.

\*\*Students must clear all the engineering subjects in the first five semesters as given in the tentative plan to be eligible for the Final year project.

\*\*\*With the advice and consent of the Department, the student may select Non Engineering Elective course and any interdisciplinary elective course from the list of courses and the student may select any approved course of EE, which he/she has not taken before.

\*\*\*\*With the consent of the department, the students can select an elective course in their area of specialization (chosen Major) according to their aptitudes and requirements of the final year project.

### Tentative Plan of Studies

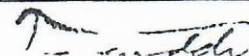
The course offering in each semester as given below is not fixed; it may vary depending on the availability of faculty and needs of the students.

Semester 1			
Course Code	Course Title	Credit Hours <sup>1</sup>	Prerequisite(s) <sup>†</sup>
HUM100	English Comprehension and Composition	3(3, 0)	
HUM110	Islamic Studies	3(3, 0)	
PHY121	Applied Physics for Engineers	4(3, 1)	
MTH104	Calculus and Analytic Geometry	3(3, 0)	
EEE113	Engineering Drawing	1(0, 1)	
MEE102	Engineering Mechanics and Thermodynamics	3(3, 0)	
		<b>17(15, 2)</b>	

Semester 2			
Course Code	Course Title	Credit Hours <sup>1</sup>	Prerequisite(s) <sup>†</sup>
EEE241	Digital Logic Design	4(3, 1)	
MTH105	Multivariable Calculus	3(3, 0)	MTH104
MTH241	Ordinary Differential Equations	3(3, 0)	MTH104
CSC141	Introduction to Computer Programming	4(3, 1)	
EEE121	Electric Circuits Analysis I	4(3, 1)	PHY121
		<b>18(15, 3)</b>	

Semester 3			
Course Code	Course Title	Credit Hours <sup>1</sup>	Prerequisite(s) <sup>†</sup>
EEE222	Electric Circuits Analysis II	4(3, 1)	MTH241, EEE121
MTH231	Linear Algebra	3(3, 0)	
EEE231	Electronics I	4(3, 1)	EEE121
CSC241	Object Oriented Programming	4(3, 1)	CSC141
	Non-Engineering Elective / IDEE II	3(3, 0)/4(3, 1)	
		<b>18-19(15, 3-4)</b>	

Semester 4			
Course Code	Course Title	Credit Hours <sup>1</sup>	Prerequisite(s) <sup>†</sup>
EEE374	Electrical Measurements and Instrumentation	4(3, 1)	EEE121
EEE261	Electromagnetic Theory	3(3, 0)	MTH105
EEE251	Probability Methods in Engineering	3(3, 0)	MTH104, MTH231
EEE223	Signals and Systems	4(3, 1)	MTH241
EEE232	Electronics II	4(3, 1)	EEE231
		<b>18(15, 3)</b>	



Semester 5			
Course Code	Course Title	Credit Hours <sup>1</sup>	Prerequisite(s) <sup>†</sup>
EEE281	Introduction to Power Engineering	3(3, 0)	
EEE325	Control Systems	4(3, 1)	EEE223
EEE351 / EEE352	Principles of Communication Systems (For all majors except Telecom) / Analog Communication Systems (For Telecom Only)	4(3, 1)	EEE223 / EEE223, EEE251
EEE342	Microprocessor Systems and Interfacing	4(3, 1)	EEE241
EEE	Major Elective I <i>Power Electronics</i>	3(3, 0)/4(3, 1)	
		18-19(15,3-4)	

Semester 6			
Course Code	Course Title	Credit Hours <sup>1</sup>	Prerequisite(s) <sup>†</sup>
EEE371	Electric Machines	4(3, 1)	EEE222
ECO300	Engineering Economics	3(3, 0)	
EEE324	Digital Signal Processing	4(3, 1)	EEE223
EEE	Major Elective II	3(3, 0)/4(3, 1)	
EEE	Major Elective III	3(3, 0)/4(3, 1)	
		17-19(15,2-4)	

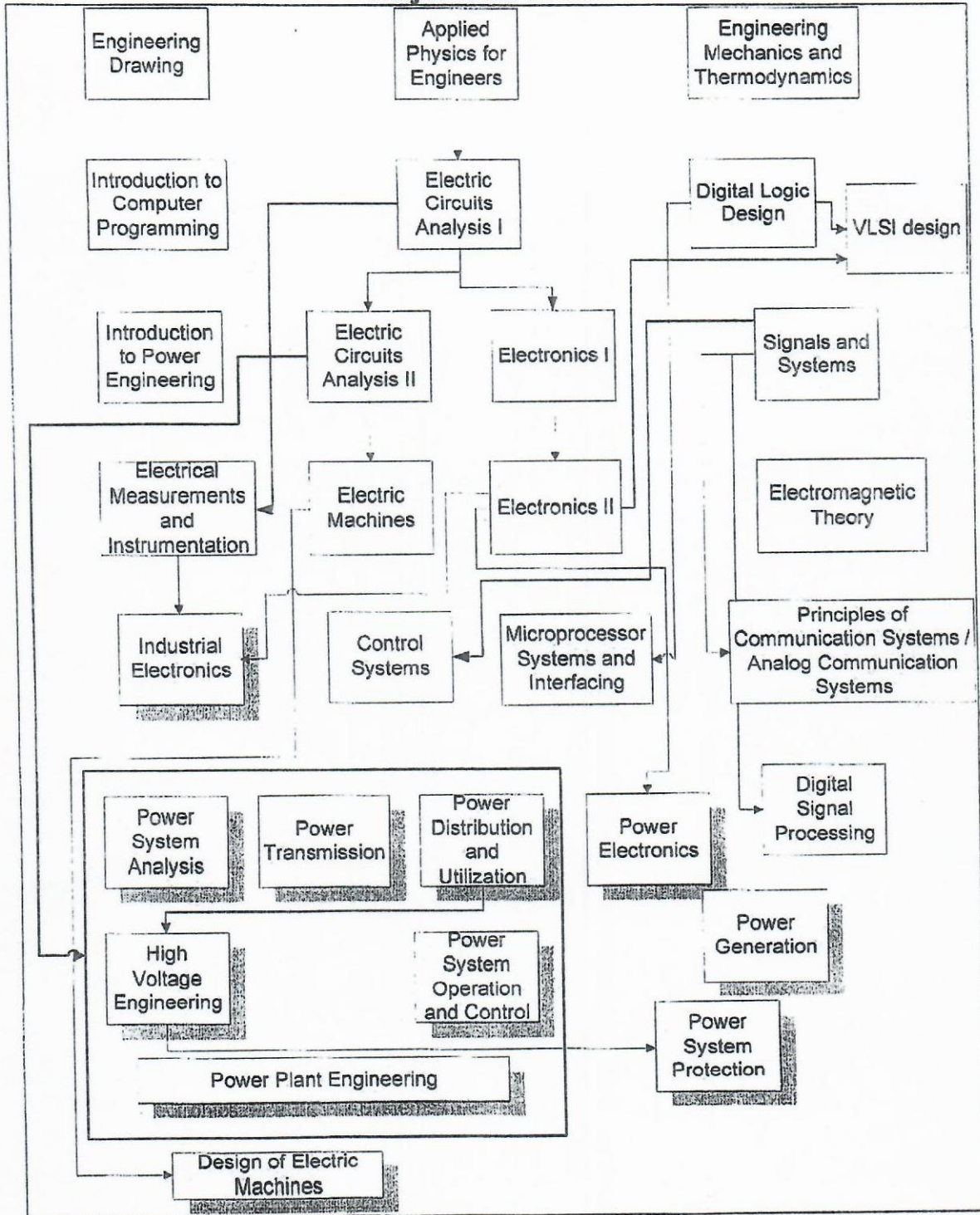
Semester 7			
Course Code	Course Title	Credit Hours <sup>1</sup>	Prerequisite(s) <sup>†</sup>
HUM102	Report Writing Skills	3(3, 0)	HUM100
EEE490	Final Year Project (Part I)**	1(0, 1)	
	EE Open I	3(3, 0)/4(3, 1)	
EEE	Major Elective IV	3(3, 0)/4(3, 1)	
MTH375	Numerical Computations	3(2, 1)	MTH104, CSCI41
		13-15(11,2-4)	

Semester 8			
Course Code	Course Title	Credit Hours <sup>1</sup>	Prerequisite(s) <sup>†</sup>
MGT462	Project Planning and Management	3(3, 0)	
EEE490	Final Year Project (Part II)**	5(0, 5)	EEE490 Final Year Project (Part I) **
HUM111	Pakistan Studies	3(3, 0)	
	EE Open II/Major Elective V	3(3, 0)/4(3, 1)	
		14-15(9,5-6)	

**Total Credit Hours: 133-140**

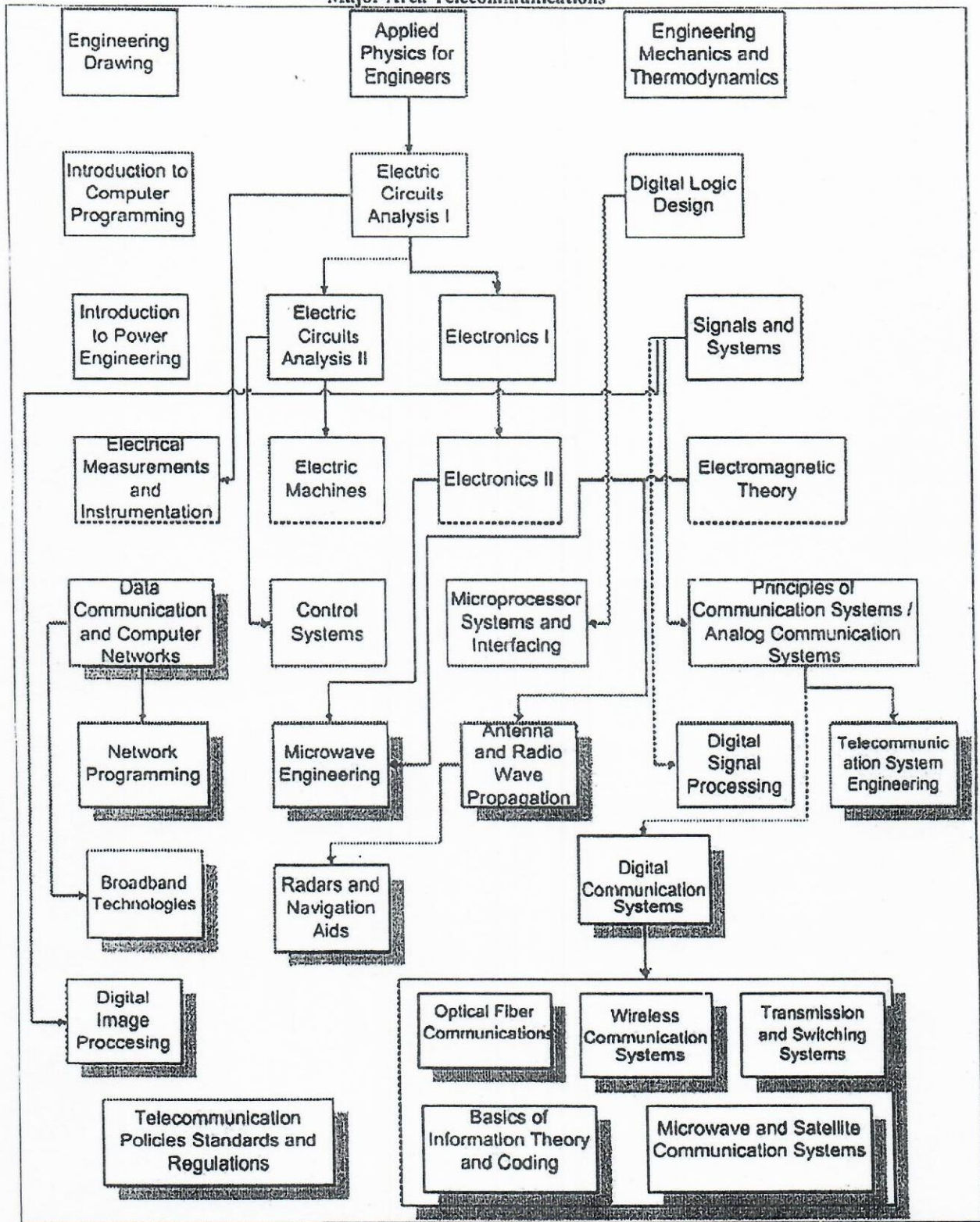
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### Courses Hierarchy Major Area Power

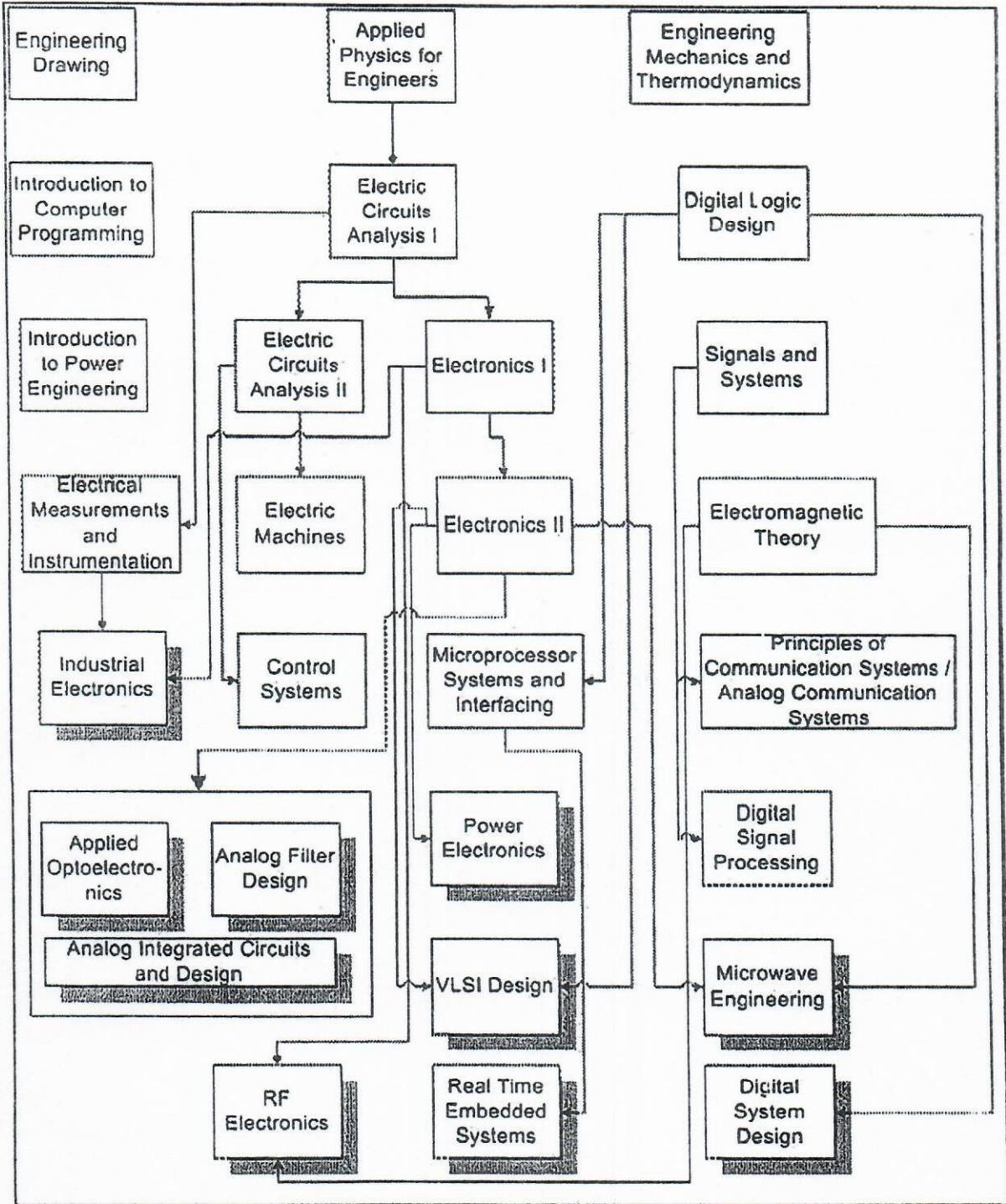


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Major Area Telecommunications

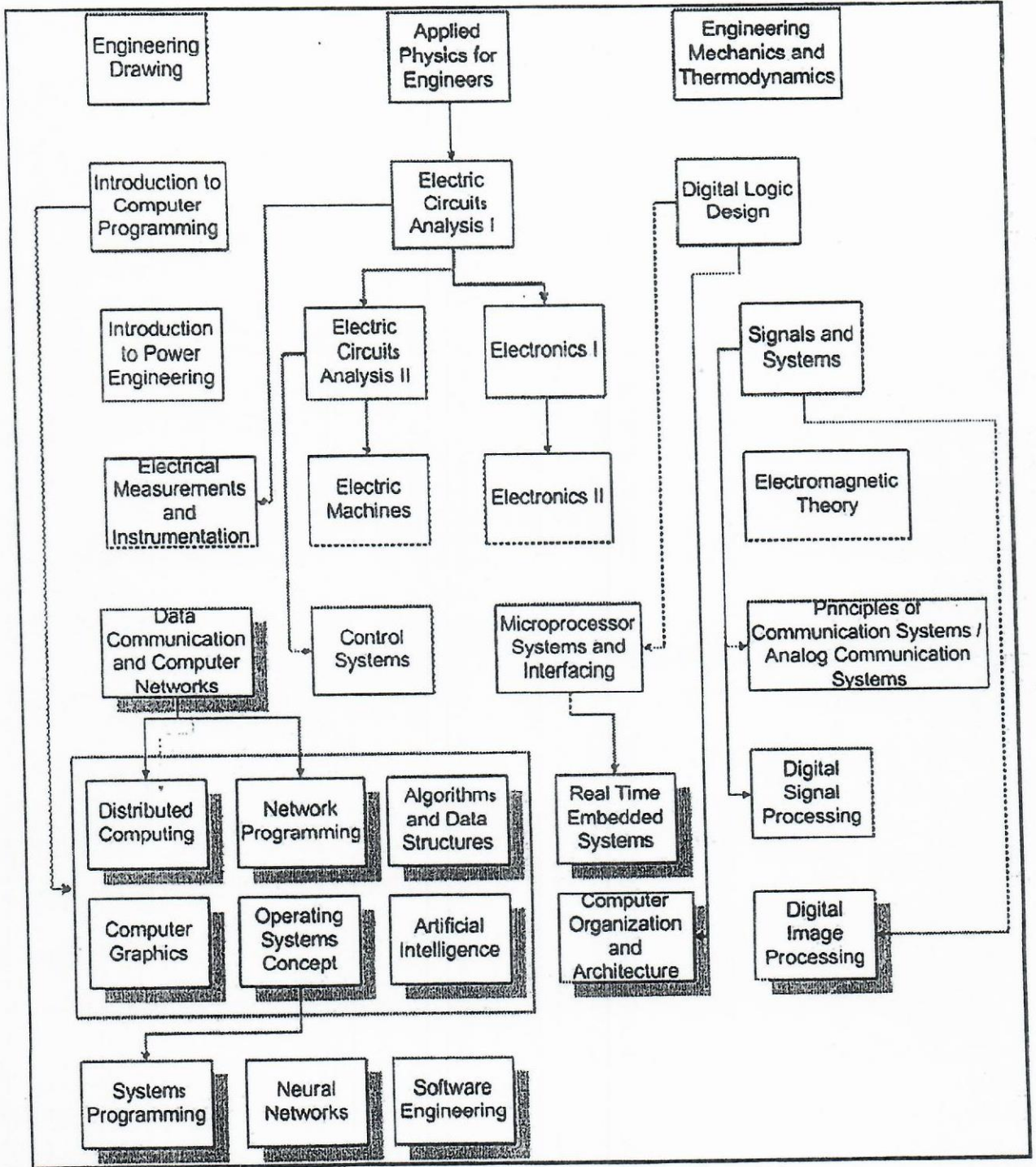


### Major Area Electronics



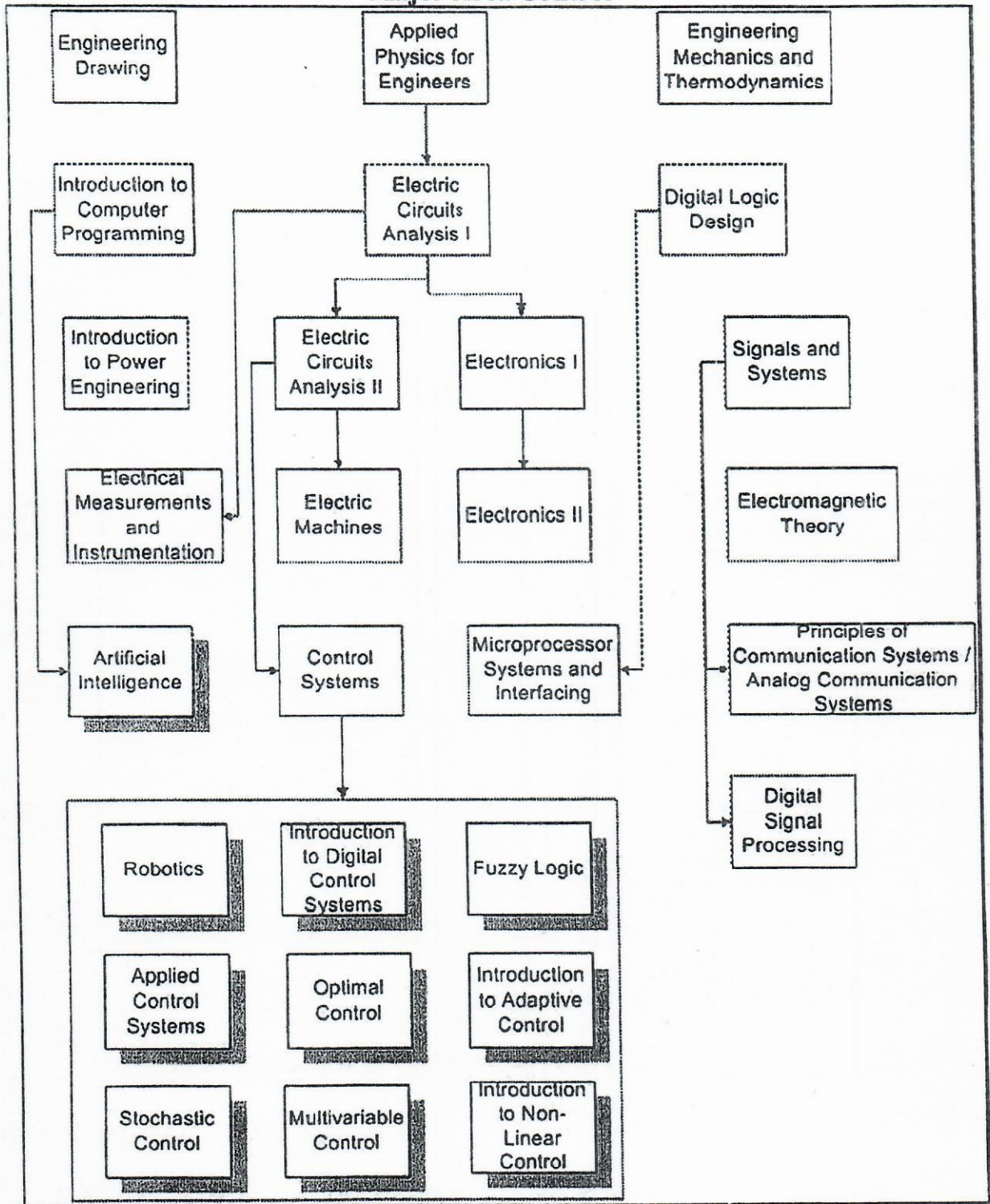
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### Major Area Computer





Major Area Control



*J. S. S. S.*