Revised Syllabus
for
Bachelor of Technology (B. Tech.) Programme
in

Energy Engineering

Department of Energy Engineering
North-Eastern Hill University, Shillong
Mawkynroh, Umshing, Shillong –793 022

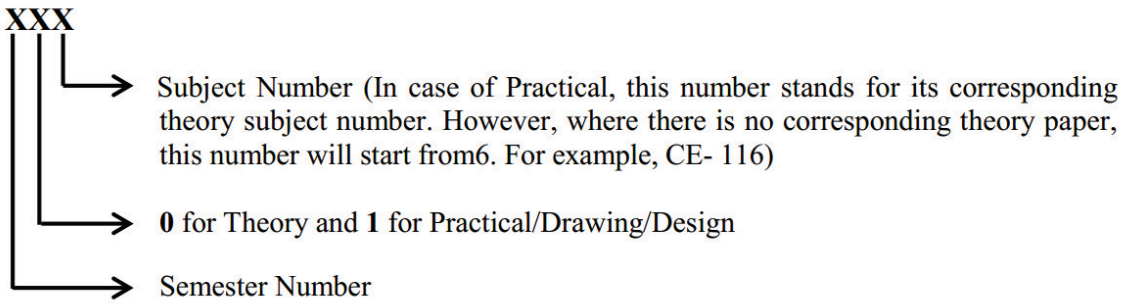
ACRONYMS USED IN SUBJECT CODING

- **Subject Nomenclature and Coding**

  MA: Mathematics
  PH: Physics
  CH: Chemistry
  HU: Humanities
  ES: Environmental Science
  EE: Electrical Engineering
  CE: Civil Engineering'
  ME: Mechanical Engineering
  EC: Electronics and Communication Engineering'
  EN: Energy Engineering
  BM: Biomedical Engineering
  NT: Nanotechnolohy

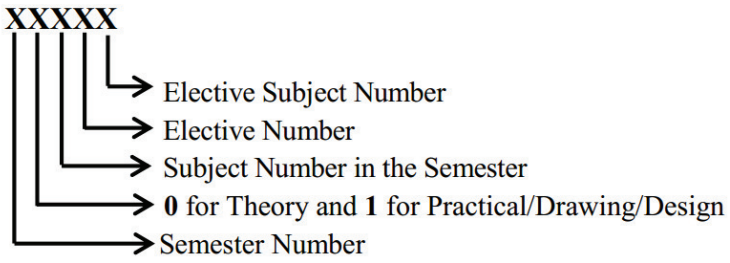
- **Subject Coding for core papers**

  Three Digit Numeric Numbers Used inSubjectCode (e.g.EC –XXX):



- **Subject Coding for elective papers**

  Five Digit Numeric Numbers Used in Subject Code (e.g. EC –XXXXX)



For example, EC – 70412: It is a Seventh (7) Semester First (1) Elective Theory (0) Paper. Paper serial number in the Seventh Semester Paper List is four (4) while elective serial number two (2) in the First Elective Paper List of the Semester.

COURSE COMPOSITION AT A GLANCE

Basic Science Papers

- Engineering Mathematics-I
- Engineering mathematics-II
- Engineering Physics-I
- **Engineering Physics-II**
- Engineering Chemistry
- Environmental Science

Humanities Papers

- Professional Communication Skills
- **Industrial Management and Entrepreneurship**
- Introduction to IPR
- **Operational Research Techniques**

Basic Engineering papers

- Solid Mechanics
- Fluid Mechanics
- Engineering Thermodynamics
- Heat and Mass Transfer
- Basic Electronic Devices
- Electrical Devices and Circuits
- Engineering Drawing

Core papers

- Basics of Renewable Energy Technology
- Solar Thermal Technology
- Photovoltaic Conversion Technology
- Biomass and Biofuel Technology
- Energy Accounting and Management
- Fuel, Combustion and IC Engine
- **Nuclear Energy**
- **Nanotechnology and Energy Systems**
- Fuel Cell and Hydrogen Energy
- Energy Economics and Planning
- Chemical Energy Conversion and Storage Devices
- **Wind, Hydro and Ocean Technology**
- Studio for Simulation
- Studio for Design
- Studio for Product Development

Elective papers

- Climate Change and Carbon Trade
- **Clean Coal and Gas Technology**
- Advanced Biofuel Technology
- Electrical Systems and Control Instrumentation
- Power Plant Technology
- Refrigeration and Air-conditioning
- Demand Side Management
- Green Buildings and Passive Architecture
- Waste Heat Recovery

1. Course Structure and Scheme

Scheme of B.Tech in Energy Engineering

BRANCH: Energy Engineering Year: I Semester: I

Semester I										
Subject Code	Subject Name	Periods/Contact Hour(s)			Evaluation Scheme					Credits
		L	T	P	Internal Works			ESE	Total	
					TA	CT	TOT			
Theory										
MA-101	Engineering Mathematics-I	3	1	-	20	20	40	60	100	4
PH-102	Engineering Physics – I	3	1	-	20	20	40	60	100	4
ES-103	Elements of Environmental Science	2	1	-	15	15	30	45	75	3
HU-104	Professional Communication Skills	2	1	-	15	15	30	45	75	3
EN-105	Solid Mechanics	3	1	-	20	20	40	60	100	4
Laboratory										
HU-114	Digital English Language Laboratory	-	-	4	20	-	20	30	50	2
EN-116	Engineering Drawing	-	-	4	20	-	20	30	50	2
TOTAL		13	5	8					550	22

L – Lecture **T** – Tutorial **P** – Practical **TA**– Teachers' Assessment **Total Marks**: **550**
CT– Class Test **TOT**– Total Internal Marks **ESE**– End Semester Examination Marks **Total Credits: 22**

BRANCH: Energy Engineering Year: I Semester: II

Semester II										
Subject Code	Subject Name	Periods/Contact Hour(s)			Evaluation Scheme					Credits
		L	T	P	Internal Works			ESE	Total	
					TA	CT	TOT			
Theory										
MA-201	Engineering Mathematics-II	2	1	-	20	20	40	60	100	4
PH-202	Engineering Physics-II	2	1	-	20	20	40	60	100	4
CH-203	Engineering Chemistry	3	1	-	20	20	40	60	100	4
EN-204	Basic Electronic Devices	3	1	-	20	20	40	60	100	4
Laboratory										
PH-212	Engineering Physics Laboratory	-	-	4	20	-	20	30	50	2
CH –213	Engineering Chemistry Laboratory	-	-	4	20	-	20	30	50	2
EN –214	Electronic Devices Laboratory	-	-	4	20	-	20	30	50	2
TOTAL		12	4	12					550	22

L – Lecture **T** – Tutorial **P** – Practical **TA**– Teachers' Assessment **Total Marks**: **550**
CT– Class Test **TOT**– Total Internal Marks **ESE**– End Semester Examination Marks **Total Credits: 22**

BRANCH: Energy Engineering Year: II Semester: III

Semester III										
Subject Code	Subject Name	Periods/Contact Hour(s)			Evaluation Scheme					Credits
		L	T	P	Internal Works			ESE	Total	
					TA	CT	TOT			
Theory										
EN-301	Basics of Renewable Energy Technology	3	1	-	20	20	40	60	100	4
EN-302	Electrical Devices and Circuits	3	1	-	20	20	40	60	100	4
EN-303	Fluid Mechanics	3	1	-	20	20	40	60	100	4
EN-304	Engineering Thermodynamics	3	1	-	20	20	40	60	100	4
Laboratory										
EN-315	Energy Laboratory - I	-	-	4	20	-	20	30	50	2
Field Visit/Studio/Project										
EN-316	Studio for Design*	-	-	8	20	20	40	60	100	4
TOTAL		12	04	12					550	22

L – Lecture **T** – Tutorial **P** – Practical **TA**– Teachers' Assessment **Total Marks**: **550**
CT– Class Test **TOT**– Total Internal Marks **ESE**– End Semester Examination Marks **Total Credits: 22**

**In the case of Studio for Design, TA = Assessment from the Guide(s,) CT = report and ESE = Viva voice*. Design and modelling using a software/Analytical design and study for various systems.

BRANCH: Energy Engineering Year: II Semester: IV

Semester IV										
Subject Code	Subject Name	Periods/Contact Hour(s)			Evaluation Scheme					Credits
		L	T	P	Internal Works			ESE	Total	
					TA	CT	TOT			
Theory										
EN-401	Heat and Mass Transfer	3	1	-	20	20	40	60	100	4
EN-402	Nuclear Energy	3	1	-	20	20	40	60	100	4
EN-403	Solar Thermal Technology	3	1	-	20	20	40	60	100	4
EN-404	Biomass and Bio-fuel Technology	3	1	-	20	20	40	60	100	4
Laboratory										
EN-415	Energy Laboratory – II	-	-	4	20	-	20	30	50	2
Field Visit/Studio/ Project										
EN-416	Studio for Simulation	-	-	8	20	20	40	60	100	4
TOTAL		12	04	12					550	22

L – Lecture **T** – Tutorial **P** – Practical **TA**– Teachers' Assessment **Total Marks**: **550**
CT– Class Test **TOT**– Total Internal Marks **ESE**– End Semester Examination Marks **Total Credits: 22**

**In the case of Studio for Simulation, TA = Assessment from the Guide(s,) CT = report and ESE = Viva voice*.
Simulation using advanced software(s).

BRANCH: Energy Engineering Year: III Semester: V

Semester V										
Subject Code	Subject Name	Periods/Contact Hour(s)			Evaluation Scheme					Credits
		L	T	P	Internal Works			ESE	Total	
					TA	CT	TOT			
Theory										
EN-501	Photovoltaic Conversion Technology	3	1	-	20	20	40	60	100	4
EN-502	Energy Accounting and Management	3	1	-	20	20	40	60	100	4
EN-503	Fuel, Combustion and IC Engine	3	1	-	20	20	40	60	100	4
EN-504	Nanotechnology and Energy Systems	3	1	-	20	20	40	60	100	4
Laboratory										
EN-515	Energy Laboratory-III	-	-	4	20	-	20	30	50	2
Field Visit/ Studio/Project										
EN-516	Studio for Product Development	-	-	8	20	20	40	60	100	4
TOTAL		12	04	12					550	22

L – Lecture **T** – Tutorial **P** – Practical **TA**– Teachers' Assessment **Total Marks**: **550**
CT– Class Test **TOT**– Total Internal Marks **ESE**– End Semester Examination Marks **Total Credits: 22**

*****_In the case of minor projects, TA = Assessment from the Guide(s,) CT = report and ESE = Viva voice_. Physical modelling using Machine Shop/Workshop.

BRANCH: Energy Engineering Year: III Semester: VI

Semester VI										
Subject Code	Subject Name	Periods/Contact Hour(s)			Evaluation Scheme					Credits
		L	T	P	Internal Works			ESE	Total	
					TA	CT	TOT			
Theory										
EN-601	Fuel Cell and Hydrogen Energy	3	1	-	20	20	40	60	100	4
EN-602	Energy Economics and Planning	3	1	-	20	20	40	60	100	4
HU-6031X	Elective I	3	1	-	20	20	40	60	100	4
EN-6042X	Elective- II (OPEN)	3	1	-	20	20	40	60	100	4
Laboratory										
EN-615	Energy Laboratory -IV	-	-	4	20	-	20	30	50	2
Field Visit/ Studio/Project										
EN-616	Minor Project	-	-	8	20	20	40	60	100	4
TOTAL		12	04	12					550	22

Elective-I		Elective-II	
Subject Code	Subject Name	Subject Code	Subject Name
HU-60311	Industrial Management and Entrepreneurship	EN-60421	Climate change and Carbon Trade
HU-60312	Introduction to IPR	EN-60422	Clean Coal and Gas Technology
HU-60313	Operation Research Techniques	EN-60423	Advance Bio-fuel Technology
		EN-60424	Electrical Systems and Control Instrumentation
		EN-60425	Power Plant Technology
		EN-60426	Refrigeration and Air Conditioning

L – Lecture **T** – Tutorial **P** – Practical **TA**– Teachers' Assessment **Total Marks**: **550**
CT– Class Test **TOT**– Total Internal Marks **ESE**– End Semester Examination Marks **Total Credit: 22**

**In the case of minor project, TA = Assessment from the Guide(s,) CT = report and ESE = Viva voice.*

BRANCH: Energy Engineering Year: IV Semester: VII

Semester VII										
Subject Code	Subject Name	Periods/Contact Hour(s)			Evaluation Scheme					Credits
		L	T	P	Internal Works			ESE	Total	
					TA	CT	TOT			
Theory										
EN-701	Chemical Energy Conversion and Storage Devices	3	1	-	20	20	40	60	100	4
EN-702	Wind, Hydro and Ocean Technology	3	1	-	20	20	40	60	100	4
EN-7031x	Elective- III (OPEN)	3	1	-	20	20	40	60	100	4
Laboratory										
EN-714	Energy Laboratory – V	-	-	4	20	-	20	30	50	2
Field Visit/ Studio/Project										
EN-715	Industrial Training/Visit	-	-	-	-	-	-	100	100#	4
EN-716	Major Project-I	-	-	8	20	20	40	60	100*	4
TOTAL		09	03	12					550	22

Elective-III (Open)

Subject Code	Subject Name
EN-70311	Demand Side Management
EN-70312	Green Buildings and Passive Architecture
EN-70313	Waste Heat Recovery

 # The field Visit/Industrial Training will be conducted during vacation after Semester VI final examinations and will be evaluated during Semester-VII

***In the case of projects, TA = Assessment from the Guide(s,) in case of a student has done a part of their project outside the Department the external and internal supervisor would share the marks equally, CT = Project Presentation and viva, and ESE = Seminar in presence of External expert*.

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L – Lecture **T** – Tutorial **P** – Practical **TA**– Teachers' Assessment **Total Marks**: **550**
CT– Class Test **TOT**– Total Internal Marks **ESE**– End Semester Examination Marks **Total Credit: 22**

BRANCH: Energy Engineering Year: IV Semester: VIII

Semester VIII										
Subject Code	Subject Name	Periods/Contact Hour(s)			Evaluation Scheme					Credits
		L	T	P	Internal Works			ESE	Total	
					TA	CT	TOT			
EN-811	Viva Voice	-	-	-	-	-	-	150	150	6
EN-812	Major Project- II	-	-	32	80	80	160	240	400*	16
TOTAL				32					550	22

**In the case of projects, TA = Assessment from the Guide(s,) in case of a student has done a part of their project outside the Department the external and internal supervisor would share the marks equally, CT = Project Presentation and viva, and ESE = Seminar in presence of External expert*.

L – Lecture **T** – Tutorial **P** – Practical **TA**– Teachers' Assessment **Total Marks**: **550**
CT– Class Test **TOT**– Total Internal Marks **ESE**– End Semester Examination Marks **Total Credits: 22**