

**Indian Institute of Technology Tirupati**  
**ENGINEERING PHYSICS**  
 B.Tech Curriculum Template (2024 onwards)

**Semester 1**

Course Code	Course	L-T-P-C
PH104L/CY104L	Introduction to Classical Physics / Chemistry for Engineers	2-1-0-3
PH103P/CY103P	Physics Laboratory / Chemistry Laboratory	0-0-3-2
MA103L	Engineering Mathematics-I	3-1-0-4
ES104M	Computer Programming	2-0-3-4
ES105L	Foundations of Engineering Mechanics	2-1-0-3
ES106L	Introduction to Electrical Systems	2-0-0-2
ES101M	Concepts in Engineering and Design	1-0-2-2
HS10XN	Language Course (P/F)	2-0-0-2
	NSO/NSS <sup>#</sup>	
Life Skills courses (Creative Arts / Physical Wellness / Lifestyle Management)		
	Semester Credits (Cumulative Credits)	22 (22)

**Semester 2**

Course Code	Course	L-T-P-C
CY104L/PH104L	Chemistry for Engineers /Introduction to Classical Physics	2-1-0-3
CY103P/ PH103P	Chemistry Laboratory / Physics Laboratory	0-0-3-2
MA104L	Engineering Mathematics-II	3-0-0-3
EA105M	Engineering Drawing	2-0-2-3
EA104P	Makers Laboratory	0-0-3-2
ES108L	Introduction to Electronic Systems	2-0-0-2
ES109L	Introduction to Data Science and Machine Learning	2-1-0-3
EE205L	Signals and Systems	3-1-0-4
Life Skills courses (Creative Arts / Physical Wellness / Lifestyle Management)		
	Semester Credits (Cumulative Credits)	22 (44)
Summer – Socially/locally relevant project under NSO/NSS <sup>#</sup>		

<b>Semester 3</b>		
<b>Course Code</b>	<b>Course</b>	<b>L-T-P-C</b>
PH201L	Kinetic Theory of Gases and Thermodynamics	3-0-0-3
PH105L	Introduction to Quantum Science and Technology	2-1-0-3
CH210L	Fluid and Particle Mechanics	3-1-0-4
EE208L	Digital Systems	3-0-0-3
EE206P	Digital Systems Laboratory	0-0-3-2
EE210L	Semiconductor Devices	3-1-0-4
MAE	Mathematics Elective	3-0-0-3
Life Skills courses (Creative Arts / Physical Wellness / Lifestyle Management)		
	<b>Semester Credits (Cumulative Credits)</b>	<b>22 (66)</b>

<b>Semester 4</b>		
<b>Course Code</b>	<b>Course</b>	<b>L-T-P-C</b>
PH202L	Applied Optics	3-1-0-4
PH203P	Mechanics, Electricity and Magnetism Laboratory	0-0-3-2
EE207L	Analog Circuits	3-1-0-4
EE207P	Analog Circuits Laboratory	0-0-3-2
EE211L	Communication Systems	3-0-0-3
ES204L	Ecology, Environment and Sustainability	2-0-0-2
HSE-1	Humanities Elective - 1	3-0-0-3
Life Skills courses (Creative Arts / Physical Wellness / Lifestyle Management)		
	<b>Semester Credits (Cumulative Credits)</b>	<b>20 (86)</b>
Summer – Socially/locally relevant project under NSO/NSS <sup>#</sup>		

<b>Semester 5</b>		
<b>Course Code</b>	<b>Course</b>	<b>L-T-P-C</b>
PH503L	Classical Mechanics	3-1-0-4
PH510L	Quantum Mechanics - 1	3-1-0-4
PH301P	Applied Optics and Material Physics Laboratory	0-0-3-2
EE308L	Engineering Electromagnetics	3-1-0-4
DPE-1	Department Elective - 1	3-0-0-3
HSE-2	Humanities Elective - 2	3-0-0-3
FRE-1	Free Elective - 1	3-0-0-3
Life Skills courses (Creative Arts / Physical Wellness / Lifestyle Management)		
Semester Credits (Cumulative Credits)		23 (109)

<b>Semester 6</b>		
<b>Course Code</b>	<b>Course</b>	<b>L-T-P-C</b>
PH505L	Condensed Matter Physics	3-1-0-4
PH512L	Statistical Physics	3-1-0-4
PH302P	Advanced Engineering Physics Laboratory	0-0-6-4
EE311L	Computer Organization and Processor Design	3-0-0-3
FRE-2	Free Elective - 2	3-0-0-3
FRE-3	Free Elective - 3	3-0-0-3
Life Skills courses (Creative Arts / Physical Wellness / Lifestyle Management)		
Semester Credits (Cumulative Credits)		21 (130)
Summer - Industrial/Research Internship*		

## Semester - 7 & 8 : Study Plan A to E

### Study Plan A

Students must have grade B or better in Project - 1 to continue with this study plan. Failing to obtain such a grade, the student will shift to Plan B automatically.

<b>Semester 7</b>		
<b>Code</b>	<b>Course Name</b>	<b>L-T-P-C</b>
DPE-2	Department Elective - 2	3-0-0-3
DPE-3	Department Elective - 3	3-0-0-3
PH491G	Project Phase - 1	- - - 3
PH391G	Industrial/Research Internship (Evaluation of internship done in the preceding summer, P/F course)	- - - 2
<b>Semester Credits (Cumulative Credits)</b>		<b>11 (141)</b>

<b>Semester 8</b>		
<b>Code</b>	<b>Course Name</b>	<b>L-T-P-C</b>
PH492G	Project Phase - II	- - - 6
FRE-4	Free Elective – 4	3-0-0-3
HS4XXL	Professional Ethics	1-0-0-1
<b>Semester Credits (Cumulative Credits)</b>		<b>10 (151)</b>

### Study Plan B

<b>Semester 7</b>		
<b>Code</b>	<b>Course Name</b>	<b>L-T-P-C</b>
DPE-2	Department Elective - 2	3-0-0-3
DPE-3	Department Elective - 3	3-0-0-3
PH491G	Project Phase - I	- - - 3
PH391G	Industrial/Research Internship (Evaluation of internship done in the preceding summer, P/F course)	- - - 2
<b>Semester Credits (Cumulative Credits)</b>		<b>11 (141)</b>

<b>Semester 8</b>		
<b>Code</b>	<b>Course Name</b>	<b>L-T-P-C</b>
DPE-4	Department Elective – 4	3-0-0-3
DPE-5	Department Elective - 5	3-0-0-3
FRE-4	Free Elective – 4	3-0-0-3
HS4XXL	Professional Ethics	1-0-0-1
<b>Semester Credits (Cumulative Credits)</b>		<b>10 (151)</b>

### Study Plan C

<b>Semester 7</b>		
<b>Code</b>	<b>Course Name</b>	<b>L-T-P-C</b>
	Extended Internship (Evaluation of internship to be done before beginning of Semester 8, P/F course)	--- 6
<b>Semester Credits (Cumulative Credits)</b>		<b>6 (136)</b>

<b>Semester 8</b>		
<b>Code</b>	<b>Course Name</b>	<b>L-T-P-C</b>
PH491G	Project Phase - I	--- 3
DPE-2	Department Elective - 2	3-0-0-3
DPE-3	Department Elective - 3	3-0-0-3
FRE-4	Free Elective - 4	2-0-0-2
FRE-5	Free Elective - 5	3-0-0-3
HS4XXL	Professional Ethics	1-0-0-1
<b>Semester Credits (Cumulative Credits)</b>		<b>15 (151)</b>

### **Study Plan D**

Students must have grade B or better in Project - 1 to continue with this study plan. Failing to obtain such a grade, the student will shift to Plan E automatically.

<b>Semester 7</b>		
<b>Code</b>	<b>Course Name</b>	<b>L-T-P-C</b>
DPE-2	Department Elective - 2	3-0-0-3
DPE-3	Department Elective - 3	3-0-0-3
PH491G	Project Phase - I	- - - 3
FRE-4	Free Elective - 4	2-0-0-2
<b>Semester Credits (Cumulative Credits)</b>		<b>11 (141)</b>

<b>Semester 8</b>		
<b>Code</b>	<b>Course Name</b>	<b>L-T-P-C</b>
PH492G	Project Phase - II	- - - 6
FRE-5	Free Elective – 5	3-0-0-3
HS4XXL	Professional Ethics	1-0-0-1
<b>Semester Credits (Cumulative Credits)</b>		<b>10 (151)</b>

### **Study Plan E**

<b>Semester 7</b>		
<b>Code</b>	<b>Course Name</b>	<b>L-T-P-C</b>
DPE-2	Department Elective - 2	3-0-0-3
DPE-3	Department Elective - 3	3-0-0-3
PH491G	Project Phase - I	- - - 3
FRE-4	Free Elective - 4	2-0-0-2
<b>Semester Credits (Cumulative Credits)</b>		<b>11 (141)</b>

<b>Semester 8</b>		
<b>Code</b>	<b>Course Name</b>	<b>L-T-P-C</b>
DPE-4	Department Elective - 4	3-0-0-3
DPE-5	Department Elective - 5	3-0-0-3
FRE-5	Free Elective – 5	3-0-0-3
HS4XXL	Professional Ethics	1-0-0-1
<b>Semester Credits (Cumulative Credits)</b>		<b>10 (151)</b>

### **Guidelines**

1. The credits shown for elective courses are only indicative. They may vary based on the actual elective course chosen by the student.
2. Credit structure

<b>Category</b>	<b>Minimum Credits Requirement</b>	<b>Remarks</b>
Basic sciences	20	This included 3 credits of mathematics elective in 3rd Semester.
Engineering sciences	26	Includes emerging technology courses of 6 credits.
Professional Major	73	Department electives must be earned from 4 or 5 level courses approved by the department.
Project	9	Six of these credits may be earned from a 24-week industrial internship or may be from the departmental electives based on the study plan chosen.
Humanities	9	Humanities electives must be earned from 2, 3, 4 or 5 level humanities and social science courses.
Free Electives	14	Must be earned from 2, 3, 4, or 5 level courses offered by the institute. Two of these credits may be earned from an 8-week summer industrial/research internship.
Total Credits	151	

3. The maximum number of allowed MOOCs credits under departmental / free elective categories will be limited to 6.

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**Details of NSS Activity and Socially/Locally Relevant Project**

At present 80 hours of NSS work is mandatory requirement for UG degree. A student is allowed to earn these hours by participating in different activities organized by the NSS team.

In the proposed curriculum NSS activity will be divided into three segments for a total of 90 hours.

- (a) 30 hours of mandatory participation in activities organized by the NSS team as earlier.
- (b) 30 hours of mandatory project work in a socially/locally relevant project during the summer after Semester 2. The student will identify, formulate and propose a solution to socially/locally relevant issues. The students are encouraged to work in their local communities. NSS team will form detailed guidelines for the same.
- (c) The project work in point (b) will be evaluated by an appropriate committee formed by NSS.
- (d) If the project is recommended for the next phase, in the summer after Semester 4 the students can complete the same and submit a final report to earn 30 hours of work.
- (e) If the project is not recommended by the NSS committee, then the student must earn another 30 hours through regular NSS activity.

Few of the best projects, if any, will be recognized and recommended by the NSS committee to the Institute's Innovation Council for consideration of financial support.

**Details of Life Skills courses**

To complete this course requirement, a student must register in any of the Life Skills courses such as creative arts (music/dance/painting etc.), physical wellness (sports/yoga/martial arts etc.) and lifestyle management courses (organized by GCU/health center etc.) during course registration on ERP. These activities (of about 30 hours) must be completed by Semester 6 with a Pass Grade.