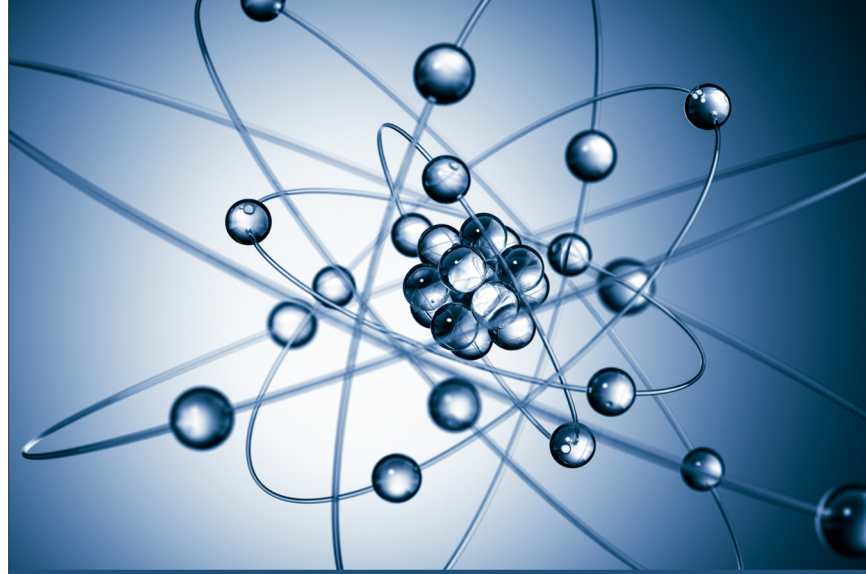


B. Tech. in Engineering Physics

(Interdisciplinary Programme)



Information Brochure

Dept. of Physics
Dept. of Electrical Engineering
Dept. of Mechanical, Materials and Aerospace Engineering



॥ सा विद्या या विमुक्तये ॥

ಭಾರತೀಯ ತಂತ್ರಜ್ಞಾನ ಸಂಸ್ಥೆ ಧಾರವಾಡ
भारतीय प्रौद्योगिकी संस्थान धारवाड़
Indian Institute of Technology Dharwad

The new B.Tech. programme in Engineering Physics aims to be a multidisciplinary programme for which necessary knowledge input is from various disciplines like Physics, Electrical Engineering, Mechanical, Materials, and Aerospace Engineering, and Humanities and Social Sciences.

The B.Tech. programme in Engineering Physics will contribute to the capacity building in some of the frontier areas like, quantum communication and computation, information security, engineering materials, atmospheric and ocean science, etc.

Credit Structure – Semester wise

Semester	Total Credits
I	35
II	38
III	35
IV	29
V	35
VI	30
VII	34
VIII	18
TOTAL	254

The minimum credit required for award of a B.Tech. degree at IIT Dharwad is between 252 and 264

SEMESTER I					
Course Code	Course Name	L	T	P	Total Credits
CH 101	Chemistry for Engineers: Fundamental concepts and Applications	3	1	0	8
MA101	Calculus	3	1	0	8
PH 101	Quantum Physics and Applications	2	1	0	6
CH 111	Chemistry Laboratory	0	0	3	3
ME 111	Engineering Graphics Laboratory	1	0	3	5
ME 113	Hands on Engineering Laboratory	0	0	3	3
HS 101	Introduction to Fine Arts	0	0	1	1 (P/NP)
HS102	Design Thinking and Creativity	1	0	0	1 (P/NP)
NSO 101	Sports	0	0	0	P/NP
TOTAL CREDITS					35

SEMESTER II					
Course Code	Course Name	L	T	P	Total Credits
BB 101	Essential Biology for Engineers	3	0	1	7
CS 101	Computer Programming	3	0	2	8
EE 101	Introduction to Electrical Systems and Electronic Circuits	3	0	0	6
MA 102	Linear Algebra	3	1	0	4
MA 103	Differential Equations – I	3	1	0	4
PH 102	Electricity and Magnetism	2	1	0	6
PH 111	Physics Laboratory	0	0	3	3
NSO 102	Sports	0	0	0	P/NP
TOTAL CREDITS					38



Course Code	Course Name	L	T	P	Total Credits
ALO *	Introductory Engineering Project	0	0	2	2

***ALO - Additional Learning Opportunities**

SEMESTER III					
Course Code	Course Name	L	T	P	Total Credits
1	Classical Mechanics	3	1	0	8
2	Engineering Mechanics	2	1	0	6
3	Thermodynamics	2	1	0	6
4	Signals and Systems	2	1	0	6
5	Introduction to Probability (Pre mid-sem)	3	0	0	3
6	Electronic Devices (Pre mid-sem)	3	0	0	3
7	Introduction to Analog Circuits (Post mid-sem)	3	0	0	3
TOTAL CREDITS					35

- NOTE:**
- 1) There are several existing/approved courses
 - 2) Most of the courses will be held along with other branches



SEMESTER IV					
Course Code	Course Name	L	T	P	Total Credits
1	Quantum Mechanics - I	3	1	0	8
2	Electrodynamics	2	1	0	6
3	Digital Systems	2	1	0	6
4	Engineering Physics Lab - I	0	0	3	3
5	Devices and Circuits Lab	0	0	3	3
6	Digital Systems Lab	0	0	3	3
TOTAL CREDITS					29



SEMESTER V					
Course Code	Course Name	L	T	P	Total Credits
1	Statistical Mechanics	2	1	0	6
2	Digital Signal Processing (Pre mid-sem)	3	0	0	3
3	Data Analysis (Post mid-sem)	2	1	0	3
4	Computer Architecture	3	0	0	6
5	Fluid Mechanics	2	1	0	6
6	Mechanics and Measurement Lab	1	0	3	5
7	Digital Signal Processing Lab	0	0	3	3
8	Computer Architecture Lab	0	0	3	3
TOTAL CREDITS					35



SEMESTER VI					
Course Code	Course Name	L	T	P	Total Credits
1	Condensed Matter Physics	2	1	0	6
2	Environmental Studies	3	0	0	6
3	Institute Elective – 1	2	1	0	6
4	Institute Elective – 2 / Project – 1	2	1	0	6
5	Engineering Physics Lab – II	0	0	3	3
6	Seminar – 1	0	0	3	3
TOTAL CREDITS					30

SEMESTER VII					
Course Code	Course Name	L	T	P	Total Credits
1	Economics	3	0	0	6
2	HSS Elective (Philosophy/Literature)	3	0	0	6
3	Seminar – 2	0	0	4	4
4	Institute Elective – 3	2	1	0	6
5	Institute Elective – 4	2	1	0	6
6	Institute Elective – 5 / Project – 2	2	1	0	6
TOTAL CREDITS					34



SEMESTER VIII					
Course Code	Course Name	L	T	P	Total Credits
1	Institute Elective – 6	2	1	0	6
2	Institute Elective – 7	2	1	0	6
3	Institute Elective – 8 / Project – 3	2	1	0	6
TOTAL CREDITS					18

SEMESTER I					
Course Code	Course Name	L	T	P	Total Credits
CH 101	Chemistry for Engineers: Fundamental concepts and Applications	3	1	0	8
MA101	Calculus	3	1	0	8
PH 101	Quantum Physics and Applications	2	1	0	6
CH 111	Chemistry Laboratory	0	0	3	3
ME 111	Engineering Graphics Laboratory	1	0	3	5
ME 113	Hands on Engineering Laboratory	0	0	3	3
HS 101	Introduction to Fine Arts	0	0	1	1 (P/NP)
HS102	Design Thinking and Creativity	1	0	0	1 (P/NP)
NSO 101	Sports	0	0	0	P/NP
TOTAL CREDITS					35

SEMESTER II					
Course Code	Course Name	L	T	P	Total Credits
BB 101	Essential Biology for Engineers	3	0	1	7
CS 101	Computer Programming	3	0	2	8
EE 101	Introduction to Electrical Systems and Electronic Circuits	3	0	0	6
MA 102	Linear Algebra	3	1	0	4
MA 103	Differential Equations – I	3	1	0	4
PH 102	Electricity and Magnetism	2	1	0	6
PH 111	Physics Laboratory	0	0	3	3
NSO 102	Sports	0	0	0	P/NP
TOTAL CREDITS					38

SEMESTER III					
Course Code	Course Name	L	T	P	Total Credits
1	Classical Mechanics	3	1	0	8
2	Engineering Mechanics	2	1	0	6
3	Thermodynamics	2	1	0	6
4	Signals and Systems	2	1	0	6
5	Introduction to Probability (Pre mid-sem)	3	0	0	3
6	Electronic Devices (Pre mid-sem)	3	0	0	3
7	Introduction to Analog Circuits (Post mid-sem)	3	0	0	3
TOTAL CREDITS					35

SEMESTER IV					
Course Code	Course Name	L	T	P	Total Credits
1	Quantum Mechanics - I	3	1	0	8
2	Electrodynamics	2	1	0	6
3	Digital Systems	2	1	0	6
4	Engineering Physics Lab - I	0	0	3	3
5	Devices and Circuits Lab	0	0	3	3
6	Digital Systems Lab	0	0	3	3
TOTAL CREDITS					29

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5	Fluid Mechanics	2	1	0	6
6	Mechanics and Measurement Lab	1	0	3	5
7	Digital Signal Processing Lab	0	0	3	3
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TOTAL CREDITS					35

SEMESTER VI					
Course Code	Course Name	L	T	P	Total Credits
1	Condensed Matter Physics	2	1	0	6
2	Environmental Studies	3	0	0	6
3	Institute Elective – 1	2	1	0	6
4	Institute Elective – 2 / Project – 1	2	1	0	6
5	Engineering Physics Lab – II	0	0	3	3
6	Seminar – 1	0	0	3	3
TOTAL CREDITS					30

SEMESTER VII					
Course Code	Course Name	L	T	P	Total Credits
1	Economics	3	0	0	6
2	HSS Elective (Philosophy/Literature)	3	0	0	6
3	Seminar – 2	0	0	4	4
4	Institute Elective – 3	2	1	0	6
5	Institute Elective – 4	2	1	0	6
6	Institute Elective – 5 / Project – 2	2	1	0	6
TOTAL CREDITS					34

SEMESTER VIII					
Course Code	Course Name	L	T	P	Total Credits
1	Institute Elective – 6	2	1	0	6
2	Institute Elective – 7	2	1	0	6
3	Institute Elective – 8 / Project – 3	2	1	0	6
TOTAL CREDITS					18



Physics

Electrodynamics
Classical Mechanics
Quantum Mechanics – I
Statistical Physics
Condensed Matter Physics

Engineering Physics Lab – I
Engineering Physics Lab – II

Electrical Engineering

Signals and Systems
Introduction to Probability (half-sem)
Data Analysis (half-sem)
Introduction to Analog Circuits (half-sem)
Digital Signal Processing (half-sem)
Electronic Devices (half-sem)
Digital Systems
Computer Architecture

Devices and Circuits Lab
Digital Signal Processing Lab
Digital Systems Lab
Computer Architecture Lab

Mechanical Engineering

Engineering Mechanics
Thermodynamics
Fluid Mechanics

Mechanics and Measurement Lab



Physics

- ❑ Quantum Mechanics – II
- ❑ Advanced Mathematical Physics
- ❑ Atomic and Molecular Physics
- ❑ Special Theory of Relativity
- ❑ Astrophysics for Engineers
- ❑ Photonics
- ❑ Introduction to Quantum Information and Computation (IQIC)
- ❑ Quantum Information Theory

Additionally students can do projects or up to eight institute electives as per their interest and courses offered by various other departments

8 institute electives

or

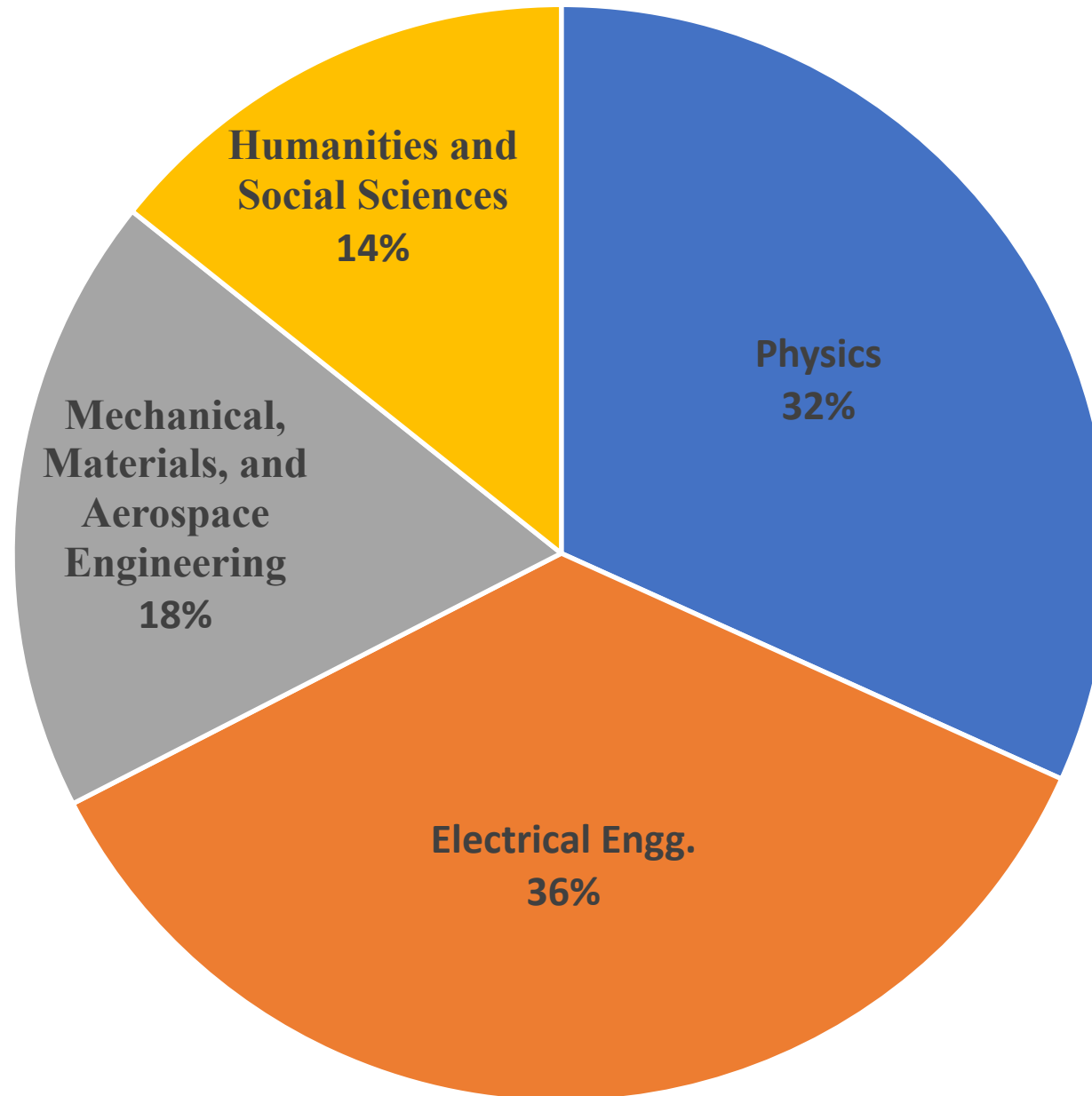
5 electives + permutation of
(3 electives, 3 projects)



Course Category	Credits
First year	73
Core - Theory	103
Core - Lab	23
Electives/Projects	48
Seminars	7
Total	254



Core Subjects	Credits
Physics	40
Electrical Engineering	45
Mechanical Engineering	23
HSS	18
Total	126



Spines of elective courses

Prospective in Physics	Quantum Information	Computational Physics
<ul style="list-style-type: none"> ❑ Astrophysics ❑ Atomic & Molecular Physics ❑ Introduction to Quantum Information & Computation ❑ Photonics ❑ Quantum Mechanics – II ❑ Special Theory of Relativity 	<ul style="list-style-type: none"> ❑ Algorithms ❑ Coding Theory ❑ Controls ❑ Information Theory ❑ Introduction to Quantum Information & Computation ❑ Optimization Principles of Communications ❑ Probability & Random Processes ❑ Quantum Information Theory 	<ul style="list-style-type: none"> ❑ Introduction to Computational Fluid Dynamics ❑ Parallel Computing ❑ Introduction to Quantum Information & Computation ❑ Software Systems

NOTE: 1) Depending on the expertise available more courses could be included into each of these spines
2) New spines could also be introduced in future



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