

B.TECH. VDSE (MV) PROGRAMME SCHEME

DEPARTMENT OF VLSI DESIGN AND SYSTEMS ENGINEERING
NATIONAL INSTITUTE OF TECHNOLOGY KURUKSHETRA
B.Tech. in VDSE (Microelectronics and VLSI Engineering) Programme Scheme

For Academic Year 2024-25 onwards

The Course Structure for B. Tech. Programme shall have the following categories of courses:

Sr. No.	Category
1	Institute Core (IC)
2	Non-Conventional Institute Core (NC)
3	Program Core (PC)
4	Program Elective (PE)
5	Open Elective (OE)

Course category explanation:

Course category	Explanation
IC	Basic Sciences
	Engineering Arts and Sciences
	Humanities and Social Sciences
PC	Courses specific to the relevant discipline
PE	Elective Courses specific to the relevant discipline
OE	Elective Courses from any domain
NC	Courses only qualifying in nature

Course category summary sheet:

Course Category	SEMESTER								Total Courses
	I	II	III	IV	V	VI	VII	VIII	
IC	06	05	01	01	-	-	01	-	14
PC (Th)	00	01	05	05	04	03	01	01	20
PC (Lab + Projects)		01	03	03	04	03	01	01	16
PE	-	-	-	-	00	01	02	01	04
OE	-	-	-	-	01	01	01	01	04
NC	01	01	-	-	-	01	-	-	03
Total Credits	21	22	22	21	21	20 + 2	20	17	61/166

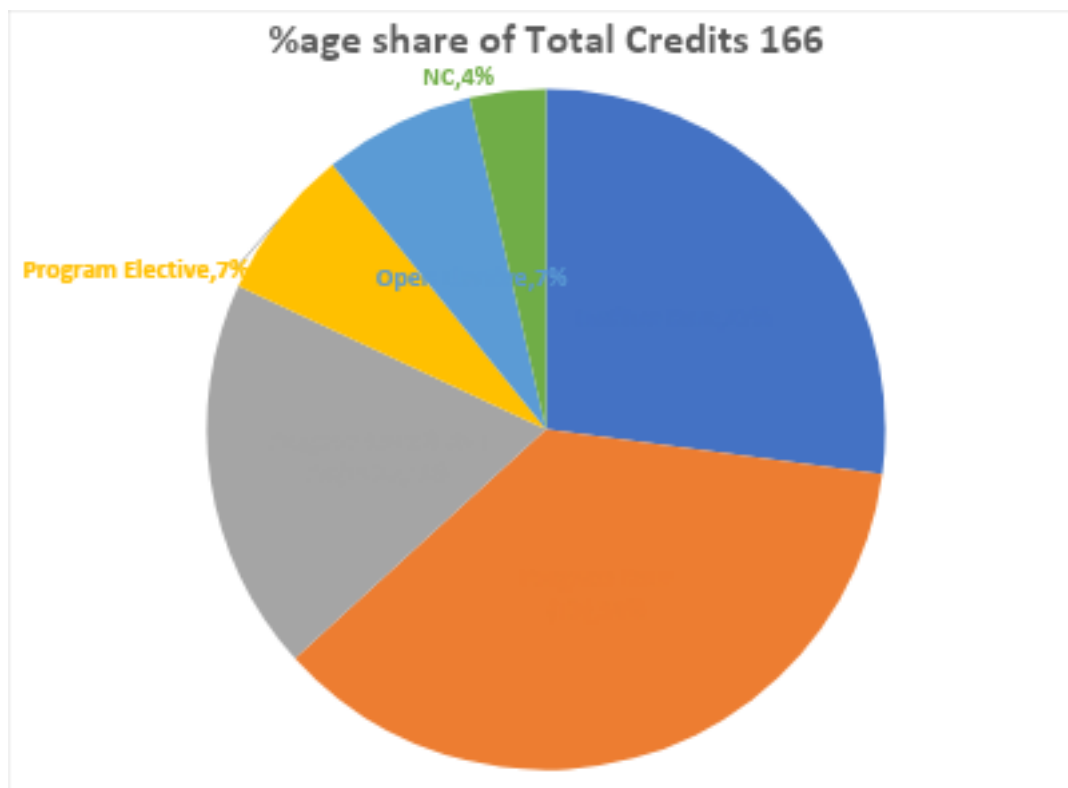
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Percentage Share of Total 166 Credits for each course category

Course Category	Total Courses	Total Credits	% of Credits
IC	14	45	27.10
PC (Th)	20	60	36.14
PC (Lab + Projects)	16	31	18.67
PE	4	12	7.22
OE	4	12	7.22
NC	3	6	3.61
Total	61	166	100

Percentage Share of Total 166 Credits for each course category



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Sr. No	Course Category	Course Title	Course Code	Lecture(L)/ Tutorial(T)/ Practical(P) per week			Credits
				L	T@	P	
1	IC	Economics for Engineers	HSIC 102	3	0	0	3#
		Business Studies	HSIC 104	3	0	0	
2		Differential Calculus and Differential Equations	MAIC 101	3	0	0	3
3		Engineering Physics	PHIC 101	3	0	2	4
4		Engineering Practice	MEIC 102	1	0	3	2
5		Problems Solving and Programming using C	CSIC 103	3	0	2	4
6		Energy and Environment Science	CHIC 101	2	0	2	3
7	NC	Indian Knowledge Systems	HSNC 106	2	0	0	2#
		Teachings of Gita	HSNC 107				
		French Language Skills	HSNC 108				
		German Language Skills	HSNC 109				
		Japanese Language Skills	HSNC 110				
		Thought Lab and Practices	HSNC 111				
8	NCC/ Sports /Yoga	SWNC 101	0	0	4	2*	
9	NSS/Club/Technical Societies	SWNC 102	0	0	4		
	Total						21

*Continuous Evaluation Model as per guidelines and the credit to be awarded at the end of VI semester based on Cumulative performance up to VI semester.

Minimum number of students required to register for the subject to be offered is 50 and maximum number is 80 in one lecture group, limited to only 2 lecture groups for any subject.

@ In lieu of tutorial, wherever necessary, assignments and interactions with the students may be conducted at their own convenience by the faculty concerned.

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Sr.No	Course Category	Course Title	Course Code	Lecture(L)/ Tutorial(T)/ Practical(P) per week			Credits
				L	T@	P	
1.	IC	Communication Skills in English	HSIC 101	2	0	2	3#
		Financial Education	HSIC 103	3	0	0	
2.		Integral Calculus and Difference Equations	MAIC 102	3	0	0	3
3.		Advanced Engg Physics	PHIC 103	3	0	2	4
4.		Engineering Graphics (Web Design)	CSIC 102	1	0	3	2
5.		Chemistry	CHIC 103	3	0	2	4
6.	NC	Human Values and Social Responsibility	HSNC 101	2	0	0	2#
		Sanskrit Language Skills	HSNC 102				
		Hindi Language Skills	HSNC 103				
		Telugu Language Skills	HSNC 104				
		Constitution of India	HSNC 105				
		Vedic Mathematics	MANC 101				
7.		NCC/ Sports /Yoga	SWNC 101	0	0	4	2*
8.		NSS/Club/Technical Societies	SWNC 102	0	0	4	
9.	PC	Circuit Theory (Theory & Lab)	MVPC 101	3	0	2	4
	Total						22

*Continuous Evaluation Model as per guidelines and the credit to be awarded at the end of VI semester based on Cumulative performance up to VI semester.

Minimum number of students required to register for the subject to be offered is 50 and maximum number is 80 in one lecture group, limited to only 2 lecture groups for any subject.

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Sr.No	Course Category	Course Title	Course Code	Lecture(L)/ Tutorial(T)/ Practical(P) per week			Credits
				L	T	P	
1	IC	Machine Learning & Data Analytics	CSIC 221	3	0	2	4
2	PC	Electronic Devices and Circuits	MVPC 201	3	0	0	3
3		Digital Design	MVPC 202	3	0	0	3
4		Signals and Systems	MVPC 203	3	0	0	3
5		Data Structure	MVPC 204	3	0	0	3
6		Computer and Processor Architecture	MVPC 205	3	0	0	3
7		Electronics-I Lab	MVPC 206	0	0	2	1
8		Digital Design Lab	MVPC 207	0	0	2	1
9		Programming with MATLAB Lab	MVPC 208	0	0	2	1
10	NC	NCC/ Sports /Yoga	SWNC 101	0	0	4	2*
11	NC	NSS/Club/Technical Societies	SWNC102	0	0	4	
Total							22

*Continuous Evaluation Model as per guidelines and the credit to be awarded at the end of VI semester based on Cumulative performance up to VI semester.

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SEMESTER —IV

Sr.No	Course Category	Course Title	Course Code	Lecture(L)/ Tutorial(T)/ Practical(P) per week			Credits
				L	T	P	
1	IC	Applied Linear Algebra	MAIC 204	3	0	0	3
2	PC	Analog Electronics	MVPC 209	3	0	0	3
3		Introduction to Communication Engineering	MVPC 210	3	0	0	3
4		Microcontrollers & Embedded System Design	MVPC 211	3	0	0	3
5		Control Systems	MVPC 212	3	0	0	3
6		Electromagnetic Field Theory	MVPC 213	3	0	0	3
7		Electronics-II Lab	MVPC 214	0	0	2	1
8		Communication Lab	MVPC 215	0	0	2	1
9		Microcontrollers and Embedded System Design Lab	MVPC 216	0	0	2	1
10	NC	NCC/ Sports /Yoga	SWNC 101	0	0	4	2*
11	NC	NSS/Club/Technical Societies	SWNC102	0	0	4	
Total							21

*Continuous Evaluation Model as per guidelines and the credit to be awarded at the end of VI semester based on Cumulative performance up to VI semester.

#Six-week internship during summer vacation Mandatory and it is to be evaluated in the V-Semester.

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SEMESTER —V

Sr. No	Course Category	Course Title	Course Code	Lecture(L)/ Tutorial(T)/ Practical(P) per week			Credits
				L	T	P	
1	PC	Linear Integrated Circuits	MVPC 301	3	1	0	3
2		Digital System Design with FPGAs	MVPC 302	3	1	0	3
3		Analog IC Design	MVPC 303	3	1	0	3
4		Digital IC Design	MVPC 304	3	1	0	3
5	OE	Open Elective-I	OE xxx	3	0	0	3
6	PC	IC Design Lab-I	MVPC 305	0	0	2	1
7		Linear Integrated Circuits Lab	MVPC 306	0	0	2	1
8		HDL lab	MVPC 307	0	0	2	1
9		Minor Project - I	MVPC 308	0	0	4	2
10		#Summer Training	MVPC 309	Six Weeks			1
11	NC	NCC/ Sports /Yoga	SWNC 101	0	0	4	2*
12	NC	NSS/Club/Technical Societies	SWNC102	0	0	4	
Total							21

*Continuous Evaluation Model as per guidelines and the credit to be awarded at the end of VI semester based on Cumulative performance up to VI semester.

Six-week internship after IV Semester in the summer vacation is mandatory, and it is to be evaluated in the V-Semester.

Sr.No	Course Title	Course Code
OPEN ELECTIVE-I		
1	HDL to Beginners	MVOE 301
2	Digital Logic Circuits using Logisim	MVOE 302

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Sr.No	Course Category	Course Title	Course Code	Lecture(L)/ Tutorial(T)/ Practical(P) per week			Credits
				L	T	P	
1	PC	Low Power Essentials	MVPC 310	3	1	0	3
2		VLSI Physical Design	MVPC 311	3	1	0	3
3		Digital VLSI Testing	MVPC 312	3	1	0	3
4	PE	Program Elective –I	MVPE xxx	3	0	0	3
5	OE	Open Elective-II	xx OE xxx	3	0	0	3
6	PC	PCB Design Lab	MVPC 313	0	0	2	1
7		IC Design Lab-II	MVPC 314	0	0	2	1
		Minor Project - II	MVPC 315	0	0	6	3
8	NC	NCC/ Sports /Yoga	SWNC 101	0	0	4	2*
9	NC	NSS/Club/Technical Societies	SWNC102	0	0	4	
Total							20+2*

*Continuous Evaluation Model as per guidelines and the credit to be awarded at the end of VI semester based on Cumulative performance up to VI semester.

#Six-week internship during summer vacation mandatory and it is to be evaluated in VII Semester.

Sr.No	Course Title	Course Code
PROGRAM ELECTIVES - I		
1	Memory Design	MVPE 316
2	Introduction to Photonics	MVPE 317
3	Advanced Semiconductor Devices	MVPE 318
4	Digital Signal Processing for FPGA	MVPE 319
5	Information Theory and Coding	MVPE 320
6	FSM's and Real Time Applications	MVPE 321
7	MOOCs [#]	MVOC xxx
8	Courses from Industry Experts [#]	MVIE xxx

#The departmental advisory committee (DAC) will decide and float the specific MOOCs (Swayam/NPTEL) and courses from industry experts as per the latest research and industry requirements.

Sr.No	Course Title	Course Code
OPEN ELECTIVE-II		
1	Drone Systems Design	MVOE 303
2	FSM Controllers	MVOE 304

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Sr.No	Course Category	Course Title	Course Code	Lecture(L)/ Tutorial(T)/ Practical(P) per week			Credits
				L	T	P	
1	IC	Entrepreneurship & Start Ups	XXIC XXX	3	0	0	3
2	PC	Micro and Nano Fabrication	MVPC 401	3	0	0	3
3	PE	Program Elective –II	MVPE xxx	3	0	0	3
4		Program Elective –III	MVPE xxx	3	0	0	3
5	OE	Open Elective-III	OE xxx	3	0	0	3
6	PC	Major Project-I	MVPC 402	0	0	8	4
7		#Summer Training	MVPC 403	Six Weeks			1
Total							20

Six-week internship after VI Semester in the summer vacation is mandatory, and it is to be evaluated in the VII-Semester.

Sr.No	Course Title	Course Code
PROGRAM ELECTIVES – II/III		
1	RF IC Design Fundamentals	MVPE 407
2	Bio-Sensors	MVPE 408
3	Quantum Communication	MVPE 409
4	Semiconductor Device Modelling	MVPE 410
5	Internet of Things	MVPE 411
6	IC Reliability	MVPE 412
7	Advanced Digital System Design	MVPE 413
8	Heterojunction Device Physics	MVPE 414
9	Data Conversion System Design	MVPE 415
10	EV Battery Management Systems	MVPE 416
11	MOOCs [#]	MVOC xxx
12	Courses from Industry Experts [#]	MVIE xxx

#The departmental advisory committee (DAC) will decide and float the specific MOOCs (Swayam/NPTEL) and courses from industry experts as per the latest research and industry requirements.

Sr.No	Course Title	Course Code
OPEN ELECTIVE-III		
1	Tiny Machine Learning (TinyML)	MVOE 401
2	Nano Electronics Fundamentals	MVOE 402

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Sr.No	Course Category	Course Title	Course Code	Lecture(L)/ Tutorial(T)/ Practical(P) per week			Credits
				L	T	P	
1	PC*	IC Manufacturing and Packaging	MVPC 404	3	0	0	3
	PE*	Program Elective-IV	MVPE xxx	3	0	0	3
2	OE*	Open Elective-IV	OE xxx	3	0	0	3
3	PC	Internship/Major Project –II	MVPC 405	0	0	12	6
4		Comprehensive Viva	MVPC 406	0	0	0	2
Total							17

Sr.No	Course Title	Course Code
PROGRAM ELECTIVES - IV		
1	Digital Signal Processing for Embedded Systems	MVPE 417
2	Neuromorphic Computing	MVPE 418
3	e-Waste Management and Recycling	MVPE 419
4	Accelerated Embedded Systems	MVPE 420
5	Spintronics	MVPE 421
6	Error Correcting Codes (ECC)	MVPE 422
7	MOOCs [#]	MVOC xxx

#The departmental advisory committee (DAC) will decide and float the specific MOOCs (Swayam/NPTEL) as per the latest research and industry requirements.

Sr.No	Course Title	Course Code
OPEN ELECTIVE-IV		
1	Bio-Medical Electronics	MVOE 403
2	Communication Technologies for Embedded Systems	MVOE 404

* The list of the MOOCs (Swayam/NPTEL) will be suggested by the departmental advisory committee (DAC) in every academic year.

* The students, who are going for internships, are required to opt three MOOCs (Swayam/NPTEL) courses from the list suggested by the DAC.

B.TECH. VDSE (MV) PROGRAMME SCHEME

The following members attended the members of the Board of Studies (BOS) meeting held on 16th January 2026:

A)

- 1) Professor (Dr.) R. K. Sharma (Chairman, BOS)
- 2) Professor (Dr.) Anand Darji, SVNIT Surat
- 3) Mr. Rohit Ohlayan, Synopsys
- 4) Dr. Ashutosh Nandi, Assistant Professor, NIT KKR
- 5) Dr. Gaurav Saini, Assistant Professor, NIT KKR
- 6) Dr. Dharmendra Singh Yadav, Assistant Professor, NIT KKR
- 7) Dr. Amit Kumar, Assistant Professor, NIT KKR
- 8) Dr. Ankush Vashistha, Assistant Professor, NIT KKR

B)

- 1) Professor (Dr.) Santosh Vishwakarma, IIT Indore did not attend the meeting.

(R. K. Sharma)	(Anand Darji)	(Rohit Ohlayan)
(Ashutosh Nandi)	(Gaurav Saini)	(Dharmendra Singh Yadav)
(Amit Kumar)	(Ankush Vashistha)	