2.2.2 _ Support to Slow Learners
Remedial classes to reinforce learning
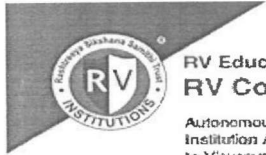
Department of Information Science and Engineering

Remedial Class Record

Academic Year: 2022-23

Class: B.E

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REMEDIAL CLASS

Remedial classes are conducted for slow learners apart from regular classes for improving their performance. The College arranges these *classes* after regular teaching hours.

OBJECTIVES:

- *To develop the academic skills.*
- *To enhance the level of understanding of students in required subjects.*

METHODOLOGY:

- Identification of slow learners on the basis of performance in CIE 1 and CIE 2.
- Time table preparation
- Faculty allotment
- Conduction of Remedial Classes
- Group interaction is encouraged by involving meritorious students.
- Remedial examinations are held to test the knowledge acquired during class hours.
- Report preparation and submission.

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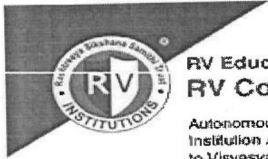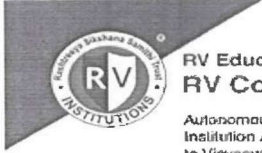University, Belagavi

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DEPARTMENT OF INFORMATION SCIENCE AND ENGINEERING

NOTICE

The Remedial Classes will be conducted for the below mentioned courses from 21.09.2022 to 30.09.2022. It is mandatory for all students whose name are displayed in the list to attend the mentioned Remedial Classes as per the given schedule.

DATE/ TIME	SEMESTER	NAME OF FACULTY/ COURSE NAME/CODE	TOPIC COVERED
21.09.2022 5PM TO 6PM	IV	Poornima k Theory of Computation-18IS46	Closure properties of Regular Languages, Context-free grammars, Simplification of CFG, Normal forms of CFGs
22.09.2022 5PM TO 6PM	IV	Sushmitha N Computer Networks-21CS45	Shortest Path Routing, Flooding, Distance Vector Routing, Link state Routing, Hierarchical Routing
28.09.2022 5PM TO 6PM	VI	Vanishree K Introduction to Management and Economics-18HEM61	Strategic Management Process, Contemporary Theories of Motivation: Adam's Equity & Vroom's Expectancy Theory, Microeconomics and Macroeconomics, Theories and Models to Understand Economic Issues

Head of the Department

Time Table

Date	Time	Course/Code	Faculty	Venue
21.09.2022	5PM TO 6PM	Theory of Computation-18IS46	Poornima K	IS224
22.09.2022	5PM TO 6PM	Computer Networks-21CS45	Sushmitha N	IS224
28.09.2022	5PM TO 6PM	Introduction to Management and Economics-18HEM61	Vanishree K	IS106A

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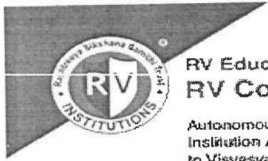University, Belagavi

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List of Students

Class: IS224		Academic Year:2022-2023
	Subject: Theory of Computation-18IS46	

SL NO.	USN	NAME OF THE STUDENT
1	1RV21IS036	PRAKASH SHINDE
2	1RV21IS043	S S ASHISH
3	1RV21IS047	SANJANA PATWARI
4	1RV21IS049	SHREEJA P KULKARNI
5	1RV21IS053	SIDDHANTH N KAGGANTY
6	1RV22IS405	SHRAVAN KUMAR
7	1RV21IS019	ISHAANI R GOWDA
8	1RV21IS024	M R ABHISHEK BHARADWAJ

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Class: IS110		Academic Year:2022-2023
Subject: Computer Networks-21CS45		
SL NO.	USN	NAME OF THE STUDENT
1	1RV21IS024	M R ABHISHEK BHARADWAJ
2	1RV21IS036	PRAKASH SHINDE
3	1RV21IS021	JAYANTH RAO P M
4	1RV21IS004	ABHINAV BAGALKOT

Class: IS110		Academic Year:2022-2023
Subject: Introduction to Management and Economics-18HEM61		
SL NO.	USN	NAME OF THE STUDENT
1	1RV21IS402	PRAMOD J

HoD
Head of the Department
Dept. of Information Science & Engg.
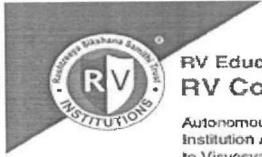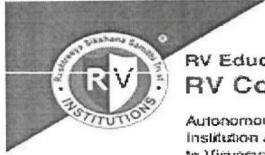R.V College of Engineering
Bangalore-560 059

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Students Performance

Class: IS224			Academic Year:2022-2023		
Subject: Theory of Computation-18IS46					
SL NO.	USN	NAME OF THE STUDENT	CIE 1	CIE 2	CIE 3
1	1RV21IS036	PRAKASH SHINDE	3	4	7
2	1RV21IS043	S S ASHISH	15	20	25
3	1RV21IS047	SANJANA PATWARI	0	19.5	27
4	1RV21IS049	SHREEJA P KULKARNI	20	18	14
5	1RV21IS053	SIDDHANTH N KAGGANTY	14	8	28
6	1RV22IS405	SHRAVAN KUMAR	20	11	0
7	1RV21IS019	ISHAANI R GOWDA	17	18	12
8	1RV21IS024	M R ABHISHEK BHARADWAJ	19	15	24

Class: IS224			Academic Year:2022-2023		
Subject: Computer Networks-21CS45					
SL NO.	USN	NAME OF THE STUDENT	CIE 1	CIE 2	CIE 3
1	1RV21IS024	M R ABHISHEK BHARADWAJ	18	27	0

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2	1RV21IS036	PRAKASH SHINDE	9	14	10
3	1RV21IS021	JAYANTH RAO P M	14	29	25
4	1RV21IS004	ABHINAV BAGALKOT	21	38	45

Class: IS106A			Academic Year:2022-2023		
Subject: Introduction to Management and Economics-18HEM61					
SL NO.	USN	NAME OF THE STUDENT	CIE 1	CIE 2	CIE 3
1	1RV21IS402	PRAMOD J	AB	25	32

Head of the Department

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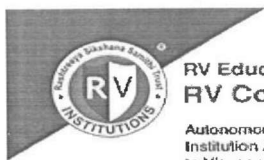Autonomous
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DEPARTMENT OF MATHEMATICS

Remedial Class Record

Academic Year: 2022-23

Class: B.E   **Semester:** I
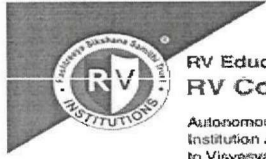
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REMEDIAL CLASS

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- *To enhance the level of understanding of students in required subjects.*

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- Report preparation and submission.

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Feb 2023

DEPARTMENT OF MATHEMATICS

Remedial class Schedule

Course & Course code: Fundamentals of Linear Algebra, Calculus and Numerical Methods, (22MA11A)

SI .NO	Date	Faculty
1	30.01.2023	Y. Sailaja
2	06.02.2023	Dr. Niranjan P K
3	13.02.2023	Dr. Harish M
4	06.03.2023	Dr. Hemanth Kumar . H. K

Dear all,

1. Kindly identify the slow learners (students who got <20 marks in Test-I) announce remedial class schedule in your respective classes.

2. Teach Test-II portions to improve their marks in next test.

Y. Sailaja.

Jayalatha. G
HoD I/c

PROFESSOR
Department of Mat...
RVCE, Rangalore-560 ...

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DEPARTMENT OF MATHEMATICS
ODD SEMESTER 2022 – 23
I Semester Remedial class allotment
(23-01-2023 to 18-02-2023 and 20-02-2023 to 16-03-2023)
CHEMISTRY CYCLE

Course: Fundamentals of Linear Algebra ,Calculus and Statistics (22MA11C)
Course Coordinator: Dr. Nivya Muchikel

Faculty	Day	Time
Dr. Harish M & Dr. T N Sakshath	Thursday	2.30 to 3.30pm
Dr. Hemanth Kumar B & Dr. Nivya Muchikel	Friday	2.30 to 3.30pm

Dear all, kindly take the remedial classes (for those who scored marks < 20 in test-1) as scheduled this week and next week for covering the portions given for CIE-I.

Course Coordinator

HOD Mathematics FIC

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Date: 6/2/2023

Department of Mathematics
Remedial Class Attendance Sheet

Course: Fundamentals of Linear Algebra, calculus and Numerical Methods (22MA11A)

Sl. No.	USN	Students Name	Signature
1.	RVCE RV22REC068	Avaneesh U. Vasishta	Av
2	RVCE22BEC037	AVIRAL JAIN	Aviral
3	RVCE22BEC018	Dhanush Kiran.V.	Dha
4	RVCE22BEC059	GAGANDEEP SINGH	Gags
5	RVCE22BEC187	Gyanesh Rathod	Gyanesh
6	RVCE22BEC032	Harshith S.	Harsh
7	RVCE22BTE011	Nanya Sharma	Nay
8	RVCE22BTE051	SANDHYA	Sandhy
9	RVCE22BEE056	A chalukya	
10	RVCE22BEE007	Dhanush Granapathy AA	Dda
11	RVCE22BEE005	IMAD RIYAZ	Imad
12	RVCE22BEE013	Nikhil Kumar	Nikhi
13	RVCE22BEE021	Sanjay Banjara	Sanjay
14	RVCE22BEE008	Soumodeep nandi	Sum

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Date. 13/2/2023

Department of Mathematics
Remedial Class Attendance Sheet

Course: Fundamentals of Linear Algebra, calculus and Numerical Methods (22MA11A)

Sl. No.	USN	Students Name	Signature
1.	RVCE22BEE002	Siri M	Siri M
2.	RVCE22BEE015	Vaibhav C kannur	Vaibhav
3.	RVCE22BEE024	Vansh Vikas Jain	Vansh
4.	RVCE22BEE008	Soummodeep nandi	
5.	RVCE22BEE005	IMAD RIYAZ	Moh
6	RVCE22BTE021	SANDYA	Sandi
7	RVCE22BTE009	Soujar. B.N.	Souj

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Department of Mathematics
Remedial Class Attendance Sheet

03/02/2023

Sl. No.	USN	Students Name	Signature
1.	RVCE22BCY033	Suhan MK	
2.	RVCE22BCY017	ARYAN chaturvedi	
3.	RVCE22BCY038	Bhakti Vyas	
4.	RVCE22BCY010	Arman Singh Bhati	
5.	RVCE22BCY039	swar Lodaya	
6.	RVCE22BCY002	Venkat Sreyas Xelishetty	
I CSA			
1.	RVCE22BCCS062	Haritha R	
2.	RVCE22BSCS014	Akshat	
3	RVCE22BSCS199	~~Adti~~ Aditya sharma	
4.	RVCE22BSCS224	Eisa Jameel	
I EE			
1.	RVCE22BEE013	Nikhil kumar	
2.	RVCE22BEE008	Soumodeep Nandi	
3	RVCE22BEE005	Imad Riyaz	
4	RVCE22BEE021	Sanjay Banjara	
5	RVCE22BEE024	Vansh Vikas Jain	

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Department of Mathematics
Remedial Class Attendance Sheet

9/03/2023

Sl. No.	USN	Students Name	Signature
1	RVCE22BAI062	RISHIKESH KAKADE	
2	RVCE22BAI005	TANISH S	Tanish
3	RVCE22BAI034	ABHISHEK BHARADWAJ	Abhishek B
4	RVCE22BAI016	JASWANTH REDDY	Jaswanth

M. Harish

Department of Chemical Engineering

Remedial Class Record

Academic Year: 2022-23

Class: B.E   **Semester:** IV

REMEDIAL CLASS

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- **Report preparation and submission.**

Remedial Classes for Chemical Reaction Engineering (2022-23)
CHEMICAL REACTION ENGINEERING (21CH44)
10/7/2023 to 30/7/2023

The following students are required to attend the remedial classes for Chemical Reaction Engineering

USN	NAME
1RV21CH001	ABHINAY KUMAR
1RV21CH003	AMRIT RAJ SATYAM
1RV21CH005	ANIRUDH BHAT
1RV21CH006	ARYAN R JAIN
1RV21CH007	BANDI VIJAYA
1RV21CH008	BHAVANI
1RV21CH009	BUVAN K C
1RV21CH013	DEVENDHU
1RV21CH015	HARSHIT SINHA
1RV21CH016	KHUSHI NITIN
1RV21CH017	SATHYAKRISHNA
1RV21CH018	M VIJAYA
1RV21CH019	MANGALAM
1RV21CH020	MEDHAVI
1RV21CH022	NEMANI MIHIRA
1RV21CH024	OM SANJAY TELANG
1RV21CH025	OMISHA SINGH
1RV21CH028	ROHIT METRY
1RV21CH029	SACHIN SHANBHAG
1RV21CH030	SAMEER KULKARNI
1RV21CH031	SHASHANK N B
1RV21CH037	TEJASWINI N
1RV21CH041	WALEED SIRAJ
1RV22CH404	SWAROOP K

Class TimeTable

Program				CH104
				Classroom No.
Semester	IV Remedial TT	Chemical Engineering		w.e.f July 10th 2023
		Section	2022-23	EVEN SEM

Program: UG CH 4

DAY \ TIME	9:00 – 10:00	10:00 – 11:00	11:00 – 11:30	11:30 – 12:30	12:30 – 1:30	1:30 – 2:30	2:30 – 3:30	3:30 – 4:30
MONDAY								
TUESDAY								
WEDNESDAY						Lunch Break		
THURSDAY							21CH44 (CV)	21CH45 (VK)
FRIDAY								21CH43 (RS)
SATURDAY	21CH44 (CV)	21CH45 (VK)		21CH43 (RS)				

Course Code – Faculty – Email Id

21CH44- Dr Vidya C- vidyac@rvce.edu.in

21CH45- Dr Vinod Kallur-vinodkallur@rvce.edu.in

21CH43-Dr R Suresh-sureshr@rvce.edu.in

Dept. TTO

Dept. Head
Head of the Department
Department of Chemical Engineering
RV College of Engineering®
Mysuru Road, Bengaluru-560 059

Department of Chemical Engineering
R.V. College of Engineering,
(An autonomous institution affiliated to VTU, Belagavi)
Bangalore-560059

Course Title: Chemical Reaction Engineering	*Course Code*: 21CH44
Semester: IV	*Academic Year:2022 –23*

TOPICS COVERED IN REMEDIAL CLASS

Date	SUB TOPICS
6/7/2023	Size comparison of single reactors, Batch reactor with plug flow reactor, comparison of mixed flow and plug flow reactor, problems
6/7/2023	Comparison of CSTR and PFR for first order reactions Graphical comparison of CSTR and PFR, multiple reactor systems,
8/7/2023	CSTRs/MFRs in series, Different size CSTRs in series, problems
8/7/2023	Finding conversion in a given system, Problems on the same
13/7/2023	Optimum combination of reactors: equal sized CSTRs in series, CSTRs in parallel, problems
13/7/2023	PFR in series, PFR in parallel , Problems on the same
15/7/2023	Reactors of different types in series, recycle reactor
15/7/2023	Solving problems on the combination of reactors, Discussion on MCQs for the chapter

Chemical Reaction Engg2 1C1444

USN	NAME	QUIZ 1	CIE_1	QUIZ_2	CIE_2	QUIZ_3	CIE_3	Quiz Final_20	Test_1 Final_100	Test Final al_4	(Q+T)_60	EL_P1_20	EL_P2_20	EL_40	CIE_100	Lab_Test_10	Lab_E L_10	Lab_Rec_30	Lab_40	LAB_50	CIE_150
		10	50	10	50	10	50	20	100	40	60	20	20	40	100	10	10	30	40	50	150
1RV21CH001	ABHINAY KUMAR	1	0	3	0	3	3	6	3	2	8	15	15	30	38	0	5	22	27	27	65
1RV21CH003	AMRIT RAJ SATYAM	3	15	6	0	2	0	9	15	6	15	15	15	30	45	0	5	22	27	27	72
1RV21CH005	ANIRUDH BHAT	7	0	4	14	5	14	12	28	12	24	15	15	30	54	4	5	25	30	34	88
1RV21CH006	ARYAN R JAIN	4	0	0	21	6	20	10	41	17	27	15	15	30	57	0	5	23	28	28	85
1RV21CH007	BANDI VIJAYA	7	5	7	30	9	24	16	54	22	38	17	18	35	73	5	6	25	31	36	109
1RV21CH008	BHAVANI	2	5	8	33	4	18	12	51	21	33	19	19	38	71	6	7	28	35	41	112
1RV21CH009	BUVAN K C	6	0	4	25	8	13	14	38	16	30	17	18	35	65	0	8	28	36	36	101
1RV21CH010	CHETHAN N	4	43	8	38	5	0	13	81	33	46	17	17	34	80	8	9	29	38	46	126
1RV21CH011	CHIEKLIT BANSAL	2	17	6	33	6	17	12	50	20	32	17	17	34	66	5	7	27	34	39	105
1RV21CH012	DARSHU PRIYA K S	6	50	5	34	8	43	14	93	38	52	19	19	38	90	9	9	30	39	48	138
1RV21CH013	DEVENDHU THATTAT	5	0	4	13	5	10	10	23	10	20	17	17	34	54	5	6	25	31	36	90
1RV21CH014	GURPUR PAVAN PAI	9	43	9	47	6	47	18	94	38	56	18	18	36	92	9	9	30	39	48	140
1RV21CH015	HARSHIT SINHA	0	0	4	22	2	18	6	40	16	22	15	15	30	52	0	5	22	27	27	79
1RV21CH016	KHUSHI NITIN SHRIVASTAVA	0	0	3	11	6	13	9	24	10	19	18	18	36	55	7	8	25	33	40	95
1RV21CH017	KUDLIGI RAGHURAM SATHYAKRISHNA	0	0	3	21	8	38	11	59	24	35	19	19	38	73	9	9	29	38	47	120
1RV21CH018	M VIJAYA RAGHAVAN	5	0	4	0	5	17	10	17	7	17	16	17	33	50	7	5	27	32	39	89
1RV21CH019	MANGALAM	5	0	5	14	5	19	10	33	14	24	18	18	36	60	8	8	29	37	45	105
1RV21CH020	MEDHAVI	5	12	5	17	7	16	12	33	14	26	18	18	36	62	7	7	28	35	42	104
1RV21CH022	NEMANI MIHIRA GAYATHRI	4	0	4	44	7	47	11	91	37	48	19	19	38	86	9	9	29	38	47	133
1RV21CH023	NIDHI P	0	41	7	29	7	42	14	83	34	48	19	19	38	86	9	9	29	38	47	133
1RV21CH024	OM SANJAY TELANG	5	11	3	17	5	22	10	39	16	26	17	18	35	61	7	7	25	25	32	93
1RV21CH025	OMISHA SINGH	3	5	5	12	9	17	14	29	12	26	18	18	35	61	7	7	26	33	40	101
1RV21CH026	PRAMOD SHANKAR T	9	43	5	43	7	30	16	86	35	51	18	18	36	87	9	9	30	39	48	135
1RV21CH027	PRANAV MISHRA	8	45	0	18	5	0	13	63	26	39	18	18	36	75	9	8	28	36	45	120
1RV21CH028	ROHIT METRY	4	18	3	0	6	17	10	35	14	24	17	18	35	59	8	7	26	33	41	100
1RV21CH029	SACHIN SHANBHAG	7	0	8	20	5	10	15	30	12	27	17	18	35	62	8	7	27	34	42	104
1RV21CH030	SAMEER KULKARNI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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1RV21CH031	SHASHANK N B	6	0	6	8	3	23	12	31	13	25	17	18	35	60	7	7	27	34	41	**101**
1RV21CH032	SHIVANGI RAI	10	43	4	24	9	35	19	78	32	51	18	19	37	88	9	9	29	38	47	**135**
1RV21CH034	SHRIDHARA A DIXIT	6	32	7	15	7	34	14	66	27	41	18	17	35	76	8	8	29	37	45	**121**
1RV21CH035	SHRUTHISHREE S	4	30	8	18	7	24	15	54	22	37	18	18	36	73	9	9	29	38	47	**120**
1RV21CH036	SINCHANA D M	7	19	5	40	6	43	13	83	34	47	19	18	37	84	8	8	27	35	43	**127**
1RV21CH037	TEJASWINI N	0	16	6	40	7	22	13	62	25	38	17	18	35	73	8	8	27	35	43	**116**
1RV21CH039	VAIBHAV PARESH SHETTY	7	35	5	45	5	40	12	85	34	46	18	18	36	82	9	9	30	39	48	**130**
1RV21CH040	VIDHU AGARWAL	4	20	3	21	4	0	8	41	17	25	17	18	35	60	5	7	27	34	39	**99**
1RV21CH041	WALEED SIRAJ	0	0	5	15	5	4	10	19	8	18	15	15	30	48	5	6	23	29	34	**82**
1RV22CH400	ABHISHEK S RAO	4	27	7	16	9	29	16	56	23	39	17	18	35	74	8	8	28	36	44	**118**
1RV22CH401	ANUSHREE M	8	43	3	35	7	43	15	86	35	50	18	19	37	87	9	9	30	39	48	**135**
1RV22CH402	GANESHA	5	32	3	16	3	0	8	48	20	28	18	18	36	64	8	9	28	37	45	**109**
1RV22CH403	KEERTHAN M SHETTY	4	32	3	40	6	0	10	72	29	39	18	18	36	75	9	9	27	36	45	**120**
1RV22CH404	SWAROOP K	4	12	3	41	6	0	10	53	22	32	18	18	37	69	9	9	29	38	47	**116**

There was improvement in marks from Test 1 to Test 2 & 3

Test 1 to Test 2 & 3

Head of the Department
Department of Chemical Engineering
RV College of Engineering®
Mysuru Road, Bengaluru-560 059

RV College of Engineering®
Mysore Road, RV Vidyaniketan Post,
Bengaluru - 560059, Karnataka, India

Department of Chemistry

Remedial Class Record

Academic Year: 2023-24

Class: B.E

Semester: Odd

REMEDIAL CLASS

Remedial classes are conducted for slow learners apart from regular classes for improving their performance. The College arranges these *classes* after regular teaching hours.

OBJECTIVES:

- *To develop the academic skills.*
- *To enhance the level of understanding of students in required subjects.*

METHODOLOGY:

- **Identification of slow learners on the basis of performance in CIE 1 and CIE 2.**
- **Time table preparation**
- **Faculty allotment**
- **Conduction of Remedial Classes**
- **Group interaction is encouraged by involving meritorious students.**
- **Remedial examinations are held to test the knowledge acquired during class hours.**
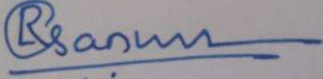- **Report preparation and submission.**

Department Circulars

DEPARTMENT OF   CHEMISTRY

NOTICE

Remedial Classes in Chemistry of Smart Materials and Devices subject for   1st Semester Students is scheduled from 2nd Dec 2023   to 22nd Dec 2023. It is mandatory for all students whose name are displayed in the list to attend the mentioned Remedial Classes as per the given schedule.

DAY & DATE	TIME	NAME OF FACULTY	TOPIC COVERED
04.12.2023	5pm to 6pm	Dr Divakar S G	Fabrication of smart materials (LCD, OLED and LEC)
11.12.2024	5pm to 6pm	Dr Sham Aan MP	Carbon nano tubes, Graphene, Sensors

Head, Dept. of Chemistry
RV College of Engineering
Bengaluru - 560 059

Signature

Head of the Department

Time Table

RVCE/DA/ **1105** /2023-24   November 3, 2023

ACADEMIC CALENDAR FOR I SEMESTER B.E. PROGRAMS
(Academic year 2023-2024 Odd Sem)

Sl. No.	ACTIVITY	DATES From	DATES To	REMARKS
1	Commencement of I Sem B.E. Programs	25 Sept 2023	***	
2	Induction Programme	25 Sept 2023	07 Oct 2023	Two Weeks
3	Selection and Finalization of Experiential Learning topics	15 Oct 2023	15 Nov 2023	Core Courses, ETC, ESC & PLC
4	Quiz – I	25 Oct 2023	18 Nov 2023	Online mode in Quiklrn Platform
5	Test - I	20 Nov 2023	22 Nov 2023	OFFLINE MODE
6	Faculty Appraisal by Students	27 Nov 2023	02 Dec 2023	Phase I
7	Review of student performance and dispatch of progress report – I	02 Dec 2023	****	CIE I Progress Reports
8	Remedial classes for students	02 Dec 2023	22 Dec 2023	After CIE I
9	**Experiential Learning Evaluation - Phase I**	04 Dec 2023	09 Dec 2023	Phase I Evaluation for 20 Marks
10	Parents -Teachers Meeting	09 Dec 2023	****	****
11	Quiz – II	04 Dec 2023	26 Dec 2023	Online mode in quiklrn Platform
12	Test - II	27 Dec 2023	29 Dec 2023	OFFLINE MODE
13	Remedial classes for students	01 Jan 2024	29 Jan 2024	After CIE-II
14	Review of student performance and dispatch of progress report – II	05 Jan 2024	****	CIE II Progress Reports
15	Faculty Appraisal by students	15 Jan 2024	27 Jan 2024	Phase II
16	Skill Developement Programme	08 Jan 2024	13 Jan 2024	One Week
17	Improvement CIE	22 Jan 2024	25 Jan 2024	Test & Quiz
18	Experiential Learning Evaluation - Phase II ***	29 Jan 2024	01 Feb 2024	Final Evaluation of EL in Exhibition Mode
19	Lab CIE	2 Feb 2024	5 Feb 2024	Lab CIE for PIC, CHY & PHY
20	**Last working day for odd Sem**	05 Feb 2024	****	****
21	Finalization of CIE Marks	07 Feb 2024		
22	Submission of Final CIE in SAP	09 Feb 2024	****	****
23	Issue of Hall Tickets	10 Feb 2024		

List of Students

Class: 1st year Subject: CSMD Academic Year:2023-24		
SL NO.	**USN**	**NAME OF THE STUDENT**
1	RVCE23BBT050	BEERLING
2	RVCE23BBT042	RAHUL GOWDA S P
3	1RV23IS039	DEEKSHA NAIKAR
4	RVCE23BIS096	Srikanth R
5	RVCE23BIS023	R Abhi

Signature
Head of the Department

List of Topics to be Discussed

SL NO.	TOPIC	TEACHING HOUR
1	Fabrication of smart materials (LCD, OLED and LEC)	*1 hour*
2	Carbon nano tubes, Graphene, Sensors	*1 hour*

Head, Dept. of Chemistry
RV College of Engineering
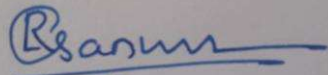Bengaluru - 560 059

Signature
Head of the Department

Students Performance

SL NO.	USN	NAME OF THE STUDENT	CIE 1	CIE 2	CIE 3
	Class:	**Subject:**	**Academic Year:**		
1	RVCE23BBT050	BEERLING	20	19	25
2	RVCE23BBT042	RAHUL GOWDA S P	20	32	40
3	1RV23IS039	DEEKSHA NAIKAR	11	25	
4	RVCE23BIS096	Srikanth R	19	34	39
5	RVCE23BIS023	R Abhi	17	34	36
6					
7					
8					
9					

Head, Dept. of Chemistry
RV College of Engineering
Bengaluru - 560 059

Signature
Head of the Department

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RVCE/DA/   /2021-2022

Tuesday, July 12, 2022

CIRCULAR

SUB: REMEDIAL CLASSES FOR IV SEMESTER BE STUDENTS:

The schedule of remedial classes for IV semester BE students is given below.

Date of Commencement of Remedial Classes: 13th July 2022;
Time: 4.45 PM to 5.45 PM (all working days & working Saturdays);

Venue: 201

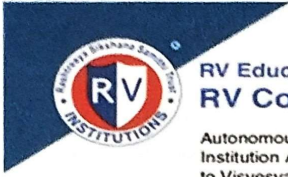| Day	Courses	Staff
Monday (18th & 25th)	18MA41A/B/C	MATH
Tuesday (19th & 26th)	18CS43 - DAA	GSNS/SB/CRM
Wednesday (13th, 20th & 27th)	18CS44 - MCES	KB/MSS/SINDHU
Thursday (14th, 21st & 28th)	18CS45 - OOP	AS/MS/DD
Friday (15th, 22nd & 29th)	18CS46 - CN	SCN/PSB/MM
Saturday (16th, 23rd & 30th)	18EC42/18BT42A/B	BT

Note:
1. Students who have scored **LESS THAN 20 MARKS IN THE FIRST TEST** are asked to attend the remedial classes.
2. Remedial classes will be held from **13th – 30th July, 2022**.

TTO
12/07/22

HOD, CSE
12/7/22

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Department of Civil Engineering

Phone: 080-67178034,8035:E-Mail:hod_civil@rvce.edu.in

Time Table for Remedial Class Compensatory Classes

Ref:REF RVCE/DA//474/2021-22
Date:26/11/2021

Schedule of remedial classes for students of B.E. Civil Engineering 3rd and 5th semester with shortage of attendance and less than 50% of CIE marks are required to attend the remedial classes positively as per the schedule.

29-11-2021 to 03-12-2021		
5:00 – 6:00 P.M.		
Date/Day	3rd Semester (CE 205)	5th Semester (CE 305)
29-11-2021/Monday	CEM (18CV32) – Dr. SMB	SA – II (18CV52) – Dr. KM
30-11-2021/Tuesday	SUR (18CV33) – Dr. KGL	DDRCC (18CV53) – Dr. KPK
01-12-2021/Wednesday	CT (18CV34) – Prof. SD	RS & GIS (18G5B05) – Dr. KGL
02-12-2021/Thursday	MAT (18MA31C) – Dr. SNP/Dr. KKDL	HE (18CV54) – Dr. SUS
03-12-2021/Friday	WSE (18CV36) – Dr. ARV	HI (18CV55) – Prof. GPME

06-12-2021 to 11-12-2021		
5:00 – 6:00 P.M.		
Date/Day	3rd Semester (CE 205)	5th Semester (CE 305)
06-12-2021/Monday	SOM (18CV35) – Prof. RSW	SA – II (18CV52) – Dr. VKM
07-12-2021/Tuesday	CT (18CV34) – Prof. SSD	DDRCC (18CV53) – Dr. TR
08-12-2021/Wednesday	WSE (18CV36) – Prof. SCR	RS & GIS (18G5B05) – Prof. RT
09-12-2021/Thursday	MAT (18MA31C) – Dr. SNP/Dr. KKDL	HE (18CV54) – Dr. LDP
10-12-2021/Friday	SUR (18CV33) – Dr. VA	HI (18CV55) – Prof. SID
11-12-2021/Saturday	SOM (18CV35) – Prof. TR	IOME (Prof. SSD/ATK)

Note: In view of extensive survey camp for 7th semester BE Civil Engineering students (29/11/21 to 09/12/21 at Melukote) remedial timetable for 7th semester is not framed.

TTO

Prof. & Head 26/11/21.

Remedial Class

Name of the Faculty : Sindhu D

Department : Civil Engineering

Semester : V Sem

Course Title : Hydrology and Irrigation Engg

Course : 21CV54

Sl. No.	USN	NAME	Dates	1 19/1	2 2/2	3	4	5	6	7	8	9	10	11
1.	1RV21CV001	Akarsh Raj		1	A									
2.	1RV21CV062	Md. Zeeshan Khan		1	2									
3.	1RV21CV088	Saksham Singh		1	A									
4.	1RV21CV110	Tushar Kumar		1	2									
5.	1RV21CV099	Siddhartha Thukral		1	2									
6.	1RV21CV112	Utkarsh Patel		1	2									
7.	1RV21CV084	Rishav Raj		1	2									
8.	1RV21CV095	Shashank Uike		1	2									
			Number Present	8	6									
			Staff Initials											

Remedial Class

Course: Hydrology and Irrigation Engineering
Course Code: 21CV54
Semester: V Sem

The performance of the following students is improved in CIE II.

Sl.NO.	USN	Student Name	CIE 1	CIE 2
1	1RV21CV062	Md. Zeeshan Khan	0	18
2	1RCV21CV110	Tushar Kumar	0	38
3	1RV21CV099	Siddartha Thukral	0	25
4	1RV21CV112	Utkarsh Patel	18	20
5	1RV21CV095	Shashank Uike	0	26

11/3/2024

11.3.24

Professor & Head
Department of Civil Engineering
RV College of Engineering
Mysuru Road Bengaluru-560 059

Remedial class

Name of the Faculty : Sindhu. D

Semester : IV

Department : Civil Engineering

Course Title : Mechanics of Fluids

Course : 21CV43

Sl. No.	USN	NAME	Dates	1	2	3	4	5	6	7	8	9	10	11
				9	7 3 8									
1.	1RV21CV002	Abhay Yadav KA		1	1									
2.	1RV21CV003	Abhijeet Pandey		1	1									
3.	1RV21CV005	Abhishek V		1	A									
4.	1RV21CV008	Aditya Raj		1	A									
5.	1RV21CV010	Adrita Maity		1	A									
6.	1RV21CV011	Akarsh Raj		1	A									
7.	1RV21CV013	Aman Tripathi		1	A									
8.	1RV21CV017	Aryaman Singh		1	A									
9.	1RV21CV020	B Dhanush.		1	2									
10.	1RV21CV021	B. Krishna Chaitanya		1	A									
11.	1RV21CVD22	B R Rohith		1	2									
12.	1RV21CV033	Darshan. H		1	2									
13.	1RV21CV056	Madhusudhan. G. B		1	2									
14.	1RV22CV405	Hemanthakumar H P		1	2									
15.	1RV22CV406	Kshitij Chandrashekar Wabhale.		1	2									
•														
		Number Present		15	8									
		Staff Initials												

Remedial Class

Course: Mechanics of Fluids
Course Code: 21CV43
Semester: IV Sem

The performance of the following students is improved in CIE II.

SI.NO.	USN	Student Name	CIE 1 (50 M)	CIE 2 (50 M)
1	1RV21CV002	Abhay Yadav K A	0	16
2	1RV21CV003	Abhijeet Pandey	0	10
3	1RV21CV005	Abhishek V	0	25
4	1RV21CV008	Aditya Raj	0	32
5	1RV21CV010	Adrita Maity	16	30
6	1RV21CV011	Akarsh Raj	0	32
7	1RV21CV013	Aman Tripathi	0	23
8	1RV21CV017	Aryaman Singh	0	18
9	1RV21CV020	B. Dhanush	0	21
10	1RV21CV021	B. Krishna Chaitanya	0	30
11	1RV21CV022	B R Rohith	0	36
12	1RV21CV033	Darshan H	7	12
13	1RV21CV056	Madhusudhan G B	7	22
14	1RV22CV405	Hemanthakumar H P	19	30
15	1RV22CV406	Kshitij Chandrashekar Wakhede	18	46

18/8/2023

18·8·23

Professor & Head
Department of Civil Engineering
RV College of Engineering
Mysuru Road, Bengaluru-560 059

RVCE/E&CE		2019 – 2020		04-03-2020

Remedial Class Time table for Higher Semester Courses:

6th Semester: Room Number (EC110)

Day	Date	Time	Course	Faculty
Monday	09-03-2020 16-03-2020 23-03-2020	5PM-6PM	CS II	SKN & MAH
Tuesday	10-03-2020 17-03-2020 24-03-2020	5PM-6PM	CCN	KV & RAS
Wednesday	11-03-2020 18-03-2020 25-03-2020	5PM-6PM	AMS	SSN & PNR
Thursday	05-03-2020 12-03-2020 19-03-2020	5PM-6PM	Elective - C	Respective Course handling faculties
Friday	06-03-2020 13-03-2020 20-03-2020	5PM-6PM	Elective - D	Respective Course handling faculties

4th Semester: Room Number (EC103)

Day	Date	Time	Course	Faculty
Monday	09-03-2020 16-03-2020 23-03-2020	5PM-6PM	AICD	SVP
Tuesday	10-03-2020 17-03-2020 24-03-2020	5PM-6PM	S&S	SPM, VD & SHB
Wednesday	11-03-2020 18-03-2020 25-03-2020	5PM-6PM	MPMC	BKR & BMM
Thursday	05-03-2020 12-03-2020 19-03-2020	5PM-6PM	HDL	DP & SPR

2nd Semester: Room Number (EC 108)

Day	Date	Time	Course	Faculty
Monday	09-03-2020 16-03-2020 23-03-2020	5PM-6PM	EEE	DRS & APC

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DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING

RVCE/E&CE/		2021 – 2022	

Remedial Class Time table for Higher Semester Common Course

7th Semester: Room Number (EC110)

Day	Date	Time	Course	Faculty
Monday	29-11-2021 06-12-2021	5PM-6PM	Global Elective	Respective Department Faculty
Tuesday	30-11-2021 07-12-2021	5PM-6PM	MWR	RMV RSH
Wednesday	01-12-2021 08-12-2021	5PM-6PM	CIPE	SAB CG
Thursday	02-12-2021 09-12-2021	5PM-6PM	LTE	PNJ RAS
Friday	03-12-2021 10-12-2021	5PM-6PM	E-F	Respective faculty Respective classroom
Saturday	04-12-2021 11-12-2021	9AM-10AM	E-G	Respective faculty Respective classroom

5th Semester: Room Number (EC103)

Day	Date	Time	Course	Faculty
Monday	29-11-2021 06-12-2021	5PM-6PM	ESD	MGR RJ
Tuesday	30-11-2021 07-12-2021	5PM-6PM	CS-1	SPM
Wednesday	01-12-2021 08-12-2021	5PM-6PM	GE(Group B)	Respective Department Faculty
Thursday	02-12-2021 09-12-2021	5PM-6PM	DVD	SVP CR
Friday	03-12-2021 10-12-2021	5PM-6PM	IPRE	SDB RH
Saturday	04-12-2021 11-12-2021	9AM-10AM	DSPML	RK

3rd Semester: Room Number (EC 108)

Day	Date	Time	Course	Faculty
Monday	29-11-2021 06-12-2021	5PM-6PM	AMC	NM APC
Tuesday	30-11-2021 07-12-2021	5PM-6PM	ADDC	PRK RSR
Wednesday	01-12-2021 08-12-2021	5PM-6PM	PEF	NBM NB
Thursday	02-12-2021 09-12-2021	5PM-6PM	MATH	MATHS FACULTY [CV/CSE CLASSROOM]
Friday	03-12-2021 10-12-2021	5PM-6PM	NA	ALS

TTO

Signature of the HOD   26/11/21

Department of MASTER OF COMPUTERAPPLICATIONS

Remedial Class Record

Academic Year: 2022-2023(EVEN Semester)

Class: MCA   **Semester:**2nd

List of Students

Class: 2ⁿᵈ Semester MCA Algorithms		Subject: Design & Analysis of Academic Year: 2022-2023
SL NO.	USN	NAME OF THE STUDENT
1	1RV22MCA03	ABHIN AYAPPA
2	1RV22MCA08	AKSHARA M V
3	1RV22MCA25	CHETHAN SINGH
4	1RV22MCA40	KAJAL PANDE
5	1RV22MCA41	KARTHIK K
6	1RV22MCA54	NANDAN NAYAK
7	1RV22MCA55	NANDAN FATHIMA
8	1RV22MCA59	NIHARIKA

Signature
Head of the Department

List of Topics to be Discussed

SL NO.	TOPIC	TEACHING HOUR
1	Basics of Algorithms and mathematical equations	*1.5 HRS*
2	Sorting algorithms	*2 HRS*
3	Searching algorithms	*2 HRS*
4	Master theorem concept	*2 HRS*
5	Divide & Conquer concept	*2 HRS*

Signature
Head of the Department

Students Performance

SL NO.	USN	NAME OF THE STUDENT	CIE 1	CIE 2	CIE 3
Class: 2nd sem Subject: Design and Analysis of Algorithm Academic Year: 2022-2023					
1	1RV22MCA03	ABHIN AYAPPA	21	23	24
2	1RV22MCA08	AKSHARA M V	18	22	25
3	1RV22MCA25	CHETHAN SINGH	-	24	25
4	1RV22MCA40	KAJAL PANDE	-	22	24
5	1RV22MCA41	KARTHIK K	22	19	21
6	1RV22MCA54	NANDAN NAYAK	23	23	23
7	1RV22MCA55	NANDAN FATHIMA	10	20	24
8	1RV22MCA59	NIHARIKA	24	20	23

Signature
Head of the Department

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Bengaluru - 560059, Karnataka, India

Department of MASTER OF COMPUTERAPPLICATIONS

Remedial Class Record

Academic Year: 2022-2023(ODD Semester)

Class: MCA   **Semester:**3rd Semester-B Section

List of Students

SL NO.	USN	NAME OF THE STUDENT
	Class: 3ʳᵈ Semester MCA	
	Subject: MODERN APPLICATION DEVELOPMENT	
	Academic Year: 2022-2023 (ODD)	
1	1RV21MC065	NIKIL
2	1RV21MC069	PAVAN V
3	1RV21MC071	PIKU
4	1RV21MC085	ROHAN S
5	1RV21MC091	SANJIV KUMAR
6	1RV21MC103	SRIGANESH
7	1RV21MC118	WINIL

Signature
Head of the Department

List of Topics to be Discussed

SL NO.	TOPIC	TEACHING HOUR
1	**Activity creation and working**	*1.5 HRS*
2	**Various layouts designing**	*1.5 HRS*
3	**Manifest file concepts**	*2 HRS*
4	**Progressive web applications**	*1.5 HRS*
5	**Native and PWA concepts**	*2 HRS*

Signature
Head of the Department

Students Performance

Class: 2nd sem Subject: Design and Analysis of Algorithm Academic Year: 2022-2023					
SL NO.	USN	NAME OF THE STUDENT	CIE 1	CIE 2	CIE 3
1	1RV21MC065	NIKIL	19	15	20
2	1RV21MC069	PAVAN V	20	21	16
3	1RV21MC071	PIKU	12	18	20
4	1RV21MC085	ROHAN S	20	24	13
5	1RV21MC091	SANJIV KUMAR	10	9	13
6	1RV21MC103	SRIGANESH	16	18	20
7	1RV21MC118	WINIL	14	12	10

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Head of the Departmen

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New Delhi

DEPARTMENT OF PHYSICS

Remedial Class Record

Academic Year: 2021 - 2022

Class: B.E   Semester: 2nd

REMEDIAL CLASS

Remedial classes are conducted for slow learners apart from regular classes for improving their performance. The College arranges these classes after regular teaching hours.

OBJECTIVES:

- To develop the academic skills.
- To enhance the level of understanding of students in required subjects.

METHODOLOGY:

- Identification of slow learners on the basis of performance in CIE 1 and CIE 2.
- Time table preparation
- Faculty allotment
- Conduction of Remedial Classes
- Group interaction is encouraged by involving meritorious students.
- Remedial examinations are held to test the knowledge acquired during class hours.
- Report preparation and submission.

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Department Circulars

DEPARTMENT OF PHYSICS

NOTICE

A Remedial Classes in   subject   for 1st Semester Students is scheduled from

11/07/2022 to 12/08/2022. It is mandatory for all students whose name are displayed in the list
to attend the mentioned Remedial Classes as per the given schedule.

DAY & DATE	TIME	NAME OF FACULTY	TOPIC COVERED
Tuesday 12/07/2022	5 pm – 6 pm	Dr. Tribikram Gupta	Quantum Mechanics: de-Broglie hypothesis, Set up of time-independent Schrodinger wave equation
Tuesday 19/07/2022	5 pm – 6 pm	Dr. Shubha S	Particle in a box derivation. Lasers, conditions, requisites.
Tuesday 26/07/2022	5 pm – 6 pm	Dr. B M Rajesh	CO_2 laser construction and working.
Tuesday 02/08/2022	5 pm – 6 pm	Dr. Ramya P	No students

Sudha Kamath
Signature

Head of the Department

Head of the Department of Physics
R V College of Engineering
Bangalore - 560 059

Time Table

Day	Date	Physics Cycle	Venue	Chemistry Cycle	Venue
Monday	July 11th,18th,25th August 1st, 8th	21MA11 - Multivariable Calculus	AS 002	21MA11 - Multivariable Calculus	AS 003
Tuesday	July 12th,19th,26th August 2nd	21PH12 - Engineering Physics	AS 002	21CH12 - Engineering Chemistry	AS 003
Wednesday	July 13th,20th,27th August 3rd, 10th	21EE13 - Elements of Electrical Engineering	AS 002	21CS13 - Programming in C	AS 003
Thursday	July 14th,21st,28th August 4th, 11th	21CV14 - Engineering Mechanics	AS 002	21ME14 - Elements of Mechanical Engineering	AS 003
Friday	July 15th,22nd,29th August 5th ,12th	*****	****	21EC15 - Elements of Electronics Engineering	AS 003

CTTO 7/7/21

DEAN ACADEMICS 7/7/22

PRINCIPAL

DEAN ACADEMICS
R.V. College of Engineering
Bengaluru - 560 059

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List of Students

SL NO.	USN	NAME OF THE STUDENT
	Class: Remedial	Subject: Engg Physics
	Academic Year: 2021-22	
1	1RV21IM043	Pratham Praveen
2	1RV21IM043	Hemanth A Reddy
3	1RV21IM043	Pratham R S
4	1RV21IM043	John Jacob Tharakan
5	1RV21IM043	Nruthyan S
6	1RV21IM051	Rishav raj
7	1RV21IM020	Gohitha Maheshwari
8	1RV21IM021	Kumar Ayush
9	1RV21AI048	Shreyas R
10	1RV21AS040	Prajwal G A
11	1RV21ME040	Prithvi Raj R
12	1RV21ME035	Karan Mali
13	1RV21ME003	Abhishek
14	RV21BME127	Harsh Rai
15	EVCE21BT046	Yashaswini C
16	1RV21BT046	Sashwathi V
17	RVCE21BCV017	Srujan G
18	RVCE21BCV058	Vishnu Gurudatt
19	1RV21CV011	Aharsh Raj

Signature
Head of the Department

Head of the Department of Physics
R V College of Engineering
Bangalore

List of Topics to be discussed

SL NO.	TOPIC	TEACHING HOUR
1.	Quantum Mechanics: de-Broglie hypothesis, Set up of time-independent Schrodinger wave equation	1
2.	Particle in a box derivation. Lasers, conditions, requisites.	1
3	CO_2 laser construction and working.	1

Signature

Head of the Department

Head of the Department of Physics
R V College of Engineering
Bangalore

RV Educational Institutions ®
RV College of Engineering ®

Autonomous
Institution Affiliated
to Visvesvaraya
Technological
University, Belagavi

Approved by AICTE,
New Delhi

Students Performance

Class: Remedial		Subject: Engineering Physics 19		Academic Year: 2018-	
SL NO.	USN	NAME OF THE STUDENT	CIE 1	CIE 2	CIE 3
1	1RV21IM043	Pratham Praveen	6	27	
2	1RV21IM043	Hemanth A Reddy	3	2	
3	1RV21IM043	Pratham R S	0	6	
4	1RV21IM043	John Jacob Tharakan	34	40	
5	1RV21IM043	Nruthyan S	19	14	
6	1RV21IM051	Rishav raj	25	12	
7	1RV21IM020	Gohitha Maheshwari	12	11	
8	1RV21IM021	Kumar Ayush	21	16	
9	1RV21AI048	Shreyas R	16	18	
10	1RV21AS040	Prajwal G A	18.5	19	
11	1RV21ME040	Prithvi Raj R	9	19	
12	1RV21ME035	Karan Mali	16	21	
13	1RV21ME003	Abhishek	13	10	
14	RV21BME127	Harsh Rai	6	0	
15	EVCE21BT046	Yashaswini C	16	10	
16	1RV21BT046	Sashwathi V	31	20	
17	RVCE21BCV017	Srujan G	6	17	
18	RVCE21BCV058	Vishnu Gurudatt	18	30	
19	1RV21CV011	Aharsh Raj	13	29	

Signature
Head of the Department

Support to Advanced Learners
Innovative Clubs

Innovative Clubs of RVCE

Ashwa

Solar Car

Astra Robotics

Garuda

HAM CLUB

Jatayu

Chimera

Dhruva

Krushi

Hydra

Frequency

Vyoma

Helios

Coding

Antariksh

EDC

RVCE HAM CLUB

- Started in the year **2019**
- The club aims to explore the spectra of short-wave communication through active research in the field of Antennae, Communication schemes, Satellite links through simulations and testing; thus contributing effectively to the scientific community.
- The club provides training to students in the field of disaster management and aid the safety personnel during communication blackouts during disasters.

Departments involved: ECE, ETE, CSE, ASE

Achievements: Fox Hunting, Antenna Design and testing
Activities: Moon Bounce, Mock for Emergencies, On-Air Quiz, Communication with ISS, Satellite Tracking, Bike Rallies, Visiting other Schools and Colleges to provide awareness of HAM

Sponsors : RVCE, RSST

Started in 2015 - 1st student satellite to carry out a biological experiment in space

Started by students of Aerospace Engineering, aspiring to be entrepreneurs in space technology. Grown to be a 100+ member team with participation from all engineering departments (ASE/CSE/ECE/EIE/EEE/BT/ISE/CV/TCE/IEM/ME).

Currently undertaking two projects:-
1. ReSOLV-1: Amateur sounding rocket
2. RVSAT-1 : A Microbiological Payload for ISRO's PS4.

Specifications

ReSOLV Mk-1
- Battery performance analysis under rigorous vibrations.
- Payload Capacity: 4.0 kg ; Size: 3U
- Dry mass: 27 kg
- Altitude: 10,000 feet AGL
- Budget: ₹16,00,000

RVSAT-1
- India's 1st space microbiological payload for PSLV Stage 4.
- Mass: 2.0 kg ; Size: 2U
- Mission life: 56 days
- Orbit: LEO (520 - 580 km)

- Team launched by Prof. U.R. Rao
- **26 publications**: 2 National, 23 International and 1 International poster presentation.
- Successfully submitted proposal for RVSAT-1 to ISRO.
- 1 of 4 Indian teams selected for Spaceport America Cup.
- Organizers of ISRO's World Space Week 2019.
- 1st prize at Nanosatellites Competition at IIA, BLR.
- Runner up in Quest Ingenium innovative project contest.
- Bagged all 6 prizes at World Space Week quiz 2018.

Sponsorship: RSST.   **Technical Support:** ANSYS, Simscale, Altair, BurnSim, MJ Castings.
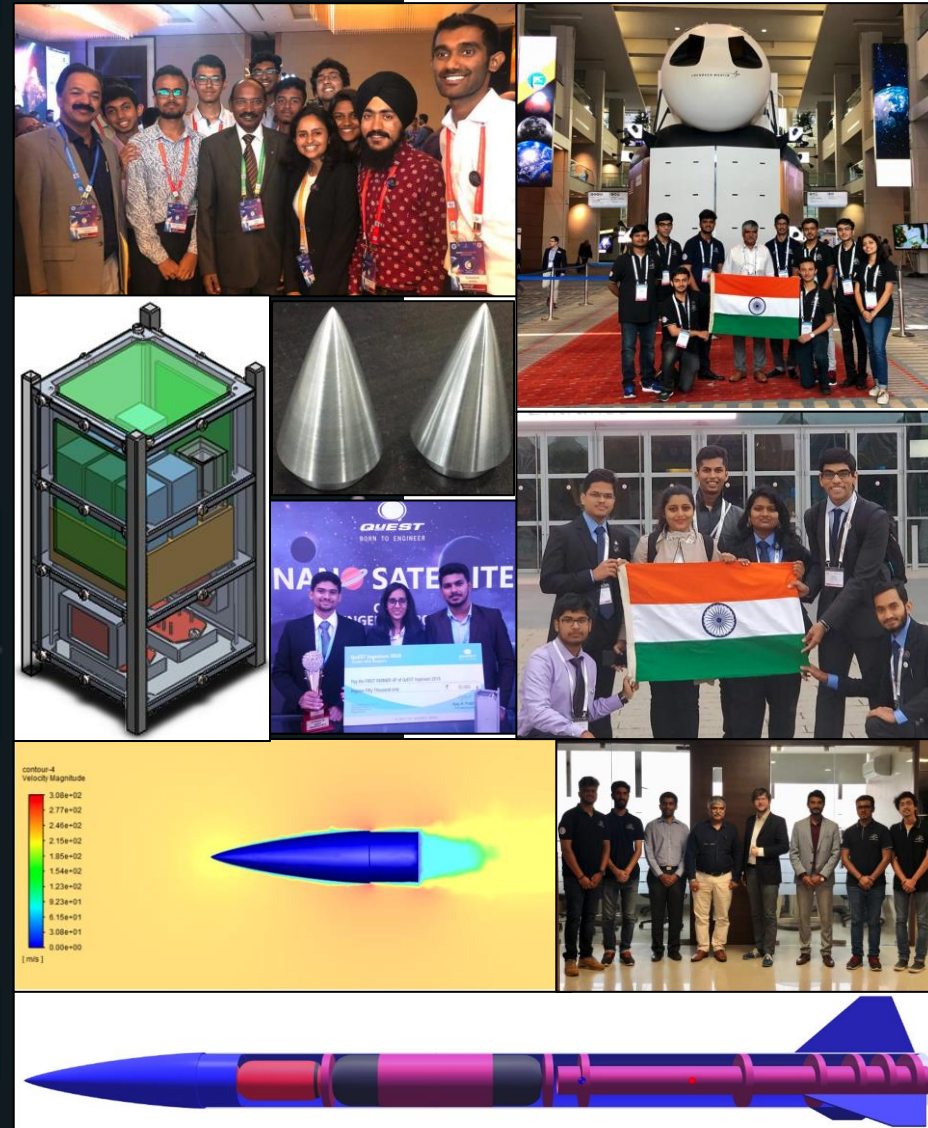
Team dhRuVa

Introduction: dhRuVa: The Astrophysics Club of RVCE, was established on October 15th, 2018. Astrophysics has been instrumental in bringing together many institutions throughout the globe to collaborate on projects that require telescopes and other instruments located at multiple points in the world. By establishing a group dedicated to the study of Astrophysics the students will not only fulfill their dreams of contributing towards this vast subject but also encourage various researchers to utilize the instruments constructed by the students of this institution.

SHORT TERM GOALS :
- To conduct activities like quizzes based on astronomy.
- Star gazing and telescope handling sessions.
- Invite speakers for talks and discussion sessions.
- Conduct special sessions on celestial events like solar and lunar eclipses.
- Organizing educational excursions to Research facilities , labs and observatories.
- Celebrating the 'Astronomy Day'.
- Collaborating our club with the local planetarium.
- Construction of a 6'' telescope . (Funding available through DST and

LONG TERM GOALS:
- Construction of a standard observatory .
- All the group members getting trained and certified as E-Astronomers.
- To get internship opportunities in the prestigious institutions .
- Working on small projects with organizations like ICTS, IIA, ARIES etc ...

Estimated Annual Budget:
1,53,000/- Rupees only

Departments Involved: ECE, EIE, CSE, ASE, ME, ISE and CE

Images from the club inaugural ceremony.

FREQUENCY CLUB
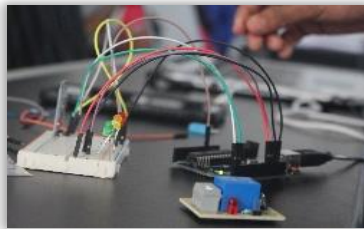
- Started in 2015

PROJECTS

Major:
- 2018-2019 Intelligent Ground Vehicle Competitions.
- To build an autonomous ground vehicle that would be trained to guide through random obstacle courses

Minor:
- (2018) - Gesture Recognition, Home Automation, IGVC Simulation, Personal Bots

Previous:
- Hydroponic System
- Smart Watch – Biomedical Applications

ACCOMPLISHMENTS

Workshops : Machine Learning, Rapid IOT Prototyping, Aero-Modelling, IoT, PCB Design

Tech Talks:
- Application Development – Cloud Computing
- Production Improvement Strategies

TECHNICAL DETAILS

Length: 3 feet - 7 feet long. Width: 2 feet – 4 feet wide.
Height: < 6 feet. Speed: 1 mph – 5 mph.
Sensors: Sick LMS 111 LiDAR, Atlaslink GNSS GP
Structure: Sica Aluminum profile

Departments involved:
CSE/ECE/ME/ISE/TCE/EEE/EIE/IEM/CH/CV/BT/ASE

ashwa RACING

STATEMENT OF WORK

To build budding undergraduate engineering students into industry-ready individuals through race car engineering while aiming to develop innovative, high performance and eco-friendly technology in order to solve the world's mobility problems.

Successfully built **15 cars** since 2005 and participated in FSAE Competitions across the globe every year.

• 2018 Formula Bharat - **Fastest Car in India based on acceleration.**

• 2018 Formula Hybrid USA - **2ⁿᵈ** in Design, **2ⁿᵈ** in Project Management, **The Spirit Of Formula Hybrid award, 2ⁿᵈ** overall

• 2018 Formula Student Italy - **Fastest Indian Car In The Event**

• 2019 Formula Hybrid – **1ˢᵗ in Project Management, 3ʳᵈ** place overall

• Structure- Mild Steel Space Frame

• Weight- **210kg**, Top Speed- **120 kmph**, Covers 75m stretch in 4.2s

• Suzuki GSX R600 Engine, Drexler LS Differential, ZF Sachs Dampers.

OVERALL BUDGET- INR 22 Lakh

DEPARTMENTS INVOLVED-
ME/ECE/EEE/IEM/EIE/CSE/CE

Sponsors: RSST, Schunk, ABB, Dynamatic Technologies Limited, DMG Mori, Continental, Schaeffler Gruppe, Mallar Group, Magod Laser, Infineon, Pegasys Systems, Phillips Corp, Durr, Mouser Electronics

ASTRA ROBOTICS

STARTED IN 2015

OUR PROJECTS

Astra Mars Rover

Each year the Astra Team develops a Mars rover to compete in the University Rover Challenge organized by the Mars Society in the MDRS, Utah, USA.

Mini Social based Projects

Team Astra takes up few societal problems every year and gives the best engineered solution.

ACHIEVEMENTS'

- 2020 - Indian Rover Challenge -12th Rank
- 2018-- 3rd place - planter bot theme E-yantra ,3rd Mercedes Benz India Hackathon,1st place ,5th place Delta Advanced Automation place Contest,organised by Delhi Automation Company

TECHNICAL DETAILS

- **Astra Mars Rover:** Double lambda mechanism, 2.4Ghz Communication from Rover to Base Station, GPS and Image Processing.
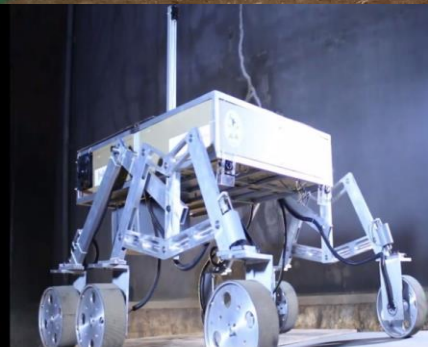
Departments involved: ECE/ME/CSE/ISE/EIE/IEM/BT/TCE/BT/CV/ASE/CE/EIE/MCA

Cost: 20,90,000/-

Sponsorship: RSST

TEAM CHIMERA

- Started in 2006
- The team is involved in designing and fabricating Formula styled Electric prototypes for FSAE events. Has participated in various national and international event and achieved the following.
- 2018 – Formula Bharat -5th in Cost Report, 6th in Business Presentation, and10th in Design Evaluation and Overall 4th
- 2018 – Formula Green – 3rd in Business Presentation, Cost Report, Design Evaluation
- 2019 – Formula Bharat – 1st in Business Presentation, 5th in Design Evaluation, 8th in Cost Report
- 2020 – Formula Bharat – 5th in Cost Report, 6th in Design Evaluation, and Overall 8th

Design specifications
Material: Mild steel, AISI 4130,
Wheel Base: 1600mm;
Track Width: 1200mm
Weight: 250kgs; Battery Capacity: 96V & 60Ah
Motor: 3-Phase AC induction motor; Power: 5.7KW
Departments involved: ME/EEE/ECE/EIE/IEM/CSE/CVE
Cost of the Project: 18 Lakhs

- The car was displayed at the EV Expo 2018, Bangalore and got featured in one of the biggest media houses in India, Times of India.

Sponsorship: RSST, Reva, BEML, General Industries, Kamal Bells, HPCL, Solidworks, Agni Motors, Prakyath Machine & Machine Tools, Zuken, Goel TMT, Sireesh Auto, Phytech, Maxon.

PROJECT GARUDA

- Started in 2006
- Seven Prototypes and Four Urban concept cars till date.
- The First Supermileage Team of India

Framework : Aluminum Alloy – 6063
Battery: 1KWh, 48V Lithium Ion Battery
Motor: 1KW,3.5Nm 3 phase Brushless DC motor
Custom designed : Carbon fiber shell, Motor Controller, Bi freewheel differential.
Cost : Rs. 9.83 lakhs
Departments involved: ME/IEM/CV/EEE/ECE/EIE/TE

Achievements:

- Won 'ROTARY YOUNG' award in 2008.
- Won 'Perseverance in the face of adversity' award in SEM-UK in 2009.
- Placed 14 in SEM-2012.ONLY INDIAN TEAM TO FINISH THE EVENT.
- Only Indian team to pass all static and dynamic tests in Battery electric Urban concept category in SEMA 2017 at Changi, Singapore.
- Only Indian team to pass all static and dynamic tests in Battery electric Urban concept category in SEMA 2019 at Sepang International circuit, Malaysia.

Sponsorship: RVCE, RSST, AWOT, MVM Industries, VB4U, JLCPCB, SBEE

TEAM HELIOS RACING

- Started in 2006
- 2018: Won 6th Place in Design Event, Baja SAE International, Oregon
- 2019: Won 2nd Place in Baja SAE India
- 2019: Won 7th Place in Acceleration, 9th Place in Hill Climb and 13th Place in Design Event, Baja SAE International, Rochester
- 2020: Won 6th Place in Baja SAE India
- 2020: Won 1st Place in Enduro Student India

ALL TERRAIN VEHICLE

- Speed: 60 kmph ; Acceleration: 6.32 sec- 150ft
- Steering: 3.0 m turning radius
- Wheel base: 51 inch
- Brake: Tandem Master Cylinder
- Suspension: Chromoly AISI 4130 and Aluminum 7075 T6 design
- Gearbox: Custom Designed and fabricated, Custom CVT transmission.
- Cost : Rs. 8 lakhs for the car;
- Registration & Transport: Rs. 10 lakhs

Departments involved: ME,EC,EIE,IEM,CH,CSE

Sponsorship: Meritor Inc, CNC India, Metal Power, CNC Technik, RSST, Wilwood, Fox Racing, Scolarian Racing, Accuspirals, Bhatia Tools, Solidworks, Helios Alumni Association, Ducom, Avanish Suzuki, Techno Springs, Enerfra, Alcoats

JATAYU – Autonomous Unmanned Aerial Vehicles

- Started in 2008
- 2018: Participated in SUAS Maryland - USA
- 2019: Placed 27th overall in SUAS, 15th in flight readiness review
- 2019: Participated in VIT graVITas

Structure: Carbon Fibre
Configuration: Autonomous Hexacopter
Payload: 3Kg
Weight : 8 Kg
Camera: Sony DSC Hx90v
Autopilot System : Pixhawk
Communication : Rocket M5 and RFD 900+
Departments involved: ME/CSE/ECE/AS
Cost : Rs. 5 lakhs

Projects:
Fixed Wing: Vayu,
Silver Surfer,
Vayu-2, Hope
Drones: Eclipse,
Sentinel

Sponsors:
RVCE, RSST

TEAM HYDRA - Autonomous Underwater Vehicle

OBJECTIVES

To deploy the AUV as an "Automated Underwater Vehicle", which will also be deployed as a 'Purifier'. To also develop the AUV for surveying and navigation purpose.

To develop it to supporting the initiatives such as 'SWACHH BHARAT ABHIYAN' 'MAKE IN INDIA', this shall comply with the modern day market requirements.

ACTIVITIES

- Design and fabrication of the outer structure of auv.
- Developing android application to monitor and control the auv.
- The hardware implementation of the electronics part
- Planning the underwater communication .
- Lake water object detection and retrieval.
- Simulation.

ABOUT THE TEAM

The Dream Team is a special cell of Team Hydra, Headed by Soubhig Shome (President), Manpreet Singh Arora (Vice-President) and other members are dedicated towards making the AUV into a commercially viable product and generate a patent.

Working in collaboration with college, the dream team aims at manufacturing a feasible product by the end of year 2020.

ACHIEVEMENTS.

1. Participation at NIOT competition at Chennai.
2. Secured second place in PDR presentation at NIOT, Chennai.
3. Received the Best project award from IISc Bengaluru.
4. Working in collaboration with Government of India, under two projects.
   a) Autonomous underwater vehicle.
   b) Autonomous Underwater Purifier
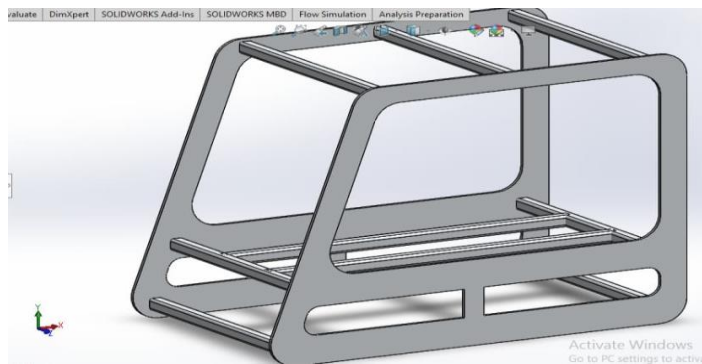
TEAM KRUSHI

- STARTED IN THE YEAR 2016
- R & D TEAM DEDICATED TO BUILD FARM MACHINERIES FOR UPLIFTMENT OF FARMERS
- SIGNED MOU WITH E.T.D.C(ESCORTS TRAINING AND DEVELOPMENT CENTRE) TO UNDERTAKE PRACTICAL PROJECTS.

- "AERIEL LIFT PLATFORM" NOMINATED AS TOP TEN BEST PROJECT BY F.P.S.I (FLUID POWER SOCIETY OF INDIA)
- INDEPENDENT HYBRID TRACTOR IN COLLABORATION WITH VST TILLERS TRACTORS Ltd.

THE DEPARTMENTS INVOLVED: ME,EIE,IEM,CHE,AERO.

YEARLY BUDGET 2.0 LACKS

FINAL YEAR PROJECT : TEA HARVESTER ,TRACTOR MOUNTED MULTICROP HARVESTER, WEED REMOVER

SPONSORS : RSST , E.T.D.C ,CLAAS INDIA.

Coding Club of RVCE

Started in November, 2016
- Coding Club aims to establish coding culture on campus. We organize coding events, technical talks, workshops and work on projects collaboratively.

EVENTS:
- Jan '18 - Talk by Anup Kalbalia, head of CodeChef
- Mar '18 - Organized code.fun.do with Microsoft
- Mar '18 - Talk by Shivaram K R, CEO of Curl Analytics
- Session every week on different topics

MEMBER ACHIEVEMENTS:
- Participated in the ACM-ICPC Regionals at Amritapuri, 2018
- Winners and 2nd runners up at XCeed's Geek!athon, 2018
- 2nd runners up in Cisco Ideathon 2018
- Participated in Smart India Hackathon, Rajasthan Hack 3.0, Women in Data Science (WiDS), LinkedIn's Wintathon, Smart Cities hackathon held at IISc

COORDINATING DEPARTMENT: ISE

TEAM VYOMA

Team Vyoma is the aerodesign club of RVCE. It is one of the leading student projects in India having won many national and international competitions, awards like the NASA Systems Engineering Award among many others.

The main objective is to design and develop low cost drones and also carry out cutting edge research for the development of Unmanned Aerial Vehicles.

DBF 2018:

Structure: Carbon Fibre Composites, MDF, Balsa, Monokote.

Weight: 0.8 – 1.6 kg, Span: 0.51m; Wing: E420

Speed : 25m/s, Altitude : 70ft, Payload : 0.8kg

Motor: Turnigy D2836 1100kV

Cost : Rs. 4.5 lakhs

Registration & Transport : Rs.12 lakhs

Departments Involved: ME/EIE/ECE/ASE

RVCE SOLAR CAR TEAM

Dimensions and weight:	4000x1600x1200 mm. 220kg (without driver)
Chassis	Carbon fiber monocoque design (Carbon fiber honeycomb sandwich structure)
Solar Panel	SunPower, USA- Maxeon Gen 2 cells(monocrystalline silicon cells). 22.4% efficiency.
Tires	Bridgestone Ecopier 95/80 R16
Brakes and suspension	Hydraulic all wheel braking, Regenerative rear brake. Double wishbone front Suspension and trailing arm rear suspension.
Batteries	Panasonic NCR18650B Li-ion cell 120V, 50Ah, 6kWh battery system.
Motor System	Mitsuba In-Hub Brushless DC Motor 97%efficiency
Telemetry System	IBM Blumix cloud computing platform
Value	Rs. 23lakhs
Departments involved	ME/EEE/ECE/EIE/IEM/CSE/BT
Registration & Transport	Rs. 20 lakhs

1ST PLACE

Dr AIT NATIONAL LEVEL TECHNICAL EXHIBITION

Sponsorship :,RSST, Ernest Solvay, Fernandes Innovative Solutions,Indian Oil, Elcom,HHV Solar,ICP,Ultralife Batteries, Dynamatic technologies,RECOM

Support to Advanced Learners

Consultancy Projects

Sl. No.	STUDENT NAME	USN	Project Title
**Center of Excellence in Connected Autonomous Vehicles**

Center of Excellence in Connected Autonomous Vehicles

Wipro – IISc Research and Innovation Network (WIRIN) Project

Project Co-ordinator & Principal Investigator - Dr. M Uttara Kumari

Industry Research Grants of Rs. 531 Lakhs

Interdisciplinary Internships and Student Projects, 2019-2023

Sl. No.	STUDENT NAME	USN	Project Title
1	Darshan S	1RV19MPD09	WIPOD 2.0 : Chassis Design
2	Pavan S bhat	1RV19MPD24	
3	Darshan	1RV17EE011	WIPOD 2.0 : Battery Design
4	Mohit Venkatesh	1RV18EE029	
5	Pranav M Kulkarni	1RV18EE039	
6	Abhishek M	1RV18EC062	Introducing acoustic into Simulator environment
7	Tharun Sivakumar	1RV17EC173	
8	K S Harshavardhan	1RV17IS018	
9	Ruthu Kallur	1RV17EC123	
10	Nehal N Shet	1RV17IS026	
11	Sameera J Sharma	1RV19EC146	
12	Saraansh Agarwal	1RV19EC151	
13	Jojode Yeswanth	1RD18MCA11	Migrating full fledge based desktop scenario editor to web platform
14	Reetesh Kumar	1RZ18MCA21	
15	Sumanta Sharma	1RZ18MCA36	

16	Abijit Trichur Ramachandran	1RV17CS006	
17	Aditya Kumar Mishra	1RV18CS010	
18	K V Sarat kumar	1RV18IS019	
19	Harish A Jartarghar	1RV18CS061	Migrating full fledge based desktop scenario editor to web platform
20	Dhanush S	1RZ18MCA10	
21	Piyush Somani	1RV18IS030	
22	Ayush Kumar	1RV18IS009	
23	Ritik Agarwal	1RV19ME088	
24	Krishna Shdbalkar	1RV19CS148	

25	Prableen Singh	1RV17CS105	
26	Ayush Agarwal	1RV17CS010	
27	R Shreya	1RV17CS117	Building V2X framework inside simulator environment
28	Nischal J	1RV18CS107	
29	Akshara N udupa	1RV18CS013	
30	Shivanshu Singh	1RV18CS156	

31	Likith S Reddy	1RV18CS081	
32	Kushagra Mishra	1RV18CS078	SDV in a Box -Simulator Optimizer
33	Kumaraskanda	1RV18CS076	
34	Krithi D Shetty	1RV18CS072	

35	Chetan	1RV17EC033	Development of Automatic Image Annotation algorithm
36	Nidhi S Nair	1RV17EC090	
37	Misma Toppo	1RV17EC076	
38	Aditi	1RV17EC0	
39	Girija S Sajjanar	1RV18TE012	Preparation of National dataset: LIDAR coud point Annotation
40	Jatin Nag SR	1RV18TE015	
41	Harsh Songara	1RV18EC055	Development of LIDAR automatic Annotation algorithm
42	Anirudh Praveen	1RV18EC016	
43	Shrikrishna Hebbar	1RV18EC152	Preparation of National dataset: Image Annotation
44	K. Suharika	1RV18EC076	
45	Vigneshwar.D	1RV18EC175	
46	K Shanmukha Vamshi	1RV18EC064	
47	Suhas B	1RV19EC174	
48	Alen Aji John	1RV19EC015	
49	Jessica Raj	1RV19EC070	
50	A Avinash Prabhu	1RV19EC001	
51	Shivesh Shrawan	1RV19EC162	
52	Sampooj S Jain	1RV19EC413	Preparation of National dataset: Image Annotation
53	Nandesh Goudar	1RV18EC092	
54	Basavaraj Tenginakai	1RV19EC402	
55	Harish R	1RV19EC404	
56	Hareesha B N	1RV19EC403	
57	Amoghavarsha B C	1RV19EC400	
58	Lalith Kumar E	1RV18EC079	

59	Vinod Sai E	1RV18EC177	Preparation of National dataset: Image Annotation
60	Kushal Agarwal	1RV18TE020	
61	KARTHIK B R	1RV18TE019	
62	Sudha R Jogin	1RV18TE051	
63	Prajna Bhat	1RV18TE035	
64	Sudarshan B	1RV18TE050	

65	Sai Pranav G	1RV18EC139	Preparation of National dataset: Image Annotation
66	Rajath Rao T N	1RV18EC127	
67	Vishal Kumar	1RV18EC179	
69	Shreya Garg	1RV18EC149	
70	Yashparna De	1RV18EC187	
71	Sushmitha B N	1RV18EC164	

72	Lalahmed Mohammed Shahbaa	1RV18EC078	Preparation of National dataset: Image Annotation
73	Karthik patel A	1RV18EC065	
74	Usha SR	1RV18EC171	
75	Nandan Gowda	1RV18EC091	
76	Navyashree B R	1RV18EC094	
77	Nachiket G Kallapur	1RV18CS096	Development of Autamtic Annotation using Mask RCNN
78	Dinesh Babu S	1RV18CS053	
79	Shuvam Mitra	1RV18CS165	
80	Furqan Abdul Khadar Ramadul	1RV18CS054	
81	Ananya GM	1RV18IS006	

82	Shreyash Gupta	1RV18CS161	
			Development of deeplearning algorithm for Acoustic annotation
83	Raghav Rawat	1RV18EC122	
84	Shreyash Mohapatra	1RV18EC150	
85	Advaith Ashwin Harish	1RV17EC006	
86	Likhita M	1RV17EC066	Obstacle detection for autonomous vehicles using Lidar Point cloud data
87	Sai Sumanth N	1RV17EC082	
88	Remidi Rohith Reddy	1RV17EC122	
89	Kaveri Patil	1RV17TE019	
90	Maria Bency	1RV17TE023	3D object Detection using Lidar Cloud Points
91	Priyanka Holla	1RV17TE035	
92	Shreya Donthi	1RV17TE049	
93	Malavika Unnikrishnan		Image Filtration
94	Akash P	1RV17EC008	Deep learning in Compressive Sensing of Image and Video systems
95	Shashank C Mouli	1RV17EC138	
96	ANANYA MAIYA	1RV17TE008	Design and implementation of wifi enabled V2V communication system
97	MEGHANA G	1RV17TE024	
98	Abhishek		Image Deblurring

99	Sonali Karki	1RV17EC159	Implementation of Randomized KD3 on PCD dataset
100	Vinay Verma	1RV17EC181	
101	Knika dawar	1RV18ME132	
102	Ashwin Sudarshan	1RV18ME030	
103	Hrishabh bhargava	1RV18ME051	Brake by wire system for WIPOD 2.0
104	Qiranul saadiyean	1RV18ME082	
105	Ankit kumar	1RV18ME019	
106	K Sharan Kumar Reddy	1RV18ME056	
107	Dinesh Reddy	1RV18ME042	
108	Bhavith Shetty	1RV18ME035	Steer by wire system for WIPOD 2.0
109	Rakshith Kamath	1RV18ME059	
110	Adarsh S Jamadagni	1RV18EC004	
111	Dandu Rithika Varma	1RV18EC037	Design and Implementation of Object Distance Estimation in Self-Driving Vehicles using the fusion of LiDAR and Camera
112	Harsh Songara	1RV18EC055	
113	K S Shreya	1RV18EC063	
114	Shantanu B S	1RV18TE044	
115	Srivathsa S	1RV18TE048	Effects of Weather on RADAR and LiDAR of Autonomous vehicles
116	Sudarshan B S	1RV18TE050	

117	Shuvam Mitra	1RV18CS165	Automatic Image Annotation - Semantic
118	P.Gunavantha	1RV18CS109	
119	Patel Sushan Anil Kumar	1RV18EC107	Simultaneous Localization and Mapping based on LIDAR and vision Fusion
120	Rishabah Srivastava	1RV18EC130	
121	Rounak Kumar Chaurasia	1RV18EC132	
122	Megha Asangi	1RV18ME064	Suspesion system for WIPOD 2.0
123	Vamsi vardhan reddy	1RV18ME060	
124	Shashanth S K	1RV17ME101	
125	Dinesh Reddy	1RV18ME042	
126	ANISH A S	1RV19CS017	LIDAR auto annotation
127	ASHISH BALLATIGI	1RV19CS027	
128	EDUPUGANTI AKHIL	1RV19CS047	
129	Parth Rajanish Dixit	1RV18EC105	LIDAR and camera data fusion for object detection in autonomous vehicle application
130	P chandan kumar	1RV18EC104	
131	Nayana Mitti	1RV18EC095	

132	Nandan Gowda P M	1RV18EC091	Real-time object detection and tracking using LiDAR and Camera
133	Pavankalyan D S	1RV18EC108	
134	Vivek Reddy NC	1RV18EC184	Localization and Mapping for Autonomous Vehicles using LiDAR and IMU
135	Yathish Kumar Y	1RV18EC189	
136	Hemmanuri Sai Sathya Kailash	1RV18EC057	Real-time Wind Noise Suppression
137	Bidushi	1RV18CS043	Perception Model for autonomus vehicles
138	Birajdar Shiwam sanjay kumar	1RV18CS044	
139	Shubh Shukla	1RV18CS163	
140	TEJAS M	1RV19EE065	MOTOR CONTROL UNIT AND VEHICLE DYNAMICS FOR AUTONOMOUS VEHICLE
141	ANURAG N	1RV20EE401	
142	SHARANAPPA ULAGI	1RV19EE067	
143	SOURABH RAJA	1RV19EE071	
144	LATHESH SHETTY KK	1RV20EE402	ELECTRICAL ARCHITECTURE AND HARNESS FOR AUTONOMOUS ELECTRIC VEHICLE
145	MALLARADDY	1RV20EE403	
146	RIDA ARFAIN A	1RV20EE404	
147	SUDARSHAN MJ	1RV20EE405	
148	CHIRAG DHOKA JAIN	1RV18EI014	BATTERY MANAGEMENT SYSTEM
149	QIRANUL SAADIYEAN	1RV18ME082	BRAKE BY WIRE DESIGN FOR AN AUTONOMOUS CAR

150	Manoj Prabhakar M	1RV20MPD16	Vision Based object detection for Autonomous
151	Sai Shrusthi S	1RV20LDC23	Implementation of object detection for Autono
152	Anand M Sharma	1RV19EI005	Collision Prevention System using Ultrasonic
153	R Dhyaan	1RV19EI036	
154	Karmugilan	1RV19EC075	Design and Development of CAN Network an
155	Akash S Shanbhag	1RV20EC400	
156	Kavana M V	1RV20EC402	
157	M Bhumika	1RV20EC403	
158	A Vishnu Charan	1RV19EI001	Sensor Integration and Monitoring system for
159	Soujanya V Bhat	1RV19EI054	
160	Sameera J Sharma	1RV19EC146	PID Controller Design and Implementation for
161	Shalini N Ganjam	1RV19EC154	
162	Samishth Sachan	1RV19EC147	
163	Nikhil K B	1RV19EI032	Battery Thermal Management system for Elect
164	Nihal B Karamudi	1RV19EI031	

165	Rashmi V Sarur	20MFSB7037	Image Annotation
166	Ashwini M	192VSB7006	Image Annotation
167	Prajwal M	20MFSB7035	Image Annotation
168	Darshan M	20MFSB7011	Image Annotation
169	Sanjana C	20MFSB7038	Image Annotation
170	Zubeda Banu	20MFSB7048	Image Annotation
171	Satvik Tiwari	1RV19EC153	Control System Design of a Self-Driving Car
172	Varad Daithankar	1RV19EC180	Control System Design of a Self-Driving Car
173	S. Advaith		anning and control algorithms for simple MAN
174	Rahul		
175	Apala das	1RV19ET008	:loping and Implementing Deep Learning Algor
176	Nilanjan Kundu	1RV19EC108	:loping and Implementing Deep Learning Algor
177	Shivaneetha G	1RV19CS150	nboard Diagnostics GUI for Autonomous Vehic
178	Sharayu B Badiger	1RV19CS145	nboard Diagnostics GUI for Autonomous Vehic
179	Kontisetty Likitha	1RV19CS074	cation Displaying the Collaboration of RVCE a
180	T J S L Savitri	1RV19CS171	cation Displaying the Collaboration of RVCE a
181	Settipallee Sahithi	1RV19CS142	cation Displaying the Collaboration of RVCE a
182	Yash Ganesh Naik	1RV19EC188	iemt of a Robust USB to CAN Communication

183	Maheshwari	1RV19EC089	Multi-Tasking Network for Autonomous Vehicle
184	Abhirami	1RV19EC072	Multi-Tasking Network for Autonomous Vehicle
185	Saksham Sharma	1RV19EC197	Motion planning for Autonomous Vehicles
186	Vidyashree K	1RV21LDC17	Lidar data analysis using ML
187	Mukul R Kulkarni	1RV21ME054	parative study of simulators for autonomous ve
188	Ankitha Shet	1RV21AS010	parative study of simulators for autonomous ve
189	Adithya U S	1RV21EC007	Electronic steering system
190	Vismay B S	1RV21EC188	Electronic steering system
191	Aditya Joshi	1RV21EC008	Electronic steering system
192	Vishnu Skhand Raaj N	1RV21EC186	Electronic steering system
193	Pradhaan R Kedlaya	1RV20CS108	Android Application
194	Shrikar Swaroop	1RV20CS195	Android Application
195	Nikhil Bennur	1RV20CS096	Android Application
196	Chandrashekar Gurammanavar	1RV21ET403	esigning for Autonomous Vehicle and Lidar An
197	D Sri Lakshmi Priya	1BY19AI014	Sensor fusion of LIDAR and camera for object
198	Shravya Shetty	1BY19AI051	Sensor fusion of LIDAR and camera for object
199	Pranavi Kamalapadu	1BY19AI025	Sensor fusion of LIDAR and camera for object
200	Lahari Bale	1BY19AI0126	Sensor fusion of LIDAR and camera for object

201	Yeshitha B	1RV19EC199	Autonomous vehicle-WIRIN - Lidar data analy

202	Udit Gupta	1RV21MMD17	Dynamic Analysis on Chassis Frame and Imag
203	Ambaresha	1RV21MMD02	PID Controller Design using MATLAB Simuli
204	Karthik S	1RV21MMD03	Analysis of Lane Changing by a Vehicle using
205	Sashikumargouda patil	1RV21MMD09	Waypoint tracking of a vehicle using MATLAI
206	Abhijith S M	1RV20EC002	Display Design
207	Basavaraj P Patil	1RV21EC402	Display Design
208	Anand	1RV20EC021	Battery Health Management System

209	Sai Nithin YadamReddy	1RV20EE043	
210	Mahendra Singh Rawat	1RV20ME060	
211	Darren Patrao	1RV20ME034	
212	Adithya Thantri	1RV20ME006	Design and Development of chassis and EV-P(
213	Saumya	1RV20EE047	
214	Ruchitha NA	1RV20EE042	
215	Vaishnavi	1RV20EE061	

216	Akshitha S	1RV20ET400	Design and development of lane detection algorithms for Autonomous vehicle using lidar point cloud data
217	Anjali M	1RV20ET402	
218	Souparna Roy	1RV19EC172	
219	Bhanuprakash Sedamkar	1RV19EC037	Map based localization for Autonomous vehic
210	Muhammad Akram A	1RV19EC101	

211	Pradhaan R Kedlaya	1RV20CS108	Android app for stats and diagnostics with fire
212	ULLAS VISHWAKARMA HS	1RV21EE405	Design of Wireless power charging system and SOC estimation
213	SHRIRAM J SHARMA	1RV20EE051	
214	DHANUSH SR	1RV21EE400	
215	PRAJWAL BG	1RV21EE403	

Support to Advanced Learners

Centres of excellence / competence

RV College of Engineering ®

(Autonomous Institution affiliated to VTU, Belagavi)
Approved by AICTE, New Delhi

Centers of Excellence

&

Centers of Competence

www.rvce.edu.in 🌐

principal@rvce.edu.in ✉

RV Vidyanikethan Post, Mysuru Road, Bengaluru - 560059

About RVCE

RV College of Engineering (RVCE) established in 1963 is one of the earliest self-financing engineering colleges in the country. The institution is run by Rashtreeya Sikshana Samithi Trust (RSST) a not for profit Trust. RVCE is an autonomous college. Currently the institution offers 15 Bachelors, 14 Master Programs and all the Other departments have a Research Centre, affiliated to Visvesvaraya Technological University (VTU) Belagavi. The institution has set itself Vision leadership in Quality Technical Education, interdisciplinary Research and Innovation, with the focus on Sustainable and Inclusive Technology.

Recent awards and achievements include - Ranked 89th in the Country by National Institutional Ranking Framework (NIRF: 2020-21), QS-IGUAGE -Diamond University Rating (2021-2024), EduFuture Excellence Award -Best Private Engineering University (South) by Zee Digital, "Engineering College of the Year-2022" by the Higher Education Review Magazine, Ranked 13th in the country & 2nd in Karnataka - IIRF Ranking (2022), Ranked 6th among the top 10 of 100 Pvt. Engg. Colleges in the Country by Education World Magazine-22. Ranked 1501+ in Times Higher Education World University Rankings-2023. Ranked 801+ in Computer Science and 1001+ Rank in Engineering category in THE World University Rankings-2023. "Excellent" rating in ARIIA Ranking-2021 and NPTEL (Local Chapter) "AA" Rating & Max. No. of NPTEL Stars. Eleven UG programs and eligible M.Tech & MCA programs have been accredited by NBA multiple times.

The institution has to its credit over 1500 National and International Journal publications, filed 52 patents, 45 published patents, 15 granted patents, completed sponsored research and consultancy projects worth Rs. 12.5 crores in the last three years. The institution has established 24 Centres of Competence / Excellence in the campus. The college currently has student strength more than 5500, faculty strength of above 350, technical administrative staff of about 225 and around 350 research scholars are pursuing Ph.D. The students have won awards and accolades in national and international competitions.

Contact Details:

Dr. K. N. Subramanya
Principal
R V College of Engineering
R V Vidyanikethan Post
Mysuru Road, Bengaluru - 560059
Ph : 91 - 080-681881000/8111-12
Fax: 91 - 080-6717 8011

www.rvce.edu.in

principal@rvce.edu.in

Interdisciplinary Research & Innovation – A Preamble

Interdisciplinary research is a type of study or research that draws from two or more disciplines in order to gain a more well-developed perspective or discover something new. Interdisciplinary research is growing in popularity and is increasingly seen as essential. Multiple perspectives on research challenges will often lead to better outcomes. In order to streamline and undertaking focused research, the institution has followed the following approach for execution of funded projects and industrial consultancy. Also to develop competency in students and faculty.

1. Identifying Thematic Areas of Research: Carrying out SWOC analysis of the institution and aligning goals inline with Thrust areas of Govt. & Industry is helping identifying need based areas of research. Thrust areas are identified through road maps, govt. policy documents, Vision 2035, UN SDG 2030, funding agency requirements and such others.
2. Aligning with existing infrastructure and identifying new infrastructure needed: The institution has separate PG / Research budget to cater to new equipment's and seed funding for students and faculty. Many companies and funding agencies have helped in establishing physical infrastructure and state of the art equipment and software are provided over a period of time.
3. Assigning Team: Based on the specialization and competency of the faculty, various interdisciplinary teams are formed to undertake need based research, execute projects and consultancy assignments.
4. Developing Modules and providing training: The newer areas of science and technologies need learning through training from experts. Based on the need of the faculty, training in thematic areas are provided through institutional funding and providing seed funding for initial experimentation & Simulation, wherever needed. Mentoring by Industry & Research Experts in the thematic areas are also taken up for better understanding of the need and execution.
5. Executing work as per standards: Funding agencies and industries expect deliverables in terms of products, processes and systems, which are scalable. Efforts are made to execute the projects and consulting work based on the goals set and measured through publishing in peer reviewed journals, developing prototypes and and obtaining Patents and copy rights.
6. Reporting periodically & Scale Up the CoE / CoC: Documentation of the work carried out and submitting to the agencies is a continuous assignment and also helps future work to be undertaken. The whole exercise of interdisciplinary research and innovation is also helping in developing incubation center and Start-ups for commercialization of IPs, and alternate Revenue generation for sustainability.

The above approach is adopted to make sure learning happens to UG / PG / PhD students in a expected way. The students are understanding the advantages of working in interdisciplinary way. As an offshoot of this exercise, many interdisciplinary and innovative courses / internships / projects / electives / skill labs are developed. This also meets the requirements of NEP -2020 and increasing the employment opportunities for students.

Hope this approach and effort helps the institution, in particular and Nation, in general in developing new products and systems for better economic development of the country.

Centers of Excellence

1	Center of Excellence in Macroelectronics	1
2	RVCE-HPCC Center of Excellence in Cognitive Intelligent Systems for Sustainable Solutions	3
3	CISCO-RVCE Center of Excellence in Internet of Things (IoT)	5
4	Center of Excellence in Computational Genomics [Intergene Life Sciences]	7
5	Center of Excellence in Smart Antenna Systems & Measurements (SASM) [Rohde & Schwarz, India]	9
6	Center for Interdisciplinary Research in Quantum Information and Technology [CIRQuIT]	11
7	Center of Excellence in Connected Autonomous Vehicles [WIRIN]	13
8	Center of Excellence in e-Mobility [Greaves Cotton]	15
9	Center of Excellence in Hydrogen and Green Technology [KREDL & IWPA Instruments]	17
10	Center for CCTV Research	19
11	Center of Excellence in Logistics and Supply Chain Management [Secure Meters]	21
12	Center of Excellence in Visual Computing [Bhargawa Info Tech Solutions Private Ltd]	23
13	Center of Excellence in AI Research [Boston Consulting, UK]	25
14	Women in Cloud: Center of Excellence in India	27
15	Center for Sensors and Sensor Applications Development [Nexsys]	29
16	Center for Nano Materials and Devices (CND)	31
17	Center for IC and Systems	33
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Centers of Competence

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20	RV-Mercedes Benz Center for Automotive Mechatronics	38
21	Center for Automation and Robotics (Digital Manufacturing)	40
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1. Macroelectronics

The CoE Macroelectronics is established in 2013 under TEQIP-II, sub-component 1.2.1 and is designated as Inter-Disciplinary Research Center (IDRC). The focus of the IDRC is on thin film deposition, synthesis, and characterization of emerging materials for novel applications including wearable electronics, flexible displays, sensors, energy harvesting nanogenerators, tribological functional coatings, e-skin, and biological devices. Emphasis is given to sustainable next-generation IoT sensors, organic solar cells, large-area printed & flexible electronics material growth, scalable processes, and product development.
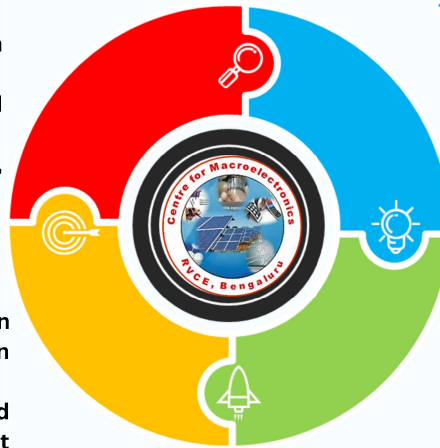
Areas of Expertise

Thin Film Fabrication & Characterization

- State-of-the-art in-house fabrication and characterization facility
- Development of novel materials and devices
- Tribological, optical, anti-reflection, and protective coatings

Sensor Development & Prototyping

- Gas sensors Fabrication and Testing
- Biological sensors and Testing Facility

Skill Development

- Training/Workshop/FDP on fabrication and characterization equipment
- Technology transfer, prototyping, and product development on smart materials, devices and sensors

Solar Cell -PV & Energy Harvesting Technologies

- Design and Development of A-Si/C-Si HiT Solar Cell
- Polymer-based Solar Cell
- Development of Piezoelectric, Triboelectric nanogenerator (TENG), MEMS, and Super Capacitor

Facility & Infrastructure

The IDRC has state-of-the-art indigenous fabrication & characterization facilities for material growth, thin film deposition, and device development including vaccum-based deposition, wet chemical processing, tribological, optical, and electrical characterization. Assistance to Ideation, prototyping, and product design are provided along with the consultancy services.

Fabrication Facility

Thin Film Fabrication

- PECVD Cluster Tool
- Thermal & E-Beam Evaporation
- Cathodic Arc Deposition
- RF/DC Sputtering
- Micro plotter
- Laser Mask Writer
- Spin Coater
- Electrospinning

Characterization Facility

Thin Film Characterization

- AFM/Raman/NSOM Microscope (WiTech Alpha 300-RAS)
- PerkinElmer FTIR Spectrophotometer
- LAMBDA™ 750 UV/Vis/NIR spectrophotometer
- XRD (MAXima_X XRD-7000)
- Hitachi Scanning Electron Microscope SU-100 and more..

Prototype Facility

Prototype to Product
Design thinking aspects of ideation, benchmarking to prototype, design and scalable product development facility
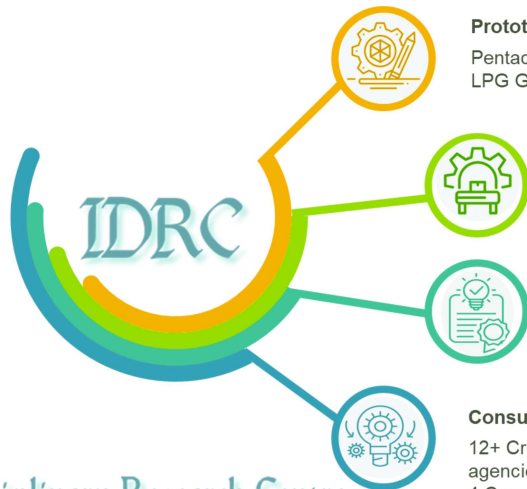
Simulation Tools

Process & Device Simulation
Different material process, structure, device, circuit and software's

COE - MACROELECTRONICS

Achievements

Prototypes

Pentacene & metal oxide Sensor, ZnO & a-Si TFT, Methane sensor, LPG Gas sensor, Thin film acoustic sensor, a-Si & HiT Solar Cell

Equipment Designed & Developed

- Electro Spin Spray System (ESSY)
- Automated Flame Assisted Liquid Spray Pyrolysis Equipment
- LPG Gas Testing Chamber

Patents & Publications

Patented filed:7, Granted:5. 100+ publication in international and national journals and conferences.

Consultancy & Projects

12+ Crore ongoing and completed funded projects for various agencies such as DST, UGC, DRDO, NRB, VGST, CPRI. 4 Consultancy projects

IDRC

Interdisciplinary Research Centre

Funding Agencies

विज्ञान एवं प्रौद्योगिकी मंत्रालय MINISTRY OF SCIENCE AND TECHNOLOGY

UGC University Grants Commission

DRDO

TEQIP

VGST

AICTE

ZnO TFT

a_Si TFT

LPG Testing chamber

Pyrrole Solution in an Ice bath

Pentacene Sensor

Microstrip MIMO Antenna

Methane Sensor

Indigenously Developed Automated Flame Assisted Liquid Spray Pyrolysis Equipment

Turbo Electric Nano Generator (TENG)

Electro Spin Spray System (ESSY)

Activity & Research Collaboration

Internship

Training, summer internship, Workshop to Science and Engineering UG & PG Students,

Facility Access

The IDRC is connected with i-STEM portal, GoI. Any industry, researcher can use the facility with nominal usage cost

Industry Connect

Consultancy services, collaborative product development for market needs.

Projects

Research Collaboration with other institutions, PSU and research labs

Ideation & Prototype

Assistance to product design, prototype and development

Contact details

Dr. H N Narasimha Murthy
Professor, Dept. of ME
narasimhamurthyhn@rvce.edu.in
Ph No:+91-9901745089

Dr. Uttarakumari M
Professor, Dept. of ECE
uttarakumari@rvce.edu.in
Ph No:+91-9945336808

Dr. Ramavenkateswaran N
Assistant Professor, Dept. of ECE
ramavenkateswarann@rvce.edu.in
Ph No:+91-9986165427

2. Cognitive Intelligent Systems for Sustainable Solutions
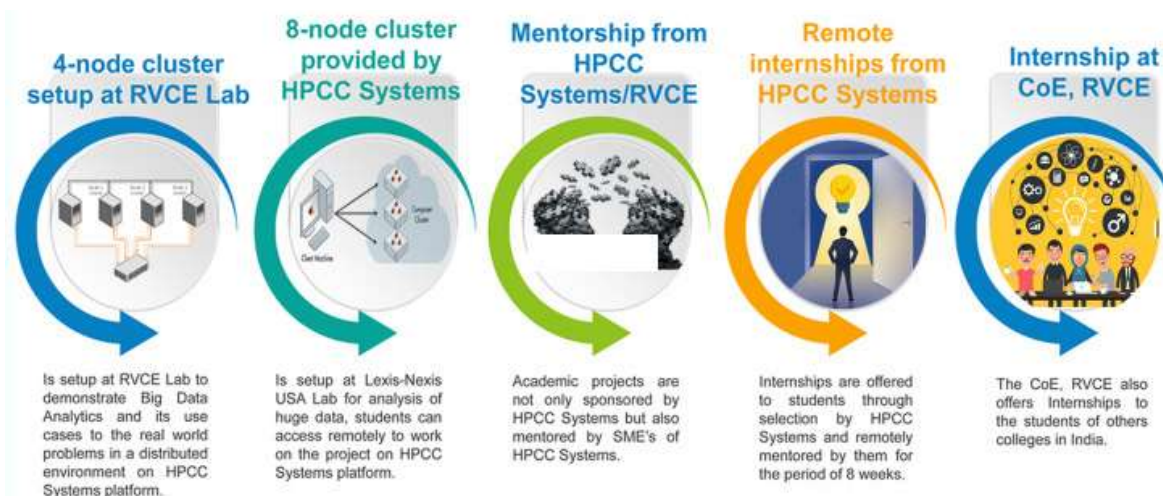## RVCE – HPCC Systems

RV College of Engineering in collaboration with HPCC Systems and LexisNexis Risk Solutions established CISSS in 2017. Funding research projects, and offering industry-based elective courses and internships to students are some of the motives for the collaboration. CISSS will emphasize on advanced interdisciplinary research activities in the area of Cognitive Intelligent Systems with assistive technologies to cater to the needs of industry and society. CISSS seeks collaboration with national and international institutes, partnerships with social institutions and industries to realize its goals.

Areas of Expertise

Explore Computing Architectures
HPCC Systems, Hadoop, GPU

Inculcate Programming Skills
Java, Python, ECL

Demonstrate Case studies on Intelligent Systems
Water Sustainability, Astronomical Data, Credit Card Fraud analysis & detection

Big Data Analytics and Processing
Bit Coin Data analysis, Covid Data Analysis

Contribute to open source community
ML libraries to HPCC ML Bundle,

Platform Enhancement
Compiler Optimization

Facility & Infrastructure

The centre is well equiped with the necessary computational infrastructure and software tools.

4-node cluster setup at RVCE Lab
Is setup at RVCE Lab to demonstrate Big Data Analytics and its use cases to the real world problems in a distributed environment on HPCC Systems platform.

8-node cluster provided by HPCC Systems
Is setup at Lexis-Nexis USA Lab for analysis of huge data, students can access remotely to work on the project on HPCC Systems platform.

Mentorship from HPCC Systems/RVCE
Academic projects are not only sponsored by HPCC Systems but also mentored by SME's of HPCC Systems.

Remote internships from HPCC Systems
Internships are offered to students through selection by HPCC Systems and remotely mentored by them for the period of 8 weeks.

Internship at CoE, RVCE
The CoE, RVCE also offers internships to the students of others colleges in India.

Achievements

09 Research & Consultancy Projects worth 94,000 USD

08 Summer Internships worth 25,400 USD

12 Publications in Reputed Journals & conferences

Conferences, Workhops, and Hackthons

Activity & Research Collaboration

Research
open for collaborative academic research

Facility Access
Consultancy and Training

Industry Connect
Leverage HPCC Systems for Big Data Analytics

Projects & Internships
Offers projects and internship for students

Ideation & Prototype
Contribution to Open source HPCC Systems Community

For more details :

Contact details

Dr. Shobha G
Professor, Dept. of CSE (Data Science)
shobhag@rvce.edu.in
Ph No:+91-9480280273

Prof. Jyoti Shetty
Assistant Professor, Dept. of CSE
jyothis@rvce.edu.in
Ph No:+91-9900052901

3. Internet of Things
CISCO-RVCE

Develop employable human resource to meet the challenges in the field of IoT. Strengthen laboratories for training, design, implementation and maintenance. Establish a competence centre in research and innovation across various verticals of IoT. Create technology business incubation centre for IoT.

Areas of Expertise

Embedded Systems

Networking and Cloud Computing (IaaS, PaaS and SaaS for IoT)

Full Stack Application Development for IoT

Analytics and Visualization

Facility & Infrastructure

The centre was initiated with the support of CISCO in 2016-17 with a fund of 3 crores for 3 years. CISCO-RVCE-CoE-IoT has provided the necessary Infrastructure for different groups of faculties to create training programs, hackathons, makathons, and proof of concepts. Currently, 40 lakhs worth of sensors, actuators, development boards, and other devices are available across different groups of faculties.

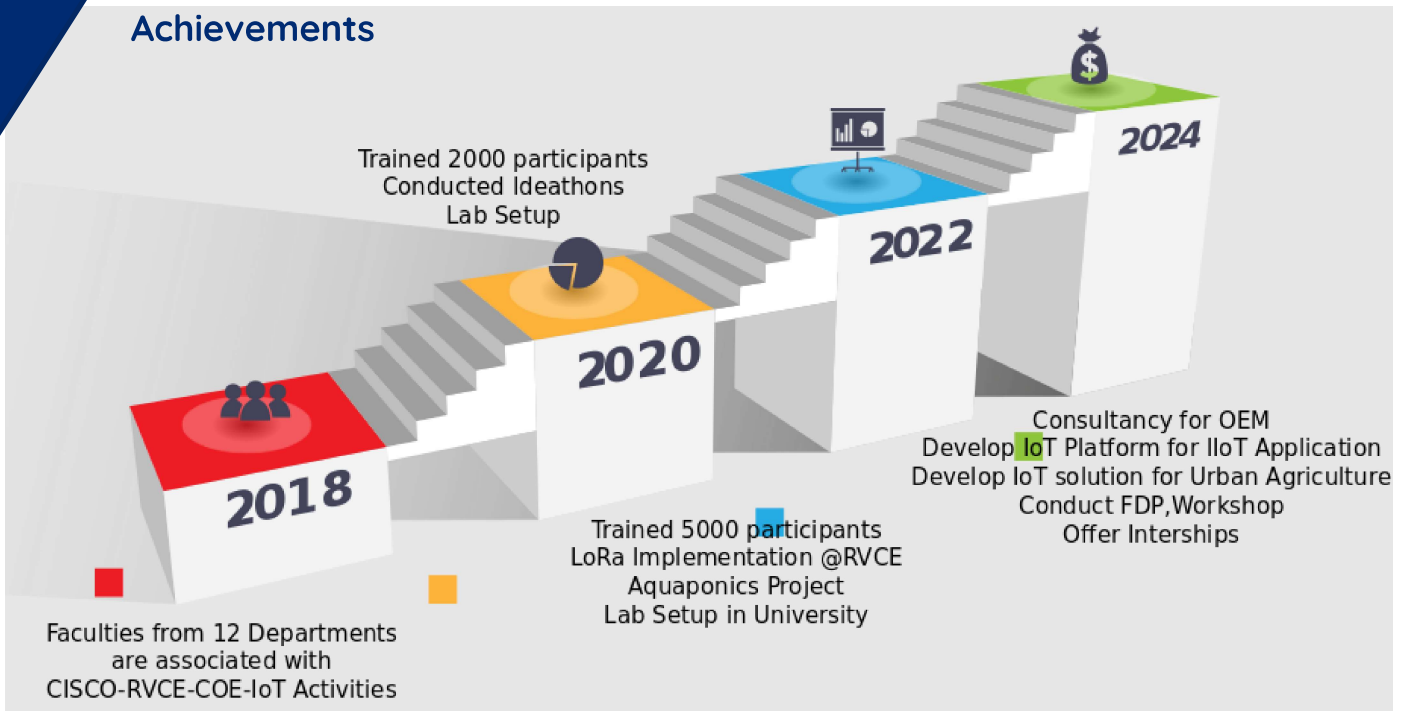

11 lakhs worth LoRa based infrastructure
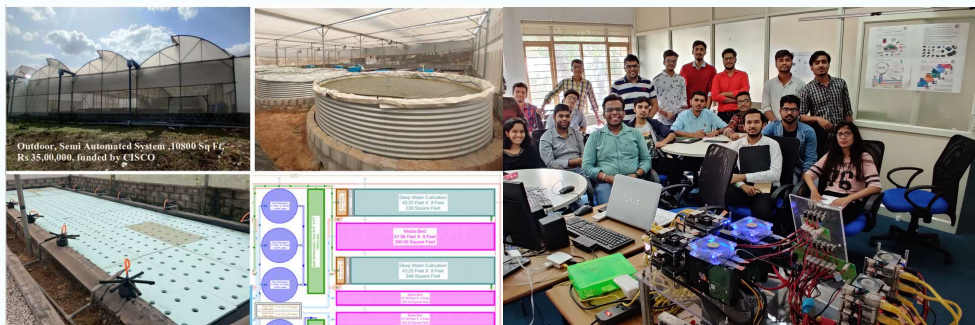
40 lakhs worth Aquaponics facility to develop IoT platform for Controlled Environment agricutlrre

40 lakhs worth IoT Kits and 10 lakhs worth Private Cloud Infra

COE - INTERNET OF THINGS

Achievements

Trained 2000 participants
Conducted Ideathons
Lab Setup

2024

2022

2020

2018

Consultancy for OEM
Develop IoT Platform for IIoT Application
Develop IoT solution for Urban Agriculture
Conduct FDP, Workshop
Offer Interships

Trained 5000 participants
LoRa Implementation @RVCE
Aquaponics Project
Lab Setup in University

Faculties from 12 Departments
are associated with
CISCO-RVCE-COE-IoT Activities

Activity & Research Collaboration

Training Programs
Faculty Development Programs

Internship

Product and Solution Development
IoT Platform Development
Industrial IoT Application Development
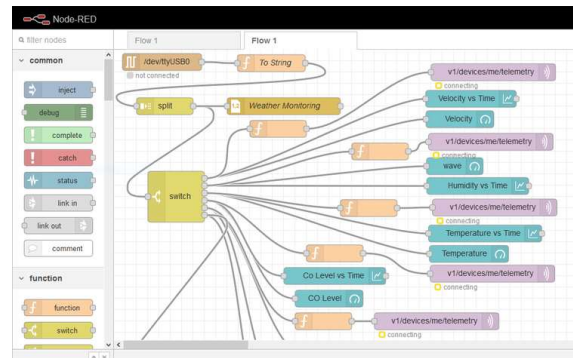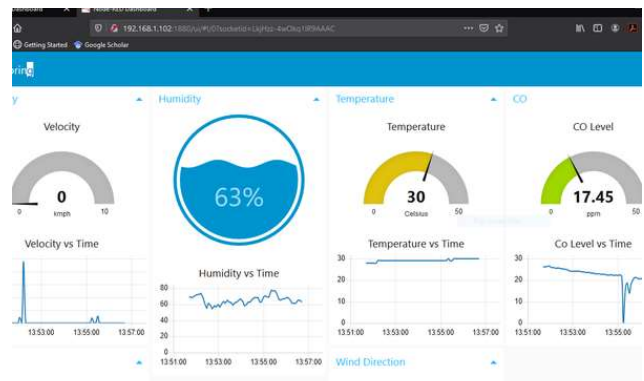
Contact details

Dr. Renuka Prasad B
Associate Professor, Dept. of MCA
renukaprasadb@rvce.edu.in
Ph No:+91-9901945674

4. Computational Genomics

Centre of Excellence - Computational Genomics is an integrated base set to provide solutions to challenges in the agriculture and healthcare research sectors.

The prime focus of the lab is to establish a robust facility in computational biology to provide efficient solutions to research challenges. The center also provides skill development training to students leading to enhanced research ability.

The lab is expertised is Drug design, safety profiling and formulation studies. It also provides an comprehensive bioinformatics solution to omics research. We are pioneering in machine learning aspects of genomics and drug discovery. We can support tools and database development.

Funding Agencies

Areas of Expertise

Omics research

Drug design and safety

Tools and database

Artificial Intelligence/ Machine Learning
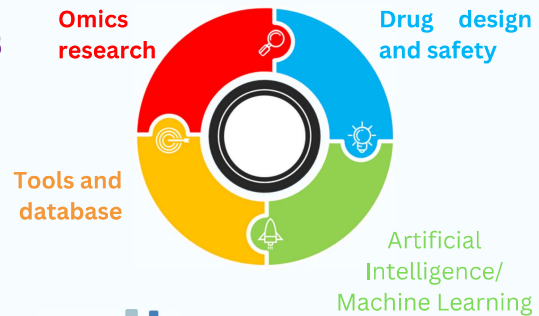
Collaborations with

Facility & Infrastructure

High throughput genome analysis

High throughput Drug screening

Software

Infrastructure

OMICS analysis

NGS, Meta-genomic, Proteomics and Meta-proteomics analysis

Drug Discovery

Screen millions of drug candidates to provide lead compounds and perform lead optimization

Simulations

Open source and commercial software like Schrodinger, Omics box, J-OCTA, and MATLAB to name a few

GPU and HPC
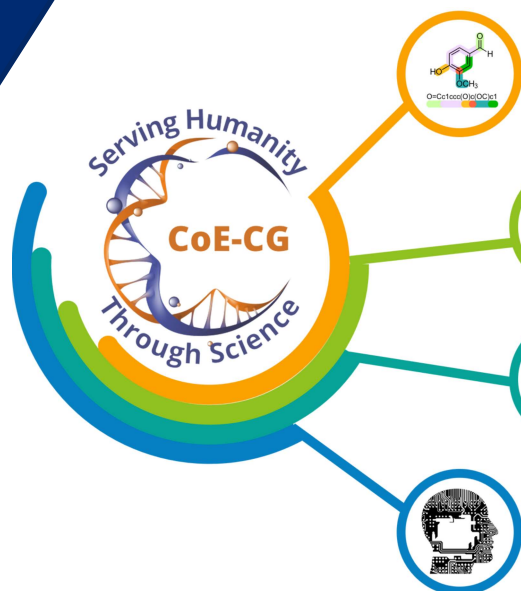
3 HPC and 4 NVIDIA GPU clusters, Storage server and G-Cloud suite

COE - COMPUTATIONAL GENOMICS

Drug Discovery

The service provided encompasses the *In-silico* Ligand design – Molecular Docking – MD simulations and Formulation studies. RNA and aptamer-based designs are performed.

OMICS research

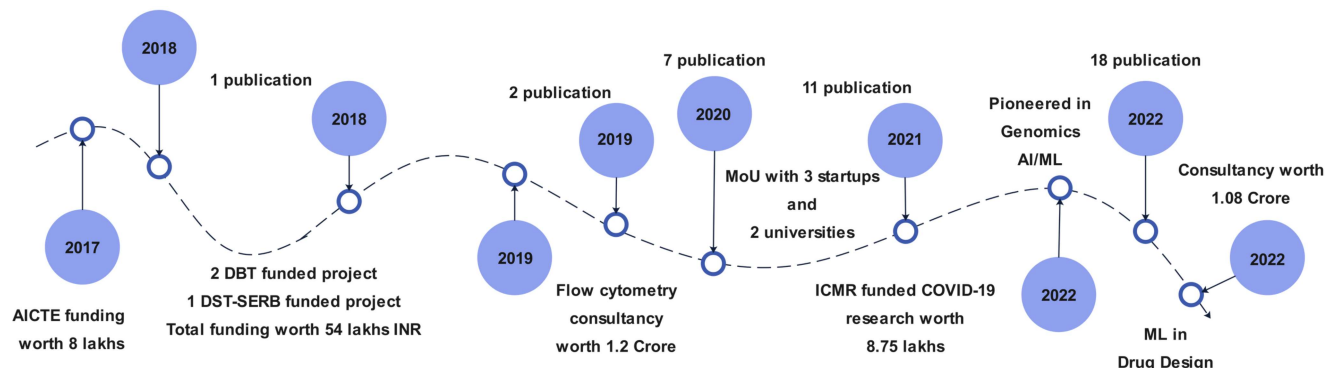Complete end-to-end OMICS research related to Genomics, Proteomics, Meta genomics, and Meta proteomics is performed

Tools and Database

Development of tools for analysis, plugins and databases for storage and management can be developed based on requiremer

Artificial Intelligence and Machine Learning

Development of ML models and prediction based on genomics data. Design of novel drug candidates based on ML models

CoE-CG
Serving Humanity Through Science

Journey and Milestones

2017 — AICTE funding worth 8 lakhs

2018

2018 — 1 publication

2018 — 2 DBT funded project 1 DST-SERB funded project Total funding worth 54 lakhs INR

2019

2019 — Flow cytometry consultancy worth 1.2 Crore

2019 — 2 publication

2020 — 7 publication — MoU with 3 startups and 2 universities

2021 — 11 publication — ICMR funded COVID-19 research worth 8.75 lakhs

Pioneered in Genomics AI/ML

2022

2022 — 18 publication — Consultancy worth 1.08 Crore

2022 — ML in Drug Design

Activity and Research

Research

We are open to academic research collaboration and funding opportunities with shared IP

Internship

Students can apply for Internships throughout the year for a nominal fee

Consultancy

Pharmaceuticals and startups can outsource the work on for a pre-decided fee.

Ideation

Involvement with start-ups to Initiate new ideas for fee or shared IP

Contact details

Dr. Vidya Niranjan
Professor and Head, Dept. of BT
vidya.n@rvce.edu.in
Ph. no:+91-9945465657

5. Smart Antenna Systems and Measurements

The centre of excellence in smart antenna systems and measurements specializes in the analysis, design, optimization and measurement of RF and microwave devices for wireless and defense applications. This facility is utilized for multiple activities such as:

a. R & D Activities: Design and Development of Antennas for cutting edge technologies
b. Lab Facility: Antennas and RF Devices Characterization
c.   Student Internships and Faculty Training (In house/External)
d. Consultancy Activities: Design, Development and Characterization of Antenna and RF Systems

Areas of Expertise

Optimization of Antenna and RF systems

Array Signal Processing

Computational Electromagnetics

Antenna Arrays and RF Devices Characterization
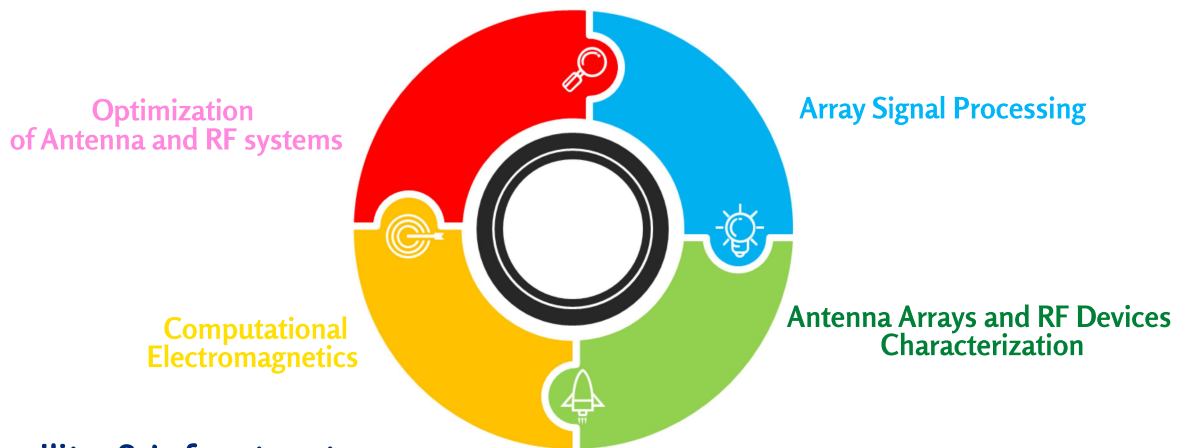
Facility & Infrastructure

a. EM Simulation Software   b. Anechoic Chamber   c. Vector Network Analyzer

d. RF Power Sensor   e. RF Cables and connectors   f. RF Phase Shifters for Beamforming
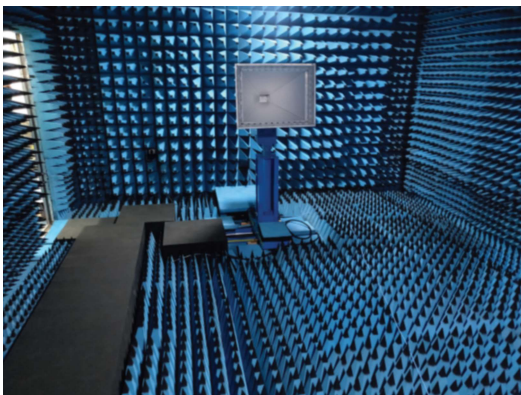
Anechoic Chamber operational up to 40GHz

Vector Network Analyser operational upto 40GHz

RF Power Meter - R&S®NRP-Z51

RF Phase Shifters for Beamforming

Achievements

2014 Set up bench to measure Antennas/RF Components

2017 Developed Hybrid Methods to compute EM fields for Lens Antennas

2018 COE SASM : Anechoic Chamber facility established

2020 Simulation Center Established to design and optimize antenna/array systems

2023 To Establish EMI/EMC Test Bench

Activities and Research

R&D Activates:
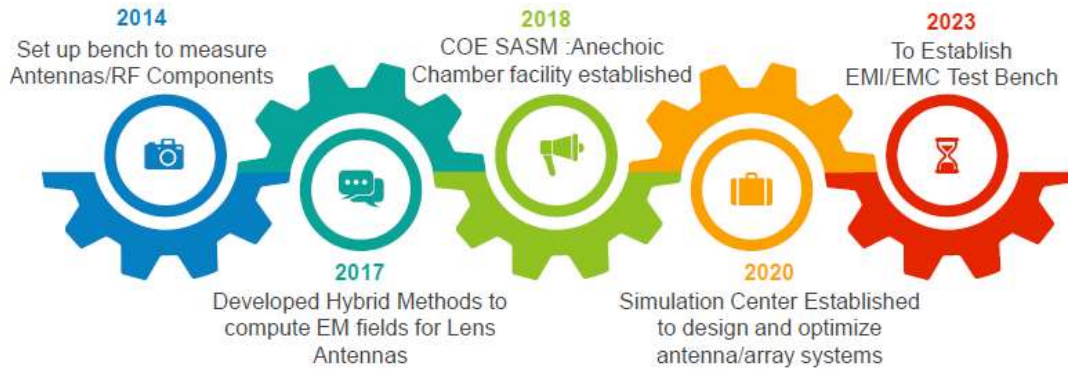- Design and Development of Antennas and RF Systems
- Development of Hybrid Methods to compute fields of Antennas

Training & Internship Activities:
- Internship certificate with performance-based grading from Centre of Excellence in SASM and WavCom Pvt Ltd
- Invited talks from leading experts through IEEE APS/MTT/Comsoc .
- Faculty Developed Programme's i
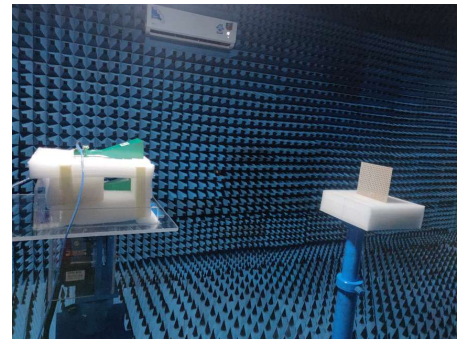
Skills Imparted in COE-SASM
- Matlab Antenna Toolbox and Phased Array toolbox
- ANSYS HFSS- EM Pro SOLVER
- Cadence AWR & Keysight ADS
- LTspice software

5 G Base station Antenna Measured in COE-SASM

Characterization & Measurements:
- Characterization of Antennas and RF devices
- Measurements of S-parameters /Reflection/Absorption coefficients of Materials

RADAR Cross Section Measured in COE-SASM

OUTCOMES
- PATENTS PUBLISHED-01
- RESEARCH PUBLICATIONS -40
- INTERNSHIPS- 100 STUDENTS COMPLETED
- 25+ PROTOTYPES DEVELOPED
- RESEARCH PROJECTS
  - TWO ONGOING PROJECTS.
  - 8 PROJECTS COMPLETED
- CONSULTANCY PROJECTS-
  - 2 ONGOING PROJECTS.
  - 5 PROJECT COMPLETED
- CONSULTANCY PROJECTS-
  - 2 ONGOING PROJECTS.
  - 5 PROJECT COMPLETED
- STUDENTS PROJECT: 25+ PROJECTS

Prototypes Developed @ COE-SASM
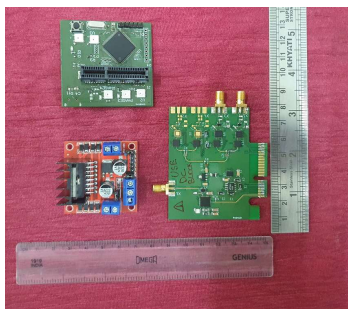
RF-Beamforming Module

X-Band 4X4 Array Antenna
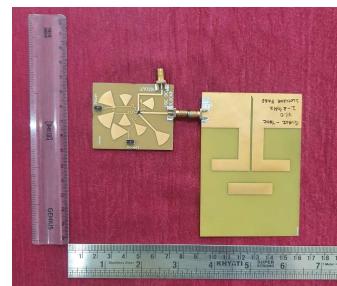
S-Band Active Antenna

Contact details

Dr. Geetha K S,
Vice Principal, RVCE
viceprincipal@rvce.edu.in
Ph No:+91-9900700990

Dr. Mahesh A,
Assc. Prof, Dept. of ECE
mahesha@rvce.edu.in
Ph No:+91-9886531812

Dr. Shushrutha K S,
Assc. Prof, Dept. of ECE
shushruthaks@rvce.edu.in
Ph No:+91-9964179197

Prof. M. Shambulinga,
Asst. Prof, Dept. of ETE
shambulingam@rvce.edu.in
Ph No: +91-9916292488

6. Quantum Computing

The CIRQuIT (Center for Interdisciplinary Research in Quantum Information and Technology) is a group of passionate students and faculty of RVCE. The group works under the Center of Excellence in Quantum Computing to explore the potential of quantum computing technologies and algorithms for solving the 21st-century problems of industry and society. The CoE works with the vision *"To inspire young minds to take up research in Quantum Computing and develop viable solutions to real-world problems."*

Areas of Expertise

O1 Quantum Algorithms

O3 Quantum-safe Cryptography

O2 Quantum Machine Learning

O4 Quantum Communications and Hardware
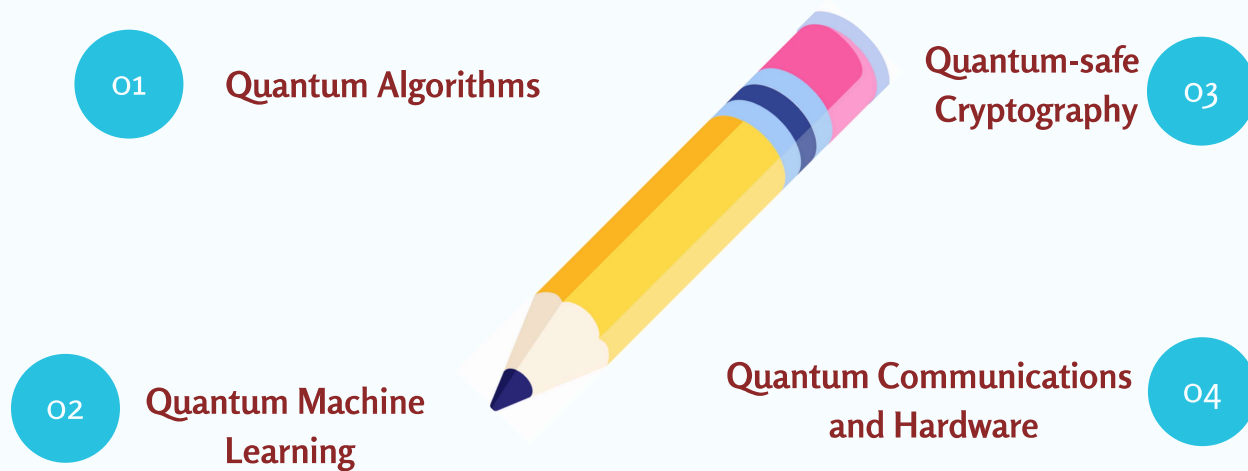
Facility and Infrastructure

O1 Expertise in developing quantum programs on the IBM-Quantum experiencevtechnology.

O2 Researching Quantum Key Distribution(QKD) schemes applications in Cyber Security and Quantum Machine learning applications in Drug development

O3 Quantum simulation experiences on Quantum Algorithms, Quantum Cryptography, Quantum Machine learning, and Quantum communication.

O4 Training programs/Hands-on workshops for students and researchers on Quantum computing, Quantum mechanics, and Quantum mathematics.

Achievements

Training

Experience

Problem Solving

Research Guidance

O1 — Training over 400+ quantum computing developers by the end of 2023

O2 — Offering project works on Quantum computing-based optimization problems.

O3 — Working with Quantum computing industries to take the technology to end users and solve some industrial problems.

O4 — Providing research guidance to scholars who want to work in Quantum Computing.

Activity and Research Collaboration

O1 Conducted month-long industrial internships for students and research scholars.

O2 Faculty development programs and hands-on workshops at the National level, sponsored by AICTE, IEEE, and others.

O3 Funded project on "Experimenting the BB84 protocol to secure Smart grid communications", sponsored by CySecK – Govt. of Karnataka.

O4 Training and research collaborations with IBM.
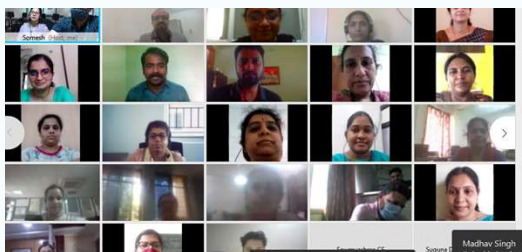
Contact details

Dr. B. Sathish Babu
Professor and Head, Dept. of AIML
bsbabu@rvce.edu.in
Ph. No:+91-9844488329

Dr. Tribikram Gupta
Asst. Professor, Dept. of Physics
tgupta@rvce.edu.in
Ph. No:+91-9591970797

7. Connected Autonomous Vehicles
WIRIN

The future of the automobile is electric, shared, autonomous and connected – a very exciting area. RV College of Engineering® (RVCE) has partnered with WIPRO and the Indian Institute of Science(IISc) to establish a Center of Excellence for Autonomous Vehicle Research at RVCE . The collaboration with WIPRO and IISc in a series of special programs devised by the WIPRO Innovation Center brings together the best automotive sector experts, researchers, innovators, companies and students to create a collaborative ecosystem at RVCE. The center seeks to focus on four key technologies for autonomous vehicles: sophisticated AI technologies for vehicle control, environment perception, route planning and vehicle navigation systems. It is a collaborative platform to observe an essential component of contemporary transportation networks.

Areas of Expertise

National Dataset Collection
- Data Set Collection from LiDAR, Camera & IMU
- Annotation of the Datasets
- Deep Learning Models for Annotation Automation

AI Stack Development
- Deep Learning Models for Perception, Localization & motion Planning.
- Embedded System Design for Vehicle Control Unit
- Sensor Integration : LiDAR, Camera, IMU etc

Mechanical Design
- 3D Model of Chassis
- FE Analysis
- Brake by Wire
- Steer by Wire

Powertrain Components Design
- Battery Design & Configuration
- Battery Management System
- Battery Health Monitoring System
- PID Controller Design
- Motor & its Controller

Vehicle Simulator
- HD Map Creation
- Vehicle Modelling
- Scenario Generation on Road Runner.

Lab & Infrastructure

Sensor
Sensor Integration Through ROS
- LiDAR
- Camera
- IMU, Ultrasonic Sensors
- Temperature Sensors etc.

Powertrain
Testing of Battery, Motor & Controllers
- EV Simulator
- Battery Testing
- Motor & its Controller Test Jig
- Battery Management System

CARLA & National Dataset
Vehicle Simulator S/W
Dataset Collection and Annotation

Integration
Embedded Controllers:
- STM
- CAN
- Display
- OBD
- Nvidia Jetson Processor

Achievements

Data Collection : Bangalore City:
9 TB Data, 10,00,000 Images, 25% Images Annotated and Integrated

Mechanical & Electrical Architecture:
CAED Modelling, FE Analysis, Brake by Wire, EV Simulator Design, Battery Design & Configuration, BMS, Motor & its Controller Integration, Integration of Power Electronics Components.

Design of ECU using Embedded Systems and ROS Integration:
Electronic Control of Speed, Steering and Brake Systems, Design of CAN Bus, Dashboard and OBD Design, Fusion Algorithm for Perception, Localization and Motion Planning!!

Vehicle Simulator & Vehicle Testing :
Desktop Simulation, V2X, Design of Real time Scenarios, Development of vehicle Simulator S/W, Design of Dynamic Vehicle Model.
Testing of Vehicle in Autonomous &Remote Control Mode, Obstacle Detection and maneuvering.

Activity & Research Collaboration

Internships
Diploma, B.E, MTech Students

Facility Access
Under & Post Graduate Students
Research Scholars
Industries
Academic Institutes

Workshops, FDPs & Skill Based Training

Student Projects
In Collaboration with Industries.

Industry Institute Collaboration
Funded Projects, Research, Consultancy Projects

Contact details

Dr. Uttara Kumari M
Professor, Dept. of ECE
uttarakumari@rvce.edu.in
Ph No:+91-9945336808

Prof. Raja Vidya
Assistant Professor, Dept. of EEE
rajavidya@rvce.edu.in
Ph. No:+91-9008395966

8. E-Mobility

Center of Excellence in Electric Mobility –COEEM is established with the objective to create a platform for academia and industry to interact, innovate and co-create newer technologies for the EV industry, all in India. The center also aims at nurturing enthusiastic students through the development of futuristic electrical vehicle solutions such as next-generation controllers, battery thermal management systems, embedded design for connected vehicles, and application development for Electric Mobility.

Areas of Expertise

Vehicle Maintenance
- Electric Vehicle service, diagnostics and Maintenance Operations
- Full Breakdown and Benchmark analysis

Motor Control
- Electric Motor Selection and Sizing Principles for EV Application
- Motor Control and Power Electronics Technology for Traction Applications

Battery and BMS
- Battery packs and design challenges for Electric and Hybrid vehicle system application
- Battery Management Systems

Thermal Management and Materials
- Magic Materials and Manufacturing Techniques for EV applications
- Thermal Management System for Electric and Hybrid vehicle's

Charging Infrastructure
- EV Charging Technology and Infrasturcture
- Safety, testing Regulations and Standards

Lab & Infrastructure

Hardware and software facilities available in e-Moblity Lab
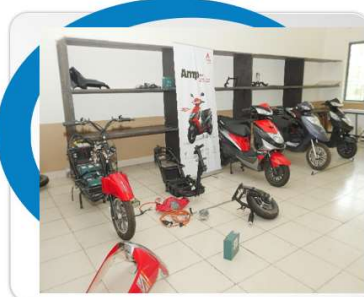
Two wheelers Assembly unit
Assembling ,Disassembling ,Harnessing and Maintenece of 2 Wheelers

Hardware Facility
Work station, ESD benches Aurdino Controller

Software available
Ansys software , Altair Embed software Matlab software , PSIM software, Ki Cad Orcad simulation software

Achievements

One Week Workshops:

Topics covered: Introduction & Benefits of EVs, Opportunities and Challenges in E-Mobility, Hybrid Electric vehicles, etc

Internships:

Internships were offered to both RV Students as well as other than RV Students.
Internships were offered for both UG and PG Students.
Statistics of Internship offered Year wise:
Yr: 2020- 48 Students completed Internships
2021- 38 Students completed Internships
2022- 02 Students completed Internships

Papers presented by Faculty Members:

Topics Covered: Futuristic energy storage devices for electric vehicles , Battery Charging Techniques for an Electric Vehicle, A comprehensive review on advanced battery technologies for E mobility, A comprehensive review on advanced battery technologies for E mobility.

15 Students of UG and PG students have done Industry Internship at Amperes
10 Students got Full time conversion

Modelling and Design

BLDC motor control using FOC algorithm

Activity & Research Collaboration

Internships
Diploma, B.E, MTech Students

Workshops, FDPs & Skill Based Training

Industry Institute Collaboration
Funded Projects, Research, Consultancy Projects

Facility Access
Under & Post Graduate Students Research Scholars Industries Academic Institutes

Student Projects
In Collaboration with Industries.

Contact details

Dr.Dinesh M.N,
Professor, Dept. of EEE
dineshmn@rvce.edu.in
Ph No: +91-9845063663

[CH₂GT]

9. Hydrogen and Green Technology

United Nations has called for immediate action by all the countries. It emphasizes creating an avenue for affordable, reliable, sustainable, and modern energy, to combat climate changes and their impact along with the revitalization of the global partnership for sustainable development. Concurrently, the Government of India has initiated the National Hydrogen Energy Mission (NHEM) with a prime focus on the generation of hydrogen from green power resources and linking India's growing renewable capacity with the hydrogen economy. In line with the initiatives of the United Nations and the Government of India, RV College of Engineering has established the Center for Hydrogen and Green Technology in March 2021.

Modules

Accolades

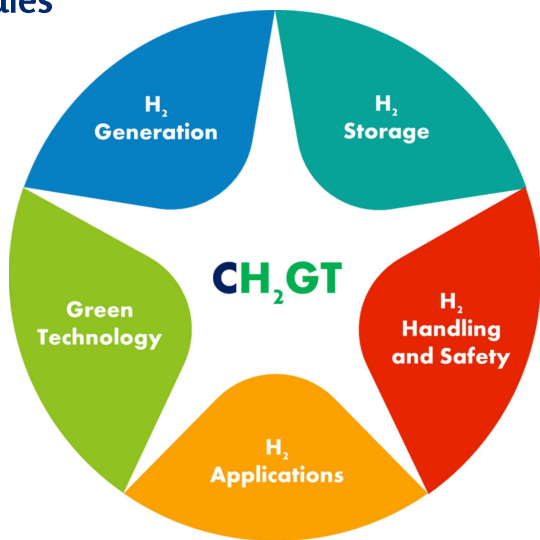| Conference Proceedings | 25 |
Students Trained	99
SCI Publications	06
Patents	04
Funded Projects	01
Students Projects	10
MoUs with Organizations	04

Focus

Generation — G

Green hydrogen powered by solar/wind energy

Blue hydrogen through carbon capture

Storage — S

Liquid organic hydrogen carriers

Metal hydrides

Hydrogen impermeable materials

Handling & Safety — H

Hydrogen sensors and sensing systems

Applications — A

Fuel cell powered vehicles

Green Technology — G

Carbon capture

Biofuels

Renewable energy

Team and Expertise

Chemical Engineering

Process and Product Design, Renewable Energy, Fuel Cells, Solar Cells Fabrication, Waste to Energy, Carbon Capture, Clean Combustion, Computational Fluid Dynamics, Polymer Composites, Cloud Computing and Data Science

CE

Chemistry / Civil Engineering

Inorganic nanomaterials – Synthesis, Characterization, Functionalization and Pollution Control

CHE/CV

Electrical Engineering

Solar PV systems, Power Systems Analysis, and Power Electronics

EEE

Mechanical Engineering / Industrial Engineering

Bio Energy, Mechanical Design, IC Engines, Supply Chain Management, Lean Manufacturing, and Operations Management

ME / IEM

CH₂GT

Support

Karnataka Renewable Energy Development Limited
Government of Karnataka

INDIAN WIND POWER ASSOCIATION
IWPA
helping mankind with energy from nature

Anvita Electronics

Nichrome Testing Laboratory and Research Pvt. Ltd.
NTLR
CONSULTING / TESTING / TRAINING / ENGINEERING

ipgi instruments
Technical Support for all

Activities

Research

Internships

Ideation

Consultancy

Projects

Contact details

Ujwal Shreenag Meda, PDEng, PhD
Assistant Professor, Department of Chemical Engineering
ujwalshreenagm@rvce.edu.in
Ph No:+91-8050842363

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10. CCTV Research
Research to Reality

An Integrated research facility to bridge the gap in knowledge, practice, protocols, testing, experiments, training, certification and expertise in video surveillance with various industry partners providing a true multi-stakeholder research facility. The Center for CCTV Research has been created with the intention of being the catalyst to bridge the wide gap between the industry and creation & execution of humongous CCTV projects in the country.
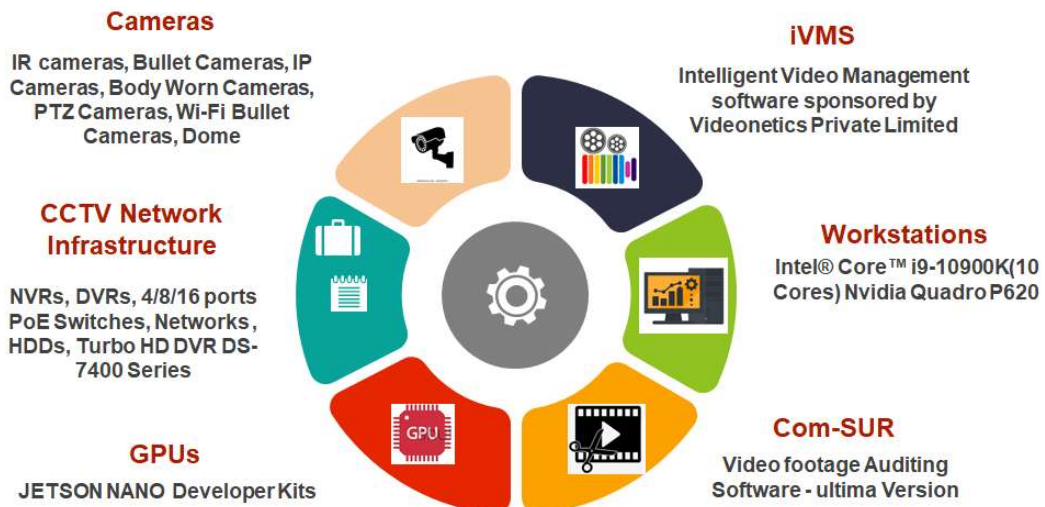
Areas of Expertise

1	One stop shop for all the video based Solutions	Video Analytics
2	Automatic Auditing of CCTV footages hourly/daily/monthly for Video Summary	Video footage Auditing
3	Criminal Investigation of Multimedia data with advanced digital forensics	Computer Forensics
4	Intelligent Video Management	Intelligent Video Management
5	Artificial Intelligence and Machine Learning Based real time use cases through high performance computing	Visual Surveillance based solutions

Facility & Infrastructure

The Center would be the synthesis and the coordination center for all major CCTV players in the country and beyond. The creation and operations of this Center would be a clear manifestation of this dream.

Cameras
IR cameras, Bullet Cameras, IP Cameras, Body Worn Cameras, PTZ Cameras, Wi-Fi Bullet Cameras, Dome

CCTV Network Infrastructure
NVRs, DVRs, 4/8/16 ports PoE Switches, Networks, HDDs, Turbo HD DVR DS-7400 Series

GPUs
JETSON NANO Developer Kits

iVMS
Intelligent Video Management software sponsored by Videonetics Private Limited

Workstations
Intel® Core™ i9-10900K(10 Cores) Nvidia Quadro P620

Com-SUR
Video footage Auditing Software - ultima Version

COE- CCTV RESEARCH

Milestones

Industry academia Collaborations
Strong industry associations for development of right technical skills. MoUs with multiple stakeholders.

Research & Development
R&D Projects funded through industry.
Lab infrastructure sponsored by multiple stake holders.
Publications in International Conferences and Journals

Training
Trainings provided to students/faculty/research scholars through certification courses, Skill Development programs, industry certified internships through Center, webinars on recent trends in technology, Internships offered at industry

Prototype Development
Interdisciplinary prototype development for the inspection of real time scenarios using machine vision

CENTER FOR CCTV RESEARCH
Research to Reality

Indusrty Partners

TechConPro — Stitching Technology Solutions

comsur — the missing piece of CCTV

NFSU — National Forensic Sciences University — Knowledge | Wisdom | Fulfillment — An Institute of National Importance (Ministry of Home Affairs, Government of India)

VIDEONETICS — the future of video computing

Inferigence Quotient

mialo — PROVIDING INTELLECTUAL INPUTS

MISTRAL ... Partners in Real Time

PATHCOM — PathMakers of Communication & Networks

Activity & Research Collaboration

Skill Development
Skill Based Labs
Training
Certification Courses

Internships
Industry Certified
Internships
Internships at Industry

R&D Projects
Execution of
Research problems
in partnership with
Industry

Monthly Webinars
Webinars by
Industry/Research
Experts

Prototype/Product Development
Interdisciplinary
prototypes/Products for
real time use cases

Team
Dr. Ramakanth Kumar P - HoD-CSE, RVCE, Head-CCCTVR
Dr. Sreelakshmi K - HoD-ETE, RVCE, Head Operations- CCCTVR
Shri. Sanjay Sahay, Director- TechConPro, Founder & Mentor - CCCTVR
Shri. T Shankar Head - Research and Projects
Shri. Gautam Goradia, CEO & MD-Hayagriva Software Private Limited, Mumbai
Dr. Surbhi Mathur, Senior Asst Prof. National Forenesic Sciences University, Gujarat
Dr. Hemavathy R, Assoc Prof, CSE RVCE
Prof. Poornima Kulkarni, Asst Prof. ISE, RVCE
Prof. Nagaraj Bhat, Asst Prof. ECE, RVCE
Prof. Neethu S, Asst Prof. ETE, RVCE

For more details contact..
Dr. Azra Nasreen, Assoc. Prof, Dept of CSE
✉ ccctvresearch@gmail.co, Ph No: +91-9886923829

11. Logistics & Supply Chain Management

The Centre of Excellence in Logistics & Supply Chain Management at RVCE is dedicated to carrying out specialized theoretical and applied research on Supply Chain and Logistics Management.

The vision of the center is to be an internationally recognized Centre for supply chain and logistics management dedicated to the creation and dissemination of new knowledge and a forum for networking with various industries, educational centers and other related entities.

Areas of Expertise

Supply Chains
Manufacturing, Oil and Gas,
Health care,
Food processing,
Public distribution system

Digital Technologies
Block Chain,
Digital twins
Augmented Reality, Virtual Reality

Circular Supply chains
e-waste management,
recycling, reuse,
sustainable economy

Futuristic Supply chains
Omni Channel,
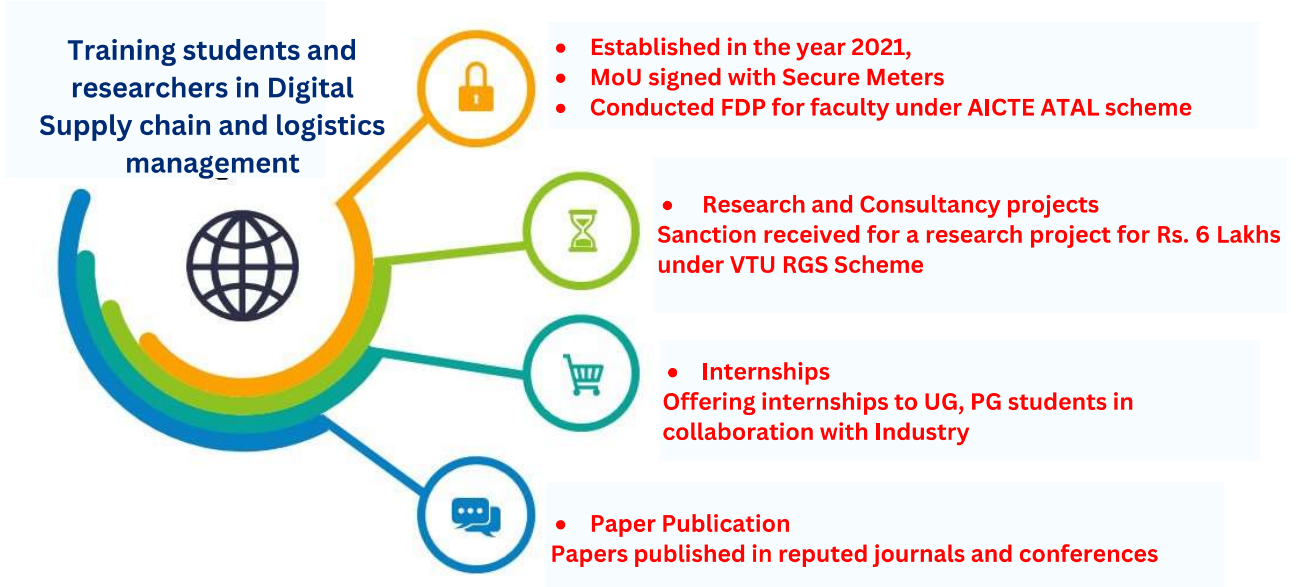Warehouse Automation,
Lean Logistics,
Elastic Logistics

Facility & Infrastructure

The center is well equipped with trained faculty, computational infrastructure and softwares both open source and commercial

ProModel

Arena

SYSTAT

PALISADE Software

Ofbiz

Opentaps

PLM

Quality Companion

Workpro

Preactor

Milestones

Training students and researchers in Digital Supply chain and logistics management

- **Established in the year 2021,**
- **MoU signed with Secure Meters**
- **Conducted FDP for faculty under AICTE ATAL scheme**

- **Research and Consultancy projects**
  Sanction received for a research project for Rs. 6 Lakhs under VTU RGS Scheme

- **Internships**
  Offering internships to UG, PG students in collaboration with Industry

- **Paper Publication**
  Papers published in reputed journals and conferences

Activity & Research Collaboration

Joint Certification courses on Supply chain and Digital Supply chain (Duration - 3 months & 6 months) and Internships

Collaborative paper publications

Research on specific issues faced by companies by RVCE Faculty and students through project work

Applying for Joint research projects for various funding agencies

Specialized Executive Development Programs on SCM

Industry Partners

SECURE

Contact details

Dr. C K Nagendra Guptha
Professor and Head, Dept. of IEM
nagendragupta@rvce.edu.in
Ph No:+91-9449612962

12. Visual Computing

The Center of Excellence in Visual Computing provides computing facilities for students, research scholars, and faculty members. The objective of the center is to bring the students and faculty of various disciplines together to execute interdisciplinary projects. The center facilitates the execution of computationally intensive research work in various state-of-the-art domains including Edge Computing, Parallel Programming, Artificial Intelligence, and Machine Learning. The center offers internships, and training and facilitates skill enhancement in the areas like image/video analytics, Mobile Application Development, Internet of Things, Natural Language Processing.

Areas of Expertise

Food, Nutrition, Environment and Agriculture
- Functional foods
- Nutraceutical
- Integrated water filtration system
- Precision agriculture
- Crop Monitoring

Machining and Novel view synthesis
- Tool Monitoring
- Tool Wear

Medical Imaging and Dentistry
- Radiology
- CBCT Imaging
- Cancer detection and Recommendation

Remote Sensing and Geo informatics
- Satellite imagery Analysis
- Spectral and Spatial resolution
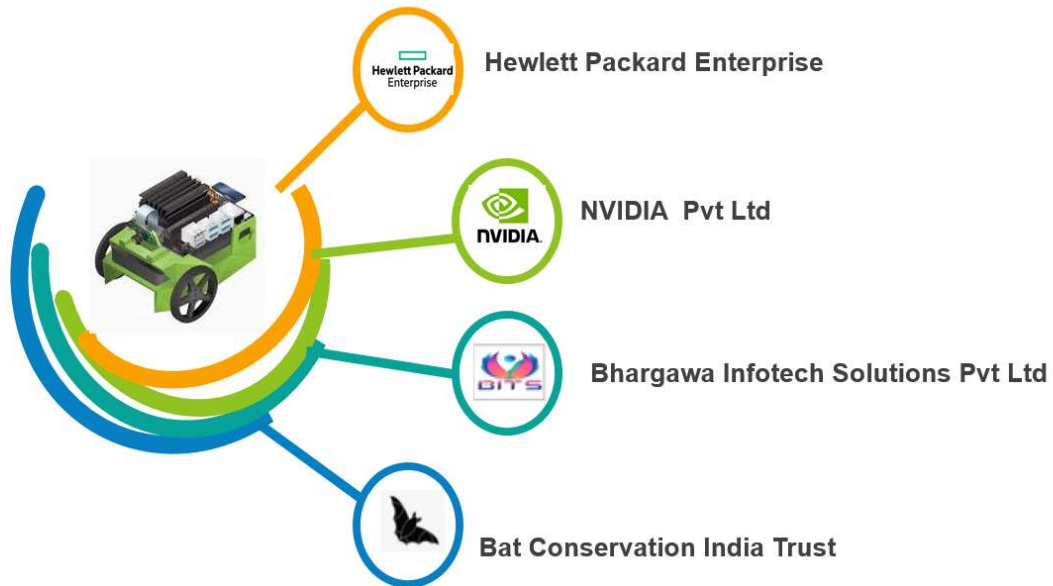- Geoinformatics
- EMR Analysis
- Spatial Analysis

Facility & Infrastructure

The centre facilitates students with required infrastructure to execute vision-based applications. The available infrastructure of the centre includes high end workstations integrated with GPU cards to execute computationally intensive tasks and model deployment devices like Jetson kits.

GPU Cards
- Quadro RTX A6000
- Quadro RTX 8000
- Titan X Pascal

Developer Kits
- Jetson nano 2GB
- Jetson Nano 4GB
- Jetson Tx2, Rpi

Workstations
- HPI RCTO Z2 tower
- HP core i9, 12900

COE - VISUAL COMPUTING

Research Collaborators and Sponsors

Hewlett Packard Enterprise

NVIDIA Pvt Ltd

Bhargawa Infotech Solutions Pvt Ltd

Bat Conservation India Trust

Activity & Research Collaboration

Consultancy
- An Intelligent framework to detect child abuse using deep learning Ÿ
- Map a bat roost app development Ÿ
- BatEYE :An acoustic signal detecting and monitoring device for bat habitat Ÿ
- Network Architecture Comparison Tool

Student Projects
- Water Quality Assessment
- Acoustic Signal Monitoring
- Object Detection in Satellite Images

Training/Internship
Trained over 200+ students on Machine Learning , Deep Learning, Data Analytics

Technical Talk
Organised Tech Talks from
- Dailyhunt
- Samsung R&D
- Accenture Labs
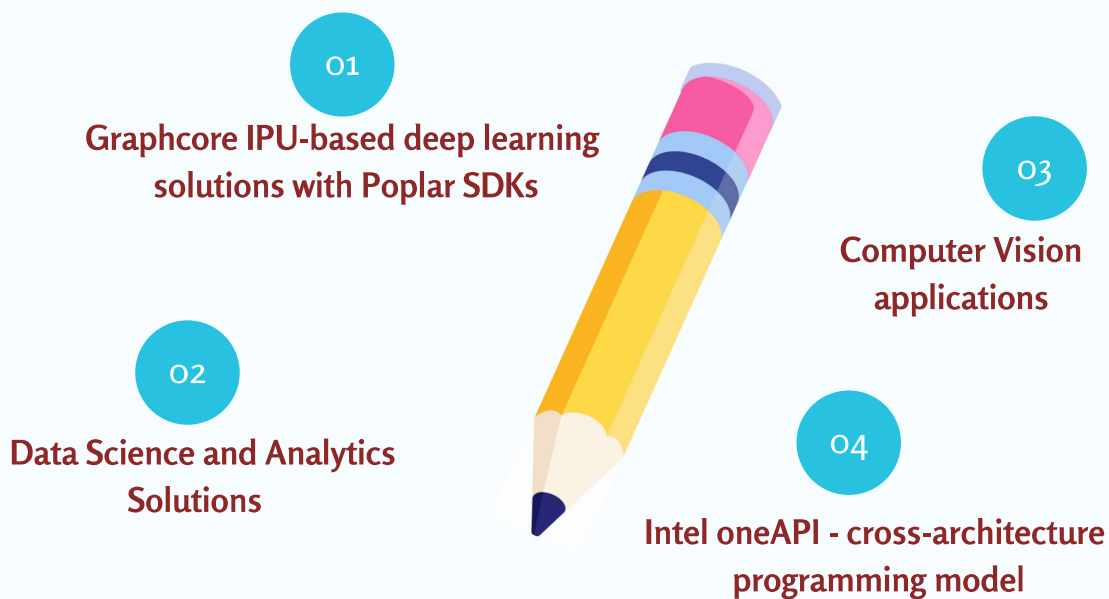- O9 Solutions
- Qualcomm

Contact details

Dr. Anala M R
Professor, Dept. of ISE
analamr@rvce.edu.in
Ph No: 8618687573

13. AI Research and Business Solution

The COE is created jointly by RV College of Engineering and Boston Ltd. UK to cater to the application of Artificial Intelligence, Machine learning, and Deep Learning in the research and development of business solutions. The COE also provides the necessary infrastructure for start-ups & technology enabled training to encourage and support start-up ecosystems

Areas of Expertise

01

Graphcore IPU-based deep learning solutions with Poplar SDKs

02

Data Science and Analytics Solutions

03

Computer Vision applications

04

Intel oneAPI - cross-architecture programming model

Facility and Infrastructure

01 The COE has a Graphcore IPU M2000 machine with POD4 capacity to handle high-end AI workloads without dependency on the cloud infrastructure. Clients can process their data locally and build and run AI, ML, and DL models.

02 The COE also offers curated training programs on the latest and cutting-edge technologies, like Intel One API, for Industry participants and students.

03 The COE also supports incubating ideas under industrial mentor ship and gives bootstrapping services to launch the ideas as workable products and business services.

04 The COE invites industrial consultancy inquiries in verticals such as commerce, science, healthcare, smart cities, agriculture, and others,where data science and AI technologies are needed.

Achievements

Training	Consultancy	Incubation and StartUp	Research Guidance
01	**02**	**03**	**04**
Training over 100+ data scientists and AI developers by the end of 2023	Offering consultancy to integrate IPU-based deep learning models in AgriTech, HealthTech, FoodTech and EduTech companies.	Incubating Start-up ideas of the MSME sector inside Bangalore and across India.	Providing infrastructure support and guidance for research scholars who works in the domain of Data Science and AI..

Activity and Research Collaboration

01 Successfully launched the first batch of the certification course in data science on 20/08/2022. Number of Participants: 10 (05 Industry + 05 Academics).

02 Train-the-trainer workshop on Intel Unnati Gaudi DL Lab

Contact details

Dr. B. Sathish Babu
Professor and Head, Dept. of AIML
bsbabu@rvce.edu.in
Ph No:+91-9844488329

14. Women in Cloud CoE in India

WOMEN IN CLOUD

Women in Cloud Center of Excellence in India at RV College of Engineering® in association with Women in Cloud (WIC), USA would like to extend the benefits of the CoE to the beneficiaries across Karnataka state. The objectives are in line with Engineering (R & D) policy 2021 and include innovation lab programs to encourage open innovation, boost the Engineering R&D ecosystem, and recruitment assistance. WIC is a community-led economic development organization taking action to generate $1B in net new global economic access for women entrepreneurs by 2030 through partnerships with corporations, community leaders, and policymakers.
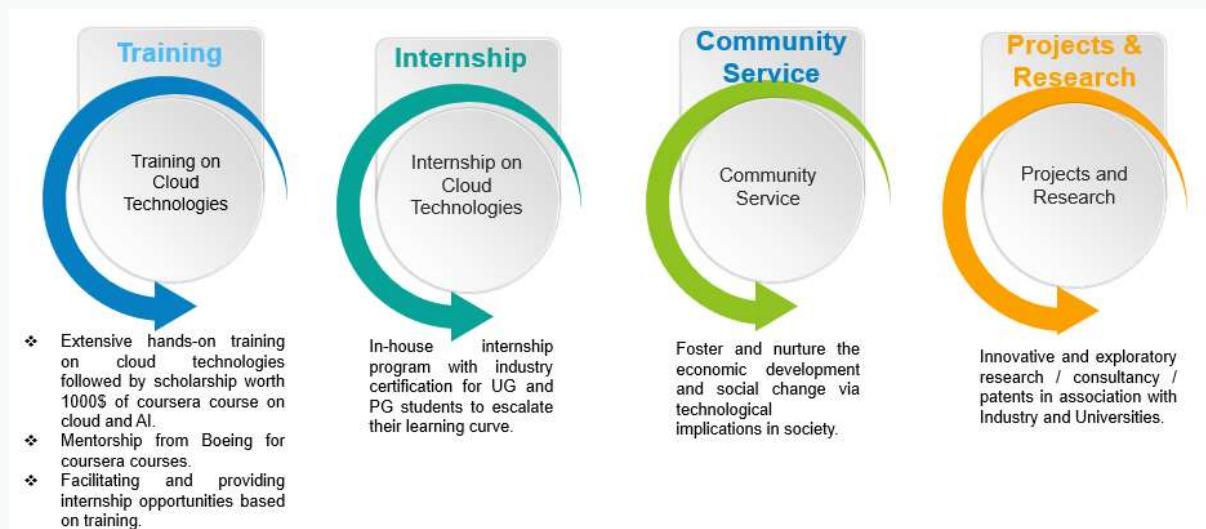
Areas of Expertise

Industry & Community partners

1. Training on Cloud Technologies
2. Community Service
3. Internship on Cloud Technologies
4. Projects and Research

Facility & Infrastructure

Software Resources: Microsoft Azure, IBM Cloud, ThingSpeak, ELK Cloud, Google Data Studio, Docker, Python Flask, MongoDB, GitHub, Atom IDE.

Hardware Resources: Data Center Rack Server.

Training — Training on Cloud Technologies
- Extensive hands-on training on cloud technologies followed by scholarship worth 1000$ of coursera course on cloud and AI.
- Mentorship from Boeing for coursera courses.
- Facilitating and providing internship opportunities based on training.

Internship — Internship on Cloud Technologies
In-house internship program with industry certification for UG and PG students to escalate their learning curve.

Community Service — Community Service
Foster and nurture the economic development and social change via technological implications in society.

Projects & Research — Projects and Research
Innovative and exploratory research / consultancy / patents in association with Industry and Universities.

Roadmap

Shape up CoE as the Center for Cloud Computing Research. → **Research**

Accelerate the process for funded projects through CoE. → **Projects**

Take up Internship/consultancy work through Laboratory and External connects to establish a sustainable model for public and private partnerships. → **External Connect**

Upskilling Faculty/Industry/Professionals/Research Scholars for employability through Internships and projects. → **Employability**

Achieving excellence through Cloud technologies training sessions. → **Training & Skilling**

Setting up of a Cloud Computing Laboratory. → **Infrastructure**

Women in Cloud Center of Excellence in India

Activity & Research Collaboration

Internship

Design & Development of Robust Cloud-Based Solution using Docker and Kubernetes Engine for Continuous Interaction / Continuous Delivery on Microsoft

Projects

Development of Cloud Native Applications to address Societal Concerns

Facility Access

Subscription to Cloud Platforms, Access to Data Center and Rack Servers

Ideation and Prototype

Incubation of new cloud and AI solutions aligned to Sustainable Development Goals (SDG) 2030 via Design Contests and Hackathons

Industry Connect

Sustainable partnerships with Academia and the IT Industry for Training, Mentoring, Research & Development and employability

Contact details

Dr. Mamatha G S
Professor, Dept. of ISE
mamathags@rvce.edu.in
Ph No:+91-9886311120

Dr. B M Sagar
Professor & HoD, Dept. of ISE
hodise@rvce.edu.in
Ph No:+91-9886332226

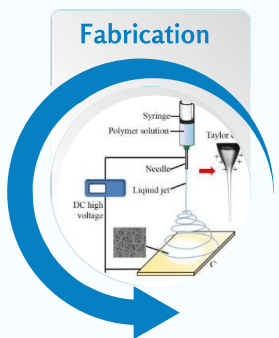# 15. Sensor Technology and Applications

The Center for Sensor Technology and Applications (CSTA) is established in September 2022 to support academic and research programs in sensor fabrication and their integration. The center has established a strong collaboration with experts from academia, research organizations, and industries related to the domain. The CSTA was launched to suffice the need for sensors and automation in robotics, agriculture, biomedical, IoT, AI, and ML. The center has the state of the art facilities for sensor fabrication and characterization for various applications using appropriate processor/controller modules. CSTA center also supports the execution of R&D projects related to sensors, funded by various government funding agencies and industrial consultancy. In addition to research, the center also conducts national/international conferences, workshops, seminars, and Internship programs.
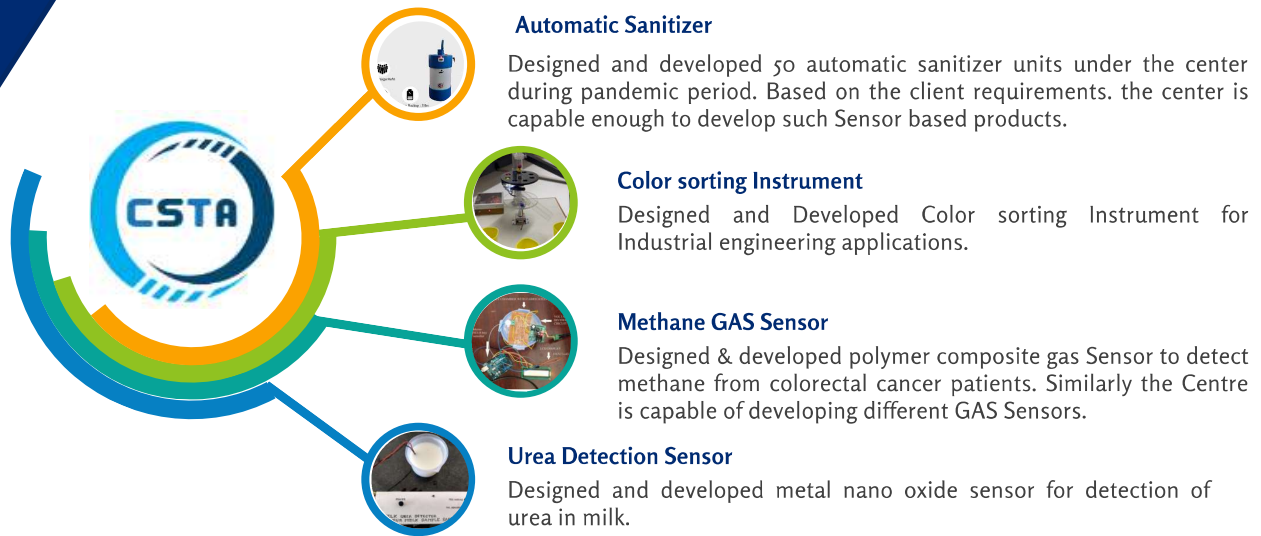
Areas of Expertise

Sensors Fabrication

Sensors Integration

CSTA

Design Thinking

IoT and IIOT

Facility & Infrastructure

The center is well-equipped with the infrastructure necessary for sensor fabrication and its integration with processors/controllers to meet the industry standards.

Fabrication

Thin Films & Coatings

The centre is able to synthesize Nano materials and fabricate thin films and coating using various techniques to develop Sensors.

Sensors

Analog/Digital Sensors

The centre has 23 Sensors under the categories of contacting, non-contacting, rotary and Linear types. These Sensors can be used in industrial & consumer applications development.

Actuators

Linear / Rotary

The centre has various types of Actuators according to the energy source like Hydraulic, Pneumatic ,Electric and Mechanical Actuators.

Processor/Controller

MP & MC Boards

The centre has various MCU boards to develop robotics / agriculture / biomedical / IoT / AIML and industrial automation applications.

COE - SENSOR TECHNOLOGY APPLICATIONS

Automatic Sanitizer

Designed and developed 50 automatic sanitizer units under the center during pandemic period. Based on the client requirements. the center is capable enough to develop such Sensor based products.

Color sorting Instrument

Designed and Developed Color sorting Instrument for Industrial engineering applications.

Methane GAS Sensor

Designed & developed polymer composite gas Sensor to detect methane from colorectal cancer patients. Similarly the Centre is capable of developing different GAS Sensors.

Urea Detection Sensor

Designed and developed metal nano oxide sensor for detection of urea in milk.

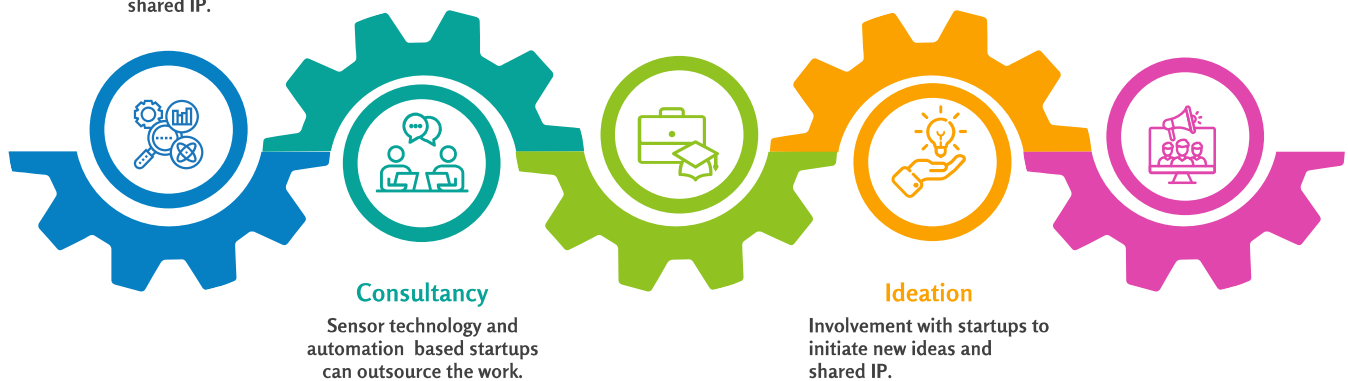## Activity & Research Collaboration

Research

We are open to academic research collaboration and funding opportunities with shared IP.

Internship

Students and Faculties can apply for internships throughout the year.

Publications

We are open to collaborate and support joint paper and patent publications.

Consultancy

Sensor technology and automation based startups can outsource the work.

Ideation

Involvement with startups to initiate new ideas and shared IP.

Contact details

Dr.Kendaganna Swamy S
Assistant Professor, Dept. of EIE
kendagannaswamys@rvce.edu.in
Ph No:+91-9980672756

16. Nanomaterials and Devices

The Centre for Nanomaterials and Devices (CND) at RV College of Engineering, Bengaluru, INDIA, was started in June 2022 to support academic and research programs in nanoscience and nanotechnology. The centre has established a strong collaboration with overseas and national nanomaterials experts in academia and industry. It has the state-of-art facilities in developing nanomaterials and characterization. The focused area of research includes nanomaterials/nanocomposites synthesis for energy, environment, electronics, electrical, telecommunication, mechanical, biotechnology, IoNTs, smart devices, chemical and civil angering applications. CND is also supporting in execution of research and development projects related to nanomaterials and devices funded by various agencies and is providing consultancy services to research institutes and industries. In addition to research, the centre also conducts international/national conferences, seminars, workshops and internship programmes on various themes of nanomaterials.

Areas of Expertise

Nanoscale materials synthesis

Nanomaterials Charecterisation

Nanomaterials for Energy, Environment applications

Nanomaterials for Biomedical, sensor applications

Facility & Infrastructure

The center is well equipped with infrastructure and necessary instruments for nanomaterials synthesis and characterization. Centre has two electrochemical workstation instruments for supercapacitor, corrosion, and electrochemical sensor applications.

Autoclave Reactors

Muffle Furnace

Electrochemical Workstation

Achievements

80+ International peer reviewed Journal Publications
50+ Scopus/SCI/Web of science indexed Journal articles
Q-1 articles = 20; Q-2 articles = 18; Q-3 articles = 08;
PhD : 5 (Persuing); PG projects = 30; UG Projects = 20

FOCUSSED RESEARCH AREAS

Supercapacitor

Battery

Biosensor

Gas Sensor

Q1 rank journal publications

Activity & Research Collaboration

Internship

Projects

Facility Access

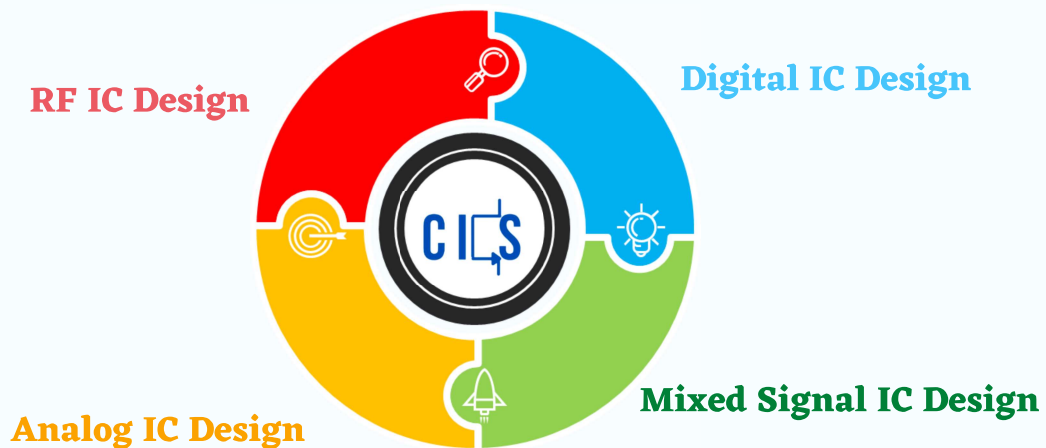Ideation & Prototype

Industry Connect

Contact details

Dr. Manjunatha C
Asst. Professor, Dept. of Chemistry
cnd_rvce@rvce.edu.in
Ph No:+91-90366 51277

Dr. Sudha Kamath M K
Assoc. Professor and Head, Dept. of Physics
sudhakamath@rvce.edu.in
Ph No:+91-94804 04395

17. Integrated Circuits and Systems

The CoE consists of passionate students and faculty members willing to create an eco-system that inspires the VLSI/Electronics system designer, to nurture the skills and innovative ideas, and to promote sustainable and interdisciplinary research, with inclusive societal concerns. The CoE promotes a coherent training program that enhances the skill set of young designers in the specified areas with academia-industry collaboration in India and abroad. It aims at engaging enthusiastic students in design/development activities through funded projects and consultancy works from various organizations thereby contributing to the growth of the nation.

Areas of Expertise

- RF IC Design
- Digital IC Design
- Analog IC Design
- Mixed Signal IC Design

Our Activities

Invited talks: Talk was delivered by Mr. Prakash Bettadapur on the topic "Product Engineering and Agility- An overview".

Consultancy Projects with Lekha Wireless Solutions Inc.

MoUs: Entuple technologies to assist the centre with fabless design. Lekha Wireless solutions which will offer consultancy projects and internships.WPIF which will offer internships to students. SCL technologies have offered 180nm PDK.

Paper Publications: Publishing research papers in the field of IC design

Activity & Research Collaboration

RESEARCH

Open to academic research collaboration and funding opportunities

INTERNSHIP

Internship opportunities throughout the year for students and faculties

TRAIN THE TRAINER PROGRAMMES

CONSULTANCY

IC design consultancy projects with various industries

IDEATION

Involvement with industry to initiate new ideas

Centre of Excellence in
Integrated Circuits & System
organizes

3 Days bootcamp on

How to design a Digital System using HDL ?

On June 11, 12 and 25 2022

Learning Outcomes :
Basics of Verilog & Coding Styles
Combinational & Sequential Design
FSM based design using Verilog
Simulation of design using test-bench

Vivado &

Contact details

Dr. Chinmaye R
Assistant Professor, Dept. of ECE
chinmayer@rvce.edu.in
Ph No:+91-9611109269

Dr. Ravish Aradhya H V
Professor & Head, Dept. of ECE
ravisharadhya@rvce.edu.in
Ph no:+91-6360290588
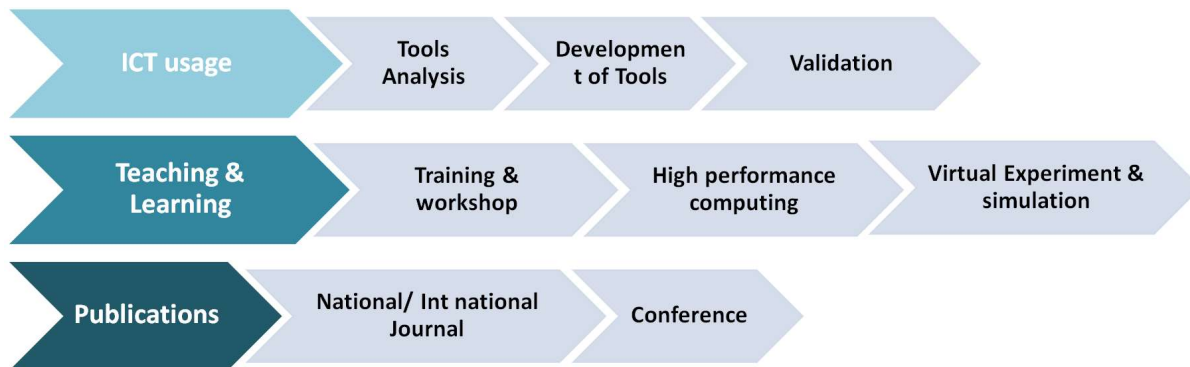
18. Education and Digital Learning Research

CEDLR is a lab dedicated to providing excellence in education to enhance teaching and learning for holistic growth. The CoE works with the vision of *"Transformation of education and learning through the adoption of digital initiatives to enhance learnability and research in engineering education"*

Facility & Infrastructure

- The center is well equipped with trained faculty, computational infrastructure and neccessary teaching learning softwares both open source and commercial

- The Center conducts training and workshops for faculty on ICT usage, the teaching-learning process and accreditation

Activity & Research Collaboration

ICT usage	Tools Analysis	Development of Tools	Validation	
Teaching & Learning	Training & workshop	High performance computing	Virtual Experiment & simulation	
Publications	National/ Int national Journal	Conference		

Contact details

Dr. B V Uma
Professor & Dean-Student Affairs
umabv@rvce.edu.in
Ph No:+91-9845593646

rexroth
A Bosch Company

19. Automation Technologies
RV-Bosch Rexroth

The Center for automation technologies was established in 2010 in collaboration with Bosch Rexroth. This interdisciplinary facility provides training to students, faculty, and industry personnel in the area of Hydraulics & Pneumatics, Mechatronics, PLC, and the Industrial Internet of Things.

Areas of Expertise

Industry 4.0
IoT Application & Implementaion

Hydraulics & Pneumatics
Circuit design & Analysis

rexroth
A Bosch Company

Mechatronics
Applications & Demonstration

PLC & SCADA
Programming& Simulation

Facility & Infrastructure

The center is well equipped with H/W and S/W facilities such as hydraulic and pneumatic training kits, new generation PLCs, Mechatronics system, Motion controllers, CNC simulator, Automation Studio software, Indralogics, Winstudio, and IoT gateway software.

Hydraulics& Pneumatics

PLC & SCADA

Mechatronics

Industry 4.0

Hydraulics & Pneumatics
Hardware kit to execute various circuits and also Automation studio simulation software to verify the same

PLC & SCADA
Basic to new generation Hardware PLC kits and Indralogic works software to execute the same.

Mechatronics
Automated assembly operation system, PLCs to change the sequence of operations

Industry 4.0 kit
Understanding the basic requirement to create IoT based project and cloud connection through gateway
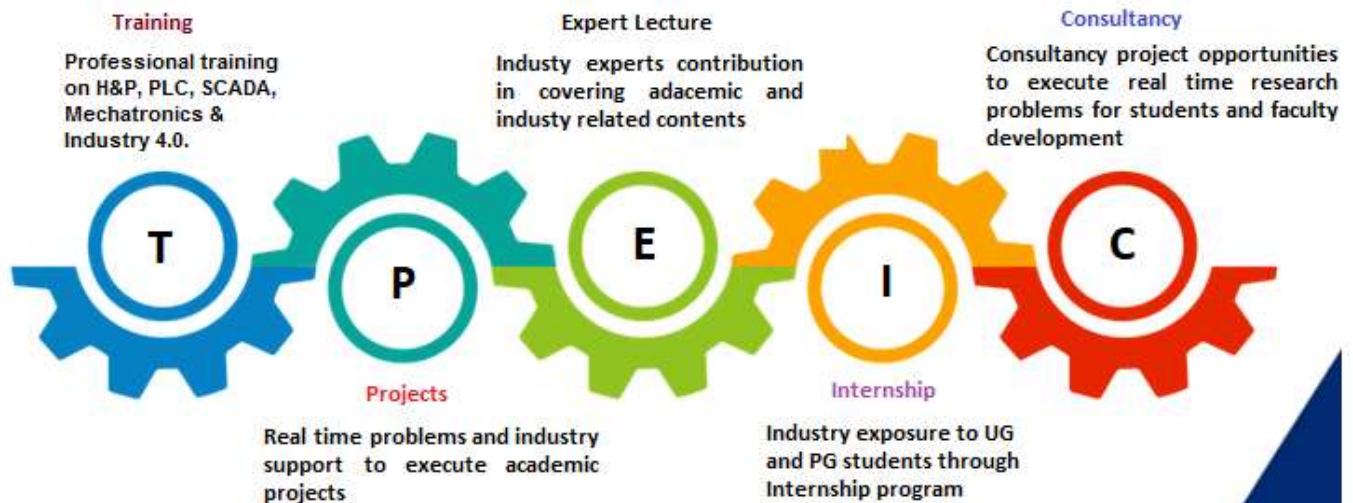
Achievements

> Professional training on Hydraulics and Pneumatics system, Mechatronics, PLC-SCADA, and Industry 4.0
> Internship : Providing opportunities to students to get industry exposure and corporate culture.
> Student Projects: Supporting academic projects by defining real time projects and involvement of industry experts to guide the students
> Consultancy projects: Opportunities for faculty and students to execute the research related problems based on industry inputs

Activity & Research Collaboration

Training
Professional training on H&P, PLC, SCADA, Mechatronics & Industry 4.0.

Expert Lecture
Industy experts contribution in covering adacemic and industy related contents

Consultancy
Consultancy project opportunities to execute real time research problems for students and faculty development

Projects
Real time problems and industry support to execute academic projects

Internship
Industry exposure to UG and PG students through Internship program

Department Involved:
Department of Mechanical Engineering
Department of Electronics & Communication Engineering
Department of Electronics & Instrumentation

Contact details

Dr. S K Harisha
Associate Professor, Dept. of ME
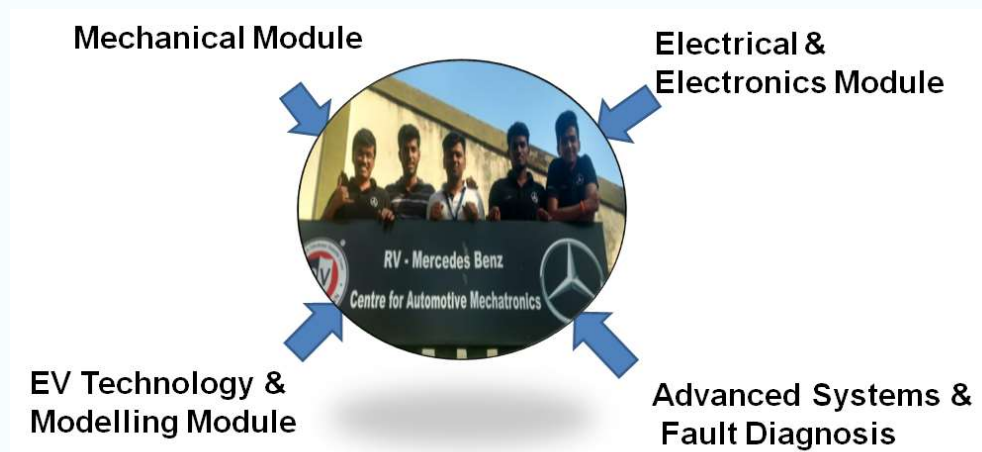harishask@rvce.edu.in
Ph No:+91-9886435884

20. Automotive Mechatronics
(RVCE - Mercedes Benz)

RVCE in association with Mercedes Benz Academy offers a globally valid one-year 'Advanced Diploma in Automotive Mechatronics'. The course is predominantly skill-based with an emphasis on hands-on learning. Mercedes is involved in planning the syllabus, development of state-of-the-art **EV - technology, car bay, aggregate training rooms equipped with Mercedes-Benz training cars, engines, transmissions,** training of faculty, and supply of tools & equipment to train students in-line with the rapidly growing luxury automotive sector not only in India but across the globe. The aim of the course is to produce qualified, industry-ready professionals to be recruited at dealerships of MBIL as well as other brands of automobiles, automotive manufacturing plants, and also at automotive R&D centers.

Modules

Mechanical Module

Electrical & Electronics Module

EV Technology & Modelling Module

Advanced Systems & Fault Diagnosis

Facility & Infrastructure

Faculty /trainers from RVCE, are Doctorates/Postgraduates in Engineering with rich experience and are trained on Automotive Mechatronics at Mercedes-Benz plant in Chakan, Pune

Mechanical
Modern engines and their functions Hands ON with actual Mercedes BENZ Vehicle

Electronics
Basic Electrics, Wiring Diagram, CAN networking & control units using CAN bus, Location and fault diagnosis

Systems
Advanced CDI, MESFI, Catalytic converter etc., ESP, ABS, BAS, ASR, Parktronic, SRS, MOST, D2B, Auto AC.

EV Technology
State of the art EV technology Hardware and Simulation training

Achievements

Milestones

80+ students trained and placed

Expert Interactions, Industrial Visits, Webinars, Workshops etc. Exposure to generic regarding automotive

Globally valid *'Advanced Diploma in Automotive Mechatronics'* by Mercedes Benz Academy, Pune

Activities

Contact details

Dr. Sridhar R
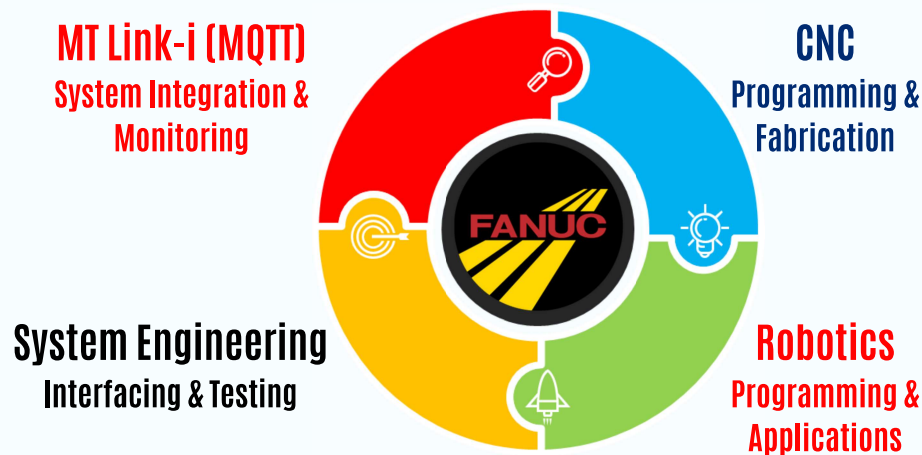Associate Professor, Dept. of ME
sridharr@rvce.edu.in
Ph No:+91-9740400717

Prof. Ravishankar Holla
Assistant Professor, Dept. of ECE
ravishankarholla@rvce.edu.in
Ph No:+91-9480111040
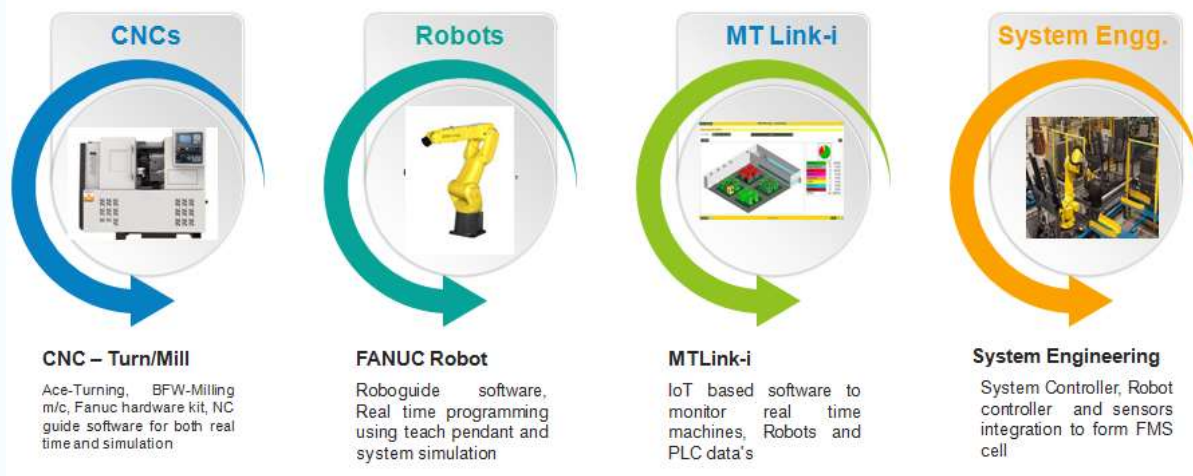
21. Automation and Robotics
RV-CAR

RV - Center of Excellence in Automation and Robotics (RV-CAR) is an interdisciplinary center initiated by the Mechanical and Industrial Engineering Department to train students and faculty members in the area of CNC robotics and IoT. This center provides academic projects, consultancy projects, and FANUC expert support for a better Industrial exposure.

Areas of Expertise

MT Link-i (MQTT)
System Integration & Monitoring

CNC
Programming & Fabrication

System Engineering
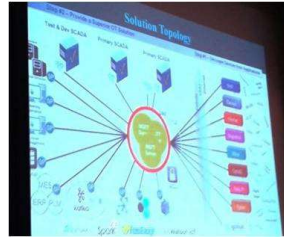Interfacing & Testing

Robotics
Programming & Applications

Facility & Infrastructure

The center is well equipped with latest H/w and S/w facilities such as FANUC Robot, CNC Hardware kit, NC guide software, Roboguide software, MQTT IoT software, Production CNC Turning and Milling machines and also system integrated components.

CNCs

Robots

MT Link-i

System Engg.

CNC – Turn/Mill
Ace-Turning, BFW-Milling m/c, Fanuc hardware kit, NC guide software for both real time and simulation

FANUC Robot
Roboguide software, Real time programming using teach pendant and system simulation

MTLink-i
IoT based software to monitor real time machines, Robots and PLC data's

System Engineering
System Controller, Robot controller and sensors integration to form FMS cell

COC- ROBOTICS AND AUTOMATION

Achievements

Professional Traning
Protessional traning on CNC programming, Robot Programming, IoT and System level integration

Internship
Providing opportunities to students to get industry exposure and corporate culture

Students projects
Supporting academic projects by defining real time projects and involvement of industy experts to execute the same

Consultancy Projects
Opportinities for faculty and students to execute the research related problem executon based on industry inputs

Activity & Research Collaboration

Training
Professional traning on CNC, Robot, MQTT and Interfacing

Expert Lecture
Industy experts contribution in covering adacemic and industy related contents

Consultancy
Consultancy project opportunities to execute real time research problems for students and faculty development

Projects
Real time problems and industry support to execute academic projects

Internship
Industry exposure to UG and PG students through Internship program
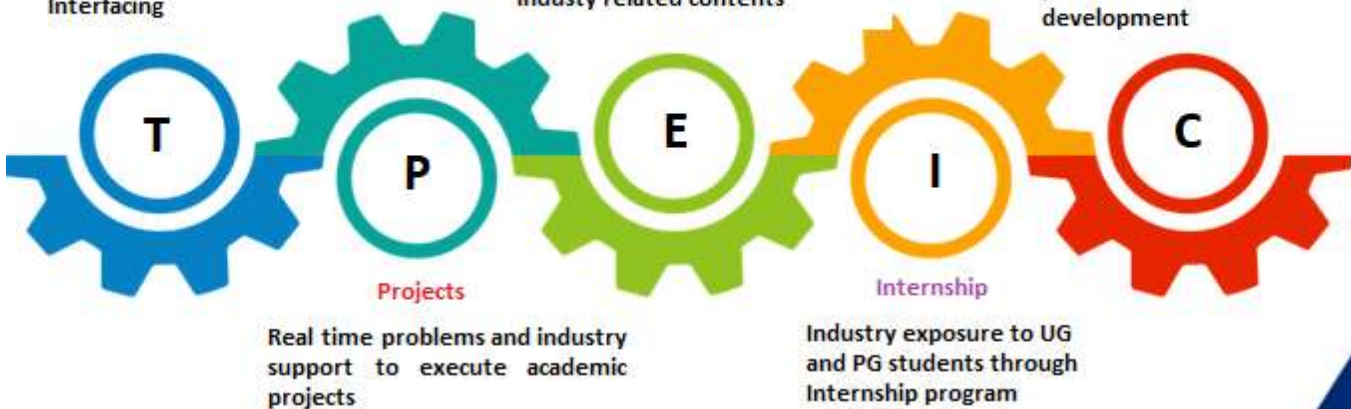
Contact details

Dr. S K Harisha
Associate Professor, Dept. of ME
harishask@rvce.edu.in
Ph No:+91-9886435884

Prof. Shruthi M N
Assistant Professor, Dept. of IEM
shruthimn@rvce.edu.in
Ph No:+91-8217061588

22. 5G and Emerging Wireless Technologies

The Center for 5G and Emerging Wireless technologies at RV College of Engineering® was started in September 2022 to support training, consultancy, and Research. The center aims at enhancing knowledge and skill through training. The center focuses on undertaking interdisciplinary research projects through collaboration with industry and research organizations. The center has signed an MoU with the German Academy for Digital Education to provide training for students and faculty to enhance their knowledge in the 5G and Allied technologies.
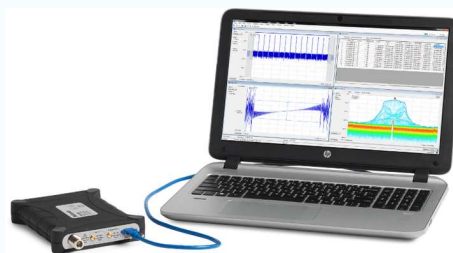
Technology Trends in 5G

Facility & Infrastructure

The center is supported by MODROB AICTE under the title, Modernization of Advanced RF and Wireless Communication Laboratory with full-fledged testing and characterization of the passive and active circuits for 5G and Allied technologies with a sanctioned amount of Rs.15,97,650.

Mixed Domain Oscilloscope

USB Spectrum Analyzer

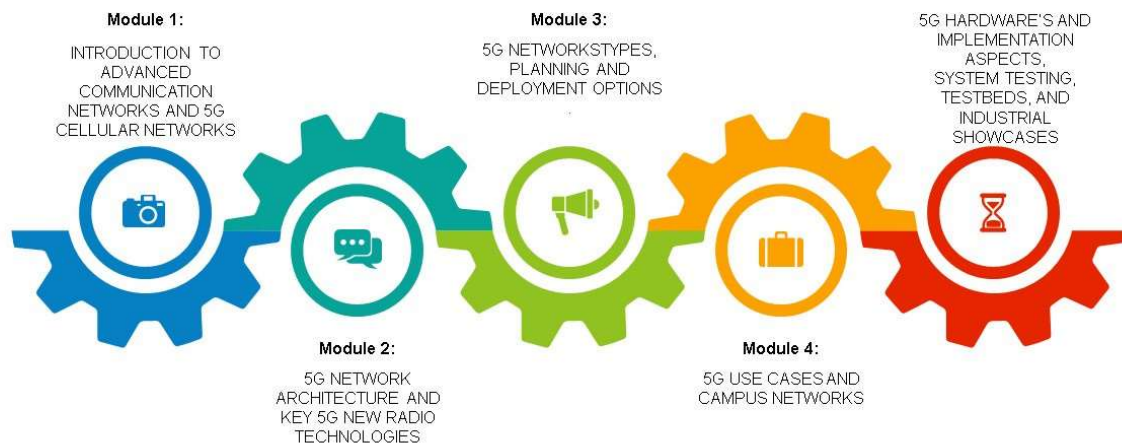**Arbitrary / Function Generator**

Integrated Research Facility

5G & Emerging Wireless Technologies

Certification Program
The Centre aims to provide certification program on 5G and allied technologies for Faculty and students.

Projects
The Centre Focusses on collaborative research with Industry and research organisation.

Internship
The Centre offers internship in collaboration with industry and R&D centres.

Workshops
The Centre organize workshops/FDP to enhance the knowledge and skills.

Activity & Research Collaboration

Certification Program on 5G

Collaboration with German Academy of Digital Education (DADB):

Module 1:
INTRODUCTION TO ADVANCED COMMUNICATION NETWORKS AND 5G CELLULAR NETWORKS

Module 2:
5G NETWORK ARCHITECTURE AND KEY 5G NEW RADIO TECHNOLOGIES

Module 3:
5G NETWORKSTYPES, PLANNING AND DEPLOYMENT OPTIONS

Module 4:
5G USE CASES AND CAMPUS NETWORKS

Module 5 & 6:
5G HARDWARE'S AND IMPLEMENTATION ASPECTS, SYSTEM TESTING, TESTBEDS, AND INDUSTRIAL SHOWCASES

Contact details

Dr. Nagamani K
Professor, Dept. of ETE
nagamanik@rvce.edu.in
Ph No:+91-9916075071

Dr. K Saraswathi
Associate Professor, Dept. of ETE
ksaraswathi@rvce.edu.in
Ph No:+91-9880166866

23. Electric Vehicle Technology

RVCE - Morris Garage

The CoC-EV (Centre of Competence in Electrical Vehicle) is a group of passionate students and faculty from RVCE. The group works in association with industry partner MG Motor India Pvt. Ltd., offering career-oriented skill development in EV Technology to cater to the Automobile Industry. The CoC works with the vision *"To provide Quality skill training, professional Knowledge, and employment opportunities in Electric Vehicles domain to the Young Professionals."*

Facility & Infrastructure

- State of the art Lab facility provided by Morris Garages India Pvt Ltd.
- The centre is supported by MGI with ZS-EV car.
- Practical experiments on high end Morris Garages EV car.
- Regular interaction with experts from Morris Garages to keep abreast of latest developments in industry.

TRACTION MOTOR
Sectioning of Induction motor

EDU (Electric Drive Unit)
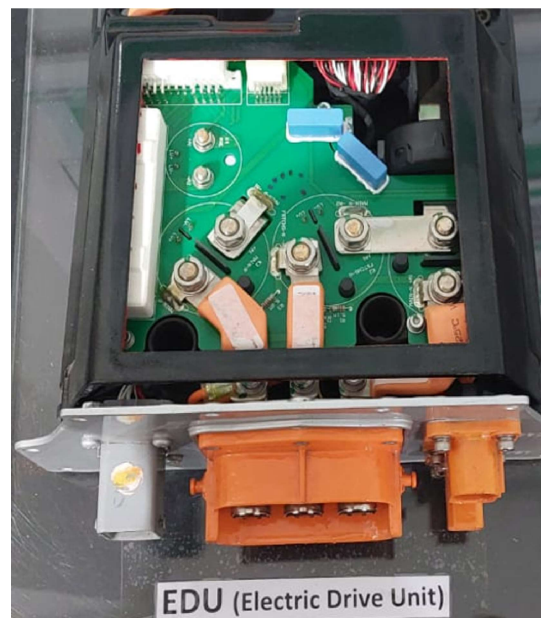
Activity & Research Collaboration

Certification program- MG-RVCE Nurture Program in Electric Vehicle Technology

Course Modules

1	Introduction to EV

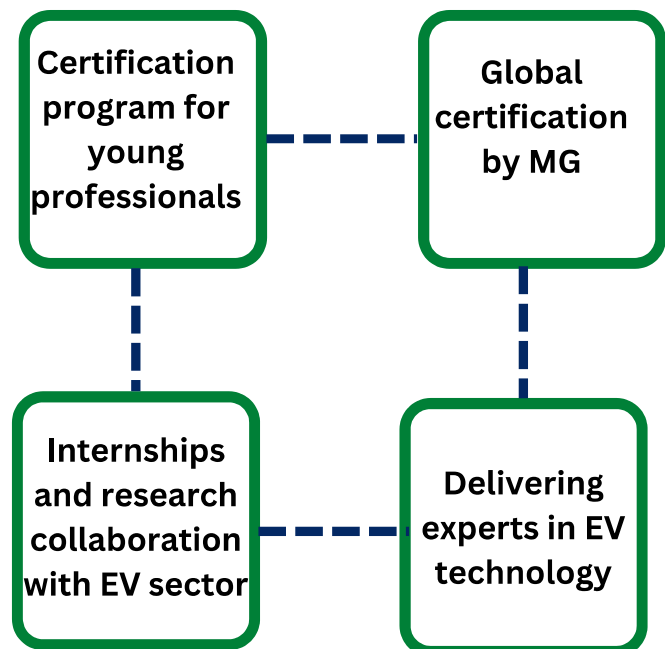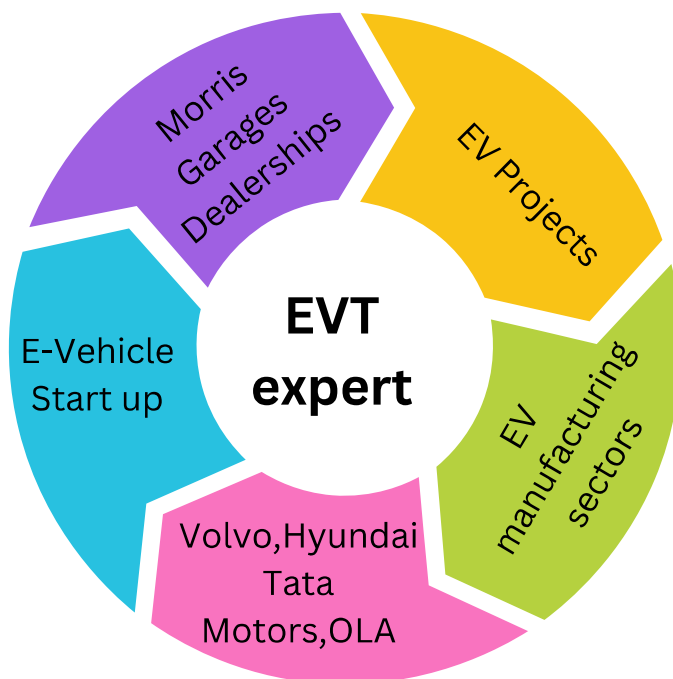| 2	High/Low Voltage System

3	Periodic maintainance

4	Connected car

- Extensively trained faculty by Morris Garages India Pvt Ltd.

- Two batches of 20 students per year

- Educated through invited talks/webinars from automotive sectors.

Placement assistance

Morris Garages Dealerships

EV Projects

EVT expert

E-Vehicle Start up

Volvo,Hyundai Tata Motors,OLA

EV manufacturing sectors

Milestones

Certification program for young professionals

Global certification by MG

Internships and research collaboration with EV sector

Delivering experts in EV technology

Contact details

Dr. M Krishna
Professor and Head, Dept. of ME
krishnam@rvce.edu.in
Ph No:+91-9980480001

Prof. Mahendra B M
Assistant Professor, Dept. of ECE
mahendra.bm@rvce.edu.in
Ph No:+91-9164602538
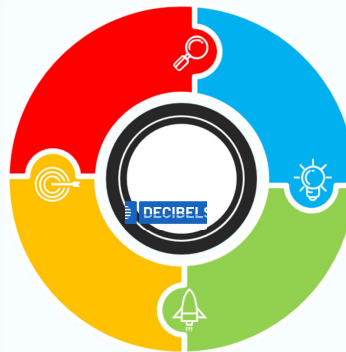
24. Decibels RVCE - EV Center of Competence

EV COC is established by the Decibels lab at RV College of Engineering with the help of govt. Of Karnataka Elevate 2021 fund, KBITS, department of IT, BT, Govt. of Karnataka.

The aim of COC is to create an industry-ready talent pool for EV sector demands by facilitating Domain-specific, hands-on training programs for students, fresh graduates, faculties & Industry Professionals. And hand-hold technical colleges & universities in assisting/creating courses, Elective subjects, honors, post-graduate diploma programs, master degrees, practical labs & E-learning learning content. Decibels aim to create 100+ COC within 2025 across India and abroad to become the leader in talent Development for automotive industry needs.

Areas of Expertise

Electric Vehicle Powertrain Development

Battery Management System Algorithm Development

Cell & Battery testing & characterisation

Electric vehicle Integration & testing

DECIBELS

COC- DECIBELS RV ELECTRIC VEHICLE

Facility & Infrastructure

The center facilitates the state of art lab infrastructure to perform cell testing for cell selection, cell behavior analysis, validation of simulation to real-world behaviors, and environmental chamber for studying the cell/pack b/w -20 to +80 Deg celsius and vehicle level testing with a chassis dynamometer for perfromace analysis and controller tuning.

Cell testing & characterisation lab

Environmental chamber (-20to +80 Deg)

2W chassis dynamometer

Milestones: Student placements

Course offerings at COC

1. Certification Course (3 Days)
1.1 Electric Vehicle Engineering

2. Educational Internships (4 Weeks)
2.1 EV Powertrain Modeling
2.2 Li-ion Cell & BMS Algorithms Modeling
2.3 Motor Controls

3. Micro-Specialization / Pre-Master Courses (3-Month)
3.1 EV Powertrain Design
3.2 Li-ion Cell & BMS Algorithms
3.3 EV CAE

4. Master Courses (9-Month)
4.1 Electric Vehicle Powertrain Design & Validation
4.2 Battery Management Algorithm Development

Contact details

Naveen C S
Center Head
naveen@decibelslab.com
Ph No:+91-8951503455

Dr. Sridhar R
Associate Professor, Dept. of ME
sridharr@rvce.edu.in
Ph No:+91-9740400717

About Centers of Excellence & Centers of Competence

Centers of Excellence

Sl. No	Center	Year of starting	Activity
1	Center for Macro Electronics	2013	To fabricate and characterize new class of materials, devices and systems based on nano materials, amorphous semiconductors, polymers, metal oxides and MEMS and also to develop flexible microelectronics devices, sensors, solar cells and TFTs for applications in health care, defense, communication fields, etc.
2	RVCE-HPCC Center for Cognitive Intelligent Systems for Sustainable Solutions	2017	To promote interdisciplinary research and outcome-based education to nurture future experts in Intelligent Systems. To develop sustainable innovative solutions to solve real world problems. Utilizing open-source tools for developing Cognitive Intelligent Systems and optimizing the resources.
3	Center for Internet of Things (IoT) (CISCO-RVCE)	2018	Develop employable human resource to meet the challenges in the field of IoT. Strengthen the connected-technology laboratories for training, design, implementation and maintenance, Establish a competence center in research and innovation across various verticals of IoT. Create technology business incubation center for IoT
4	Center for Computational Genomics [Intergene Life Sciences]	2019	To provide skill development training to students leading to enhanced research ability. An integrated base to provide solution in agriculture and healthcare research sectors.
5	Center for Smart Antenna Systems & Measurements (SASM) [Wavcom Pvt Ltd]	2019	Analysis, Design, Development of Antennas and RF devices and their Characterization for Defence and Wireless Communication Applications.
6	Center for Interdisciplinary Research in Quantum Information and Technology [CIRQuIT]	2019	Fundamentals and advances in quantum physics and quantum information theory to develop quantum safe security techniques for cyber physical systems, solve optimization problems and work on experimental and theoretical quantum physics.
7	Center for Connected Autonomous Vehicles – WIRIN	2019	Analytical models for automation, Data Analytics. Vehicle Automation Hands on modules: Data Acquisition using sensors – RADAR, LIDAR, Data processing and Actuation; Self Driving Car Vehicle Simulator (SDV in a Box), Acoustics Simulator, Application of Deep Learning models for vehicle detection – image annotation, LIDAR annotation, Acoustic annotation, object detection, compressive sensing, obstacle detection.
8	Center for e-Mobility [Greaves Cotton]	2020	Developing futuristic Electrical vehicle solutions such as Next Generation Controller, Battery Thermal Management – GCL IP project, Embedded Design for Connected vehicles and Application development for Electric Mobility.
9	Center for Hydrogen and Green Technology Research	2021	Developing affordable, reliable, an sustainable Hydrogen energy systems. Providing sustainable solutions to industrial and societal problems. Enhancing employability and creating startup culture in aspiring minds. Promoting innovation and entrepreneurship among youth.
10	Center for CCTV Research [TechconPro]	2021	To bridge the gap in knowledge, practice, protocols, testing, experiments, training, certification and expertise in video surveillance with various industry partners providing a true multi-stakeholder research facility.
11	Center for Logistics and Supply Chain Management [Secure Meters]	2021	Advanced supply chain management models for small, medium and large-scale industries for Healthcare, General Engineering and other sectors.
12	Center for Visual Computing	2021	Execution of computationally intensive research works in various state-of-the-art domains including Edge Computing, Parallel Programming, Artificial Intelligence and Machine Learning.
13	Center for AI Research and Business Solutions (Boston-RVCE)	2022	AI Research & Business Solutions, Industry Certification Course in Data Science, Consultancies in the domain of AL

14	Women in Cloud: Center of Excellence in India	2022	To accelerate women and allies' access to digital skilling, technology innovation, and job placement by leveraging public-private partnerships
15	Center for Sensor Technology Applications [Nexsys]	2022	To establish state of the art facilities for the development of Sensors fabrication and their characterization to develop various applications. To enable collaboration with national and international experts in the field of sensors fabrication and its applications development leading to papers, patents and products. Connecting academia and industries by commercializing the developed products and internship execution. To produce highly trained industry ready researchers to address the societal challenges like robotics / agriculture/biomedical/IoT/AIML and industrial automation applications through Sensor Technology and its integrations, using appropriate processor/controller modules.
16	Center for Nano Materials and Devices	2022	To develop advanced nanomaterials for sustainable solutions. To establish state-of-the-art facilities to enable a strong foundation for research and development of prototypes devices. Facilitate the interdisciplinary/multidisciplinary collaboration with foremost experts at national and international level, leading to papers, patents, prototypes, and products. To produce highly-trained researchers to address the challenges of energy, environment, engineering, agriculture and biomedical fields though nanoscience and technology approach. Connecting academia and industries by commercializing the developed products. Establish start-ups in nanomaterials devices for product development.
17	Center for IC and Systems	2022	The CoE consists of passionate students and faculty members willing to create an eco-system that inspires the VLSI/Electronics system designer, to nurture the skills and innovative ideas, and to promote sustainable and interdisciplinary research, with inclusive societal concerns.
18	Center for Education & Digital Learning Research (CEDLR) [Institutional]	2022	Hands on modules - Content Development for teaching and learning integrating advanced digital technologies

Centers of Competence

19	Bosch Rexroth – RVCE Centre of Competence in Automation	2010	Training on Hydraulics, Pneumatics, Mechatronics, PLC, SCADA and Industry 4.0, Student project execution, Consultancy projects, Guest lecture from Industry Experts.
20	RV-Mercedes Benz Center for Automotive Mechatronics	2018	1 Year course on Advanced Diploma in Automotive Mechatronics, Student internship training
21	Center for Automation and Robotics (Digital Manufacturing)	2022	Training on Robotics, CNC,MT Link-i, System Engineering Equipment's, Student project execution, Consultancy projects, Guest lecture from Industry Experts
22	Center for 5G and Emerging Wireless Technologies	2022	Building state of the art infrastructure for designing and implementation of advanced wireless solutions for industrial and societal benefit. Enhancing Knowledge and Skill through training to make students industry ready. Undertaking interdisciplinary research projects through collaboration with Industry & research organizations and developing Sustainable Solutions.
23	Center for Electric Vehicle Technologies (RVCE-Morris Garage)	2022	Skill development certification program on Electric vehicle technology is provided for young professionals. Joint internships and research projects with MG India
24	Center of Competence in Advanced Automotive Systems [Decibels]	2022	Offering state of the art courses in the automotive & other technology domains.To continuously be abreast with the pace of technology development & engage with technology companies, IT tools & the latest learning techniques.To establish a relevant connect & relationships with the industry for placements & on boarding the trained professionals, Execution of ELEVATE GRANT, selected by Govt. of Karnataka.

Vision

Leadership in Quality Technical Education, Interdisciplinary Research & Innovation, with a Focus on Sustainable and Inclusive Technology

Mission

- To deliver outcome based Quality education, emphasizing on experiential learning with the state of the art infrastructure.
- To create a conducive environment for interdisciplinary research and innovation.
- To develop professionals through holistic education focusing on individual growth, discipline, integrity, ethics and social sensitivity.
- To nurture industry-institution collaboration leading to competency enhancement and entrepreneurship.
- To focus on technologies that are sustainable and inclusive, benefiting all sections of the society.

Contact Details:

Dr. K. N. Subramanya
Principal
R V College of Engineering
R V Vidyanikethan Post
Mysuru Road, Bengaluru - 560059
Ph : 91 - 080-681881000/8111-12
Fax: 91 - 080-6717 8011

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SWAYAM NPTEL

RV College of Engineering, Bengaluru

SWAYAM (Study Webs of Active-Learning for Young Aspiring Minds) MOOC Platform was developed indigenously by AICTE in 2016 to facilitate hosting of online courses which could be accessed by anyone, anywhere at any time free of cost to achieve three cardinal principles of Education Policy viz. access, equity and quality. SWAYAM as one of the World's biggest Massive Open Online Courses (MOOCs) integrated platform of free online courses, cover subjects from high school onwards till higher education including Skill based courses to ensure that every student benefit from learning material through ICT.

There has been a major paradigm shift in higher education in the recent years, from developing cognitive and non-cognitive skills within the confines of a classroom to technology based online learning, which is a flexible anyone, anytime, anywhere Platform with the advent of MOOCs. SWAYAM being the India Chapter on MOOC is rightly poised at this juncture to bring transformative changes in educational outcomes by extending reach and access to quality education at economical costs. SWAYAM has an educational as well as a technology aspect. It has been instrumental in bringing an amalgamation of educational and technology partners under one umbrella at a pan-India level. It is a big step towards accumulating knowledge and democratization of education. Nine National coordinators of Swayam are AICTE, CEC, IGNOU, IIMB, NCERT, NIOS, NITTTR, **NPTEL** and UGC.

 NPTEL (National Programme on Technology Enhanced Learning), is a joint venture by seven Indian Institutes of Technology (Bombay, Delhi, Kanpur, Kharagpur, Madras, Guwahati and Roorkee) along with the Indian Institute of Science, Bengaluru, funded by the Ministry of Education (MoE) Government of India, to provide quality education to anyone interested in learning from the IITs. The main goal was to create web and video courses in all major branches of engineering and physical sciences at the undergraduate and postgraduate levels and management courses at the postgraduate level.

UGC and AICTE have issued guidelines whereby up to 40% of course credits can be obtained by taking courses on SWAYAM.

In this context, RV College of Engineering has been an active Local Chapter since 2015, with LC ID:239. RV College of Engineering has adopted NPTEL as part of the UG curriculum from 2018 scheme of all programmes. In 2018 scheme of syllabus, during the third year, (5th semester) of the programme, an Elective group was allotted to NPTEL courses. Here a student had to opt for a course from the set of NPTEL courses identified by the respective departments. These were 12 week courses for 3 credits. During the revision of the syllabus in 2021, MOOC courses are offered during the 4th and 5th semester, as part of the elective group. In 2021 scheme, students opt for 8 week NPTEL courses during their 4th semester and 5th semester.

NPTEL courses is formally introduced in PG curriculum in its 2022 scheme. This is as part of the Professional Development Program (PDP).

Apart from this, students who have opted for an additional degree B.E.(Honors), earn 18 credits through NPTEL courses. This is as per the guidelines given by Visvesvaraya Technological University (VTU). Students are also encouraged to take up and clear NPTEL course examination as part of Experiential Learning (EL) evaluation for the courses wherever applicable and possible.

Many faculty members also take up NPTEL courses regularly to improve upon their knowledge, skill sets and the latest technologies. It is found that learners at RVCE are regularly performing extremely well in these courses, at the National level. RVCE NPTEL local chapter is rated in AAA category during most of the semesters. Many students and faculty members are recognized by NPTEL as NPTEL STARS, based on the number of courses they have completed and the domain. Top performing students have also received paid Summer and Winter internship from different IIT's in India.

Following table depicts the brief statistics on the participation of learners from RV College of Engineering, along with the semester wise results.

Sl. No.	Semester	Present	Gold	Silver	Elite	Successfully completed	Toppers	Rating	Overall Position	Position in Karnataka
1	Jul-Oct 2016	21	1	-	16	3	3	A		
2	Jan-Apr 2017	55	4	-	27	15	3	A	63	2
3	Jul-Dec 2018	998	95	-	549	281	123	AAA	2	1
4	Jan-Apr 2018	209	12	-	140	51	38	AAA	17	1
5	Jul-Dec 2019	332	14	77	133	74	46	A	63	3
6	Jan-Apr 2019	1012	59	199	278	400	80	AA	11	1
7	Jan-Dec 2020	1381	160	515	334	150	181	AAA	5	1
8	Jan-Dec 2021	1695	117	676	495	190	225	AAA	8	2
9	Jan-Apr 2022	658	86	297	185	62	186	AA	13	1
10	July-Dec 2022	302	19	107	73	25	42	A	76	8
11	Jan-Apr 2023	1507	367	618	330	113	400	AAA	3	1
12	July-Dec 2023	1697	135	374	536	350	267	AA	16	2