1.3.3 List of students undertaking the field project work program wise in the last completed academic year along with the details of title place of work (2020 - 21)

SL NO.	USN	STUDENT(S) NAME	BATCH NO	PROJECT TITTLE
		CIVIL		
1	1RR17CV026	DARSHAN GOWDA K S	B1	STUDY ON HYBRID FIBER SELF COMPACTING CONCRETE WITH RELAVANCE TO THERMAL CYCLE
2	1RR17CV020	BHARATH N		
3	1RR17CV041	LOHITH S		
4	1RR17CV025	DANESH HIREMATH		
5	1RR17CV048	MOHAMMED SUHAIL MULLA	B2	STUDY ON BEHAVIOUR OF CONCRETE SUBJECTED TO FIRE BY PARTIALLY REPLACING CEMENT WITH BARITE MATERIAL
6	1RR17CV013	ASIM PASHA		
7	1RR17CV034	JAYA KRISHNA V S		
8	1RR17CV018	BADRI VISHAL		
9	1RR17CV044	MAHESH M	B3	MICROSTRUCTURAL ANALYSIS OF SCC INCOPARATIVE WITH ALCCOFINE
10	1RR17CV108	RAHUL R		
11	1RR17CV052	NAVYA KL		
12	1RR17CV037	KEERTHAN BJ		
13	1RR17CV049	MONISHA R	B4	RECYCLE AND REUSE OF WASTE PLASTIC IN ROAD CONSTRUCTION
14	1RR17CV050	MUDE DEEPIKA		
15	1RR17CV053	NIHAL P		
16	1RR17CV016	ASHWIN KUMAR BU		
17	1RR18CV400	ABHISKEK R	B5	PERFORMANCE EVALUATION OF SOFTENING SYSTEM
18	1RR17CV040	LAVANYA N		
19	1RR17CV103	VINAY KUMAR G		
20	1RR17CV101	VIJAYKUMAR A		
21	1RR18CV410	JAVANIKA M	B6	STUDY ON STRENGTH AND DURABILITY PROPERTIES OF BACILLUS SUBTILIS IN CONCRETE
22	1RR18CV409	HEMA P		
23	1RR18CV411	KEERTHANA R		
24	1RR18CV404	DARSHAN RAO C H		
25	1RR17CV056	NISARGA TS	B7	DURABILITY STUDY ON CONCRETE SLAB
26	1RR17CV075	RAKSHITHA MJ		
27	1RR18CV434	VINUTHA DP		
28	1RR18CV429	SOWMYA		
29	1RR17CV032	HARSHITHA KS	B8	EXPERIMENTAL STUDY ON IMPROVEMENT OF STRENGTH LIGHT WEIGHT FOAMED
30	1RR17CV047	MEGHANA K R		
31	1RR17CV064	PREKSHA L		
32	1RR16CV063	RAMESHWARI M	B9	COMPARITIVE STUDY OF MECHANICAL PROPERTIES OF BAMBOO AND STEEL REINFORCEMENT BARS
33	1RR16CV088	TEJASWINI D		
34	1RR16CV020	H N NEELAMBIKA		
35	1RR16CV055	PRAJWAL G V		
36	1RR17CV006	ANANYA K R	B10	USE OF FLY ASH AGGREGATE FOR SUSTAINABLE CONSTRUCTION
37	1RR17CV046	MANOJ B M		
38	1RR15CV097	UMESH KULALI		
39	1RR17CV005	AMITH NYAMAGOUDA		

40	1RR17CV107	KOUSHIK C V		
41	1RR17CV045	MALLIKARJUN ARADHYA TM	B11	DESIGN OF FLEXIBLE PAVEMENT FROM CHUNCHANAKUPPE TO AJJANAHALLI VILLAGE
42	1RR17CV033	HITHESH D S		
43	1RR18CV413	MADHU K R		
44	1RR18CV402	AMBIKA.S		EXPERIMENTAL STUDY ON PROPERTIES OF FOAM CONCRETE INCORPORATED WITH GGBS
45	1RR18CV405	DARSHINI.H	B12	
46	1RR17CV017	ARPITHA.S		
47	1RR18CV408	GIRISH.P		
48	1RR18CV421	RAVIKUMAR B N		AN EXPERIMENTAL STUDY ON CONCRETE USING CRUMB RUBBER WITH PARTIAL REPLACEMENT OF FINE AGGREGATE
49	1RR18CV430	SRINIVASA H M	B13	
50	1RR18CV418	RAGHU A N		
51	1RR18CV419	RAMAKRISHNA D N		
52	1RR17CV009	ANUSHA H K		ANALYSIS AND DESIGN OF MULTISTOREY RC FLAT SLAB BUILDING BY SAFE SOFTWARE.
53	1RR17CV021	BINDU S M	B14	
54	1RR17CV023	CHANDRAKALA S M		
55	1RR17CV022	CHAITRA C V		EXPERIMENTAL INVESTIGATION ON PROPERTIES OF CONCRETE BY PARTIAL REPLACEMENT OF CONCRETE BY PARTIAL REPLACEMENT OF BAGGASE ASH
56	1RR17CV036	KAVERI	B15	
57	1RR16CV093	BUPESH YADAV		
58	1RR17CV083	SANGAMESH S GOUDAR		
59	1RR17CV084	SANJAY V R		STUDY ON HYBRID COMPOSITE MILD STEEL MATERIAL FOR CONSTRUCTION
60	1RR17CV089	SHIVAKUMAR H M	B16	
61	1RR17CV080	SAMPREETH B S		
62	1RR17CV072	RAKESH T		
63	1RR17CV055	NIKHIL DILIP INGALE		STUDY ON CHARACTERISTICS OF SELF COMPACTING CONCRETE USING SPENT FIRE BRICKS (SFB) AND COCONUT SHELL
64	1RR17CV063	PREETHU M	B17	
65	1RR17CV060	POOJASHREE S		
66	1RR17CV058	PAVAN REDDY		
67	1RR17CV079	SAKSHI R		DEVELOPMENT OF LOW COST ECO-FRIENDLY PATHOGEN FREE WATER PURIFIER
68	1RR17CV091	SRI RAKSHA N	B18	
69	1RR17CV100	VANDANA		
70	1RR17CV450	VANDANA R		
71	1RR16CV092	YOGESH GOWDA		ASSESSMENT OF HEAVY METALS IN GROUND WATER & SUITABILITY OF DRINKING WATER IN DUGGAVATI VILLAGE
72	1RR15CV042	MADAN B N	B19	
73	1RR15CV073	PUNITH M		
74	1RR17CV451	VARUN KUMAR S		
75	1RR18CV433	VIJAYALAKSHMI		TREATMENT OF TEXTILE INDUSTRY WASTEWATER BY ELECTRO-COAGULATION
76	1RR18CV428	SHWETHA	B20	
77	1RR18CV414	NAGRAJ		
78	1RR17CV105	YASHWANTH		
79	1RR17CV090	SINDHU Y H		ANALYSIS AND DESIGN OF RC MULTISTOREY BUILDING USING ETABS
80	1RR17CV097	TEJASWINI R	B21	
81	1RR17CV096	TEJASWINI N		
82	1RR17CV420	RAVI KIRAN N		

83	1RR17CV076	RANGAN S R	B22	STRENGTH OF RC BEAM USING GEOPOLYMER CONCRETE AND ADOPTING BUBBLE TECHNOLOGY
84	1RR17CV077	RATNESH RANJAN K		
85	1RR17CV061	PRAJWAL H P		
86	1RR17CV094	SUMANTH B		
87	1RR17CV418	KIRAN KUMAR P	B23	FATALITY RISK ANALYSIS OF VULNERABLE ROAD USERS
88	1RR17CV454	VIVEK B C		
89	1RR17CV401	AJITH KUMAR M D		
90	1RR15CV108	NANDAN N		
91	1RR16CV029	KEERTHANA M	B24	STUDY ON ECONOMIC IMPACT OF NON-MOTORIZED TRANSPORTATION IN BANGALORE CITY
92	1RR15CV091	SUSHMITHA C B		
93	1RR17CV099	THEJASWINI V		
94	1RR17CV093	SUJANA S R		
95	1RR17CV086	SAROJ	B25	EFFECT OF ASPECT RATIO ON STRENGTH CHARACTERISTICS OF FRP CONFINED CONCRETE COLUMN
96	1RR17CV082	SANDHIP		
97	1RR17CV106	SHAYIQ		
98	1RR18CV416	PREETHI R		
99	1RR18CV422	RAVIKUMAR M	B26	EVALUATION OF STRNGTH AND DURABILITY CHARACTERSTICS OF FLY ASH BASED GEO POLYMER CONCRETE WITH FERRO CROME
100	1RR18CV424	RUDRESH B G		
101	1RR18CV415	NANJESH K J		
102	1RR17CV088	SHARAN BASAVA		
103	1RR18CV423	RAVIKUMAR R	B27	EFFECT OF CATHODIC PROTECTION AND CONCRETE COATING IN PREVENTION OF CORROSION IN RC STRUCTURE
104	1RR18CV426	SANJAY B N		
105	1RR18CV432	THEJUS H R		
106	1RR17CV085	SANTHOSHA G		
107	1RR17CV102	VIKAS G GOWDA	B28	A STUDY ON REMOVAL OF DYE FROM INDUSTRIAL EFFLUENTS USING PHOTOCATALYST
108	1RR17CV095	TN MANOJ		
109	1RR17CV087	SHARAN V		
110	1RR17CV067	AJITH.R		
111	1RR17CV035	JAYANTH P	B29	AN EXPERIMENTAL STUDY ON "BAMBOO AS A REINFORCEMENT MATERIAL"
112	1RR17CV038	KEERTHI CHANDRU		
113	1RR17CV039	LALANA M		
114	1RR17CV042	MADHU V		
115	1RR15CV016	CHETAN Y	B30	STUDY ON FEASIBILITY OF CONCRETE OF STEEL SLAG AS FINE AGGREGATE AND ALCCOFIND
116	1RR15CV046	MANIKANTHA N H		
117	1RR15CV100	VARUN PATEL		
118	1RR15CV038	MANJU K N		
119	1RR17CV027	DARSHAN.R	B31	EFFECT OF IMPROPER BUS STOP LOCATION ON CAPACITY OF SPEED-FLOW LOCATION
120	1RR17CV043	MADHUSUDHAN.R		
121	1RR17CV010	ANUSHKUMAR.M.G		
122	1RR18CV412	KIRAN.M		
123	1RR17CV029	DEEPAK D	B32	MODELLING APPROACH TO DEVELOP A MULTIMODAL TRANSPORT NETWORK
124	1RR17CV024	CHETHAN S		
125	1RR17CV403	BORUDREGOWDA		
126	1RR17CV059	POOJA C S	B33	EFFECTS OF SIDE FRICTION ON TRAFFIC CHARACTERISTICS OF URBAN ARTERIALS
127	1RR17CV062	PRATHUSHA		
128	1RR17CV066	PUNEETH GOWDA S		
129	1RR17CV098	THANUJ KUMAR B G		

ISE

Sl.No	USN	NAME OF THE STUDENT	BATCH	PROJECT TITLE
1	1RR16IS053	G.VINEETHA	B01	Detection of Fake and Clone Accounts in Twitter Using Classification and Distance
	1RR16IS033	PRIYA. T		
	1RR17IS039	SWATHI. S		
2	1RR17IS040	VISMITHA G	B02	Unusual Event Activities Detecting (CCTV).
	1RR17IS038	SUMALATHA G		
	1RR17IS041	SAFURA ALIYA		
3	1RR15IS017	GIRISH V	B03	School Management.
	1RR15IS018	GURU PRASAD		
	1RR15IS011	CHETAN SHARMA		
4	1RR16IS003	AKHILA B	B04	Ubiquitous Home.
	1RR16IS032	PRATHIKSHA B V		
	1RR17IS003	ANUSHA B M		
5	1RR17IS004	ASHA M	B05	Machine Learning based Driver Drowsiness Detection And Monitoring
	1RR17IS007	BANSARA B		
6	1RR17IS012	GAYATHRI M	B06	Two Way Smart Communication System for Deaf and Normal People.
	1RR17IS011	GAGANA K		
	1RR17IS009	DAKSHA C		
7	1RR15IS036	SHRUTHI D D	B07	Dynamic Street Parking.

ECE

Sl. No	USN	NAME OF THE STUDENT	BATCH	PROJECT TITLE
1	1RR17EC057	Jeevitha.K.R, Devika.S, Meghana.KR, Hemanth.M	B1	Robot for the treatment of communicable diseased patients using AI and ML
2	1RR17EC037	Rohan Kumar S,Divya D N,Chaitra R,Chethana M,	B2	Augmented Reality Students ID Card
3	1RR17EC158	G Santosh Kumar,Ananth M Purohit, Anil Seervi,Darshan M	B3	Green way for Ambulance by Automatic Control of Traffic lights
4	1RR17EC054	Dore Swamy H N,Manoj B,Chandan B V, Avinash R	B4	Design of wireless IOT sensor node and platform for detection and alerting system for leakage in drinking water pipeline and water quality.
5	1RR17EC156	Aswin PV,Abishek M,Yashaswini S, Abhishek Gowda S	B5	Smart communication and health monitoring military vaist
6	1RR17EC038	Kavyashree S,Devika R,Gattu Jishnu,Gowtham M	B6	Pneumonia detection using deep learning
7	1RR17EC024	Ashwini R,Chaitra N,Chaithra J,Bindu B Gowda M	B7	Smart personal protective equipment using raspberry pi
8	1RR17EC030	Chandana. A,Chandana. C,Divya Shree.M.R,Gagana Shree. U	B8	CAN controller implementation with message authentication

9	1RR17EC042	Darshan TM,Chethan U,Adithya P Shetty,	B9	Pot hole detection system using ultrasonic sensor
10	1RR17EC005	Gaganarpitha V,Druthi J Pithadia,Sowmya S, Rajashree C	B10	Lung cancer detection using ANN and image enhancement
11	1RR17EC006	Akash,A.Venu,Sreekanth.D,Nayan S J	B11	IoT sensor and deep neural networks based wildfire prediction system
12	1RR17EC033	Bharath C S,A S Puneeth Kumar,Pavithra. V, Chethan N	B12	A novel model for an automobile emission monitoring and alerting system using IOT
13	1RR17EC040	Vaibhav Sowchi ,R Tilak ,Varun Kumar S L , Indudhar B K	B13	Facial emotion recognition and speech intelligence system using machine learning
14	1RR17EC064	P.S.Leela kumar ,Nitish S,Pavankumar Reddy S , Navajith.N	B14	Smart Casket for package conveyance
15	1RR17EC025	Manoj J Yadav,Manish Kumar, Sadiq.D	B15	Usage of Mobile Elements in IoT for Data Aggregation in WSN
16	1RR17EC016	Samreen taj,Prakruthi.L,Prashanth,Nishanth	B16	IoT Based robotic Farming Systems
17	1RR17EC015	Keerthana S ,Sahana N,Shradha Suman Jena, Shradha Damodar	B17	Manasvita - Pre-detection of Suicidal Tendancies using Neural Networking.
18	1RR17EC002	Nisarga.P,MEENA KUMARI G,MONISHA D,RACHANA HP	B18	IoT Based Automatic Lake CLEANING Andsurveilance Boat
19	1RR16EC111	Pavithra Kumar ,Pooja S Hugar,Pooja A, Manish N	B19	Automatic Cow Milk Extractor
20	1RR17EC001	Sanjay K,Pavithra R, Pooja M N, Nikitha N Divakar	B20	e-Sight for Visually challenged people
21	1RR17EC060	K. Sagar ,Mallikarjuna H ,Mayur GR , Vaibhav D moraskar	B21	Frequency Reconfigurable Antennas
22	1RR17EC036	Sandeep ,Sandeep M, Sathish S ,Shoiab pasha M D	B22	Cloud based automated waste segregator using ML
23	1RR17EC045	Harshitha H ,Nayana K R ,Manoj M , Nithin Kumar Yadav K	B23	Smart approach to rain water harwesting
24	1RR17EC047	Rithushree I,Uzair neuman,Afshan khannum, Apoorva D V	B24	Automatic sanitizer Dispenser and temperature detection
25	1RR17EC014	Thanushree K H,Varshitha M S,Vihara G Shetty, Yashaswini B D	B25	LoRa based LPG monitorig and automatic cylider booking system

26	1RR17EC023	Harshitha M,Niharika,Vinay, Shashank	B26	Covid -19 Thermal Screening
27	1RR17EC022	Tejashwini R, Varshini M, Varshitha Mv, Yuvaraj R	B27	Autonoumous army robot for border surveillance
28	1RR17EC019	Nagarjun,Nitin Kumar Pb,Sumanth Sk, Tejesh P	B28	COVID safety measures and Driver drowsiness detection system
29	1RR17EC026	Ranjitha M,Roopa M,Spandan S Gangannavar, Vidyashree K V	B29	Detection of Earthquake and tsunami using GSM network
30	1RR17EC027	Rakshita N,Roopashri,Sneha G,Swathi K	B30	Fake Indian currency note Recognition
31	1RR17EC039	Arindam Saha,Ashwini R, Kainath Sultana, Neha	B31	Underwater wireless communication using visible light implemented using AI
32	1RR17EC043	Vaishnavi S, Varuni L N,Sonika M R,Sharath K	B32	Children security and Tracking with an alert system using GSM and GPS Technology
33	1RR17EC034	Harshitha R, Arshiya K,Kavya V, Bhumireddy Hemanth Reddy	B33	Smart device for fuel theft prevention and accident Detection along with Authentication access for drivers in vehiclesTeam Members
34	1RR17EC029	Sanjay S,Vinutha J,Shivaprasad R,Ganga G V	B34	Fog-assisted secure healthcare data aggregation scheme in IoT-enabled WSN
35	1RR17EC003	Suhas GC,Siddraju,Nayana,Sirish Kumar	B35	Efficient protocol for secure file sharing in cloud
36	1RR17EC044	Gayathri D,Bindu Sree.M,Aishwarya G.R, Anu Suresh	B36	Color based vegetables and fruits cutter and sorter bot using aurdino
37	1RR17EC152	Adrsh G N, Pavan H K,Akash P,Manoj S	B37	Smart device for authentication access using finger print and RFID

SI. No	USN	Name of the Students	Batch No	Project Title
				ME
1	1RR17ME058	Marvel M Vaz	B1	Design & Fabrication of semi automated arecanut tree climber for pesticide sprayer
	1RR17ME075	Niteen		
	1RR17ME059	Mir Mohammed		
	1RR17ME013	Bharath K B		
2	1RR17ME024	Deepak Devanand,	B2	Aerodynamic on a Commercial Truck by modifying the Geometry to decrease the Drag Co-Efficient
	1RR17ME021	Darshan Kesarkar M		
	1RR17ME010	Avinash N		
	1RR17ME012	Bharath Akshay		
3	1RR16ME062	Narapureddy Karthik Kumar Reddy	B3	Design & development of Zirconia form ceramic porous heating burner to reduce Cox & Nox emissions
	1RR16ME070	Palla Maruthi Kumar Reddy		
	1RR16ME041	Manikanta M Shivayogi		
	1RR16ME082	R Nitesh Kumar		
4	1RR17ME030	Goutham.B.S	B4	Development of smart damper (using magneto rheological fluid)
	1RR17ME088	Ravi Kiran R,		
	1RR17ME111	Srinivas M,		
	1RR17ME132	Yadhunandan P		
5	1RR16ME400	Achyuth Yadav S	B5	Characterization of silicon carbide / graphite composites & Alluminium hybride composites
	1RR16ME405	Dakshath Gowda A		
	1RR15ME048	Koushik. V		
	1RR16ME143	Yashwanth.N		
6	1RR16ME108	Santoshbiradar	B6	Protyping of arduing based CNC router(3axes) for wood works
	1RR16ME426	Syed Yousuf Faizen		
	1RR17ME103	Shargav C S		
7	1RR17ME077	Nithin P	B7	Design and fabrication of Garbage Collection Robot Using Wireless Technology
	1RR17ME128	Vineeth V		
	1RR17ME073	Niroop B S		
	1RR17ME124	Venkatesha V P		
8	1RR16ME051	Manu D H	B8	Experimental investigation of double pipe heat exchanger using helical coil inserts
	1RR16ME099	Sachin M A		
	1RR16ME023	Darshan N		
	1RR15ME105	Vignesh M		
9	1RR17ME025	Deepak Srinidhi	B9	Performance study on parabolic trough collector using internal mesh of a receiver tube
	1RR17ME014	Bharath.V		
	1RR17ME005	Abhishek Sp		
	1RR17ME036	Hemanth Gowda Hs		
10	1RR17ME041	Jagadeesha K	B10	Design and development of a solar water heating system with wavy shaped absorber tubes
	1RR17ME027	Dhruva V		
	1RR17ME039	Hemsagar B K		
	1RR17ME031	Hariharan P		
11	1RR15ME059	Mukul Kumar J	B11	Experimental investigation of heat transfer using R134A and LPG gas in a convergent -divergent squared coil
	1RR15ME109	Vishnu Teerth Kulkarni		
	1RR15ME071	Pavan Kalyan		
	1RR15ME002	Abhishek Pawar		

12	1RR17ME083	Praveen Kumar	B12	Design & Fabrication of Domastic swirling burner
	1RR17ME082	Praveen Ghandhi		
	1RR17ME078	Pavan Nikhil Picardo		
	1RR17ME085	Pushpak Hc		
13	1RR17ME032	Harsha H K	B13	Design & development of a novel solar water heating system
	1RR17ME035	Harshith K		
	1RR17ME029	Govind Raj H S		
	1RR17ME047	Karthik B S		
14	1RR17ME065	Mohan K	B14	Optimisation of mechanical properties of friction stir welded (FSW) Dissimilar alloys AA2024 and AA7075
	1RR17ME067	Mukesh Kumar Sirvi		
	1RR17ME042	Jayanth B T		
15	1RR17ME011	Balaji R	B15	Performance assesment of spiral solar flat plate collector
	1RR17ME034	Harshavardhan B		
	1RR17ME063	Mohammed Musab Khan		
	1RR17ME003	Abhay B		
16	1RR17ME076	Nithin H M	B16	Electrochemical corrosion studies of dissimilar aluminum alloys AA2024 & AA7075 using friction stir welding process (FSW)
	1RR17ME068	Namith S Gowda		
	1RR17ME048	Karthik H P		
	1RR17ME069	Naveen D		
17	1RR17ME018	Chethan Kumar Kn	B17	Design & Fabrication of treadmill Bicycle
	1RR17ME017	Chethan K M		
	1RR17ME004	Abhishek D		
	1RR17ME070	Naveenkumar S		
18	1RR16ME096	Revanth Kumar L	B18	Design & Fabrication of waste paper pencil machine for reducing deforestation
	1RR16ME106	Santhosh G B		
	1RR15ME025	Bharath.S		
	1RR16ME115	Shivakumar L		
19	1RR16ME019	Chandan M N	B19	New approach of sheet metal forming with a hot press
	1RR16ME124	Suhas M P		
	1RR16ME022	Darshan C J		
	1RR16ME009	Aravind S		
20	1RR17ME049	Karthik M	B20	Active suspension system
	1RR17ME060	Mithun P		
	1RR17ME052	Kiran M		
	1RR17ME055	Manoj I V		
21	1RR17ME100	Shanthi Swaroop K	B21	Design and Fabrication of skate board using hybrid composites
	1RR17ME135	Naveen A		
	1RR17ME104	Shashank B S		
	1RR17ME114	Suhas K N		
22	1RR17ME120	Ujjwal Kumar A N	B22	Design & development of pneumatic punching & riveting
	1RR17ME123	Vamshikrishna D N		
	1RR17ME110	Sri Sai Rakshan M		
	1RR17ME129	Vinod B		
23	1RR18ME405	Sandesh	B23	Power generation and water lifting using swing craddle
	1RR16ME134	Vighnesh G		
	1RR16ME067	Nikhil Hr		
	1RR16ME020	Chethan Kr		

24	1RR17ME106	Shashivardhan	B24	Pneumatic breaking system using ultrasonic sensor with automatic distance measurement
	1RR17ME121	Upendra		
	1RR17ME105	Shashikumar J		
	1RR17ME126	Vinay G		
25	1RR17ME002	Abdul Jaleel Ahmed	B25	Design & Fabrication of Regenerative Electric bike powerd by Fluid power system
	1RR17ME072	Nikhil Nr		
	1RR17ME061	Mohammad Haseeb Ulla		
	1RR17ME040	Ismail M Hittalamani		
26	1RR16ME114	Shiva Chandan N	B26	Structural & thermal analysis of automotive disc brake rotor
	1RR17ME437	Rangaswamy K		
	1RR17ME016	Chethan B		
	1RR15ME004	Adash Kumar M S		
27	1RR17ME117	Syed Mateen Khundimiri	B27	Design and fabrication of tubular solar still using mttal foam
	1RR16ME076	Praveen.R		
	1RR16ME077	Preetham.R		
	1RR17ME019	Chiranjeevi Ram P		
28	1RR17ME028	Goutham. U	B28	Design and development of novel prabolic trough collector receiver tube
	1RR17ME015	Chethan. A		
	1RR17ME046	Karthik		
	1RR17ME044	Kanimesh. G		
29	1RR17ME116	Sushmitha T R	B29	Design & Fabrication of solar still composed of parabollic dish collector
	1RR17ME006	Aishwarya J		
	1RR15ME009	Akshay V Rao		
	1RR17ME074	Nishanth S		
30	1RR17ME089	Rohan K Acharya	B30	Designing of diesel engine Exhaust
	1RR17ME081	Prashanth J		
	1RR17ME095	Sagar K B		
	1RR17ME084	Prem Chand M C		
31	1RR17ME093	Sachin	B31	Modal analysis of aluminium and stainless -steel plate
	1RR17ME096,	Sai Pavan R Naidu		
	1RR17ME097	Sanjay R		
	1RR17ME101	Sharath		
32	1RR16ME058	Mohammed Husain B S	B32	Emergency Mechanical Ventilator
	1RR16ME036	Md Moiz Pasha		
	1RR17ME009	Areef Basha S		
33	1RR17ME108	Shridhar Danawad	B33	Smart dustbin using sensors & GPS
	1RR17ME094	Sachin Hs		
	1RR17ME122	V D Jayaram		
	1RR17ME127	Vinay V		
34	1RR16ME100	Sachin S Kyadiggeri	B34	Design and fabrication of whit worth mechanism based solar weeder
	1RR15ME075	Pramod Kumar C		
	1RR15ME082	Ravi S Kanchan		
	1RR16ME086	Rahul.A		
35	1RR17ME080	Prasad V	B35	Automatic shutter control system using rain sensor
	1RR17ME086	Rakshith M		
	1RR17ME090	Rohan S		
	1RR17ME087	Ranjith Kumar V		

36	1RR17ME444	Shashikiran. V	B36	Development & fabrication of Air braking system using engine exhaust gas
	1RR17ME404	Chethan		
	1RR16ME413	Lakshman M		
	1RR17ME409	Hs Rohith Kumar		
37	1RR18ME410	Vikas H	B37	CFD Analysis on helical coil heat exchanger by varying parameters of Coil
	1RR18ME401	Chandu Kumar		
	1RR17ME134	Yathish Kumar B L		
	1RR18ME403	Niranjan B Chandargi		
38	1RR17ME113	Suhaib Ali Khan	B38	Development & study of CZTS based thin film solar cell
	1RR17ME131	Wasim Ahmed.M		
	1RR17ME091	S Abraham Kingston		
	1RR17ME119	Touheed Khan		
39	1RRR18ME411	Zubair Bashir Lone	B39	Free energy water pollution eliminator
	1RR17ME001	Aabid Bijapur		
	1RR17ME045	Karan Bs		
	1RR17ME079	Pragati Bhatt		

EEE

SI. No	USN	Name of the Students	Batch No	Project Title
1	1RR16EE037	Swaroop M S	B1	Smart Dual Band For Women Safety
2	1RR16EE040	Uday Kanth Yadav		
3	1RR17EE404	Charan Singh		
4	1RR16EE029	Saba Arman	B2	Power Generation From Footsteps
5	1RR16EE001	A Komal		
6	1RR17EE029	Vinutha M V		
7	1RR17EE024	Thanuja B S		
8	1RR17EE032	Manoj Kumar S R	B3	Intelligent Energy Metering System to transfer Solar Power to BESCOM (KEB) and Power theft control
9	1RR17EE033	Mohan G		
10	1RR17EE035	Priyanka U		
11	1RR17EE040	Vidya Shree N		
12	1RR17EE028	Venkatesh S	B4	IoT based smart street lighting system with intelligent switching
13	1RR17EE037	Shahul Hameed		
14	1RR17EE041	Vignesh Kumar		
15	1RR17EE008	Divya H	B5	Speed control of DC motor by using mulilayer neural network parameter tuner for PI controller
16	1RR17EE015	Rashmi R		
17	1RR17EE012	N Santoshakumara		
18	1RR17EE030	Bharath N		
19	1RR17EE022	Soundarya Poovaiah.K	B6	Platooning Of Vehicles
20	1RR17EE031	Gagan Gowda R		
21	1RR17EE007	Dhanush H D		
22	1RR17EE003	Akshatha K M		
23	1RR15EE062	Harinashree P	B7	Three Phase Transmission Lines Fault detection and intimation through IoT
24	1RR14EE055	Pradeep Kumar P		
25	1RR15EE061	Shashank R		
26	1RR15EE014	Harini G		
27	1RR17EE009	Hima Bindu T	B8	Heart Attack detection by health monitoring using IoT
28	1RR17EE038	Swathi Kodanda		
29	1RR17EE042	Vrinda N		
30	1RR17EE006	Chaitra D Buddinni		
31	1RR16EE410	Manoj D	B9	Automated Wheel Chair With Gesture Control
32	1RR16EE417	Shashi Bhushan B		
33	1RR16EE423	Sujan M S		
34	1RR17EE409	Nadeem Ahmad Lone		
35	1RR16EE043	Vijay G S	B10	Development Of Sensor to sensor protocols using Clustering Algorithm
36	1RR16EE059	Kumar R		
37	1RR17EE406	Nithin S		
38	1RR16EE017	Samrin Mehdi	B11	Pest Detection And Obliteration Robotic System
39	1RR17EE019	Shaik Shaffiulla Sharief		
40	1RR17EE025	Thilaknath G K		
41	1RR17EE021	Shreenidhi		
42	1RR17EE020	Shashank P Naidu	B12	Wireless power charging of EV through Renewable Grids
43	1RR17EE027	Veenit		
44	1RR17EE026	V ArunKumar		
45	1RR17EE004	Bharadwaj G M		

46	1RR17EE010	Janardhanan K	B13	Intelligent optical fibre fault detection system using visible light communication
47	1RR17EE014	Ramanna T G		
48	1RR17EE001	Abhishek Kumar		
49	1RR17EE016	Sai Sagar T R		
50	1RR16EE061	Dipti Ramesh	B14	Cubesat: On-Board Payload System - Enhanced Altitude Sensors &Payload
51	1RR16EE062	Nandan T G		
52	1RR18EE400	Bharath C	B15	IoT based monitoring of power generation at highways using Wind and Solar System
53	1RR18EE401	Channaveer C A		
54	1RR18EE402	Deepika R		
55	1RR18EE405	Ravi Kumara H G		
56	1RR17EE034	Nida Saher R	B16	Unmanned smart Panzer with target destroy capabilities
57	1RR17EE013	Rakshitha S		
58	1RR17EE036	Sahana M V		
59	1RR14EE020	Kusuma G R	B17	Web monitoring and speed control of Solar Based BLDC motor with IoT
60	1RR14EE012	Ishwarya G V		
61	1RR15EE028	Raeesa Ruqsar		
62	1RR15EE045	Tejas Kumar		
63	1RR16EE060	Prakruthi Nanda N	B18	Intelligent hybrid Inverter
64	1RR16EE058	Karunya R Badiger		

		CSE		
1	1RR17CS108	Reddy Nagadurga	B1	soil quality monitoring and automation irrigation using Machine learning and blynk
2	1RR17CS053	Kavya gs		
3	1RR17CS056	keerthana prakash nayak		
4	1RR17CS036	Firdose Tabassum		
5	1RR17CS021	Bhoomika C	B2	Secured communication and text detection of web videos
6	1RR17CS024	Bhuvaneshwari K		
7	1RR15CS010	Apoorva B		
8	1RR15CS048	Jayanthkumar Nayaka k		
9	1RR17CS057	K G Ashwin Krishnan	B3	Identifying defects during semiconductor manufacturing using machine learning.
10	1RR17CS034	Dileep Kumar Simhadri		
11	1RR17CS044	Harshith R		
12	1RR17CS041	Gummalla Akhil Kumar Reddy		
13	1RR15CS087	Rachana Sanjeev Raidurg	B4	Data Analytics Based Cost Prediction for a Logistics Application
14	1RR15CS069	Nidhi Srinivasa		
15	1RR17CS172	Rashmi J B	B5	An efficient quality driven of face occlusion detection and recognition
16	1RR17CS045	Harshitha B S		
17	1RR17CS055	Kavya K		
18	1RR17CS052	kaveri k		
19	1RR17CS032	Deepthi C	B6	medical chatbot for disease perdition
20	1RR17CS054	Kavya K		
21	1RR17CS065	Lakshmi M		
22	1RR17CS039	Gowri B R		
23	1RR17CS026	Chandana M R	B7	Imbalanced data handling using Machine learning
24	1RR17CS020	Bhavana K		
25	1RR18CS401	Pallavi K R		
26	1RR17CS007	Akshata N		
27	1RR17CS062	Krupa M J Gowda	B8	Detection of Arrhythmia using Machine Learning
28	1RR17CS063	Kushaal Kumar R N		
29	1RR17CS066	Lavanya P		
30	1RR17CS098	Prajwal R G		
31	1RR17CS038	Gowda Varsha Krishna	B9	Face Skin Disease Categorization using ResNet
32	1RR16CS113	Preethi M		
33	1RR17CS046	Harshitha H B		
34	1RR17CS112	Roshini J V		
35	1RR17CS059	Kirti Singh	B10	PREDICTION OF RAINFALL USING MACHINE LEARNING
36	1RR17CS070	M Chandan Agrahar		
37	1RR17CS067	Likith S		
38	1RR17CS078	Meghana A		
39	1RR17CS090	Nishanth R	B11	Predicting Global Terrorism Activities using Machine learning Techniques
40	1RR17CS072	Manish Seena Devadiga		
41	1RR17CS073	Manoj B		
42	1RR17CS088	Nikesh M R		
43	1RR17CS086	Navya L	B12	DETECTION OF GLAUCOMA DISEASE BY USING RETINAL EYE IMAGES
44	1RR17CS081	N Yathish		
45	1RR17CS110	Rohini H		
46	1RR17CS068	Lohith H N		

47	1RR17CS014	Apoorva Y		An Implementation of Machine Learning In Stock Price Prediction Based on Deep Residual Network
48	1RR17CS029	Chidanand L	B13	
49	1RR17CS006	Ajay		
50	1RR17CS012	Anubhav Srivastava		
51	1RR16CS066	Kiran SS		BRAIN TUMOR DETECTION AND CLASSIFICATION USING DEEP NEURAL NETWORK IN MACHINE
52	1RR15CS010	Niswana S	B14	
53	1RR16CS047	Gajendra R Vagale		
54	1RR16CS161	T J Shashank Uthkarsh		Student Evaluation And Stress Detection System Using Machine Learning
55	1RR16CS163	Tejaswini K	B15	
56	1RR16CS125	Ravindranath		
57	1RR15CS127	Chidan		
58	1RR17CS170	Yogitha lakshmi T	B16	Age invariant face recognition using convolutional neural network
59	1RR17CS150	Tejaswini B matad		
60	1RR17CS139	Srihari U		PSORIASIS STAGES DETECTION THROUGH IMAGE PROCESSING
61	1RR17CS151	Thanuj Kumar V	B17	
62	1RR17CS123	Sharath C		
63	1RR17CS161	Vishal S		
64	1RR17CS115	Sanjay H S		Online interview based on facial expression using Machine Learning
65	1RR17CS124	Shashank C	B18	
66	1RR17CS149	Tejas S		
67	1RR17CS138	Sourav P Kachwahe		
68	1RR18CS400	Adil rashid bhat		Human migration modeling using Machine Learning
69	1RR17CS148	Tauseef ahmad wani	B19	
70	1RR17CS167	Yawar Hussain bhat		
71	1RR17CS143	Suleman siddiqui		
72	1RR17CS010	Anjali Rani		Covid-19 cases detection using Deep neural network with x ray images
73	1RR17CS013	Aparna Singh	B20	
74	1RR17CS058	Khushi Mathur		
75	1RR17CS129	Shivani Singh		Detection of counterfeit currency using machine learning
76	1RR17CS128	Shilpitha Yadav S M	B21	
77	1RR17CS135	Sonu Mallik		
78	1RR17CS121	Shambhavi G		
79	1RR17CS169	Yogesh R		Asthma Prediction Using Machine Learning
80	1RR17CS131	Shreyas M S	B22	
81	1RR17CS136	Soumya Ranjan Nayak		
82	1RR17CS159	Vinod R		
83	1RR17CS043	Harsh K Jain		Bone Cancer detection using Machine Learning
84	1RR17CS037	Ganesh Dattatray Bhagwat	B23	
85	1RR17CS075	Manoj Krishna Hegde		
86	1RR17CS084	Natesh S		
87	1RR17CS119	Shalini G		Forecasting Air Quality Based on Machine Learning Techniques
88	1RR17CS122	Sharanya B	B24	
89	1RR17CS103	Rajeena R R		
90	1RR17CS109	Rekha S		
91	1RR17CS011	Anjali.S		Crop disease detection using machine learning algorithm
92	1RR17CS028	Chandana.S	B25	
93	1RR17CS005	Aishwarya.BK		

94	1RR17CS017	Ashwini V	B26	Topic modelling on twitter tweets based on public health and medical topic sources
95	1RR17CS025	Calvin Thomas Dani		
96	1RR17CS153	Tushar		
97	1RR16CS029	B.S.Darshith	B27	A Speculation Technique for Stock Market Using Time Series
98	1RR16CS009	Amaresh A Channad		
99	1RR16CS046	G.Jayavardhan		
100	1RR16CS010	Amaresh R Vasisth		
101	1RR17CS085	Navya J S	B28	Machine Learning Approach
102	1RR17CS079	Meghana L		
103	1RR17CS069	Lynette Francis Mathew		
104	1RR17CS145	Sushma M		
105	1RR17CS117	Satyam Sahay	B29	Text Interaction Voice Bot (TIV BOT)
106	1RR17CS118	Shah Minhal Fida		
107	1RR17CS162	Vishveshwar Hiremath		
108	1RR17CS171	Amandeep Singh		
109	1RR17CS019	Bhagyalakshmi B G	B30	Chatbot Using Deep Learning and NLP
110	1RR17CS015	Arthi R		
111	1RR17CS030	Daksha Prakash		
112	1RR17CS009	Anitha s		
113	1RR17CS168	Yeshaswini N	B31	Human disease predictor using machine learning with claims data
114	1RR17CS116	Saraswathi G		
115	1RR17CS152	Thejaswini N		
116	1RR17CS137	Soundarya N		
117	1RR17CS134	Sindhu C	B32	Traffic prediction using convolution neural network
118	1RR17CS071	Mamatha CN		
119	1RR17CS082	Nandini V aghera		
120	1RR17CS092	Nithyashree M		
121	1RR17CS089	Nikhil Kumar B	B33	Identification of cyber bullying on Twitter posts using Deep learning
122	1RR17CS074	Manoj K N		
123	1RR17CS102	R Prashanth		
124	1RR17CS114	Sachin		
125	1RR16CS184	Tanziya Begum.S	B34	Performance enhancement for prediction of chronic kidney diseases using ML techniques
126	1RR17CS163	Vismaya R Kishore		
127	1RR17CS157	Vaibhavi Kuna		
128	1RR16CS084	N Sowmya		
129	1RR17CS080	Mohammad Tahir	B35	Crime prediction using Machine Learning
130	1RR17CS113	Ruma Afsha Sultana		
131	1RR17CS035	Fardeen khan		
132	1RR17CS077	Md Asif Anwar		
133	1RR17CS120	Shalini.G	B36	Birds species classification using Deep Learning
134	1RR17CS146	Sushma.S		
135	1RR17CS130	Shobha.G		
136	1RR17CS127	Shikhar Sharma	B37	DETECTION OF AUTISM SPECTRUM DISORDER IN EARLY STAGE USING MACHINE LEARNING MODEL
137	1RR17CS132	Shriya Mattoo		
138	1RR17CS140	Srujana Mohan Tekale		
139	1RR17CS164	W G Dhanya		

140	1RR17CS094	Pavan M S	B38	
141	1RR17CS095	Pavan S		
142	1RR17CS096	Pesala venkata harish		
143	1RR17CS107	Ravikiran T M		
144	1Rr16cs001	Aakash Singh	B39	Object Segregation using RCNN
145	1RR17CS097	Prajwal Nale		
146	1RR17CS016	Ashish Prasad		
147	1RR17CS087	Nihal Singh		
148	1RR17CS042	Harish G	B40	Human Activity Recognition using Machine Learning
149	1RR17CS099	Prakruthi Holla		
150	1RR17CS104	Ramya V		
151	1RR16CS083	Meghana M C		
152	1RR17CS401	Chaitra.N	B41	Efficient underwater image Reconstruction using Deep Convolutional neural network
153	1RR17CS402	Usha T		
154	1RR15CS020	Bhuvana V.G		
155	1RR16CS086	Nandini R		
156	1RR16CS060	Indhu VS	B42	Emotion based media player
157	1RR16CS057	Hemalatha K		
158	1RR16CS056	Heba Farheen B		
159	1RR18CS402	Sadiya Banu		
160	1RR15CS012	Arjun K	B43	Online Review Categorization
161	1RR17CS048	Jagadeesh p		
162	1RR17CS111	Ronak Mewera	B44	intelligent tourist information
163	1RR17CS083	Naresh Kumar		
164	1RR17CS173	Navjot Singh Virk		
165	1RR17CS158	Vindya B S	B45	Hyperspectral Image Classification using ML
166	1RR16CS110	Praveen N		
167	1RR17CS166	yashvanthkumar hv		

SI. No.	USN of Candidate	Name of candidate	Batch no	Title of the linkage
		MCA		
1	1RR19MCA51	AMITH N	B1	Big data analysis using python
2	1RR19MCA52	ANJANA R PATIL	B2	Knowledge on technical tools
3	1RR19MCA53	ANUSHA P	B3	PYTHON INTERNSHIP
4	1RR19MCA54	ARPITHA P BULATI	B4	MEDICAL CHATBOAT USING PYTHON
5	1RR19MCA55	ARPITHA N	B5	PRACTICAL TRAINING ON PYTHON, DEJANGO AND ADVANTURE FRAMEWORKS
6	1RR19MCA58	CHAITRA YL	B6	TECHNICAL TOOLS
7	1RR19MCA59	CHINMAY NADIG	B7	PYTHON INTENSHIP
8	1RR19MCA60	DIKSHIT R	B8	PRACTICAL TRAINING ON PYTHON, DEJANGO AND ADVANTURE FRAMEWORKS
9	1RR19MCA61	GEETHA N	B9	PYTHON AND MACHINE LEARNING
10	1RR19MCA62	H JADESHA	B10	INTERNET OF THINGS
11	1RR19MCA63	JAYASHREE V	B11	BIG DATA ANALYSIS USING PYTHON
12	1RR19MCA64	KAVANA P	B12	PRACTICAL TRAINING ON PYTHON, DEJANGO AND ADVANTURE FRAMEWORKS
13	1RR19MCA65	KAVYA MB	B13	PYTHON INTERNSHIP
14	1RR19MCA67	MAMATHA KS	B14	PRACTICAL TRAINING ON PYTHON, DEJANGO AND ADVANTURE FRAMEWORKS
15	1RR19MCA68	MANIKANTHA G	B15	PYTHON INTERNSHIP
16	1RR19MCA69	MANJUNATH NS	B16	BIG DATA ANALYSIS USING PYTHON
17	1RR19MCA70	MONOJ S	B17	WEB DEVELOPMENT
18	1RR19MCA71	MEGHANA M	B18	Technical tools
19	1RR19MCA72	MOHAMMAD JAVED MANUR	B19	JAVA project on network security domain
20	1RR19MCA73	MOHAN R J	B20	WEB DEVELOPMENT
21	1RR19MCA74	MONICA J	B21	PYTHON INTERNSHIP
22	1RR19MCA75	NANDHINI CN	B22	PYTHON
23	1RR19MCA76	NAVEEN SHIRUR	B23	VIRTUAL TOURISM APP OF VIJAYAPUR
24	1RR19MCA78	PRABHAKAR M	B24	BIG DATA ANALYSIS USING PYTHON
25	1RR19MCA79	RACHANA S DHAMLE	B25	JAVA PROJECT ON NETWORK SECURITY
26	1RR19MCA80	RINKU R	B26	PRACTICAL TRAINING ON PYTHON, DEJANGO AND ADVANTURE FRAMEWORKS

27	1RR19MCA81	SADIYA SULTANA	B27	FOOD RECOMMENDATION USING MACHINE LEARNING CHRONIC KIDNEY DISEASE PATIENTS
28	1RR19MCA83	SANJANA S	B28	ARTIFICIAL INTELLIGENCE
29	1RR19MCA84	SARVESH NAIR A	B29	Technical tools
30	1RR19MCA86	SHIVA KUMAR K	B30	Technical tools
31	1RR19MCA87	SOWMYA BAI R	B31	Big data analysis using python
32	1RR19MCA88	SOUNDARYA P	B32	PYTHON INTERNSHIP
33	1RR19MCA89	SUMA S	B33	PRACTICAL TRAINING ON PYTHON, DEJANGO AND ADVANTURE FRAMEWORKS
34	1RR19MCA90	SUPRIYA R	B34	Technical tools
35	1RR19MCA91	SWETHA RANI	B35	PYTHON
36	1RR19MCA92	NOUMAN MATEEN	B36	Technical tools
37	1RR19MCA94	YOGESH	B37	Technical tools

Principal
RAJARAJESWARI
COLLEGE OF ENGINEERING
Ramohalli Cross, Bengaluru-74

				MBA
1	1RR19MBA10	Kusuma Rekha H R	B1	A study on HR Policies and Implementation at Shree Manjunatha Roller Flour Mills Pvt Ltd
2	1RR19MBA07	Harshitha T S	B2	A study on Evolution of Tranning Programme at Bharath Arts & Crafts
3	1RR19MBA05	Farira Begam	B3	A study on Effectiveness of Employee Employment at SLN CNC Tech Pvt Ltd
4	1RR19MBA35	Yogesh R	B4	A study on Prevantion of Industrial Accidents: Measures and Challenges
5	1RR19MBA24	Ramya B K	B5	A study on Quality of work life at Terra Firm a Bio Technologies Ltd
6	1RR19MBA06	Harshitha C U	B6	A study on Employee Stress Management of a Company: Tochnost Systems.
7	1RR19MBA04	Chandana A	B7	A study on employee health and society measures at IMC India Coach Builders Ltd
8	1RR19MBA07	Bindu K	B8	A Study on Employee Job Satisfation SF Dyes Industries Private Limited, Hoskote.
9	1RR19MBA19	Neeraja KM	B9	A study on employees attrition at orchid engeeniers bangalore.
10	1RR19MBA16	Meghana H R	B10	A study on Analysis of Satisfaction Level of Employees in Manufacture sector at Britaniya Industries Ltd
11	1RR19MBA08	Jayashree Pawar	B11	A study on Employee satisfaction at Orient Cement Ltd.
12	1RR19MBA27	Sinchana C	B12	A study on Employee Retention statergies at Joythi Bags
13	1RR19MBA25	Ramyashree S	B13	A study on Performance Apprisal at KMS Coach Builders Pvt Ltd
14	1RR19MBA29	Soumyashree Siddalingappa Babji	B14	A study on HR/ Manpower planning at KBB Food Products Pvt Ltd
15	1RR19MBA29	Swathi Sheety	B15	A study on Pay rool managemnt at walvoil fluied power pvt ltd.
16	1RR19MBA13	Mamatha R	B16	A study on Employee welfare measures in Shri Vinayaka KAB Engineering Pvt.Ltd.
17	1RR19MBA23	Raghavendra D S	B17	A project Reort on HR Policies and Implimentation at TAPETUM India Ltd
18	1RR19MBA28	Siri Suresh	B18	A Study om Employee Morale of the Company at Impluse Sign and Display Bangalore
19	1RR19MBA19	Pallavi G	B19	A study on Employee Relationship Management At Sula Vineyards
20	1RR19MBA17	Menaka P V	B20	A study on Employees traning and Development at KSDL
21	1RR19MBA12	Mahantesh Desai	B21	A study on credit Apprisal at Shree Vijaya Co-operative Society Ltd.

22	1RR19MBA09	Karthik Reddy	B22	A Study of Credit Analysis of Personal Loan in Bank of Baroda
23	1RR19MBA02	Asha D	B23	A study on Cash Flow Management with referrence to Marketonix Services Pvt Ltd
24	1RR19MBA22	Pruthvi K B	B24	A study of Working Capital Managemnt at Texport Industries Pvt Ltd., Bangalore.
25	1RR19MBA21	Priyadarshini S	B25	A Study on Finance Statement analysis of Tindal Aluminium Ltd
26	1RR19MBA30	Sujatha Patra	B26	A study on Receivables management with Reference to Mysore Electrical Industries Ltd
27	1RR19MBA33	Uday B	B27	A study on effective ness of advertisement and promotional offer at mylari agro products ltd in Bangalore.
28	1RR19MBA15	Manoj S	B28	A Study on Marketing Strategies at Bamul
29	1RR19MBA31	Swamy K A	B29	A study on Customer Satisfaction of Sales Performance
30	1RR19MBA20	Promoda kakkeri	B30	A study on Customer behaviour at proto tech hydro movers ltd.
31	1RR19MBA03	Basavaraju M J	B31	A Study on Customer Satisfaction towards Nandhini Milk & Milk Products at Tumkuru Co-operative Milk Producers Union Ltd, Tumkur.

Sl. No.	Title of the Collaborative	Name of the Collabrative agency with contact details	Name of paticipant	Year of Collaboration	Duration (From-To)
1.3.3	List of students undertaking the field internship program wise in the last completed				
			2020-21		
CSE			INTERNSHIPS		
1	To build a classification model using ML that predicts heart disease in a subject.		Apoorva B	2020-2021	01/08/20 to 01/10/20
	Classification model for prediction of coronary heart disease using machine learning		Bhuvana V G	2020-2021	01/08/20 to 01/10/20
	Food delivery website using web development techniques		Heba Farheen B	2020-2021	01/10/20 to 01/12/20
	Interior design website		Hemalatha K	2020-2021	01/09/20 to 01/11/20
	Interior design website		Indhu V S	2020-2021	01/09/20 to 01/11/20
	Classification model for prediction on Coronary Heart Disease using Machine Learning	Verzeo 675, 9th Main Rd, Sector 7, HSR Layout, Bengaluru, Karnataka 560068, India +918047166564	Nandini R	2020-2021	01/08/20 to 01/10/20
	Interior design website		Aishwarya B K	2020-2021	01/08/20 to 01/10/20
	Blood donation center administration framework		Anitha S	2020-2021	08/11/20 to 11/01/21
	Interior design		Anjali S	2020-2021	01/08/20 to 01/10/20
	Interior design		Ashwini V	2020-2021	01/08/20 to 01/10/20
	An interior design website		Bhagya Lakshmi B G	2020-2021	01/08/20 to 01/10/20
	Event management		Bhoomika C	2020-2021	01/09/20 to 30/11/20
	Interior designing website		Bhuvaneshwari K	2020-2021	01/08/20 to 01/10/20
	Interior design		Chandana S	2020-2021	01/08/20 to 01/10/20
	Design an interior designing website		Manoj Krishna Hegde	2020-2021	01/07/20 to 01/09/20
	Food delivery		Rumaafsha Sultana	2020-2021	01/10/20 to 01/12/20
	Online pharmacy management system		Amandeep Singh	2020-2021	03/03/21 to 10/05/21
	Interior design website		Chaitra N	2020-2021	01/08/20 to 01/10/20
	Interior design website		Usha T	2020-2021	13/9/20 to 13/11/20
	Interior design website		Sadiya Banu	2020-2021	01/09/20 to 01/11/20
	Online shopping	Avohi Venus Buildings, 3rd floor, Kalyana Mantapa road, Jakkasandra Block, Koramangala, Bangalore-560034	Arjun K	2020-2021	05/07/19 to 07/08/19
	Blood Bank Management System		Jayavardhan G	2020-2021	07/09/20 to 14/10/20
	Online goods and apparel shopping system		Kiran S S	2020-2021	03/07/20 to 29/08/20
	online bookstore		N Sowmya	2020-2021	04/09/20 to 14/10/20
	Online food ordering system		Niswana S	2020-2021	15/09/20 to 04/11/20

	Project	Company	Student	Year	Duration
	IoT based home automation system		Preethi M	2020-2021	15/09/20 to 04/11/20
	GYM Management System		T J Shashank Uthkarsh	2020-2021	07/09/20 to 14/10/20
	Blood bank management system		Dileep Kumar Simhadri	2020-2021	07/09/20 to 14/10/20
	Covid testing management system		Firdose Tabassum	2020-2021	07/09/20 to 14/10/20
	Sorting algorithm visualizer		Gowri B R	2020-2021	07/09/20 to 14/10/20
	Blood Bank Management System		Gummalla Akhil	2020-2021	07/09/20 to 14/10/20
	Daily task management		Harshitha B S	2020-2021	07/09/20 to 14/10/20
	Sorting Alogorithm Visulization		Kaveri K	2020-2021	07/09/20 to 14/10/20
	Daily tasks management system		Kavya K	2020-2021	07/09/20 to 14/10/20
	Sorting Alogorithm Visulization		Kavya K	2020-2021	07/09/20 to 14/10/20
	Memory recollection system		Kushaal Kumar R N	2020-2021	04/09/20 to 14/10/20
	Memory recollection system	Avohi	Lavanya P	2020-2021	04/09/20 to 14/10/20
	Online pharmacy system	Venus Buildings,	Lohith H N	2020-2021	04/09/20 to 14/10/20
	Blood Bank Management System	3rd floor, Kalyana	Lynette Francis Mathew	2020-2021	04/09/20 to 14/10/20
	Online food ordering system	Mantapa road,	Mamatha C N	2020-2021	04/09/20 to 14/10/20
	Online Examination	Jakkasandra Block,	Manish Seena Devadiga	2020-2021	04/09/20 to 14/10/20
	College library system	Koramangala,	Manoj K N	2020-2021	04/09/20 to 14/10/20
	College library system	Bangalore-560034	Meghana A	2020-2021	04/09/20 to 14/10/20
	Food ordering system	INDIA	N Yathish	2020-2021	04/09/20 to 14/10/20
	Hostel management system	connect@avohi.com	Navya J S	2020-2021	04/09/20 to 14/10/20
	Food ordering system		Navya L	2020-2021	04/09/20 to 14/10/20
	Online pharmacy system		Pesalavenkata Harish	2020-2021	04-09-20 to 14/10/20
	Online Examination		Prajwal R G	2020-2021	04-09-20 to 14/10/20
	Dairy farm shop Management System		Rajeena R R	2020-2021	07/09/20 to 14/10/20
	Curfew e-pass management system		Reddy Naga Durga	2020-2021	07/09/20 to 14/10/20
	Tourism management system		Rekha S	2020-2021	07/09/20 to 14/10/20
	Online pharmacy management system		Sachin	2020-2021	04/09/20 to 14/10/20
2	Dairy Farm Shop Management System		Shalini G	2020-2021	07/09/20 to 14/10/20
	Online home service management system		Shambavi G	2020-2021	07/09/20 to 14/10/20
	Tourism Management System		Sharanya B	2020-2021	07/09/20 to 14/10/20
	Pharmacy management System		Shobha G	2020-2021	07/09/20 to 14/10/20

Project	Organization	Name	Year	Duration
Online food ordering management system		Sindhu C	2020-2021	07/09/20 to 14/10/20
Gym Management Website		Navjodh Singvirk	2020-2021	07/09/20 to 14/10/20
Gym management website		Amulya Reddy	2020-2021	07/09/20 to 14/10/20
Online food ordering website		Ankit kumar	2020-2021	07/09/20 to 14/10/20
Tourism management system		Anusha B M	2020-2021	07/09/20 to 14/10/20
Tourism management system		Asha M	2020-2021	07/09/20 to 14/10/20
Yoga management system		Bansara B	2020-2021	07/09/20 to 14/10/20
Dairy farm shop management system		Daksha C	2020-2021	07/09/20 to 14/10/20
Web development		Gagana K	2020-2021	07/09/20 to 14/10/20
Web Development		Gayathri M	2020-2021	07/09/20 to 14/10/20
School management system	Avohi	Girish V	2020-2021	07/09/20 to 14/10/20
Python programming	Venus Buildings,	Hemanth Gowda	2020-2021	07/09/20 to 14/10/20
Blood bank Management System	3rd floor, Kalyana	Keerthana K	2020-2021	07/09/20 to 14/10/20
Ecommerce web application development	Mantapa road, Jakkasandra Block,	Mohammed Shah Fahad	2020-2021	07/09/20 to 14/10/20
Web Development	Koramangala,	Monika Singh	2020-2021	07/09/20 to 14/10/20
Interior design management system	Bangalore-560034 INDIA	Neha Durgadmath	2020-2021	07/09/20 to 14/10/20
A Personal Website	connect@avohi.com	Nida	2020-2021	07/09/20 to 14/10/20
Online Examination		Nishanth Raj	2020-2021	07/09/20 to 14/10/20
Online quiz management system		Nitesh	2020-2021	07/09/20 to 14/10/20
Store management system		Prasanth N	2020-2021	07/09/20 to 14/10/20
Yoga management system		Prathiksha B V	2020-2021	07/09/20 to 14/10/20
Web development		Priya T	2020-2021	07/09/20 to 14/10/20
Store management system		Sagar	2020-2021	07/09/20 to 14/10/20
Online group messenger		Sanath kumar	2020-2021	07/09/20 to 14/10/20
College notes gallery		Saniya Taj	2020-2021	07/09/20 to 14/10/20
Restaurant management system		Sanjana K	2020-2021	07/09/20 to 14/10/20
Store management system		Sharath BN	2020-2021	07/09/20 to 14/10/20
Web development		Shivam	2020-2021	07/09/20 to 14/10/20
Tourism management system		Shrusti A	2020-2021	07/09/20 to 14/10/20
Online dance audition management system		Sinchana	2020-2021	07/09/20 to 14/10/20
Hotel room booking system		Sourav P	2020-2021	07/09/20 to 14/10/20
Web development		Vineetha G	2020-2021	07/09/20 to 14/10/20

3	Desktop application using Python	X value technologies 4th Floor, Apex Chambers, 20, Sir Theagaraya Rd, T. Nagar, Chennai, Tamil Nadu 600017, India +914442610086	Jayanth Kumar Nayak K	2020-2021	07/09/20 to 4/10/20
	Departmental Store Management		Amaresh A Chennad	2020-2021	07/09/20 to 14/10/20
	Departmental Store Management		B S Darshith	2020-2021	07/09/20 to 14/10/20
	Hotel management system		Bhavana K	2020-2021	07/09/20 to 14/10/20
	Hotel management system		Chandana M R	2020-2021	07/09/20 to 14/10/20
	Hangman game		Nandini V Aghera	2020-2021	07/09/20 to 14/10/20
	Hangman game		Nithyashree M	2020-2021	07/09/20 to 14/10/20
	Online weather Information System		Ravi Kiran T M	2020-2021	07/09/20 to 14/10/20
	Speech recognition		Rohini H	2020-2021	07/09/20 to 14/10/20
4	Placement Cell	TechCiti Technologies #22, 23,23,24,25/101 ,	Nidhi Srinivasa	2020-2021	03/08/20 to 02/11/20
	Detecting and avoiding the blockage for information security		Aman Gupta	2020-2021	16/07/18 to 16/08/18
5	Mobile Application	AppInsight Technologies 1st Floor, Prithvi Soudha Building, N.H.66, Junction, Post, Ambalpadi, Udupi, Karnataka 576103 Contact info@appinsight.tec h 07204705003	Chidan	2020-2021	10/03/21 to 10/04/21
6	Pos with Inventory Management	DarkHorse.io Dark Horse Comics 10956 SE Main Street Milwaukie, OR 97222 (map) - Telephone: (503) 652-8815 Fax: (503) 654-9440	Aakash Singh	2020-2021	01/08/20 to 10/11/20

7	Online Lead Management	Myknot OPC PVt LTD E9 4TH J CROSS NEW GURUPPANPALA YA KRISHNAPPA GARDEN NEAR LAKSHMI THEATER BANGALORE Bangalore KA 560029 IN GOUTHAM4391@ GMAIL.COM	Amaresh R Vasisth	2020-2021	05/04/20 to 05/06/20
8	Department management Store	Qspiders 01, Hayavadana Rao Rd, Basappa	Gajendra R Vagale	2020-2021	17/07/19 to 08/08/19
	Pizza ordering system		Praveen N	2020-2021	07/07/19 to 08/08/19
9	Dairy Farm Shopping Management System	IC Solutions 721, puttenahalli road, 7th phase, jp	Tejashwini K	2020-2021	12/10/20 to 12/11/20
	Food Ordering System		Kirti Singh	2020-2021	15/08/20 to 04/10/20
10	Book my cab	Formax Information Technologies No. 172, 1St Floor, 9Th Main, 7Th Sector, Hsr Layout, Bangalore, Karnataka, India. (800) 232-5535	Meghana M C	2020-2021	05/07/19 to 07/08/19
11	Hotel management	Brain O vision , LVS Arcade, Plot No. 71, Jubilee Enclave, Hitec City, Madhapur, Hyderabad –	Ajay	2020-2021	10/08/20 to 06/10/20
	Forest fire detection		Anubhav Srivastav	2020-2021	17/08/20 to 29/09/20
	Forest Fire Detection using CNN		Apoorva Y	2020-2021	17/08/20 to 29/09/20
	Hotel management		Chidanand L	2020-2021	17/08/20 to 29/09/20
12	Firewall and Oracle form development	Nation Mineral development corporation XH3R+XXW, NGO Colony, Wilson Garden, Bengaluru, Karnataka 560027, India Phone: +91 80 2221 2912	N Akshata	2020-2021	29/09/20 to 28/10/20
13	TIC-TAC-TOE game	Tevatron technologies Tevatron Technologies, B-	Anjali Rani	2020-2021	29/06/20 to 09/08/20
	Rock paper scissors game		Keerthana Prakash Nayak	2020-2021	16/07/20 to 20/09/20
	Hangman Game		Khushi Mathur	2020-2021	29/06/20 to 09/08/20

14	Online voting System	Infocampus Sai Ram Building , 1st Floor, Above HDFC Bank, Near Kalamandir, Outer Ring Road Marathahalli, Bengaluru, Karnataka Pincode : 560037 Help line no : 8884166608 / 09740557058 Email Address : hr.infocampus@gmail.com	Aparna Singh	2020-2021	15/09/20 to 15/10/20
15	Image processing using deep learning	Acranton Technologies Private Limited, D NO 3511, OPP	Arthi R	2020-2021	20/09/20 to 21/10/20
	MNIST and fashion MNIST		Daksha Prakash P	2020-2021	20/09/20 to 21/10/20
16	Banking System	The Spark Foundation 11th Main Rd, Rajathadri Kalayana Mantappa,	Ashish Prasad	2020-2021	05/11/20 to 05/12/20
	Banking Systems		MD Asif Anwar	2020-2021	01/04/21 to 05/05/21
	Banking System		Naresh Kumar	2020-2021	01/05/21 to 04/06/21
	Banking System		Shah Minhal Fida	2020-2021	01/05/21 to 01/06/21
17	E-commerce website	AGIXURY , Scholiverse Educare Pvt. Ltd. B-610, Unitech	Calvin Thomas Dani	2020-2021	15/09/20 to 15/10/20
	E-Com:Travel and Lodging		Visheshwar Hiremath	2020-2021	19/10/20 to 26/11/20
18	Interns salary prediction	Tech creativa No. 648/21, 2nd Floor, Kala Nivasa 3rd Main, Kumaravyasa Rd, Srinagar, Bengaluru, Karnataka 560050, India	Deepthi C	2020-2021	03/09/20 to 03/10/20
	Titanic survivors prediction using machine learning		Gowda Varsha Krishna	2020-2021	03/09/20 to 09/10/20
	Titanic survivor prediction using machine learning		Harshitha H B	2020-2021	03/09/20 to 09/10/20
	Intern's Salary prediction		Roshini J V	2020-2021	03/09/20 to 03/10/20
	Face detection and recognition		Pallavi K R	2020-2021	26/8/2020 to 26/09/20
19	Hotel room booking system	Sookshmas Pvt Ltd. #18 Second Floor, 1st Cross Road, 1st Main Rd, S.V.G. Nagar, Priyadarshini Layout, Vijayanagar, Bengaluru, Karnataka 560072, India +918023504212	Ganesh Dattatray Bhagwat	2020-2021	01/09/20 to 31/10/20
	Hotel room booking system		Harsh K Jain	2020-2021	01/09/20 to 31/10/20
	Hotel room booking management system		Kavya G S	2020-2021	01/09/20 to 20/10/20
	Online library		M Chandan Agrahar	2020-2021	01/09/20 to 08/11/20
	Online library		Manoj B	2020-2021	01/09/20 to 08/11/20
	Hotel Room booking management system		Natesh S	2020-2021	01/09/20 to 08/11/20
	Online library		Nikesh M R	2020-2021	01/09/20 to 08/11/20
	Online library		Nishanth R	2020-2021	01/09/20 to 08/11/20

20	Invoice generator	Indian society for education research and technology No 488, 1st Cross Road, Block IV HBR Layout, Kalyan Nagar Bangalore 560 043, Karnataka, India Mobile: +91 990 1810 727 | 9677 597 222 Mail: chairman@isert.org.in	Jagadeesh P	2020-2021	07/09/20 to 14/10/20
21	Automated data visualizer-dashboard	Aum Infotech Y 122, I and II Floor, Sunrise Plaza, 16Th Main Road, Rajajinagar Bangalore – 560010. +91-80-23303024 or +91-9448054076	Ashwin Krishna K G	2020-2021	05/08/20 to 05/11/20
22	Face recognition	Technofly solutions #792/E , 1st Cross, 3rd A Main Rd, near TTMC bus stop, Hosahalli Extension, Vijayanagar, Bengaluru, Karnataka 560040, India +919663476586	Lakshmi M	2020-2021	26/08/20 to 26/09/20
	Object detection		Prakruthi Holla	2020-2021	08/09/20 to 08/10/20
	Object Detection using OpenCv		Ramya V	2020-2021	08/09/20 to 08/10/20
	Handwritten digit recognition		Soumya Ranjan Nayak	2020-2021	25/11/20 to 28/12/20
	Handwritten digit recognition		Vinod R	2020-2021	25/11/20 to 28/12/20
	Hyper spectral image classification		Yashvanth Kumar H V	2020-2021	25/12/20 to 22/01/21
	Income classifier		Yogesh R	2020-2021	25/11/20 to 28/12/20
	Face recognition and detection		Rashmi J B	2020-2021	26/8/20 to 26/09/20
23	Restaurant System	Kaashiv Infotech 310 near Block No 3, Plot Number, Mogappair West, Depot, Chennai, Tamil Nadu 600037, India Phone: +91 76676 62428	Likith S	2020-2021	25/08/20 to 04/10/20

Principal
RAJARAJESWARI
COLLEGE OF ENGINEERING
Ramohalli Cross, Bengaluru-74

24	Website management	Nishritha Foundation Annasandrapalya Extension, Vimanapura, Bengaluru, Karnataka 560017, India	Nihal Kumar Singh	2020-2021	16/10/20 to 16/11/20
25	Online Blood Bank system	Manac Infotech Pvt Ltd. Sagarview Building, 201, 2nd, Liberty Rd, Himayatnagar, Hyderabad, Telangana 500029, India Phone: +91 96666 07505	Nikhil Kumar B	2020-2021	01/05/20 to 23/08/20
26	Color Detection using python	AVM IT Solutions 410 Apollo Square Square Race Course Road 452001 Indore 09589007600 contactavmits@gmail.com	Pavan M S	2020-2021	01/06/20 to 30/06/20
27	Freelance web platform	PVH software solutions #50,SUBHASH NAGAR BHATRA	Pavan S	2020-2021	01/03/21 to 02/04/21
	Student feedback management		Shivani Singh	2020-2021	15/03/21 to 15/04/21
	Hotel Website		Soundarya N	2020-2021	15/03/21 to 15/04/21
28	Online COVID Plasma Donor System	INNOSIGHTS SOFT SOLUTIONS LLP 15 Bahubali Nagara Bangalore Bangalore-560013 Karnataka mahabushsab035@gmail.com	R Prashanth	2020-2021	10/09/20 to 13/10/20

29	Tourism management system	Internshala Scholiverse Educare Pvt. Ltd. B-610, Unitech Business Zone, Nirvana Country, South City 2, Gurgaon, India - 122018 email us: sarvesh@internshala.com	Ronak mewara	2020-2021	07/09/20 to 14/10/20
30	Configuration of SSH	Cisco Networking Academy , SEZ Unit, Cessna Business Park, Kadubeesanahalli Village Varthur	Sanjay H S	2020-2021	10/08/20 to 10/09/20
	Configuration of telnet		Thanuj Kumar V	2020-2021	10/08/20 to 10/09/20
	Configuration of VLAN		Tejas S	2020-2021	10/08/20 to 10/09/20
	Configuration of telnet		Shashank C	2020-2021	10/08/20 to 10/09/20
	Configuration of TFTP		Sharath C	2020-2021	10/08/20 to 10/09/20
31	Hotel Website	Pralotech Solutions LLP #1,Silicon Plaza, Sannatammanahalli, Battarahalli, Bengaluru, Karnataka 560049, Phone: +91 91648 84137	Saraswathi G	2020-2021	15/03/21 to 15/04/21
32	Music player & music library manager web app	Smartknower Sector 3, HSR Layout, Bengaluru, Karnataka 560102,	Shikhar Sharma	2020-2021	22/04/21 to 26/05/21
	Ipl match score predictor		Satyam Sahay	2020-2021	12-2020 to 30/01/2021
33	Father and son height prediction	Ikonecttechnologies Mahaveer Plaza, #1276, 2nd Floor Metro Station, 10th Main Rd, near Vijayanagar, Bengaluru, Karnataka 560040, India Phone: +91 80 4122 6536	Shalini G	2020-2021	15/10/20 to 30/11/20

J. odl

Principal
RAJARAJESWARI
COLLEGE OF ENGINEERING
Ramohalli Cross, Bengaluru-74

34	Restaurant Website	Tech Fortune Technologies #18,22nd main, subbanna garden road, near white petals, Vijayanagar, Bengaluru, Karnataka 560040, India +919591687143	Shilpitha Yadav S M	2020-2021	15/07/20 to 02/09/20
35	Evergreen Grocery store	Ananta Techno system , Ananth Technologies Limited Plot No. 593, 9th A-Main 14th Cross, ISRO Layout, J.P.Nagar Post, Bangalore - 560 078 Phones: 080-26664179, 26666229 Fax: +91-80-26664175	Tekale Srujana Mohan	2020-2021	03/08/20 to 05/09/20
36	Mall Customer Dataset	Pie infocomm Technology 1st floor, B-12, Sector E, Aliganj, Lucknow, Uttar Pradesh 226024, India	Suleman Siddiqui	2020-2021	24/10/20 to 23/11/20
37	HashTagAdCo	SCHBANG Digital Solutions Oxford Tower, Door no. 901, 8th floor, 139, Kodihalli, Bengaluru, Karnataka 560008, India	Sushma M	2020-2021	17/07/20 to 17/08/20
38	Configuration of routers and switches	National institute of electronics XQWR+G9G, Srinagar, Jammu	Tauseef Ahmed Wani	2020-2021	01/09/20 to 03/11/20
	Ospf Labs and vlan labs		Yawar Hussain Bhat	2020-2021	01/09/20 to 03/11/20

39	Smart kitchen using IBM Cloud	Smartbrige Bapuji Nagar Park, 2nd Floor, Plot No 132, Habsiguda Main Rd, above DCB bank, Nacharam, Hyderabad, Telangana 500076, India +919676938853	Yeshaswini N	2020-2021	02/09/20 to 30/09/20
40	Time and Attribute Factors Cobined Access Control for Time Sensitive Data in Public Cloud	mindsoft technologies # 1019, 2nd Floor, Venkateshwara Complex, Service Road, Vijaya Nagar, Bangalore 560040, India Telephone: +91-80-41270938 E-Mail: contact@mindsofttech.com	Vaibhavi Kuna	2020-2021	05/01/21 to 05/02/21
41	Smart home automation system	Pantech solutions Pvt. Ltd 51, First Floor, Nehru St, Ram Nagar, Coimbatore, Tamil Nadu 641009, India Phone: +91 89255 33487	Adil Rashid Bhat	2020-2021	02/12/20 to 02/02/20
ECE	**INTERNSHIPS**				
42	Integration of Gas turbine control system components	Aniba solutions private limited,Mutha Complex, No 22, 1st Main Rd, Yeswanthpur, Bengaluru, Karnataka 560022	Vinay R	2020-2021	01/10/2020 to 5/12/2020
43	hosting a website on aws platform	Appslucent software Pvt. Ltd MIG 19, 1st floor, Sharada arcade, Hoysala circle, KS town, Bangalore,	Rithushree I	2020-2021	1/9/2020 to 30/9/2020
	AWS		Manish N	2020-2021	1/9/2020 to 30/9/2020
	AWS		Apoorva D V	2020-2021	1/9/2020 to 30/9/2020
	surveillance robot using IoT	APSIS	Abishek M	2020-2021	4/8/2020 to 5/9/2020

44	multidirectional bluetooth controlled smart vehicle	SOLUTIONS ,#1353 , A-Square	Aswin P V	2020-2021	4/8/2020 to 5/9/2020
45	General Aspects Of A Substation	BESCOM, Bangalore	Roopashri	2020-2021	29/32021 to 28/4/2021
	Outline on BESCOM Billing Services		Sneha G	2020-2021	29/32021 to 28/4/2021
	Types of Works, Meter Services and Schemes in BESCOM		Swathi K	2020-2021	29/32021 to 28/4/2021
	BESCOM structure with their Duties and Responsibilities and Estimation		Vaishnavi S	2020-2021	29/32021 to 28/4/2021
	Transmission and Distribution losses in BESCOM		Varuni L N	2020-2021	29/32021 to 28/4/2021
46	Forest fire detection using CNN	BRAIN O VISION, LVS Arcade, Plot No. 71, Jubilee Enclave, Hitec City, Madhapur, Hyderabad – 500081	Ganga G V	2020-2021	03/8/2020 to 4/8/2020
47	IPv4 configuration and Enable routing using Cisco Packet Tracer	BSNL, Bangalore	Pooja M N	2020-2021	20/7/2020 to 15/8/2020
	Packet tracker using Cisco Packet tracer		Nihaarika M Amrutha	2020-2021	20/7/2020 to 15/8/2020
	BSC installation and commissioning		Nikitha N Diwakar	2020-2021	20/7/2020 to 15/8/2020
	VLAN configuration using Cisco Packet Tracer		Pavithra R	2020-2021	20/7/2020 to 15/8/2020
	Subnetting Packet tracker using Cisco Packet tracer		Nagarjun	2020-2021	20/7/2020 to 15/8/2020
	VoIP Cisco packet tracer		Prakruthi L	2020-2021	20/7/2020 to 15/8/2020
48	arduino based smoke detector	chira information technologies, 514/E, East Of Chord Road Vijayanagar,	Afshan Khanum	2020-2021	03/8/2020 to 4/8/2020
	smart night light using arduino		Uzair Nouman	2020-2021	03/8/2020 to 4/8/2020
	Arduino based electronic voting machine		Manish Kumar	2020-2021	25/2/2021 to 25/3/2021
	Room security using PIR sensor		Rachana H P	2020-2021	25/2/2021 to 25/3/2021
	pulse width modulation it's important and application in embedded system		Gowtham M	2020-2021	25/2/2021 to 25/3/2021
	Line following Robot		Manoj J Yadav	2020-2021	25/2/2021 to 25/3/2021

49	Smart Soil Monitoring System	Cleverbit Solutions PVT LTD, 1788/23, 2nd Floor, 5th Main, 9th Cross Rd, 2nd Stage, Vijayanagar, Bengaluru, Karnataka 560104	Manoj M	2020-2021	25/2/2021 to 25/3/2021
	Automatic street lights control using LDR sensor		Monisha D	2020-2021	25/2/2021 to 25/3/2021
	Smart Office automation		P S Leela Kumar	2020-2021	25/2/2021 to 25/3/2021
	Password protected door lock		Pavankumar Reddy S	2020-2021	25/2/2021 to 25/3/2021
	Smart Irrigation		Pavithra Kumar	2020-2021	25/2/2021 to 25/3/2021
	Automatic Lighting System		Pooja A	2020-2021	25/2/2021 to 25/3/2021
	Balancing of Objects Using Tilt Sensor		Pooja S Hugar	2020-2021	25/2/2021 to 25/3/2021
	Interfacing ultrasonic sensor and gas sensor		Sumanth Sk	2020-2021	25/2/2021 to 25/3/2021
	design and development of embedded systems		Tejesh P	2020-2021	25/2/2021 to 25/3/2021
	Programming Arduino using code Arduino IDE and block programming		Thanushree K H	2020-2021	25/2/2021 to 25/3/2021
50	Optical fiber transmission system	University of Aberdeen (through CTDS), King's College, Aberdeen AB24 3FX, United Kingdom	Anil Seervi	2020-2021	25/2/2021 to 25/3/2021
	Non Linear Pulse Propagation In Optical Fiber		Avinash R	2020-2021	25/2/2021 to 25/3/2021
	Nonlinear effects and their analysis using matlab code		Chandan B V	2020-2021	25/2/2021 to 25/3/2021
	Optical fiber transmission system		Chethan U	2020-2021	25/2/2021 to 25/3/2021
	Optical fiber transmission system		Darshan M	2020-2021	25/2/2021 to 25/3/2021
	Optical fiber transmission system		Darshan Tm	2020-2021	25/2/2021 to 25/3/2021
	Nonlinear effects and their analysis using matlab code		Doreswamy H N	2020-2021	25/2/2021 to 25/3/2021
	Nonlinear effects and their analysis using non linear schrodinger equation using mat lab		Manoj B	2020-2021	25/2/2021 to 25/3/2021

	Water Level Controller Using Arduino Uno		Bindu B Gowda M	2020-2021	01/03/2021 to 5/4/2021
	Covid 19 Robot		Anu Suresh	2020-2021	01/03/2021 to 5/4/2021
	Priority based ambulance monitoring system		Ashwini R	2020-2021	01/03/2021 to 5/4/2021
	War Field Robot	Elecsis Infotech, ARE RANGA COMPLEX, NO. 2934E/2935E 3RD FLOOR VIJAYANAGAR 2ND STAGE BENGALURU, Karnataka 560040	Aishwarya G R	2020-2021	01/03/2021 to 5/4/2021
	Smart Garbage collection system using arduino uno		Chaithra J	2020-2021	01/03/2021 to 5/4/2021
51	Multipurpose Agricultural Robot Using Arduino and IOT		Chaitra N	2020-2021	01/03/2021 to 5/4/2021
	RFID Bases attendance		Gayathri D	2020-2021	01/03/2021 to 5/4/2021
	Train track crack detection		Bindu Shree M	2020-2021	01/03/2021 to 5/4/2021
	Functioning of Robot		Kavya V	2020-2021	01/03/2021 to 5/4/2021
	Sun tracking Solar panel		Pavitra V	2020-2021	01/03/2021 to 5/4/2021
52	Home automation	Embiot Technologies, #281/5, 20th Main, Marenahalli Main Rd, Bengaluru, Karnataka 560040	Yuvaraj R	2020-2021	8/7/2019 to 8/8/2019
53	design and verification using verilog	EntupleTechnologies, #2730 'Trikanikka, 80 Feet Rd, HAL 3rd Stage,	Chandana A	2020-2021	8/8/2020 to 22/09/2020
	Design and Verification using Verilog		Samreen Taj	2020-2021	8/8/2020 to 22/09/2020
54	Fire Alarm system	Exposis Data Labs, P.M R. Residency, Ground Floor, No-5/3 Sy. No.10/6-1	Nayana K R	2020-2021	17/8/2020 to 17/9/2020
	Soil moisture detection and monitoring system		H Harshitha	2020-2021	17/8/2020 to 17/9/2020
55	Project on Gesture Control Car using Embedded C	Gemini Electro corporation, RV GEM HOUSE No.30, 7th Main, 2nd Cross, , Muthyalamma Temple Rd, Muthyala Nagar, muthyalanagara, Bengaluru, Karnataka 560054	Kainath Sultana	2020-2021	8/7/2019 to 8/8/2019
56	Final Assembly CHEETAH/CHEETAK HAL Helicopter Division Technology	Hindustan aeronautics limited, Bangalore	Kavyashree S	2020-2021	29/1/2020 to26/2/2020

Principal
RAJARAJESWARI
COLLEGE OF ENGINEERING
Ramohalli Cross, Bengaluru-74

57	iot platform-Automatic asset tracking using RFID technology	Infotest IT services, 69, Shanmuga Theatre Road, Coimbatore, 64100	Devika R	2020-2021	29/1/2020 to26/2/2020
58	Hybrid Ultra Capacitor and Electric Vehicle	inGO Electric Pvt. Ltd., Marielle Apartments, Richmond Town, Bengaluru, Karnataka 560025	Keerthana S	2020-2021	24/1/2019 to 5/4/2019
59	Smart Interfacing of traffic signal	Lime Electronics inc	Adarsh G N	2020-2021	15/03/2021 to 15/04/2021
	Smart Interfacing of traffic signal		Nishanth P	2020-2021	15/03/2021 to 15/04/2021
	interfacing of traffic light controller		Prashanth G	2020-2021	15/03/2021 to 15/04/2021
	Smart Interfacing of traffic signal		Vaibhav Sowchi	2020-2021	15/03/2021 to 15/04/2021
60	Uber Pickup database	Pie Infocomm, 1st floor, B-12, Sector E, Aliganj, Lucknow, Uttar Pradesh 226024	Sowmya S	2020-2021	15/03/2021 to 15/04/2021
61	Smart Agriculture system using Iot	SmartBridge Private Limited, Le Banaka, 6-3-248/F, 3rd Floor, Road No.1, Shyam Rao Nagar, Banjara Hills, Hyderabad, Telangana 500004	Sanjay S	2020-2021	6/9/2020 to 7/9/2020
62	street light using LDR	Syslog Technologies, Maruthi Complex, # 2943/E, 2nd Floor,	Gattu Jishnu	2020-2021	2/3/2020 to 30/3/2020
	home automation		Nitin Kumar P B	2020-2021	2/3/2020 to 30/3/2020
63	Automatic water dispenser	TI2 Technologies, Company address: #2, Sathya Shanthi Nilaya, 10th Cross, Bagalagunte,Bangal ore -560073.	Pavan H K	2020-2021	8/7/2020 to 7/8/2020
	Web development for IT company		Rakshitha N	2020-2021	15/7/2020 to 1/9/2020
	web application development for education institutions.		Divya D N	2020-2021	15/7/2020 to 1/9/2020
	Web Development using WordPress		Rohan Kumar S	2020-2021	15/7/2020 to 1/9/2020
	Manages candidates votes using aurdino UNO		R Tilak	2020-2021	15/7/2020 to 1/9/2020

64	automatically household lights are controlled by arduino	Tech Fortune #18 22nd main Subanna Garden, Vijay Nagar, Bangalore-560040	Varun Kumar Sl	2020-2021	15/7/2020 to 1/9/2020
	Electronic voting machine based on Ardino UNO and bluetooth		Akash P	2020-2021	15/7/2020 to 1/9/2020
	Distance measurement using ultrasonic sensor		Manoj.S	2020-2021	15/7/2020 to 1/9/2020
	Web development for CAD Vision Research and Development center		Chethana M	2020-2021	15/7/2020 to 1/9/2020
	Red wine Quality Analysis		Shradha Suman Jena	2020-2021	15/7/2020 to 1/9/2020
	Embedded IoT		Chandan B S	2020-2021	8/7/2019 to 5/8/2019
65	Assistive communication system for deaf,dumb and blind	TECHNOFLY SOLUTIONS, Bengaluru 21,Ground Floor,17th cross Service Road , Near Maruthi Mandir, Next to City Union Bank, Vijay Nagar, Bengaluru, Karnataka 560040	Akash	2020-2021	18/3/2021 to 16/4/2021
	Assistive communication system for deaf,dumb and blind		Anjinappagari Venu	2020-2021	18/3/2021 to 16/4/2021
	Fire and Gas detection WiFi controlled Robo using Arduino UNO		Devika S	2020-2021	18/3/2021 to 16/4/2021
	Protection of crops and proper usage of rain water using GSM and wireless sensor		Jeevitha K R	2020-2021	18/3/2021 to 16/4/2021
	traffic management using arm cortex		Meena Kumari G	2020-2021	18/3/2021 to 16/4/2021
	Metro cash and carry using Arm LPC2148		Navajith N	2020-2021	18/3/2021 to 16/4/2021
	Office Automation using Arduino		Nisarga P	2020-2021	18/3/2021 to 16/4/2021
	Controlling street light using LDR and IOT		Nitish S	2020-2021	18/3/2021 to 16/4/2021
	Electronic voting machine using Arm LPC2148		Meghana K R	2020-2021	18/3/2021 to 16/4/2021
	Assistive communication system for deaf,dumb and blind		Nayan Suresh Jadhav	2020-2021	18/3/21 to 16/4/21
	Assistive communication system for deaf,dumb and blind		Sreekanth Doddamani	2020-2021	18/3/21 to 16/4/21

66	Malaria Detection	Techsim+, 3rd Floor, kalpataru Towers, Near Time Coaching, Zone-II, Maharana Pratap Nagar, Bhopal, Madhya Pradesh 462011	Ananth M Purohit	2020-2021	17/8/2020 to 15/10/2020
	Detection of Pneumonia using X-ray Images		G Santosh Kumar	2020-2021	17/8/2020 to 15/10/2020
	Handwritten digit recognitions usin k-Nearest Neighbors		K Sagar	2020-2021	17/8/2020 to 15/10/2020
	Covid-19 Mask Detection By Deep Learning Using TensorFlow, keras and OpenCV		Mallikarjuna H	2020-2021	17/8/2020 to 15/10/2020
	Browser automation using selenium & beautifulsoup4 library		Mayur Gr	2020-2021	17/8/2020 to 15/10/2020
	Salary prediction		Sandeep	2020-2021	17/8/2020 to 15/10/2020
	restaurant review using nlp		Sandeep M	2020-2021	17/8/2020 to 15/10/2020
	social distance monitoring		Sathish S	2020-2021	17/8/2020 to 15/10/2020
67	Student Marks prediction and visual representation of clusters	UNIQ Technology, No. 15/2-1, Christi Tower, Hosur Main Road, Madiwala Upas, opp. to The Grand Krishna Rooms Pick N Save Super Market , Bengaluru, Karnataka 560068	Harshitha M	2020-2021	1/5/2020 to 30/5/2020
68	Machine Learning and Deep Learning using LabVIEW software	VI Solutions, # 22, 2nd Floor, Akai Plaza, D Rajagopal Road, opp. to Axis Bank, Sanjaynagar, Bengaluru, Karnataka 560094	Nithin Kumar Yadav K	2020-2021	18/3/21 to 16/4/21
69	Smart Led Using Wifi Module	GYAAN Vivarttana Technologies, SYNERGE Tower, No. 1573, 39th F	Sahana N	2020-2021	17/9/2020 to 16/10/2020
	Smart Car Using Bluetooth Module		Shradha Damodar	2020-2021	17/9/2020 to 16/10/2020

J. ooH

Principal
RAJARAJESWARI
COLLEGE OF ENGINEERING
Ramohalli Cross, Bengaluru-74

	Project	Company	Student	Year	Duration
	Project Customer Service Requests Analysis		Harshitha R	2020-2021	17/08/2020 to 17/9/2020
	IOT Based Heart Defect Monitoring System Using ECG		Bhumireddy Hemanth Reddy	2020-2021	17/08/2020 to 17/9/2020
	Smart Car Reverse Parking Alert System		Yashaswini S	2020-2021	17/08/2020 to 17/9/2020
	bank loan prediuction using ml		Abhishek Gowda S	2020-2021	17/08/2020 to 17/9/2020
	oil price prediction using ml		Bharath C S	2020-2021	17/08/2020 to 17/9/2020
	breast cancer diagnosis using ml		Chandana C	2020-2021	17/08/2020 to 17/9/2020
	Enhancement of plant monitoring system using IOT		Nayana R	2020-2021	17/08/2020 to 17/9/2020
	stock market prediction using ml		Divya Shree M R	2020-2021	17/08/2020 to 17/9/2020
	Smart water quality monitoring system using Iot		Chaitra R	2020-2021	17/08/2020 to 17/9/2020
	IOT based greenhouse monitoring and control system	X-Ciencia technologies India PLT #1030/A,2nd main,4th cross behind Vasavi PU college, near Hosahalli Metro Station Vijayanagar,Bangalore-560040	Gagana Shree U	2020-2021	17/08/2020 to 17/9/2020
	Google voice activated automation assistant		Gaganarpitha V	2020-2021	17/08/2020 to 17/9/2020
	IOT Office automation		Ranjitha M	2020-2021	17/08/2020 to 17/9/2020
	Credit card fraud detection using machine learning		Roopa M	2020-2021	17/08/2020 to 17/9/2020
	IOT Based Antenna Postioning System		Sadiq D	2020-2021	17/08/2020 to 17/9/2020
	Rice seed analysis using machine learning		Sanjay K	2020-2021	17/08/2020 to 17/9/2020
	Crop yield prediction using Machine Learning		Hemanth M Motwani	2020-2021	17/08/2020 to 17/9/2020
	Automatic door opening system using IOT		Sharath K	2020-2021	17/08/2020 to 17/9/2020
	Bank loan prediction using Machine learning		Shashank H S	2020-2021	17/08/2020 to 17/9/2020
	IOT based distribution transformer health monitoring system		Vihara G Shetty	2020-2021	17/08/2020 to 17/9/2020
	IOT based Sound and Air pollution Monitoring System		Vinutha J	2020-2021	17/08/2020 to 17/9/2020
	School security system using IOT		Yashaswini B D	2020-2021	17/08/2020 to 17/9/2020
	Air quality prediction using ML		Dhruthi J Pithadia	2020-2021	17/08/2020 to 17/9/2020
70	Air quality index		Chethan N	2020-2021	17/08/2020 to 17/9/2020
	visiting customers to mall using ML		Rajashree C	2020-2021	17/08/2020 to 17/9/2020

based big data storage system in cloud computing using iot		Arshiya K	2020-2021	17/08/2020 to 17/9/2020
Protection for women using iot Smart device		Shivaprasad R	2020-2021	17/08/2020 to 17/9/2020
IOT based Mining Tracking And Worker Safety Helmet		Sirish Kumar	2020-2021	17/08/2020 to 17/9/2020
Design of pet feeder using web server as internet of things		Siddraju M	2020-2021	17/08/2020 to 17/9/2020
Raspberry Pi Air and Noise Pollution Monitoring System over IoT	X-Ciencia technologies India PLT #1030/A,2nd main,4th cross behind Vasavi PU college, near Hosahalli Metro Station Vijayanagar,Bangalore-560040	Arindam Saha	2020-2021	17/08/2020 to 17/9/2020
Joystick Using Arduino		Ashwini R	2020-2021	17/08/2020 to 17/9/2020
Women Safety Device and Application-FEMME		Neha S	2020-2021	17/08/2020 to 17/9/2020
Iot Based Automatic Accident Vehicle Detection and Rescue System		Shoaib Pasha Md	2020-2021	17/08/2020 to 17/9/2020
Bank Loan Management System		Vaibhav D Moraskar	2020-2021	17/08/2020 to 17/9/2020
Liquid level Monitoring System using Iot		Sonika M R	2020-2021	17/08/2020 to 17/9/2020
Car Parking system using IOT		Spandan S Gangannavar	2020-2021	17/08/2020 to 17/9/2020
IOT Based Weather Monitoring System using RASPBERRY PI		Suhas G C	2020-2021	17/08/2020 to 17/9/2020
Fake news detection on social media using AI		Tejashwini R	2020-2021	17/08/2020 to 17/9/2020
Robust Malware security detection using AI		Varshini M	2020-2021	17/08/2020 to 17/9/2020
IOT based Water management system		Varshitha M S	2020-2021	17/08/2020 to 17/9/2020
IOT using smart parking system		Varshitha Mv	2020-2021	17/08/2020 to 17/9/2020
IOT Based Intelligent Gas Leakage Detector using Arduino		Vidyashree K V	2020-2021	17/08/2020 to 17/9/2020

71	cyber security techniques & reverse engineering	Prinston Technologies Pvt Ltd, 119 FLORAL DECK PLAZAE WING 1ST FLOOR MIDC OPP SEEPZ ANDHERI EAST MUMBAI Mumbai City MH 400093 IN	As Puneeth Kumar	2020-2021	8/7/2020 to 9/8/2020
72	IoT and Embedded Systems	Diverse Technology Pvt .Ltd,No. 72, 27th Main Rd, PWD Quarters, 1st Sector, HSR Layout, Bengaluru, Karnataka 560102	Adithya P Shetty	2020-2021	8/7/2020 to 9/8/2020
73	Web Development Systems	Diceque Solutions, #1738, 90TH CROSS NEAR SAGAR HOSPITAL KUMARSWAMY LAYOUT BANGALORE Bangalore KA IN 560078	Indudhar B K	2020-2021	8/7/2020 to 9/8/2020
74	Artificial Intelligence	Technologies Global Pvt Ltd., Bangalore	Fathima Bee	2020-2021	12/03/21 to 12/04/21
			Shabistan Nayab		12/03/21 to 12/04/21
			Ummehani		03/10/20 to 10/12/20
			Varun C		12/03/21 to 12/04/21
			Vidya C N		12/03/21 to 12/04/21
			Vishwajith V Pai		12/03/21 to 12/04/21
75	Internship Training	Pragna Microdesigns, No. 34, Karekallu, Kamakshipalya, Basaveshwaranagar Post, Bengaluru - 560079	Anup G Prabhu	2020-2021	22/03/21 to 24/04/21

CIVIL	INTERNSHIPS				
76	Six laning of bangalore to Nidagatta section of NH-275 in the state of karnataka under HAM	MSV INTERNATIONAL INC. House no 232/545 BM road vaderahalli ramanagara ,Ramanagara Email: msv.nidagatta@gmail.com contact: 9480539951	Darshan Gowda K S,	2020-2021	04/08/2020 to 02/09/2020
	Highway Material Testing And Construction		Chaithra C V	2020-2021	04/08/2020 to 02/09/2020
	Construction of Residential Buildings		Nisarga T S ,	2020-2021	04/08/2020 to 02/09/2020
	Six laning of bangalore to Nidagatta section of NH-275 in the state of karnataka under HAM		Sharan V,	2020-2021	04/08/2020 to 02/09/2020
	Six laning of bangalore to Nidagatta section of NH-275 in the state of karnataka under HAM		Vikas g Gowda ,	2020-2021	04/08/2020 to 02/09/2020
	Six laning of bangalore to Nidagatta section of NH-275 in the state of karnataka under HAM		T N Manoj	2020-2021	04/08/2020 to 02/09/2020
77	Construction work of 3BHK housing project at Nagarabhavi	Design Point consultants, Kerala samajan building,KS Rao main road vijayanagar, Mangalore, karnataka-575001. Ph:9686544447	Rakshitha MJ,	2020-2021	8/3/2021 to 23/3/2021
	Construction work of Police Quarters at Nagarabhavi		Preethu M,	2020-2021	8/3/2021 to 23/3/2021
	Construction work of Police Quarters at Nagarabhavi		SUSHMITHA C.B,	2020-2021	8/3/2021 to 23/3/2021
	Construction work of 3BHK housing project at Nagarabhavi		H N NEELAMBIKA ,	2020-2021	8/3/2021 to 23/3/2021
	Construction work of 3BHK housing project at Nagarabhavi		Thejashwini V,	2020-2021	8/3/2021 to 23/3/2021
	Construction work of 3BHK housing project at Nagarabhavi		Rameshwari M,	2020-2021	8/3/2021 to 23/3/2021
	Construction work of 3BHK housing project at Nagarabhavi		Tejaswini D	2020-2021	8/3/2021 to 23/3/2021
78	Construction at project sites in 4View design organisation	4 View Designs, No-533, 1st Main, 2nd Cross, Annapoornehwari nagar, Nagadevanahalli II stage, Bengaluru-560091	NANDAN N	2020-2021	12/03/2021 To 11/04/2021

Principal
RAJARAJESWARI
COLLEGE OF ENGINEERING
Ramohalli Cross, Bengaluru-74

79	Construction of building at Mallathahalli	A+ Quality Constructions & Developers, shop no 2, #106, 5th cross,opp Dr. Ambedkar college, Mallathahalli, Bangalore-560056. Ph: 9035356295	Preethi R	2020-2021	15/03/21 to 15/04/21
80	GEF Hall-2 Building Construction	Bhagirath construction company, #43 old, # 240/A, 3rd floor, 57th cross 3rd block, Rajajinagar,	Hema P,	2020-2021	16-03-21 to 31-03-21
	GEF Hall-2 Building Construction		Keerthana R ,	2020-2021	16-03-21 to 31-03-21
	GEF Hall-2 Building Construction		Javanika M,	2020-2021	16-03-21 to 31-03-21
81	Project on "Residence at NR Colony Bangaluru"	Bharani constructions, No. 82, Vinayaka Layout, Subramanyapura Gram Panchayat, Gubbalalu, Uttarahalli hobli, Bangalore-560061, Ph: 9341229925, 08026625	RANGAN S R	2020-2021	10/03/2021 to 25/03/2021
82	Construction of Multi Dwelling Residential project	Bhargavi ventures, 182 G Block, 19th Cross 20th Main, , Sahakara Nagar, 560092 - Bangalore. Ph:9945241483	Ravikumar B N,	2020-2021	18/03/21 To 10/04/21
	Construction of Multi Dwelling Residential project		Srinivasa hm,	2020-2021	18/03/21 To 10/04/21
	Construction of Multi Dwelling Residential project		Ramakrishna D N ,	2020-2021	18/03/21 To 10/04/21
	Construction of Multi Dwelling Residential project		Nanjesh k j,	2020-2021	18/03/21 To 10/04/21
	Construction of Multi Dwelling Residential project		Raghu AN	2020-2021	18/03/21 To 10/04/21
83	Construction of Residential Building	C & I CONSTRUCTION, #1267, D Block Aecs Layout, 6t cross Marathahalli bangalore-560037,	NAGARAJ GS,	2020-2021	24/03/21 to 12/04/2021
	Construction of Residential Building		YASHWANTH Y G,	2020-2021	24/03/21 to 12/04/2021
	Construction of Residential Building		Vandana R,	2020-2021	24/03/21 to 12/04/2021
84	Project on REVET Architecture	Canter technology privet limited, canter cadd institute, benz circle, vijayavada, Andhrapradesh. Ph:9030512121	Mude Deepika	2020-2021	08/03/2021- 08/04/2021

Principal
RAJARAJESWARI
COLLEGE OF ENGINEERING
Bamohalli Cross, Bengaluru-74

85	Excavation And Foundation Construction Procedure In Construction Building"	Civil experts consultants and testing , No174, Sri Ranga Complex, Amritnagar Main Road, New Bank Colony, konankunte, Bengaluru, Karnataka 560062, Ph: 9743130259	Girish P	2020-2021	9/3/21 to 30/3/21
	Excavation And Foundation Construction Procedure In Construction Building"		Manikanta Nh,	2020-2021	9/3/21 to 30/3/21
	Excavation And Foundation Construction Procedure In Construction Building"		Shivakumar H M	2020-2021	9/3/21 to 30/3/21
	Excavation And Foundation Construction Procedure In Construction Building"		Sanjay VR,	2020-2021	9/3/21 to 30/3/21
	Excavation And Foundation Construction Procedure In Construction Building"		Kiran M	2020-2021	9/3/21 to 30/3/21
	Excavation And Foundation Construction Procedure In Construction Building"		Sampreeth B S	2020-2021	9/3/21 to 30/3/21
	Excavation And Foundation Construction Procedure In Construction Building"		Rakesh Talakeri	2020-2021	9/3/21 to 30/3/21
	Excavation And Foundation Construction Procedure In Construction Building"		Darshini H	2020-2021	9/3/21 to 30/3/21
86	Project on SRI Ram Southern CREST Infra	Construction management Training institute, #197 E/5, 2nd floor, 27th cross, 8th B main road, 3rd block, Jayanagar, Bengaluru-560011,	Danesh Hiremath	2020-2021	25/04/2021-10/05/2021
	Project on Advaitha Aksha Astral pipes		Mohammed Suhail Mulla,	2020-2021	25/04/2021-10/05/2021
	Project on Advaitha Aksha Astral pipes		Bharath N,	2020-2021	25/04/2021-10/05/2021
	Project on SRI Ram Southern CREST Infra		Lohith S	2020-2021	25/04/2021-10/05/2021
87	Strom water drainage system and building construction	Consolidated Construction Consortium (CCCL), 3rd Main Rd, Dollars Colony, Phase 4, J. P. Nagar,	Vinaykumar G	2020-2021	17 March 2021 to 16 April 2021
	Strom water drainage system and building construction		VIJAYKUMAR A	2020-2021	17 March 2021 to 16 April 2021
88	Construction project under CRIS Indusrtries	CRIS Ready Mix Concrete, Cris Industries, Double Road, Double Road Chamarajanagar, Chamarajanagar - 571313. Ph:9035727670	Ravikiran N	2020-2021	15/3/2021-30/3/2021
89	Construction of Engineering college Building	Government of Karnataka public works department, Ramanagara .	KOUSHIK CV	2020-2021	22/03/2021 - 10/04/2021
	Construction of Engineering college Building		Hitesh DS	2020-2021	22/03/2021 - 10/04/2021

90	Construction of Building and site activities	Hoysala projects Pvt ltd, 104, Ground Floor, Infantry Techno Park,	Shwetha.S	2020-2021	31 March to 14 April
	Construction of Building and site activities		Vijayalakshmi.P	2020-2021	31 March to 14 April
91	Reach1A BMRCL project	ITD cementation India (Bangalore), #41, Hosur Rd, Madiwala, 1st	Sri Raksha N	2020-2021	11/03/2021 To 31/03/2021
	Reach1A BMRCL project		SAKSHI R	2020-2021	11/03/2021 To 31/03/2021
92	Constructon work	JST CONSTRUCTION AND CONSULTANT, #128/1ᵇ, Upkar layout, 7th Block, sir MV Nagar, Gidada Kennenahalli, Muddinapalya, Bengaluru 560091. Ph:9740058769/ 7760782604/ 7899123215,Mail id:	KAVERI	2020-2021	11/03/2021 To 31/03/2021
	Constructon work		BINDU S M	2020-2021	11/03/2021 To 31/03/2021
	Constructon work		MADHU V	2020-2021	11/03/2021 To 31/03/2021
	Constructon work		Anusha HK	2020-2021	11/03/2021 To 31/03/2021
	Constructon work		Chandrakala S M,	2020-2021	11/03/2021 To 31/03/2021
	Constructon work		Santhosha G	2020-2021	11/03/2021 To 31/03/2021
	Constructon work		Varun patel	2020-2021	11/03/2021 To 31/03/2021
93	Design & Constructon work	KANASU DESIGNS AND CONSULTANCY, No 7, 1st floor, Loop Rd, 2nd Block, Kumara Park West, Bengaluru, Karnataka 560020, Ph: 7892436517	Sharanbasava	2020-2021	5th March to 20 March 2021
94	Design & Constructon work	MECADEZ core technologies private limited , XGP7+CMF,	Sindhu Y H	2020-2021	25/3/2021 to 10/04/2021
	Design & Constructon work		Tejaswini N	2020-2021	25/3/2021 to 10/04/2021
95	Practical Aspects of practical management	Prayojana construction management training institute,	Keerthan B J	2020-2021	25/04/2021 To 10/05/2021
	Practical Aspects of practical management		Nikhil Dilip Ingale	2020-2021	25/04/2021 To 10/05/2021
96	Construction work on Prestige willow tree	Prestige willow tree, Prestige Falcon Tower, No.19, Brunton Road, Bengaluru – 560025. Tel: +91 80 2559 1080	Tejaswini R	2020-2021	25th March to 17th April
97	Construction of Quarters Building	PUBLIC WORK DEPARTMENT (PWD) Mandya, Assistant Executive	Sanjay B N	2020-2021	17/03/21 To 2/4/21
	Construction of Quarters Building		Thejus HR	2020-2021	17/03/21 To 2/4/21

98	Construction of Flexible pavements	PUBLIC WORK DEPARTMENT NO-1 SUB DIVISION CHAMARAJANAG AR. Ph: 9986637278	Madhusudhan R	2020-2021	8/3/21 - 31/3/21
99	Construction of Engineering college Building	Public Works Department (PWD), Ramanagara, Ph: 9742756838	Darshan.R	2020-2021	09/03/2021 to 24/03/2021
	Construction of Engineering college Building		Deepak D	2020-2021	09/03/2021 to 24/03/2021
	Construction of Engineering college Building		Badari Vishal P Betageri	2020-2021	09/03/2021 to 24/03/2021
100	PWD- design	Public Works Department (PWD), #1, seshadri road, SJP capus, Near KR circle, Bengaluru-560001 . Ph:9449145522	Monisha R	2020-2021	9.03.2021 to 24.03.2021
101	PWD-work	Public Works Department Government of Karnataka, #01, PWD Sub-Division, Ramanagar-562159, Ph: 7892481470	JayaKrishna. VS	2020-2021	15-03-2021 - 21-04-2021
102	Proposed steel building construction at Dayanand sagar university, Harohalli	S K STEEL INFRA, #18, 11th cross, Ganapathynagar, Peenya industrial area, Bangalore - 560058, Ph:8608796669	Preksha L	2020-2021	3-3-2021 to 20-3-2021
	Proposed steel building construction at Dayanand sagar university, Harohalli		Meghana K R	2020-2021	3-3-2021 to 20-3-2021
	Proposed steel building construction at Dayanand sagar university, Harohalli		RAHUL R	2020-2021	3-3-2021 to 20-3-2021
103	KSHIP Project of two laning with paved shoulder (Gadag to Honnalli)	Sadbhav Engineering Limited, "sadbhav house" Opp Law Garden police chowki, Ellisbridge, Ahmedabad-380006. Ph:9454173747	Borudregowda	2020-2021	20-03-2021 to 10-04-2021

Principal
RAJARAJESWARI
COLLEGE OF ENGINEERING
Ramohalli Cross, Bengaluru-74

104	Residential House planning and construction	SKM TECHNOSOLZ, #472/9 AVS compound 80feet road 4th block Koramangala, Bengaluru-560034, Ph:	Ambika S	2020-2021	07/08/2020-07/09/2020
	Residential House planning and construction		Lalana.M	2020-2021	07/08/2020-07/09/2020
	Residential House planning and construction		Keerthi chandru	2020-2021	07/08/2020-07/09/2020
	Residential House planning and construction		Harshitha KS	2020-2021	07/08/2020-07/09/2020
105	Construction of Residential Building	VSD Construction & Interiors ,11-C, 2nd floor, 1st Main Road, 60, feet raod · 098805 97707	Prajwal HP	2020-2021	11/03/21 to 30/03/21
106	Construction of commercial building	Vyshali group, #65, Richmond Road, Shanthala Nagar, Ashok Nagar Bengaluru, Karnataka -560025,	Ajithkumar M D	2020-2021	12-03-2021 to 30-03-21
	Construction of commercial building		Anush Kumar MG	2020-2021	12-03-2021 to 30-03-21
	Construction of commercial building		VarunKumar. S	2020-2021	12-03-2021 to 30-03-21
107	Construction of Residential building in bangalore	X-Ciencia Technologies India Pvt. Ltd. No.3/1, Robertson Road	Prajwal G V	2020-2021	12-03-2021 to 03-04-2021
	Construction of Residential building in bangalore		Sangamesh Goudar	2020-2021	12-03-2021 to 03-04-2021
108	Structural Drafting	YSTR Structural Consultant, #57, 2nd cross, First main road, Valmiki nagar, Mysore road, karnataka, Ph:	Prathusha S	2020-2021	06-03-2021 to 06-04-2021
	Structural Drafting		Vandana,	2020-2021	06-03-2021 to 06-04-2021
	Structural Drafting		Sujana S R	2020-2021	06-03-2021 to 06-04-2021

Principal
RAJARAJESWARI
COLLEGE OF ENGINEERING
Ramohalli Cross, Bengaluru-74

ME		INTERNSHIPS			
109	Advanced Aerospace Materials Characterization & Modeling	CSIR-National Institute For Interdisciplinary Science and Technology, Trivandrum, Kerala	Aabid Bijapur	2020-2021	07/09/20 to 01/10/20
110	Advanced Aerospace materials Characterization and Modeling	ISERT and CSIR-NIIST, Trivandrum, Kerala	Abhishek S P	2020-2021	07/09/20 to 01/10/20
	Advanced Aerospace materials Characterization and Modeling		Aishwarya	2020-2021	07/09/20 to 01/10/20
	Advanced Aerospace Materials Characterization and Modeling		Karan B S	2020-2021	7/09/20 to 01/10/20
111	Vehicle Dynamics of Commercial and Race Cras	Elite Techno Groups,418, JEM, Ridhi Sidhi, Jaipur, 302018, Ph:7742633665	Abdul Jaleel Ahmed	2020-2021	17/08/20 to 28/09/20
	Vehicle dynamics		Balaji R	2020-2021	03/08/20 to 14/09/20
	Vehicle dynamics of commerical and race cars		Bharath akshay B	2020-2021	01/03/21 to 31/03/21
	Vehicle Dynamics		Harshavardhan B	2020-2021	03/08/20 to 14/09/20
	Vehicle dynamics		Karthik M	2020-2021	07/09/20 to 18/10/20
	Vehicle dynamics		Karthik	2020-2021	07/09/20 to 18/10/20
	Vehicle Dynamics		Mithun P	2020-2021	31/08/20 to 11/10/20
	Vehicle dynamics of commercial vehicles and race cars		Mohamed Haseebulla	2020-2021	17/08/20 to 28/09/20
	Vehicle Dynamics		Mohammed Musab Khan	2020-2021	21/08/20 to 02/10/20
	Vehicle Dynamics		Nikhil N R	2020-2021	17/08/20 to 27/09/20
	Vehicle dynamics		Zubair Bashir lone	2020-2021	17/08/20 to 27/09/20
112	A study of Manufacturing of Aerospace launch vehicle	HAL Aerospace Division, 15/1, Cubbon Road, Bengaluru, 560001	Abhay B	2020-2021	04/03/21 to 03/04/21
	Foundry and Forge Technology		Bharath V	2020-2021	17/03/21 to 17/04/21
	A Study on manufacturing of aerospace launch vehicle		Chethan Kumar K N	2020-2021	04/03/21 to 04/04/21
	A Study on manufacturing of aerospace launch vehicle		Deepak Srinidhi	2020-2021	17/03/21 to 17/04/21
113	Industrial Automation - Basics in Pneumatics and Hydraulics	Karnataka German Technical Training Institute, Bengaluru	Abhishek D	2020-2021	15/03/21 to 14/04/21
	Industrial Automation - Basics in Pneumatics and Hydraulics		Govindraj H S	2020-2021	15/03/21 to 14/04/21
	Industrial Automation		Harsha H K	2020-2021	15/03/21 to 14/04/21

114	Smart Interfacing of Traffic Signal	Lime Electronics Inc. No.41, SDM Lane, Manavarthipet, Bangalore - 560059, Ph: 9480399447	Abhishek Pawar	2020-2021	15/03/21 to 15/04/21
	Mechatronics in Industrial Application		Mukul Kumar J	2020-2021	15/03/21 to 15/04/21
	Mechatronics in Industrial Application		Adeshkumar M S	2020-2021	15/03/21 to 15/04/21
115	Advanced Aerospace materials Characterization and Modeling	ISERT and CSIR-NIIST, Trivandrum, Kerala	Abhishek S P	2020-2021	07/09/20 to 01/10/20
	Advanced Aerospace materials Characterization and Modeling		Aishwarya	2020-2021	07/09/20 to 01/10/20
	Advanced Aerospace Materials Characterization and Modeling		Karan B S	2020-2021	7/09/20 to 01/10/20
116	HVAC analysis	Prinston Smart Engineers	Abraham Kingston S	2020-2021	01/03/21 to 15/04/21
	Heat ventilation and air conditioning		Aravind S	2020-2021	10/08/20 to 10/09/20
	Heating Ventilation and air Conditioning		Darshan C J	2020-2021	10/08/20 to 10/09/20
	HVAC design for school building		Manikanta M Shivayogi	2020-2021	01/03/21 10/04/21
	Heating ventilation air conditioning		Manu D H	2020-2021	01/03/21 to 10/04/21
	HVAC design for school building		Narapureddy Karthik Kumar Reddy	2020-2021	01/05/21 to 15/06/21
	HVAC Design For School Building		Naveen D	2020-2021	01/03/21 to 10/04/21
	HVAC analysis		Pavan Nikhil Picardo	2020-2021	01/03/21 to 10/04/21
	HVAC analysis		Praveen Gandhi M	2020-2021	01/03/21 to 15/04/21
	HVAC analysis		Nitesh Kumar	2020-2021	01/03/21 to 15/04/21
	HVAC Design		Sachin H S	2020-2021	07/11/20 to 12/12/20
	HVAC Design		Sandesha G D	2020-2021	01/03/21 to 10/04/21
	HVAC Design		Suhaib Ali Khan	2020-2021	01/03/21 to 15/04/21
	HVAC Design		Touheed khan	2020-2021	01/03/21 to 15/04/21
	HVAC Design		Venkatesha	2020-2021	07/10 20 to 12/11/20
117	Internship	Rane Engine Valve Ltd.,Hirehalli, Tumkuru, Ph: 8163292512	Achyuth Yadav S	2020-2021	27/07/20 to 27/08/20
118	Product Engineering - Wiring Harness & Battery Pack Design	GRADPRO, 4/10, Nagarbhavi Main Road, Govindarajanagar, Vijaynagar, Bengaluru- 40,	Akshay V Rao	2020-2021	13/03/21 to 05/05/21
	Product Engineering-wiring harness and battery pack design		Nishanth S	2020-2021	22/09/20 to 13/01/21

	Internship training on altair hyperworks		Avinash N	2020-2021	10/03/21 to 10/04/21
	Internship training on altair hyperworks		Bharath K B	2020-2021	10/03/21 to 10/04/21
	Internship training on altair hyperworks		Chethan K M	2020-2021	10/03/21 to 10/04/21
	Internship training on altair hyperworks		Darshan Kesarkar M	2020-2021	10/03/21 to 10/04/21
	Internship training on altair hyperworks		Deepak Devanand	2020-2021	10/03/21 to 10/04/21
	Internship training on altair hyperworks		Dhruva V	2020-2021	10/03/21 to 10/04/21
	Internship training on altair hyperworks		B K Hemsagar	2020-2021	10/03/21 to 10/04/21
	Internship training on altair hyperworks		Jagadeesha K	2020-2021	10/03/21 to 10/04/21
	Internship training on altair hyperworks		Mir Mohammed Saiffudin	2020-2021	10/03/21 to 10/04/21
119	Internship training on altair hyperworks	Altair Hyperworks	Sachin S Kyadiggeri	2020-2021	10/03/21 to 10/04/21
	Internship training on altair hyperworks		Sai Pavan R Naidu	2020-2021	10/03/21 to 10/04/21
	Internship training on altair hyperworks		Sanjay R	2020-2021	10/03/21 to 10/04/21
	Internship training on altair hyperworks		Shanthi Swaroop K	2020-2021	10/03/21 to 10/04/21
	Internship training on altair hyperworks		Sharath	2020-2021	10/03/21 to 10/04/21
	Internship training on altair hyperworks		Shashank B S	2020-2021	10/03/21 to 10/04/21
	Internship training on altair hyperworks		Suhas K N	2020-2021	10/03/21 to 10/04/21
	Internship training on altair hyperworks		Sushmitha T R	2020-2021	10/03/21 to 10/04/21
	Internship training on altair hyperworks		VD Jayaram	2020-2021	07/03/21 to 07/04/21
	Internship training on altair hyperworks		Yathish Kumar B L	2020-2021	10/03/21 to 10/04/21

120	A study on Engine, transmission and Bus body design at BMTC	Bangalore Metropolitan Transport corporation, Shantinagar, Bengaluru-27	Bharath S	2020-2021	15/03/21 to 26/04/21
	A Study on Engine, Transmission and bus body design		Chandan M N	2020-2021	15/03/21 to 21/06/21
	Engine transmission and body design		Chethan B	2020-2021	15/03/21 to 21/06/21
	Engine Transmission and Bus body Design		Chiranjeevi Ram P	2020-2021	15/03/21 to 21/06/21
	Engine Transmission and Bus Body Design		Manoj I V	2020-2021	12/03/21 to 27/04/21
	Engine Transmission and Bus Body Design		Naveen Kumar S	2020-2021	26/03/21 to 27/04/21
	Engine transmission and body design at bmtc		Preetham R	2020-2021	15/03/21 to 21/06/21
	Engine transmission and bus body design		Revanth Kumar L	2020-2021	15/03/21 to 21/06/21
	A Study on Engine, Transmission and Bus Body Design		Shashikiran.V	2020-2021	10/03/21 to 27/04/21
121	Internship	KTM Service Centre,Chandra Layout KTM, Vijayanagar, Bangalore, Ph: 080-49547755	Chandu Kumar S	2020-2021	01/03/21 to 01/04/21
122	Conforma Cladding	Kennametal India Ltd., Tumkur Road,	Chethan A	2020-2021	15/03/21 to 09/04/21
	Conforma Cladding		Goutham U	2020-2021	15/03/21 to 09/04/21
123	Assembly and calibration of vision measurement machine	Omega metrology products, Near Peenya 2nd Stage, Bengaluru-58, Ph: 7204093135	Chethan S	2020-2021	01/03/21 to 30/03/21
	Assembly and calibration of vision measurement machine		H S Rohith Kumar	2020-2021	01/03/21 to 30/03/21
	Assembly and calibration of vision measurement machine		Lakshman M	2020-2021	01/03/21 to 30/03/21
124	Pneumatic Sheet Metal Cutting	Mirdo Technologies,vijayn agar, road, Hampi Nagar, Binny Mills	Dakshath gowda A	2020-2021	11/03/21 to 10/04/21
	Pneumatic sheet metal cutting		Koushik V	2020-2021	11/03/21 to 10/04/21
125	Internship in Dark Horse Hydraulics, Bengaluru	Dark Horse Hydraulics, Bengaluru	Darshan N	2020-2021	12/03/21 to 10/04/21
	Internship in Dark Horse Hydraulics, Bengaluru		Nikil H R	2020-2021	12/03/21 to 10/04/21
	Hydraulic cylinders and powerpack		Santosh G B	2020-2021	12/03/21 to 10/04/21
	Hydraulic cylinders and powerpack		Vighnesh G	2020-2021	12/03/21 to 10/04/21
	Hydraulic cylinders & power packs		Yashwanth N	2020-2021	12/03/21 to 10/04/21

126	Overview Of Export Manufacturing	Bharat Electronics Limited, Bengaluru	Hariharan P	2020-2021	18/03/21 to 17/04/21
	Production Process Of Electronics		Niroop BS	2020-2021	17/03/21 to 15/04/21
127	Advanced automation	Maruti Suzuki, ITPL Road,	Harshith K	2020-2021	10/03/21 to 10/04/21
	Advanced automation		Kiran M	2020-2021	10/03/21 to 10/04/21
128	Product design and development	Triveni Hi-Tech Pvt Ltd., Peenya 2nd Stage, Bengaluru-58, Ph: 080-8361471	Shridhar Danawad	2020-2021	04/03/21 to 06/04/21
	Product design and development		Jayanth B T	2020-2021	04/03/21 to 06/04/21
	Product design and development		Kanimesha G	2020-2021	04/03/21 to 06/04/21
129	Design and Development Department	QA Bangalore Pvt Ltd., Balaji Nagar, Peenya 2nd Stage , Banfgalore -58	Namith S Gowda	2020-2021	17/03/21 to 20/04/21
	Design and Development Department		Karthik H	2020-2021	17/03/21 to 20/04/21
	Design and Development Department		Nithin H M	2020-2021	17/03/21 to 20/04/21
130	Internship / Inplant Training in mills	West Coast Paper Mills Ltd.,Po No. 5, Bangur NagarDandeli-581325, Ph: (08284)230391-395	Marvel Michael Vaz	2020-2021	03/03/21 to 03/04/21
131	Study on pv inverters and motor drives	TMEIC, 2nd Phase, Vasanthanarasapura Industrial Area, Kora, Thumkuru Dist - 572128	Md Moiz Pasha	2020-2021	10/03/21 to 15/04/21
	Study on PV inverters and motor drives		Mohammedhusain Bashirahmed Shirahatti	2020-2021	10/03/21 to 15/04/21
132	Improvement of Safety ConditionBy Eliminationg Hoist	Toyota, Bidadi Industrial Area, Ramanagar - 562109, Ph: 080-66292929	Mohan K	2020-2021	01/03/21 to 17/04/21
	Improvement of Safety ConditionBy Eliminationg Hoist		Mukesh Kumar Sirvi	2020-2021	01/03/21 to 17/04/21
133	Study of the manufacturing process of white crystal sugar	The Mahatma Gandhi sahakara sakkare karkhane Bhalki dt bidar 585328	Niteen	2020-2021	10/03/21 to 07/04/21
134	Internship at Machanical Production Division	Magnitude, IV Phase Peenya Industrial area, Bangalore - 560058, Ph: 080 - 41227804	Nithin P	2020-2021	01/11/20 to 31/12/20

135	Product Design of Innovative material Handling System	Ven gree metal punch private limited, Rajajinagar Industrial Estate, Bangalore - 560044	Pragati Bhatt	2020-2021	07/12/20 to 13/01/21
136	CNC milling operation	Govt. Tool Room & Training Centre, Rajajinagar Industrial Estate, Bengaluru -560010	Prasad V	2020-2021	01/03/21 to 31/03/21
	CNC Milling		Rakshith M	2020-2021	01/03/21 to 31/03/21
	CNC Milling		Ranjith Kumar V	2020-2021	01/03/21 to 31/03/21
	CNC Milling Operation		Ravikiran R	2020-2021	01/03/21 to 31/03/21
	CNC Milling Operation		Rohan S	2020-2021	01/03/21 to 31/03/21
	CNC Milling Programming and Operation		Shargav C S	2020-2021	22/03/21 to 21/04/21
	CNC Milling Programming and Operation		Shashi Kumar J	2020-2021	22/03/21 to 21/04/21
	CNC Milling Programming and Operation		Shashivardhan B S	2020-2021	01/03/21 to 31/03/21
	CNC Milling Programming and Operation		Syed Yousuf Faizan	2020-2021	22/03/21 to 21/04/21
	CNC milling programming		Ujjwal Kumar A N	2020-2021	01/03/21 to 31/03/21
	CNC Milling		Upendra R	2020-2021	01/03/21 to 25/03/21
	CNC milling programming		Vamshikrishna D N	2020-2021	01/03/21 to 31/03/21
	CNC milling programming		Vinay G	2020-2021	22/03/21 to 21/04/21
	CNC milling programming		Vinay V	2020-2021	01/03/21 to 31/03/21
137	Electric Vehicle	SkillDzire Technologies pvt Ltd., Vengalrao Nagar, Hyderabad - 500038, Ph: 08790114641	Rahul A	2020-2021	11/03/21 to 10/04/21
138	Training in Production Power Train Division	Honda motorcycle scooter India Pvt Ltd, Plot No. 109-142, Narsapura Industrial Road, Kolar - 563130	Sri Sai Rakshan M	2020-2021	22/03/21 to 28/04/21
139	Internship	Standard Elastomers, Kanakapur Taluk,	Rohan K Acharya	2020-2021	27/07/20 to 22/08/20
	Internship		Sagar K B	2020-2021	27/07/20 to 27/08/20
140	Internship on production of valves	VALTEK CORPORATION, Dharwad - 04	Niranjan .B. Chandargi	2020-2021	18/03/21 to 17/04/21
141	Internship	MGSSK Ltd., Bhalki - 585328	Sachin	2020-2021	10/03/21 to 04/04/21
142	Parts Manufacturing Using CNC Operations	Chaitanya Hi-Tech Engineering Co.Pvt.Ltd	Syed Mateen Khundmiri	2020-2021	01/03/21 to 01/04/21
	CNC Machining		Vikas H	2020-2021	01/03/21 to 01/04/21

143	Mechatronics in Industrial Application	Gen Ed Technologies, Mangammanapalya Main Road, Bengaluru	Vishnu Teerth S Kulkarni	2020-2021	10/03/21 to 09/04/21
144	Earth Mover Division & Hydraulic and Power Line Division	BEML Limited, Mysuru Complex, Belavadi PO, Mysuru -570018	Wasim Ahmed M	2020-2021	23/03/21 to 21/04/21
	Internship trainee		Yahunandan P	2020-2021	01/03/21 to 31/03/21

Principal
RAJARAJESWARI
COLLEGE OF ENGINEERING
Ramohalli Cross, Bengaluru-74

ISE	INTERNSHIPS				
146	Language Translator webpage	Exposys Data labs, No-5/3 Sy. No.10/6-1 Opp Nithyotsava Wedding Hall,	Akash S	2020-2021	20/09/20 to 20/10/20
	Language Translator webpage		Sheshadri GS	2020-2021	20/09/20 to 20/10/20
146	Gym management website	Avohi Info Tech, 3rd floor,venus building,kalyana mantapa road,jakkasandra,Koramangala,Bangalore -8217246151	Amulya Reddy	2020-2021	07/09/20 to 14/10/20
	Online food ordering website		Ankit kumar	2020-2021	07/09/20 to 14/10/20
	Tourism management system		Anusha B M	2020-2021	07/09/20 to 14/10/20
	Tourism management system		Asha M	2020-2021	07/09/20 to 14/10/20
	Yoga management system		Bansara B	2020-2021	07/09/20 to 14/10/20
	Dairy farm shop management system		Daksha C	2020-2021	07/09/20 to 14/10/20
	Web development		Gagana K	2020-2021	07/09/20 to 14/10/20
	Web Development		Gayathri M	2020-2021	07/09/20 to 14/10/20
	School management system		Girish V	2020-2021	07/09/20 to 14/10/20
	Python programming		Hemanth Gowda	2020-2021	07/09/20 to 14/10/20
	Blood bank Management System		Keerthana K	2020-2021	07/09/20 to 14/10/20
	Ecommerce web application development		Mohammed Shah Fahad	2020-2021	07/09/20 to 14/10/20
	Web Development		Monika Singh	2020-2021	07/09/20 to 14/10/20
	Interior design management system		Neha Durgadmath	2020-2021	07/09/20 to 14/10/20
	A Personal Website		Nida	2020-2021	07/09/20 to 14/10/20
	Online Examination		Nishanth Raj	2020-2021	07/09/20 to 14/10/20
	Online quiz management system		Nitesh	2020-2021	07/09/20 to 14/10/20
	Store management system		Prasanth N	2020-2021	07/09/20 to 14/10/20
	Yoga management system		Prathiksha B V	2020-2021	07/09/20 to 14/10/20
	Web development		Priya T	2020-2021	07/09/20 to 14/10/20
	Store management system		Sagar	2020-2021	07/09/20 to 14/10/20
	Online group messenger		Sanath kumar	2020-2021	07/09/20 to 14/10/20
	College notes gallery		Saniya Taj	2020-2021	07/09/20 to 14/10/20
	Restaurant management system		Sanjana K	2020-2021	07/09/20 to 14/10/20
	Store management system		Sharath BN	2020-2021	07/09/20 to 14/10/20
	Web development		Shivam	2020-2021	07/09/20 to 14/10/20
	Tourism management system		Shrusti A	2020-2021	07/09/20 to 14/10/20
	Online dance audition management system		Sinchana	2020-2021	07/09/20 to 14/10/20
	Hotel room booking system		Sourav P	2020-2021	07/09/20 to 14/10/20
	Web development		Vineetha G	2020-2021	07/09/20 to 14/10/20
147	Face detection using python	X-Value Technologies, Chennai, T Nagar, Chennai	Vishmitha G	2020-2021	07/09/20 to 14/10/20
	Sales prediction using ML & Python		Sumalatha	2020-2021	07/09/20 to 14/10/20
	Python programming		Safura Aliya	2020-2021	07/09/20 to 14/10/20
148	IOT Using Embedded C	Digihub Solutions,#548,3rd	Ashika P	2020-2021	01/09/20 to 30/09/20
	IOT using embedded C		Brunda S P	2020-2021	01/09/20 to 30/9/20

149	Selenium based automation testing	Indian Society for education research & technology, Bangalore	B S Vidyashree	2020-2021	15/09/20 to 04/11/20
	Selenium based automation testing		Lavanya R	2020-2021	15/09/20 to 04/11/20
	Selenium based automation testing		Shantha Kumari B	2020-2021	15/09/20 to 04/11/20
150	Object detection & classifcation	TechnoFly Solutions,vijayanagar,bangalore	Chetan Sharma J	2020-2021	05/03/21 to 05/04/21
	Object detection & classifcation		Guru prasad S	2020-2021	05/03/21 to 05/04/21
	Object detection & classifcation		Shruthi D D	2020-2021	05/03/21 to 05/04/21
151	IoT based industraila parameters monitoring & akarming system	CODEBIG Technologies,3rd floor,manuvana,vijayanagar,bengaluru-40, 9886577548	Rakesh U	2020-2021	01/03/21 to 31/03/21
152	Front-End web development	Innovation creation, JP nagar,7th phase,bengaluru-78,9957171355	Saima Sharieff	2020-2021	01/09/20 to 30/09/20
153	Data science & machine learning	N-U Sigma U-square analytics lab,B2,block 2,jayanthi garden apartments, JP nagar,bangalore-78,9845163188	Saimanoj R Bharawaj	2020-2021	01/09/20 to 15/10/20
154	Google voice activated home automation	Mirdo Technologies,vijaynagar, road, Hampi Nagar, Binny Mills Employees Colony, Attiguppe, Bengaluru, Karnataka 560040	Sharath B	2020-2021	01/04/21 to 30/04/21
155	Language Translator webpage	Exposys Data labs, No-5/3 Sy. No.10/6-1 Opp Nithyotsava Wedding Hall, Doddaballapur Main Road, Singanayakanahalli, Yelahanka, Bengaluru, Karnataka 560064	Sheshadri GS	2020-2021	20/09/20 to 20/10/20

156	IoT using python & IoT based health monitoring system for comatose patients	X-Ciencia technologies India private limited,2nd main,4th cross, vijayanagar,behind vasavi pu college near hosahalli metro station, Bengaluru, Karnataka 560040	Swathi	2020-2021	10/08/20 to 10/09/20

EEE			INTERNSHIPS		
157	Transmission Towers Spotting and Erection	Power Skull Solutions, No.203 2nd Cross, E & F block, Ramakrishna Nagar, Mysuru -22, Ph:8553335812	Harini G	2020-2021	15/08/20 to 16/09/20
			Kumar R	2020-2021	05/08/20 to 07/09/20
			Pradeep Kumar P	2020-2021	15/08/20 to 16/09/20
			Manoj D	2020-2021	05/08/20 to 05/09/20
			Shashank R	2020-2021	15/08/20 to 16/09/20
			Abhishek Kumar	2020-2021	05/08/20 to 06/09/20
158	Product Engineering - Wiring Harness and Battery Pack Design	GRADPRO, 4/10, Nagarbhavi Main Road, Govindarajanagar, Vijaynagar, Bengaluru- 40, krishnaa@gradpro.c o	Akshatha K M	2020-2021	17/08/20 to 13/01/21
			Arun Kumar V	2020-2021	17/08/20 to 13/01/21
			Bharadwaj G Megharaj	2020-2021	17/08/20 to 13/01/21
			Dhanush H D	2020-2021	17/08/20 to 13/01/21
			Janardhanan K	2020-2021	17/08/20 to 13/01/21
			Santosha Kumara N	2020-2021	17/08/20 to 13/01/21
			Ramanna TG	2020-2021	17/08/20 to 13/01/21
			Shashank P Naidu	2020-2021	17/08/20 to 13/01/21
			Thilaknath G k	2020-2021	17/8/20 to 13/01/21
			Venkatesh S	2020-2021	17/08/20 to 13/01/21
			Vignesh Kumar.k	2020-2021	17/08/20 to 13/01/21
			Veenit	2020-2021	17/08/20 to 13/01/21
159	Embedded systems, High Voltage Testing, Program Loading to Medical Ventilators at BEL	SLN Technologies Pvt Ltd.,	Bharath N	2020-2021	01/07/20 to 31/08/20
160	Indian Metros Manufacturing	BEML Ltd., Bangalore Complex	Chaitra D	2020-2021	22/03/21 to 17/04/21
			Nida Saher R	2020-2021	22/03/21 to 17/04/21
			Vrinda N	2020-2021	22/03/21 to 17/04/21
161	Circuit Breaker Testing and Maintenance	Power Service, Testing & Commissioning Engineers, #180, 3rd cross, 2nd	Channaveer C A	2020-2021	01/04/21 to 17/04/21
	Circuit breaker testing and maintenance		Ravikumara H G	2020-2021	01/04/21 to 17/04/21
			Bharath C	2020-2021	01/04/21 to 24/04/21
162	A study on manufacturing and testing of distribution	KARNATAKA VIDYUTH	Charan Singh R	2020-2021	07/10/20 to 06/11/20
			Swaroop M S	2020-2021	07/10/20 to 06/11/20

163	Applications of SCADA	Karnataka Power Transmission Corporation Limited(KPTCL), State Load Despatch Centre(SLDC), A . R Circle, Banglore- 09.	Deepika R	2020-2021	15/03/21 to 15/04/21
	Transmission Line and Substation		Karunya R Badiger	2020-2021	15/03/21 to 15/04/21
	Transmission Line and Substation		Komal M	2020-2021	15/03/21 to 15/04/21
	Advantages of SCADA in Grid Operation		Priyanka U	2020-2021	15/03/21 to 15/04/21
	220/110/11kv sub station		Sai Sagar TR	2020-2021	06/10/20 to 06/11/20
	Advantages of scada in grid operation		Swathi Kodanda	2020-2021	15/03/21 to 15/04/21
	Advantages of SCADA in grid operation		Vidyashree.N	2020-2021	15/03/21 to 15/04/21
	Transmission Line and Substation		Harinashree	2020-2021	15/03/21 to 15/04/21
	Transmission Line and Substation		Prakruthi Nanda	2020-2021	15/03/21 to 15/04/21
	Transmission Line and Substation		Vinutha M V	2020-2021	15/03/21 to 15/04/21
164	Space Settlement Design Concept	Society for Space Education Research and Development [SSERD], Choodasandra, Bangalore- 35	Dipti Ramesh	2020-2021	06/09/20 to 17/10/20
165	Machine learning based on python	Xciencia technologies India	Divya H	2020-2021	10/08/20 to 10/9/20
			Rashmi R	2020-2021	10/08/20 to 10/09/20
166	Transformer Manufacturing and Wire harness	Miracle Electronic Devices Pvt. Ltd. #48/1, Karihobhavanahalli village, Thigarapalya Main Road, Peenya 2nd Stage, Bangalore, Ph: 080-28362750	Gagan Gowda R	2020-2021	04/08/20 to 01/09/20
167	Programming Arduino using code Arduino IDE and block programming	ISERT and CSIR-NIIST, Trivandrum, Kerala	Hima bindu T	2020-2021	07/09/20 to 01/10/20
			Manoj Kumar S R	2020-2021	07/09/20 to 01/10/20
			Mohan G	2020-2021	07/09/20 to 01/10/20
168	Machine Learning	Digital Attain IT Solution	Ishwarya G V	2020-2021	01/05/21 to 31/05/21
169	Operation and control of substation 132KV/33KV	Jammu & Kashmir Power Transmission Corporation Ltd.	Nadeem Ahmed Lone	2020-2021	05/10/20 to 07/11/20

J. ल्ल्ख्

Principal
RAJARAJESWARI
COLLEGE OF ENGINEERING
Ramohalli Cross, Bengaluru-74

170	Design and development of Static test pad for Solid rocket motor	SPACE (Space technology and aeronautical rocketry) Address: 3rd Floor, Study Center, GreenCity, Green City Road, Bhatha Surat – 394510	Nandan T G	2020-2021	13/03/21 to 12/04/21
171	Embedded systems	Micro Embedded Solutions & #485/1,1st stage,6th phase, Mahaganapathinagar, Rajajinagar, Bangalore-560010	Nithin S	2020-2021	10/02/21 to 10/04/21
172	Machine Learning	WEBNISH Software LLP., Muniswamappa Layout , Hosur Road, Bangalore - 68	Raeesa Ruqsar.H	2020-2021	01/09/20 to 30/09/20
173	Industry 4.O	Gustovalley Technovation Industry 4.O pvt lmt	Rakshitha S	2020-2021	02/09/20 to 02/10/20
			Soundarya Poovaiah K	2020-2021	02/09/20 to 02/10/20
174	Performance Stability testing of ZnO blocks under high voltages	World Serve, KEB Layout, BTM 1st Stage, Bengaluru, Karnataka 560029	Samrin Mehdi	2020-2021	23/10/20 to 27/11/20
175	Electrical Design	Prinston smart Engineer's	Shahul Hameed	2020-2021	01/03/21 to 15/04/21
176	Embedded System and IoT	Technofly Solutions, Vijayanagar, Bangalore, Ph: 9663476586	Shaik Shaffiulla	2020-2021	03/10/20 to 03/11/20
177	Traction System	BMRCL, K H Road, Shantinagar,	Shreenidhi	2020-2021	27/03/21 to 26/04/21
			Saba Arman	2020-2021	27/03/21 to 26/04/21
178	Study of Primary and Secondary Electric Distribution System	Bangalore Electricity Supply Company Limited, Ramanagara Urban Sub Division, BESCOM Ramanagara	Thanuja B S	2020-2021	16/03/21 to 10/04/21
179	Manufacturing of Electrical Lab equipments and control panels	Mega Power Systems, #5, 2nd cross, Channappa	Uday Kanth Yadav G	2020-2021	20/03/21 to 19/04/21
			Vijay G S	2020-2021	20/03/21 to 19/04/21

MCA	INTERNSHIPS				
	Big data analysis using python	Neubotz Technologies Pvt Ltd Chandra Layout, Bangalore-40 080-49542263	Amith N	2020-2021	15/02/21 to 08/03/21
	Internet of Things		Geetha N	2020-2021	15/02/21 to 08/03/21
	Internet of Things		Geetha N	2020-2021	15/02/21 to 08/03/21
180	Big data analysis using python		H Jadesha	2020-2021	15/02/21 to 08/03/21
	Big data analysis using python		Manikanta G	2020-2021	15/02/21 to 08/03/21
	Big data analysis using python		Prabhakar M	2020-2021	15/02/21 to 08/03/21
	Artificial Intelligence		Sanjana S	2020-2021	15/02/21 to 08/03/21
	Big data analysis using python		Shiva kumar K	2020-2021	15/02/21 to 08/03/21
181	Knowledge on technical tools	Blitz Technology 9591423924	Anjana R Patil	2020-2021	12/02/21 to 12/03/21
	Technical tools		Ashwini N	2020-2021	12/02/21 to 12/03/21
	Technical tools		Manoj S	2020-2021	11/02/21 to 11/03/21
	Technical tools		Yogesh Nagaraj Naik	2020-2021	11/02/21 to 11/03/21
182	Python Internship	Web Blitz Softwares 74068842553 Rajaji Nagar Bangalore-560010	Anusha P	2020-2021	12/02/21 to 12/03/21
	Python Internship		Kavana P	2020-2021	12/02/21 to 12/03/21
	Practical Training on Python, Django and Adventure Frameworks		Kavya M B	2020-2021	12/02/21 to 12/03/21
	Python Internship		Monica J	2020-2021	12/02/21 to 12/03/21
	Python Internship		Sowmya Bai R	2020-2021	12/02/21 to 12/03/21
183	Food recommendation using Machine Learning chronic kidney disease patients	X-ciencia Technologies India Pvt Ltd 6363760275 Davangare PIN :-577002	Sadiya Sulthana	2020-2021	08/02/21 to 08/03/21
	Medical Chatboat using Python		Arpitha G Bellutti	2020-2021	08/02/21 to 08/03/21
184	Practical Training on Python, Django and Adventure Frameworks	Accent Softwares Bangalore-71 email: info@accentsoftwar es.com	Arpitha N	2020-2021	12/02/21 to 12/03/21
	Practical Training on Python, Django and Adventure Frameworks		Chinmay Nadig	2020-2021	12/02/21 to 12/03/21
	Practical Training on Python, Django and Adventure Frameworks		Jayashree V	2020-2021	12/02/21 to 12/03/21
	Practical Training on Python, Django and Adventure Frameworks		Rinku R	2020-2021	12/02/21 to 12/03/21
	Practical Training on Python, Django and Adventure Frameworks		Soundarya P	2020-2021	12/02/21 to 12/03/21

185	Python Internship	ILACS Technologies 9916232827, Bangalore-560078	Chaitra Y L	2020-2021	20/02/21 to 20/03/21
	Python Internship		Mamatha K S	2020-2021	20/02/21 to 20/03/21
	Python		Nandini C N	2020-2021	20/02/21 to 20/03/21
	Python		Supriya R	2020-2021	20/02/21 to 20/03/21
186	Python and Machine Learning	QSPIDERS - WWW.QSPIDERS. COM, bangalore-560019	Dikshit R	2020-2021	12/02/21 to 12/03/21
187	Web Development	PRALOTCH SOLUTIONS LLP BANGALORE-49	Manjunath N S	2020-2021	15/02/21 to 08/03/21
188	JAVA project on network security	APTECH 8892062682	Rachana S Damle	2020-2021	12/02/21 to 12/03/21
	JAVA project on network security domain		Meghana M	2020-2021	12/02/21 to 12/03/21
189	Web Development	KIYAAN INFOTECH	Mohammad javed manur	2020-2021	11/02/21 to 10/03/21
190	Virtual Tourism App of Vijayapur	MAGNUM GLOBAL SOLUTIONS 9900225325	Naveen Shirur	2020-2021	09/02/21 to 11/03/21
191	Technical tools	CLOUT BUSSINESS NW LTD	Shivdath nair A	2020-2021	11/02/21 to 11/03/21
	Technical tools		Suma S	2020-2021	11/02/21 to 11/03/21
	Technical tools		Swetha Rani	2020-2021	11/02/21 to 11/03/21

Principal
RAJARAJESWARI
COLLEGE OF ENGINEERING
Ramohalli Cross, Bengaluru-74

RajaRajeswari College of Engineering

(Approved by AICTE, New Delhi, Govt. of Karnataka & Affiliated to Visvesvaraya Technological University, Belgaum)

Sponsored by: MOOGAMBIGAI CHARITABLE AND EDUCATIONAL TRUST

ISO 9001-2008

NAAC 'A' Accredited

NBA

Date-19/11/2018

To
The Chairman
Janapada Loka
Ramanagara-562159

Respected Sir,

Sub: Regarding accommodation at Janapada Loka.

****

    As per Visvesvaraya Technological University curriculum the extensive survey camp has to be conducted for the III year B.E Civil Engineering students. It is decided in the meeting to conduct the survey camp from 18/01/2019 to 29/01/2019 near JANAPADA LOKA, Ramanagara. We are planned to stay in Janapada Loka hence i request you to confirm the above mentioned date with quotation for 165 members. Kindly do the needful at the earliest.

Thanking You

Yours faithfully

HOD

Dr H Vijayakumar
Professor & HOD
Department of Civil Engineering
RAJARAJESWARI COLLEGE OF ENGINEERING
Bengaluru-74

PRINCIPAL
Principal
RAJARAJESWARI
COLLEGE OF ENGINEERING
Ramohalli Cross, Bengaluru-74

Campus
#14, Ramohalli Cross, Kumbalgodu, Mysore Road
Bengaluru - 560 074
Ph : 080 - 28437124 / 28437375 Fax : 080 - 28437373
E-mail : info@rrce.org, enquiry@rrce.org
www.rrce.org

Respected Sir

****

    As per Telephonic conversation today morning with Rudrappa Sir I Am here by sending request regarding survey camp accommodation.

    As per VTU curriculum the extensive survey camp has to be conducted for the III year B.E Civil Engineering students since last four years we conducted camp near JANAPADA LOKA as its good and convenient for our students to carry the studies hence in the meeting its decided to to conduct camp from 16/01/2019 to 22/01/2019 near JANAPADA LOKA, Ramanagara. We are planned to stay in Janapada Loka hence I request you to confirm the date with quotation (To The Principal RRCE Blore).

Regards
Gangadhar N
Assistant professor
Civil department
RRCE Blore-74
Mob no, 998686892

Dear hangadhar. as per your request, it is filled
pl contact your collegue whom you have deputed
for this purpose.

With warm regards

ಮುಖ್ಯ ಅಡಳಿತಾಧಿಕಾರಿ
ಜಾನಪದ ಲೋಕ
ರಾಮನಗರ.–562159

PRINCIPAL
Principal
RAJARAJESWARI
COLLEGE OF ENGINEERING
Ramehalli Cross, Bengaluru-74

RAJARAJESHWARI COLLEGE OF ENGINEERING

Department of Civil engineering

EXTENSIVE SURVEY CAMP (2018)

6th semester

Extensive survey camp is a part of the curriculum for the students of sixth semester .The camp was conducted for duration of 10 days at Janapadaloka, Ramanagaram District 8th January 2018 to 17th January 2018.The students camped at Government premises adjoining Janapadaloka. Separate accommodation was provided for girls and boys.

The following projects were done by the students by rotation in the following sites.

1. New Tank Project near Government Engineering College, Ramanagaram

2. Old Tank Project close to Government Engineering College, Ramanagaram.

3. Village Project /Water Supply /Sanitation Project at the village Rajiv Gandhi Pura, Ramanagaram   District.

4. Highway Project from Janapada Loka to village Rajiv Gandhi Pura, Ramanagaram District.

After doing the field work the students completed the required office work and prepared corresponding drawings .On final day they prepared the project report.

Students conducting survey for highway project and new tank project

Students conducting survey for old tank project

Students conducting survey for old tank project

Highway project survey

New tank project site

Rajarajeswari college of ENGINEERING

DEPARTMENT OF CIVIL ENGINEERING

Bangalore-560 074

EXTENSIVE SURVEY PROJECT REPORT

A Dissertation Submitted to

VISVESVARAYA TECHNOLOGICAL UNIVERSITY

BELAGAVI

In Partial Fulfillment of Prerequisites for the award of Bachelor Degree in Civil Engineering

BY

AKASH B M   *USN: 1RR19CV400*

Rajarajeswari college of engineering

#14 ramohalli cross, mysore road, kumbalgodu, Bangalore-560 074

DEPARTMENT OF CIVIL ENGINEERING

<u>CERTIFICATE</u>

Certified that, the project work entitled *"EXTENSIVE SURVEY PROJECT (18CVEP68)"* carried out by Mr/Ms.*AKASH B M* USN:*1RR19CV400* a bonafied student of *RAJARAJESWARI COLLEGE OF ENGINEERING* partial fulfilment for the award of Bachelor of Civil Engineering Degree, of the *Visvesvaraya Technological University, Belagavi*, during the year 2020-2021.Further it is certified that all corrections/suggestions indicated for Internal Assessment have been incorporated in the report deposited in the departmental library. The Project report has been approved as it satisfies the academic requirements in respect of the Project work prescribed for the said Degree.

SIGNATURE OF EXAMINAR   **Head of the Department Of Civil Engineering**

                                     Prof. Dr.RAMESH

1. _____

2.

BATCH MEMBERS

NAME   **USN**

ANIL KUMAR H   1RR17CV007

BHUMIKA V ADAGI   1RR18CV011

HIMAMSHU   1RR18CV016

IRFAN HANIEF   1RR18CV018

MANOJ G M   1RR18CV026

MITHUN H S   1RR18CV027

AKASH B M   1RR19CV400

GIDEON SAMVEL EZEK JEL 1RR19CV405

PRAPHULLA B R   1RR19CV418

PRINCIPAL
Principal
RAJARAJESWARI
COLLEGE OF ENGINEERING
Ramohalli Cross, Bengaluru-74

BATCH IN-CHARGE

NEW TANK PROJECT -
Asst.Prof.SHALINI

WATER SUPPLY AND SANITATION -
Asst.Prof.BABITHA

HIGHWAY PROJECT-
Asst.Prof.KAMALAKAR

OLD TANK PROJECT-
Asst.Prof.BHASKAR

TOWN PLANNING-
Asst.Prof.KAVYA

PRINCIPAL
Principal
RAJARAJESWARI
COLLEGE OF ENGINEERING
Ramohalli Cross, Bengaluru-74

SL.NO	CONTENTS	PAGE NO

PRINCIPAL
Principal
RAJARAJESWARI
COLLEGE OF ENGINEERING
Ramohalli Cross, Bengaluru-74

PRINCIPAL
Principal
RAJARAJESWARI
COLLEGE OF ENGINEERING
Ramohalli Cross, Bengaluru-74

CHAPTER-01

NEW TANK PROJECT

1.0 INTRODUCTION

It is the process of artificial supply of water to the soil for raising crops with an economic, low-cost and efficient system to fit natural conditions. It is controlling and harnessing of various natural resources.

Irrigation is necessary in India as agriculture is main resources, which totally depends on water. The non-uniform distribution of rainfall and its variation with time makes it essential for irrigation. Also, ill times and insufficient rainfall demands the irrigation.

1.1 PURPOSE OF IRRIGATION

- Irrigation water supplies moisture, which is essential for chemical action within the plant.
- The irrigation water supply moisture, it is essential for the life of bacterial beneficial for the plant growth.
- It acts as a solvent for nutrients.
- It softens the tillage pans.
- Irrigation water cools the atmosphere and makes favourable environment for healthy plant growth.

1.2 NECESSITY OF IRRIGATION

- Less rainfall
- Non-uniform rainfall
- Additional water requirement for cash crops
- Controlled water supply

PRINCIPAL
Principal
RAJARAJESWARI
COLLEGE OF ENGINEERING
Ramehalli Cross, Bengaluru-74

1.3 ADVANTAGES OF IRRIGATION

- Increased food production
- Cultivation cash crops
- Addition to the wealth of the country
- Increases in prosperity of people
- Inland navigation
- Canal plantations
- Domestic and industrial water supply
- Improvement in ground water storage

DISADVANTAGES OF IRRIGATION

- May contribute problems of water pollution.
- Over irrigation leads to water logging.
- May result in colder and damper climate.
- Irrigation is complex expensive in itself.

1.4 TYPES OF IRRIGATION

- Major Irrigation
- Minor Irrigation
- Tank Irrigation

- Major irrigation scheme are those scheme which have culturable command areas of more than 10,000 hectares. These are designed to serve various purposes combined such as flood control, irrigation, water supply, power generation.
- Minor irrigation scheme are those scheme which have culturable command areas of 2000 hectares. These serve for supply of water and irrigation.

Tank bund is a small storage tank used for the irrigation and domestic water supply for a small population; it is an earthen bund of maximum height 12m-14m. Tank bund is also called tank bank. The tank stores the rain water during monsoon and releases the stored water as and when required through pipe sluice. The system of irrigation carried out through tank bund is known as tank irrigation. The distribution of water to the field is done through proper

intake structure, pipe sluice and canal network. The capacity of tank is computed based on the area of irrigation, crop season, crops grown in the area and climatic condition. In addition, the hydrological characteristics also govern the selection of tank capacity. Further, the material of construction of tank bund is selected based on the nearby borrow pits, soil properties and construction machinery.

1.5 TANK IRRIGATION

INTRODUCTION

Tank irrigation may be defined as the storage irrigation scheme, which utilizes the water stored on the upstream side of a smaller earth dam, called a bund. These earthen bund reservoirs are thus, in fact, called as tank, specifically in South India, where such works are very common. This terminology is, therefore, limited to India only. There is, thus, no technical difference between a reservoir and a "TANK" except that a large sized tank will be termed as a reservoir. Moreover a reservoir will generally be formed by dams of any material: whereas, a tank is generally said to be formed by earth dams only. These earthen bunds, spanning across the streams, are called tank bunds or tank banks.

Most of the existing tanks of south India possess a maximum depth of 4.5 m, while a few are as deep as 7.5 to 9m, only a few exceptional ones exceed 11m in depth. When the depth of the tank exceeds 12m or so, the tank is generally referred to as a reservoir. Like all earth dams, tank bunds are generally provided with sluices or outlets for discharging water from the tank for irrigation or other purposes. These tank sluices may be pipes or rectangular or arched openings passing near the base of the bund and through the body of the bund and carrying the water into the downstream channel below the bund or transporting at distances where required, through pipes or canals. Sometimes, the supply sluices may not be passed through the body of the bund, and may be carried adjacent to it through some hillside at one end of the bund. Similarly, as in the case of all dam reservoir projects, tanks are provided with arrangements for spilling away the excess surplus water that may enter into the tank, so as to avoid over-topping of the tank bund. These surplus escape arrangements may be in the form of surplus escape weir with its top that is crest level at equal to full tank level. When tank is full up to full tank level, and extra water comes in, it is discharged over the surplus escape weir. The length or capacity of this surplus escape weir will be so designed that water level in the tank does never exceed the maximum water level. The top of the tank bund will be kept at a level, so as to provide a suitable freeboard above this maximum water level

1.6 EARTHEN DAMS

Earthen dams are used for the storage of water for irrigation, daily uses such as drinking and other domestic purposes. These dams have been built since earliest times. These dams are however for limited heights. For the design of earthen dams the foundation conditions & materials of construction are thoroughly investigated.

A purely homogeneous type earth dam is composed of single kind of material. In these dams internal drainage system is provided in the form of horizontal filter drain.

Existing bund is inadequate to store water for irrigation and water supply for near- by villages. Hence it is planned to propose new bund to fulfill the present and future requirement of water. Moreover, the site chosen for the new bund has greater capacity of storing water compared to the existing bund.

1.6.1 Types of Earthen Dam

➢ Rolled fill dam

- Homogeneous type
- Zone type
- Diaphragm type

➢ Hydraulic fill dam.

Design of Tank Bund includes

- Fixing of center line
- Profile of the canal
- Canal alignment
- Reservoir capacity
- Design of sluice
- Design of weir
- Computation of earthwork
- Stability analysis

• 1.7 SELECTION OF SITE FOR BUND

- Water storage should be largest for minimum possible height and length.
- Good foundation should be available at the site.

- Materials of construction should be available at the site or near to it.
- It should be accessible in all seasons.
- The overall cost of construction and maintenance should be taken into consideration.

1.8 DESIGN CRITERIA FOR EARTH DAMS

A fill of sufficient low permeability should be developed out of available materials, so as to best serve the intended purpose with minimum cost. Borrow pits should be as close to the dam site as possible, so as to reduce the leads.

- Sufficient spillway and outlets capacities should be provided so as to avoid the possibility of overtopping during design flood.
- Sufficient freeboard must be provided for wind setup, wave action, frost action and earthquake motions.
- The seepage line (i.e. phreatic line) should remain well within the downstream face of the dam, so that no sloughing off the face occurs.
- There is little harm in seepage through a flood control dam. If the stability of foundation and embankment is not impaired, by piping, sloughing, etc. but conservation dam must be as water tight as possible.
- There should be no possibility of free flow of water from the upstream to the downstream face.
- The portion of the dam, downstream of the impervious core, should be properly drained by providing suitable horizontal filter drain, or toe drain, or chimney drain, etc.
- The u/s and d/s slope should be flat enough, as to provide sufficient base width at the foundation level, such that the maximum shear stress developed remains well below the corresponding maximum shear strength of the soil, so as to provide a suitable factor of safety
- The stability of the embankment and foundation is very critical during construction or even after construction (i.e. during the period of consolidation),due to the development of excessive pore pressures and consequent reduction in shear strength of soil, the embankment slopes must remain safe under this critical condition also.

  All the above criteria must be satisfied and accounted for, in order to obtain a safe design and construction of an earth dam.

1.8.1 Selection of Suitable Preliminary Dimension of Earth Dam

Table No.1 Standard Recommendations

Height Of Dam (In Meters)	Maximum Freeboard (In Meter)	Top Width In (Meters)	U/S Slope (H:V)	D/S Slope (H:V)
Up to 4.5	1.2 to 1.5	1.85	2:1	1.5:1
4.5 to 7.5	1.5 to 1.8	1.85	2.5:1	1.75:1
7.5 to 15	1.85	2.5	3:1	2:1
15 to 22.5	2.1	3.0	3:1	2:1

1.9 SALIENT FEATURES OF BUND

The proposed project includes the selection of reservoir site, bund, weir, tank sluice and canal alignment work. The site has been chosen for the reservoir is ideal one and most beneficial for surrounding area. The area surrounding is the best suited for the irrigation, also being main occupation of the locality. Reservoir provided is more than sufficient to provide supply water to the fields during times of requirements.

It is the type of storage reservoir, which is primarily used for water supply and irrigation. It is constructed to store the excess water during the period of large supply and release it gradually as and when needed. The engineering, geological and hydrological investigation show that the catchment area has less or minimum percolation losses. Catchment area has adequate capacity without submerging excessive land and other properties. The water stored is suitable for the project undertaken. The soil and rock mass at the reservoir site do not contain any objectionable minerals and salts.

1.10 CONTOUR

- A contour is an imaginary line on the ground joining points of equal elevation.
- The vertical distance between any two consecutive contours is called contour interval.

- The contour interval is kept constant for a contour plan, otherwise the general appearance of the map will be misleading.
- The points are surveyed and represented on the map in the form of contours.

1.11 CALCULATION OF RESERVOIR CAPACITY

The contour plan can be used to calculate the capacity of reservoir.

If **A_1, A_2, A_3…., A_n** are the areas enclosed by various contours and h is contour interval, the reservoir capacity is given by:

Trapezoidal method

Prismoidal method

1.11.1 Types of Storages in Reservoir

➢ **Useful Storage**

The quantity of water available between FRL and DSL is known as useful storage. It is the actual quantity of water which can be drawn from reservoir for the purpose for which water is stored.

➢ **Dead Storage**

The quantity of water available below DSL is known as dead storage. It is provided in reservoirs to accommodate sediments.

➢ **Surcharge Storage**

Excess of water available above FRL up to the gate is known as surcharge storage.

1.12 TYPES OF LEVELS

➢ Maximum water level

➢ Maximum water level is the one at which water level is measured during highest floods.

➢ Full reservoir level (F.R.L)

➢ Full reservoir level refers to the max water level in reservoir up to crest of the spillway in normal operating condition of the reservoir.

➢ Dead storage level (D.S.L)

> Dead storage level refers to the minimum water level to be maintained in the reservoir in normal operating conditions of the reservoir.

1.13 SURPLUS WEIR

Weir is an overflow section from which water is discharged. Protective works in the form of aprons, etc. are required to keep the bed from erosion. Where the foundation is hard rock no protective works are necessary.

Diversion weirs are usually 3 to 10 meters high and their primary function is to raise the river level for diverting the water into the canal.

A weir is generally placed at right angles to the direction of flow of the river. The required height of weir must be determined from the consideration of the stream flow during low flow period.

1.13.1 Conditions for Stability of Weir

> There must be no tension in the masonry or in the contact plane between the weir and the foundation.
> There must be no overturning.

> There must be no tendency to slide on the joint with the foundation or any horizontal plane above the base.

> The maximum toe and heel pressures on foundations should not exceed the prescribed safe values.

1.13.2 Design of Weir

> The top width of the weir is calculated using the formula.
> **Top width = a = 0.55**

Where, **H** = Difference between full tank level and RL of bottom.

h = Difference between max water level and full tank level.

Bottom width = b = 1.45

> Discharge is calculated using the formula.
> By using Ryve's formula,

$$Q = CA^{2/3}$$

Where, **A** = Catchment area in Km^2.

C = Ryve's coefficient.

➢ The length of the weir crest is calculated using

$$C_d - [L-(0.1 \times n \times h)] \sqrt{h3/2}$$

Where, **C_d** = co-efficient of discharge

n = no. of end contractions & **h** = head of water

1.14 STABILITY ANALYSIS

Resisting moment (M_R), Overturning moment (M_O), Horizontal forces ($\sum H$), Vertical force ($\sum V$) are calculated using pressure diagram.

Factor of safety (FOS) against overturning is calculated by

$$FOS = M_R/M_O$$

Factor of safety against sliding (FOS) is calculated by

$$FOS = (\mu * \sum V)/\sum H$$

1.14.1 Stability of Slopes

1.14.1. a Types of Slopes

➢ **Infinite Slopes**

They have dimensions that extend over great distances and the soil mass is inclined to the horizontal.

➢ **Finite Slopes**

A finite slope is one with a base and top surface, the height being limited. The inclined faces of earth dams, embankments and excavation and the like are all finite slopes.

1.14.1. b Importance of Slope stability analysis

When the ground surface is not horizontal a component of gravity will try to move the sloping soil mass downwards. Failure of natural slopes (landslides) and man-made slopes has resulted in much death and destruction. Some failures are sudden and catastrophic; others are widespread; some are localized. Civil Engineers are expected to check the safety of natural and slopes of excavation. Slope stability analysis consists of determining and comparing the shear stress developed along the potential rupture surface with the shear strength of the soil.

1.14.2 Causes of Slope Failure

➢ **Erosion:** The wind and flowing water causes erosion of top surface of slope and makes the slope steep and thereby increase the tangential component of driving force.

> **Steady Seepage:** Seepage forces in the sloping direction add to gravity forces and make the slope susceptible to instability. The pore water pressure decreases the shear strength. This condition is critical for the downstream slope.

> **Sudden Drawdown:** in this case there is reversal in the direction flow and results in instability of side slope. Due to sudden drawdown the shear stresses are more due to saturated unit weight while the shearing resistance decreases due to pore water pressure that does not dissipate quickly.

> **Rainfall:** Long periods of rainfall saturate, soften, and erode soils. Water enters into existing cracks and may weaken underlying soil layers, leading to failure, for example, mud slides.

> **Earthquakes:** They induce dynamic shear forces. In addition there is sudden buildup of pore water pressure that reduces available shear strength.

> **External Loading:** Additional loads placed on top of the slope increases the gravitational forces that may cause the slope to fail.

> **Construction Activities at the Toe of the Slope:** Excavation at the bottom of the sloping surface will make the slopes steep and thereby increase the gravitational forces which may result in slope failure.
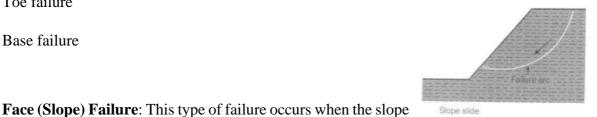
1.14.3 Types of Failure
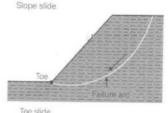
Broadly slope failures are classified into 3 types as

> Face (Slope) failure

> Toe failure

> Base failure

> **Face (Slope) Failure**: This type of failure occurs when the slope angle (β) is large and when the soil at the toe portion is strong.

> **Toe Failure**: In this case the failure surface passes through the toe. This occurs when the slope is steep and homogeneous.

> **Base Failure**: In this case the failure surface passes below the toe. This generally occurs when the soil below the toe is relatively weak and soft.

1.15.4 Types of Analysis of Slope Stability

For a finite slope whose base and top surface, the height being limited. The inclined faces of earth dams, embankments, excavation and the like are all finite slopes. Investigation of the stability of finite slopes involves the following steps:

- Assuming a possible slip surface,
- Studying the equilibrium of the forces acting on this surface, and
- Repeating the process until the worst slip surface, that is, the one with minimum margin of safety is found.

1.14.5 Methods of Analysis of Slope Stability

➢ Cullman‟s method

➢ Swedish slip circle method

- Purely cohesive soil
- C-ϕ analysis

➢ Friction circle method

➢ Bishop‟s method

1.14.6 The Swedish Method of Slices fora Cohesive –Frictional (C-ϕ) Soil

Slip circle divided into slices   FBD on a typical slice
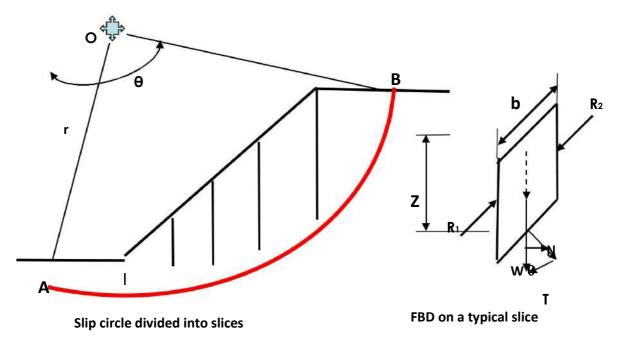
Fig No. 01: Method of slices in c-ϕ soils

For a **c-ϕ** soils the undrained strength envelope shows both **c** and ϕvalues. The total stress analysis can be adopted.

The procedure is follows

➢ Draw the slope to scale.

➢ A trail slip circle such as AB with radius **'r'** is drawn from the center of rotation **'O'**.

➢ Divide the soil mass above the slip surface into convenient number of slices (more than 5 is preferred)

➢ Determine the area of each slice **A1, A2, ……, An**

$$A = \text{width of the slice X mid height}$$

$$\mathbf{A = b\ X\ Z}$$

➢ Determine the total weight W including external load if any as

$$\mathbf{W = \gamma\ b\ Z = \gamma\ A}$$

Where, **γ**= unit weight

b = width of slice

Z = height of slice.

The forces on a typical slice are given in Fig 1.

The reactions **R₁** and **R₂** on the sides of the slice are assumed equal and therefore do

not have any effect on stability.

➢ The weight W of the slice is set –off at the base of the slice. The directions of its normal component „N" and the tangential component „T" are drawn to complete the vector triangle.

$$\mathbf{N = W\ Cos\delta,\ T = W\ Sin\delta}$$

➢ The values of **N** and **T** are sealed off for each of the slices.

➢ The values of „N" and **'T'** are tabulated and summed up as shown in the following table.

➢ The factor of safety is calculated as follows. Note: The tangential components of a few slices at the base may cause restoring moments.

➢

Sliding moment = r∑T (reckoned positive if clockwise)

Restoring moment = r (cr θ+∑N tanø) (reckoned positive if counter clockwise)

Note: The tangential components of a few slices at the base may cause restoring moments.

1.15 DESIGN OF SLUICE

The sluice barrel is buried under the tank bund. The barrel will have masonry side walls**.** The roof can be either of R.C slab laid in situ or precast R.C slab with a leveling course of concrete laid over it.

1.15.1 Vent Way

The area of Vent way of the sluice must be such that it can draw normal supplies of water when the tank is at the low water level or a level at which the tank supply will be always available (DSL).However, the sluice opening is designed to draw the normal requirements with a driving head of 0.25m, & when the tank water level is high, the vent way is throttled by means of screw gearing shutters. Assuming a driving head of 0.25m above the center of the opening, we get the discharge by formula,

$$Q = Cd\ A$$

Where, Cd is the coefficient of discharge of a large orifice generally taken as 0.6, A is the area of vent-way and h is driving head in meters. Since the necessary discharge required is 0.0638 m^3/sec we have

$$0.0638 = C_d\ A$$
$$= 0.6 \times A\sqrt{(2 \times 9.81 \times 0.25)}$$
$$= 0.0638/\ 1.328$$
$$A = 0.048\text{sq meters}.$$

But the min vent-way to be adopted for sluice barrel is about 75cms x 60 cms, so as to allow room for repairs, etc. so, insert a diaphragm stone with 30cms diameter opening in it. This will be placed at the entrance to the sluice barrel with regulating arrangements.

1.15.2 R.C.Slab

The R.C.slab of the sluice barrel is designed for the clear span of 60cmssupporting the overburden. So, designing for the maximum possible load, i.e., considering the section of the barrel, at the center of the bank, the height of the earth supported by slab is calculated.

1.16 CANAL

A canal is an artificial channel, generally trapezoidal in shape constructed on the ground to carry water to the Fields either from the river or from the reservoir. Classification based on the function of canal

➢ Irrigation canal.

➢ Carrier canal.

➢ Feeder canal.

➢ Navigation canal.

➢ Power canal.

Based on the capacity of the water in the reservoir the canal is designed as an irrigation canal. An irrigation canal carries water to the agricultural fields.

1.16.1 Canal Alignment

A canal has to be aligned in such a way that it covers the entire area proposed to be irrigated with shortest

- Possible length and at the same time its cost including drainage work is minimum. A shorter length of canal

- Insures less losses of head due to friction, smaller loss of discharge due to seepage and evaporation so that addition

- Area can be brought under cultivation.

According to alignment the channels maybe,

➢ Ridge canal

➢ Counter canal.

➢ Side slope canal.

Based on capacity of the water in the reservoir the canal is designed as an Irrigation canal. Based on canal alignment the canal is designed as a Contour canal.

Empirical Formulae

➢ **Dickens Formula**: The formula is generally useful for the catchments of North India.

$$Q=CA^{3/4}$$

Where,   **Q** = peak discharge in cumecs

A = catchment area in km^2.

C = constant depending upon nature of Catchment.

➢ **Ryve'sFormula**

$$Q=CA^{2/3}$$

Where, **Q**, **C&A** have the same meaning as Dickens"s formula.

➢ **Ingle's Formula`**

$$Q =124A/\sqrt{A}+10.4$$

Where, **A**= Catchment area in km^2.

Q= Peak flood discharge in cumecs

1.17 PROPOSALS

It was proposed to replace too weak soil along the tank bund alignment. Due to the construction of tank bund Area of land will be under submergence, which includes cultivated land and road so compensation has to be provided to the farmers and alternate road for communication is proposed.

1.18 DRAWINGS PRODUCED

- Key map
- Plan of bund
- Longitudinal section of tank bund
- Typical section for tank bund
- Cross sections of tank bund
- Capacity contour
- Block levelling at waste weir
- Block levelling at sluice
- Drainage plan of tank bund
- Longitudinal section of canal
- Typical section for canal in cutting
- Cross sections of canal
- Plan of waste weir

1.19 DESIGN AND CALCULATION

1.20 DESIGN OF SURFULS WEIR

T.B.L = 110.045M

M.W.L = 109.045M

F.T.L = 108.545M

Deepest Bed level = 105.035m

Low Water level = 105.035m

Maximum depth of water storage (H) = MWL - Deepest bed level

$$= 109.045 - 105.035$$

$$= 4.01 \text{ M.}$$

Free board required for the earth dam = 1.00 M

Top Bund level (TBL) = MWL + Free Board

$$= 109.045 + 1.00$$

$$= 110.045 \text{ M.}$$

Therefore Top width of bund (A) = h/5 + 3 for every low dams

= 0.55 H ^1/2 + 0.2 H for dams lower than 30 Mt

= 1065 (H + 1.5) 1/3 for dams higher than 30 Mt

H = Height of dam

A = 0.55 H^1/2 + 0.2 H

H = 4.01

A= 2.0 M

Design of waste weir

Estimation of flood discharge entering the tank generally the flood discharge can be calculated using Ryve's formula as,

Q = C X M^2/3

M = Catchment area of the tank = 2.85 sq-km.

C = Ryve's constant = 9

Q = Flood discharge in m^3/sec

Then, Q = 9 X 2.8^2/3

= 17.87 M^3/sec.

Water is to be stored upto a level of 108.545 i.e FTL of tank is 98.53 and so the crest level of the surplus weir has to be kept at 108.545 M.

Submersion of for shoe lands is limited to 99.03 Mt I.e MWL of tank is to be kept at 109.045. Since temporary regulating arrangements are to be made on top of weir to store water at the times of necessity, grooved dam stones 15cms x 15cms projecting 75cm above the crest will be fixed in the centre of crest at 1mt intervals with top at MWL is given by,

Q = 2/3 x Cd x L x 2g x H^3/2

Where, Q = Discharge in cumec = 17.87

H = Head over weir = (MWL – FTL) = 109.045 – 108.545

= 0.500 Mt.

Cd = Co-efficient of discharge = 0.6

g= Acceleration due to gravity = 9.81 M/sec.

L = Clear length of weir in metres.

Calculation of total length

17.87 = 2/3 x 0.6 x L x 2x9.81 x (0.5) ^3/2

L = 28.25 M

L = 29 M.

Since water is stored temporary upto MWL we have to provide Dam stone size 20cm x 20cm at 1m c/c on the top of weir
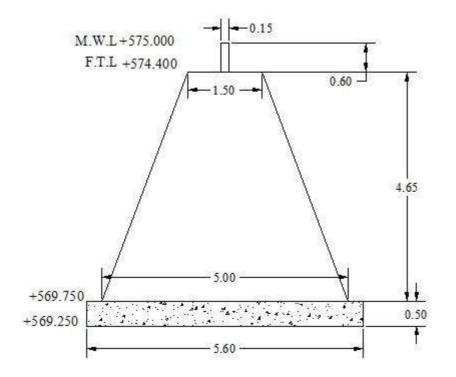
Ht of dam stone = Head over weir

Lt = L + Num of Dam stones x width of each dam stone

  = 29 + 28 x 0.2

  = 34.6 Mt

Design of weir (Top width, bottom width, height of weir)

Crest level (FTL) = 108.545

Top of dam stone (MWL) = 109.045

AVG Ground level for 10m u/s side = 107.545m

Bottom level foundation = 106.545m

Taking 0.6 m below the soil

RL of bottom foundation = 106.545

TFL = 106.545 + 0.6 = 107.545M

Height of weir = FTL – TFL

$\qquad$ = 108.545 – 107.545

$\qquad$ = 1Mt.

Top width of weir (a) = 0.55 (H + h)

$\qquad$ = 0.55 (1 + 0.5) =0.825 say 1mt

$\qquad$ = 1 Mt.

Bottom width of weir (b) = H + h / 2.3

$\qquad$ = 1 + 0.5 /2.3   = 1.21m
$\qquad$ =1.5mt.

Calculate the length of the apron using seepage theory

Mathematically the seepage length = Max uplift pressure x hydraulic gradient

$\qquad$ = (MWL – D/S BL) X HG

$\qquad$ = (109.545 – 107.545) X 5

$\qquad$ = 15 Mt.------------- Eqn - 1

Actual seepage length = AB+BC+CD+DE+EF

$\qquad$ =1.5+0.6+2.1+DE+EF

$\qquad$ = 4.23DE ------------- Eqn- 2

$\qquad$ Equating Eqn-1 and Eqn-2,

$\qquad$ 8.15 = 4.23 DE

$\qquad$ DE = 3.92 = 4 Mt.

Length of the 1st apron = 3 Mt

Length of the 2nd apron = 1 Mt

To find the thickness of the apron t1 and t2 using seepage theory,

$\qquad$ t= Residual uplift pressure of water/ (Sc – 1)

$\qquad$ = Max uplift pressure – uplift pressure lost/ (Sc – 1)

= [(Max uplift pressure) – (seepage length up to the point)/HG)]/(Sc – 1)

= [MWL – (D/S BL) – (Seepage from A B to D)/HG] / (Sc – 1)

= [109.045 – (107.545) – (3/5)] / (2.4 – 1)
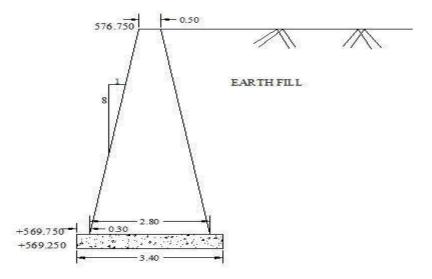
= 0.66 or 0.7 Mt.

T1 = 0.7 Mt

T2 = 50% of t1, = 0.4 Mt.

Design of protection wall

Design of abutment

Design of U/s wing wall

The wing walls slopes from 110.045 at B 109.045 at C and a then using wall becomes leveled CDE

Design of D/S wing wall (AF)

The wing walls slopes from 110.045 at A 107.545 at F and then using wall becomes leveled.

CHAPTER 2

WATER SUPPLY AND SANITARY PROJECT

2.0 INRODUCTION

One of the major essential requirement for human existence is Water; with other elements such as Air, Food, Heat and Light. The use of water by man, plants and animals is Universal. Without it there can be no life. The availability and quality of water plays an important role in determining the quality of Life of the people.

For proper control and use of water it is essential to have an idea of availability of water resources of the world. World oceans cover about three fourth of earth''s surface. Of these global water resources, about 97.3% is in oceans as saline water and only about 2.7% is available as fresh water. About 77.2% is present as ground water and soil moisture. The rest is available in lakes, rivers, atmosphere and vegetation.

Distribution of Water on Earth

1. Saline Water (Oceans & Sea) – 97.3%
2. Fresh Water   - 2.7%

   Fresh Water Resources:-
   - Polar Ice Caps   77.2%
   - Ground Water & Soil Moisture   22.4%
   - Lakes & Reservoirs   0.35%
   - Atmosphere   0.04%
   - Rivers & Streams   0.01%

The planning, designing, financing and operations of water systems are complex understandings and they require high degree of skills and judgment. The work of construction and maintenance of water supply is generally undertaken by Government agencies mostly consisting of Civil Engineers and Environmental Engineers.

A water supply scheme for **Mukthinaga temple village** is planned and designed for the project.

2.1 EXTENSIVE SURVEY PROJECT SITE

In our extensive survey project work, it is proposed to conduct the survey project camp at mukthinaga temple is a village in Kengeri, in the Banglore district, Karnataka. It is situated about 20kms from the city Kengeri.cordinates 14.588^{O}N, 75.854^{O}E the elevation of 530m a lake runs through the center of the village & the village is surrounded by minor hills.

Fig No.01: Map of Mukthinaga temple Village

2.1.1 Main Objective

The Main objective of this project is to provide pure and safe drinking water supply with proper sewerage system to the proposed village.

2.1.2 Selection of Survey Project Site

Before commencement of the survey work we have made reconnaissance survey to locate the site for intake works, water treatment plant, overhead tank, rising main, gravity main and distribution system for the proposed village.

Detailed survey work is made for the entire project work and is given below

PRINCIPAL
Principal
RAJARAJESWARI
COLLEGE OF ENGINEERING
Ramohalli Cross, Bengaluru-74

- Block levels for the proposed Intake works (Reservoir Intake works).
- Compass survey work is made from intake works to the Proposed Water Treatment plant (L/S).
- Block levels for the proposed Water Treatment Plant.
- Rising main (L/S) to Overhead Tank using compass.
- Block leveling for proposed Overhead Tank on the hill station.
- Gravity main (L/S) using compass up to the proposed village.
- Block leveling for Water Distribution system to the proposed village.

2.2 WATER SUPPLY PROJECT

Intake works, Water Treatment Plant, Rising Main, Over Head Tank, Distribution system. All the drawings connected to the above two stages are given in detail, in a separate bounded report after the selection of site for the proposed village, detailed survey work has been carried out.

Using survey data, we have made the following designs. Based on the prepared Layout for the proposed village and the no. of occupants in

2.3 NECESSITY

The use of water is increasing rapidly with our growing population. Already there are acute shortage of both surface and underground water in many parts of the country. In order to ensure the availability of sufficient quantity of good quality water, it becomes almost imperative in a modern society, to plan and build suitable water supply scheme, which may provide potable water to the various sections of the community in accordance with their demands and requirements.

Mukthinaga temple village is not provided with proper and sustained water supply system to convey water to the houses. Water is obtained in these villages mainly through open wells, bore-wells and a small reservoir tank constructed mainly for the purpose of irrigation of nearby farm lands.

The ground water resource is fast depleting due to the continuous usage of water and it may cause shortage of available water in the case of draught and if monsoon fails. And the

existing water supply is inefficient to meet the basic needs of people and for the development of these villages. This inconvenience can be avoided by constructing an efficient water supply scheme for the above village.

2.4 WATER DEMAND

It is essential to determine the quantity of water that is required daily before designing a proper water works project. The demand can be meet, only if there is sufficient source for supply otherwise a compromise has to be made in either the water demand or the source of supply of water.

2.4.1 Types of water demand

The various type of water demand, which a city may have, maybe broken down in to following categories;

a) **Residential or Domestic use**: This includes the water required for various activities such as drinking, cooking, bathing, washing of clothes, utensils, and flushing of water closets. According to the manual on water supply and treatment prepared by „Ministry of Urban Development, New Delhi‟; recommends **70 lpcd** (liters per capita per day) for communities with population up to 20,000.

b) **Institutional use:** The requirement of water for various institutions such as hospitals, hotels, schools and colleges, offices, railway stations, etc. should be assessed and provided in addition to other demands. Currently there are no such large scale institutes, except 3 primary schools.

c) **Industrial use:** The quantity of water required for industrial use depends upon the type and number of industries present and are likely to be built in near future is considered in water supply project planning. The 3 villages considered for this project has no industries that can be accounted for and there is less likelihood for scope of future industries in these areas.

d) **Public use:** This includes the water required for public utility purposes such as road washing, sanitation and public parks. A nominal amount of 5% of the total consumption may be added to meet this demand on an arbitrary basis.

e) **Fire demand:** In a densely populated and industrial area, fire generally breaks out and may lead to serious problem. The villages considered are not so densely populated and the chance of breaking out large fire is rare. The fire can be extinguished using the available stored water.

f) **Water system loss:** This includes the water lost in leakage due to bad plumbing or damaged meters, stolen water due to unauthorized water connection, and other losses and wastes.

2.5 SOURCES OF WATER

The following are common sources of water

1. **Surface Sources**:-the sources of water in which the water flows over the earth‟s surface are called surface sources

   a) River or Streams
   b) Natural pond and lake
   c) Impounding reservoirs
   d) Sea water

2. **Subsurface Sources or Underground Sources**: -Springs Wells, Infiltration Galleries and Infiltration wells. Surface water Sources are generally contaminated and cannot be used without proper treatment and purification system, Compared to Ground water source.

   a) Infiltration gallery
   b) Infiltration well
   c) Springs
   d) Wells

2.6 QUALITY OF WATER

In order to ascertain the quality of water, it is subjected to various tests. These tests can be divided into following 3 categories:-

➢ Physical tests.

➢ Chemical tests.

➢ Bacteriological tests.

Drinking Water Quality Recommendations by Bureau of Indian Standards as Per IS 10500-2012: -

- **Color**   < 10 and not exceed 20 on cobalt scale
- **Taste and odor**   not exceed 3
- **Temperature**:   10 degrees Celsius
- **Turbidity**:   5 to 10 ppm
- **Chlorides**:   Should not exceed 250 mg/l
- **Dissolved gases**:   5 to 10 ppm
- **Hardness**:   14.25 ppm
- **P^H Value**:   between 6.5-8
- **Ammonia**:   0.15 ppm
- **Nitrites**:   NILL
- **Nitrates**:   should not exceed 45 mg/l

2.7 FACTORS AFFECTING PER CAPITA SUPPLY

The design per capita supply shall be minimum of 70 lpcd for rural areas. Water demand shall be calculated for the projected population for the design period of the project which is30 years.

1) Size of the City: The per capita demand for big cities is generally large as compared to that for smaller towns. This is because of the fact that in big cities, huge quantities of water are required for maintaining clean and healthy environments. For example, big cities are generally sewered, and as such required large quantities of water.

2) Climatic Conditions: At hotter and dry places, the consumption of water is generally more, because more of bathing, cleaning, air-cooling, sprinkling in lawns, gardens, roofs etc., are involved .Similarly, in extremely cold countries, more water may be consumed, because the people may keep their taps open to avoid freezing of pipes, and there may be more leakage from pipe joins, since metals with cold.

3) Types of Gentry and Habits of People: Rich and upper class communities" generally consume more water due to their affluent living standards. Middle class communities consume average amounts, while the poor slum dwellers consume very low amounts. The amount of water consumption is thus directly dependent upon the economic status of the consumers.

4) Industrial and Commercial Activities: The pressure of industrial and commercial activities at a particular place increases the water consumption by large amounts. Many

industries require really huge amounts of water (much more than the domestic demand),and as such , increase the water demand considerably.

5) Quality of Water Supplies: The quality and taste of the supplied water is good, it will be consumed more, because in that case, people will not use other sources such as private wells, hand pumps, etc. Similarly, certain industries such as boiler feeds, etc. which require standard quality waters will not develop their own supplies and will use public supplies, provides the supplied water is up to their required standards.

6) Pressure in the Distribution System: If the pressure in the distribution pipes is high and sufficient to make the water reach at 3rd or even 4th storey, water consumption shall definitely be more. This water consumption increases of two reasons:

➢
   People living in upper storeys will use water freely as compared to the case when water is available scarcely to them.

➢
   The losses and water due to leakage are considerably increased if this pressure is high .For example, if the pressure increase from 20 m head of water, to 30 m head of water, the losses may go up by 20 to 30 per cent.

7) Development of Sewerage Facilities: As pointed out earlier, the water consumption will be more, if the city is provided with „flush system‟ and shall be less if the old „conservation system‟ of latrines is adopted.

8) System of Supply: The water may be supplied continuously for all the 24 hours of the day, or may be supplied only for peak periods during the morning and evening. The second system i.e. the intermittent supplies, may lead to some saving in water consumption due to the losses occurring for lesser time and a more vigilant use of water by the consumers. But at many places, the intermittent supplies may not give much saving over the continuous supplies, because of the following reasons:

➢
   In Intermittent supply system, water is generally stored by consumers in tanks, drums, utensils, etc. for non-supply periods. This water is thrown away by them even if unutilised as soon as the fresh supply is restored. This increases the wastage and losses considerably.

➢
   People have a general tendency to keep the taps open during non-supply hours, so that they may come to know of it as soon as the fresh supply is

restored. Many a times, water goes on flowing unattended even after the supply is restored, thus resulting in wastage of water.

9) Cost of Water: If the water rates are high, lesser quantity may be consumed by the people. This may not lead to large savings as the affluent and rich people are little affected by such policies.

10) Policy of Metering and Method of Charging: Water tax is generally charged in two different ways:

➢ On the basis of meter reading (meters fitted at the head of the individual house connections and recording the volume of water consumed).

➢ On the basis of certain fixed monthly flat rates.

2.8 DESIGN PERIOD

The water supply project includes construction of dams, reservoirs, intake structures, water treatment works and distribution networks. These all works cannot be replaced easily or capacities increased conveniently for future expansions. While designing and constructing these works, they should have sufficient capacity to meet the future demand of the town for number of years. The number of years for which the designs of water works have been done is known as design period. The water works are designed for design period of 20-30years as per "**Central Public Health and Environmental Engineering Organization"** (CPHEEO) manual. For water supply project the design period is taken as 30years.

A water supply scheme includes huge and costly structures (such as dams, reservoirs, treatment works, penstock pipes, etc.) which can"t be replaced or increased in their capabilities, easily and conveniently. In order to avoid these future complications of expansions, the various components of water supply schemes are purposely made larger; so as to satisfy the community needs for a reasonable number of years to come. This future period or the number of years for which a provision is made in designing the capacities of the various components of water supply schemes is known as *design period*.

Water supply project under normal circumstances may be designed for a design period of 30 years. This 30 years period is to be counted after the completion of the project. Hence, a completion time of about 2 years may also be added to this design period. The design period recommended by the GOI Manual on water supply, for designing the various components of water supply project, are given in table. Manual stipulate design period, For some

components it may be modified depending on its useful life, facility for carrying out extensions when required and interest rate so that expenditure far ahead of utility is avoided. Land for future extension should be acquired in beginning itself. Project components may be designed to meet the requirements of the following design period.

The water supply project is designed to cater the needs of the community up to the end of the designed period. Generally water supply projects are designed for 2 to 4 decades. This project is designed for a period of **3 decades**.

Table No.01The design period for various project components are given below:

Components	Design period (years)
1. Infiltration works	30
2. Pump sets	30
3. Raw water and clear water conveying mains	30
4. Water treatment units	15
5. Balancing reservoir and storage tanks	15
6. Distribution system	30

2.8.1 Factors Affecting Design Period

1. Useful life of component structures and the chances of their becoming old and obsolete. Design period should not exceed those respective values.

2. Ease and difficulty that is likely to be faced in expansions, if undertaken at future dates. For example, more difficult expansions mean choosing a higher value of design period.

3. Amount and availability of additional investment likely to be incurred for additional provisions. For example, if the funds are not available, one has to keep a smaller design period.

4. The rate of interest on the borrowings and the additional money invested. For example, if the interest rate is small, a higher value of the design period may be economically justified and, therefore, adopted.

5. Anticipated rate of population growth, including possible shifts in communities, industries and commercial establishments. For example, if the rate of increase of population is less, a higher figure for the design period may be chosen.

2.9 POPULATION FORECASTING

Estimating the future population depending upon the known populations of previous decades is known as **population forecasting.**

There are many methods which are used in population forecasting namely, Arithmetic Increase Method(AIM),Geometric Increase Method(GIM), Incremental Increase Method(IIM),Master plan method, Simple graphical method, Decreasing rate of growth method, Comparative graphical method, Logistic curve method.

1. **Arithmetical Increase Method:**

- It is the simplest method of population forecast, though it gives lower results. In this method, the increase in population from decade to decade is assumed to be constant.

$$Pn = P_O + n\ x$$

Where, Pn = Future population at the end of n decades,

x = Average increment per decade.

2. **Geometrical Increase Method:**

- In this method, it is assumed that the percentage increase in population from decade to decade is constant. This method gives higher results since the percentage increase never remains constant. The manual water supply and treatment recommends using this method.

$$Pn = P_O(1 + (r\ /\ 100))\ n$$

Where, Pn = Future population at the end of n decades,

P_O = Present population,

r   = $\sqrt{(1/n\&\ (r1.r2..rn))}$

3. **Incremental Increase Method:**

- This method combines both arithmetical average method and geometrical average method. In this method growth rate is not assumed to be constant.

$$P(n) = P(0) + n\ x^{\wedge'} + (n(n+1))/2*y'$$

Where, Pn = future population at the end of n decades,

P_O = present population,

$⟦\ x⟧\ ^{\wedge'}$= average increment per decade.

n = number of decades

y'= Average of incremental increase of known decade

4. **Simple Graphical Method:**

- A graph is plotted between time and population.

- The curve is then smoothly extended up to the desired year.

- Population of a particular year can be known referring to the graph.

- But simple graphical method gives very approximate results as the extension of the curve is done by the intelligence of the designer.

5. **Master Plan Method:**

- Only those expansions are allowed which are permitted or proposed in master plan.

- In master plan method a city is divided into various zones like residence, commerce and industry and the population density is also fixed.

- For example, there may be 5 persons living in a residential plot and there may be 10000 plots in a zone. Then total population of this zone, when fully developed, can be easily worked out as 5*10000=50000.

6. **Comparative Graphical Method:**

- In this method the cities having conditions and characteristics similar to the city whose future population is to be estimated are, first of all selected. It is then assumed that the city under consideration will develop, as the selected similar cities have developed the past.

- This method has a logical background, and if statistics of development of similar cities are available, quite precise and reliable results can be obtained.

7. **The Ratio Method or the Apportionment Method:**

- In this method the forecasting future population of a city or a town, the city"s census population record is expressed as the percentage of the population of the whole country.

- In order to do so, the local population and the country"s population for the last four to five decades is obtained from the census records. The ratios of the population to national population are worked out for these decades.

- A graph is then plotted between time and these ratios, and extended up to the design period, so as to extrapolate the ratio corresponding to the future design year.

8. **The Logistic Curve Method:**

- It was explained earlier that under normal conditions, the population of a city shall grow as per the logistic curve**.**

- P.F. Verhulst has put forward a mathematical solution for this logistic curve. According to him, the entire curve AD can be represented by an autocatalytic first order equation.

- Since, the design period is fixed the next step is to determine the population of town, the population of town depends upon the factor like birth, death, migration, and annexation.

(Design) Calculation of quantity of water

According to population censes data at the year 2001 = 2500

According to population data calculated for 3 decades by AIM & GIM = 3250

Assuming 70 liters per capita per day as the rate of water supply,

But as it is the pilgrimage center there will be more visitors we have assume the population as 12000 (3250+10200)

Average daily demand Q = Population*water demand

$$=(3250*70)/1000 = 227.5 \text{ m}^3/\text{day}.$$

Max. Daily demand Qmax = 1.50* Average daily demand

$$= 1.50*227.5= 341.2 \text{ m}^3/\text{day}.$$

Design of Pumps

Pumping hours =12 hours/day.

Discharge required from pump   = (341.2) /(12*60*60)

$$Q \quad = 7.8*10^{-3} \text{ m}^3/\text{s}.$$

Economical Diameter:-

From the lea formula

D = 1.2√Q

= 1.2√$7.8*10^{-3}$ = 108mm~110mm.

Source and pumping distance

Water Source = Surface source.

Average reduced level of ground level at SOURCE = 840.10m.

Average reduced level of ground level at Treatment plant = 920.00m

Distance from Source to Treatment plant = 900m

H_s = Static head

H_s = (920.00-840.10) = 80m

H_f = Head loss due to friction=Major Loss

H_f = $flV^2/2gD$

H_f = $0.09*900*0.820^2/2*9.81*0.110$ = 25.23m.

Minor Los ,H_m=10% of Major Loss =2.52m.

Total Head = H = Residual Head+Height of Water in Tank+Free Board+Hs + H_f +H_m+Water Table.

H = 10+3+1+80+25.23+2.52+60

H= 180m.

Efficiency of Pump = 60%

BHP = (γw*Q*H)/(0.75η)

= $(1000*7.8*10^{-3}*180)/(0.75*0.6))$ = 32HP.

Sewer Design

Population: 3250

Assume rate of supply: 70lpd

Assume 70% of water supply is converted into waste water

Quantity of waste water = ((3250x70x80)/(1000x100))

$$= 182 m^3/day$$

Peak discharge = 2.5x average discharge

$$= 2.5 \times 182$$

$$= 455\ m^3/day$$

Because rain

Water also is entering the sewer line = 455/(24x60x60)

$$= 5.26 \times 10^{-3} m^3/sec$$

Dia of sewer line:

Assume sewer flow = ½full

$Q = A \times V$

$Q = (\pi d^2/4) \times ((1/4) \times R^{2/3} \times S^{1/2})$

S = (900-

   800)/600 =0.1

$R = A/P = d/2$

Assume N=0.012

d=0.053m d=53mm.

2.10 DESIGN OF WATER SUPPLY SYSTEM

Find out water demands

Population forecasting methods

Water Demands

It is very difficult to precisely assess the quantity of water demanded by the public, since there are many variable factors affecting the consumption. Certain thumb rules and empirical formulas are, therefore, generally used to assess this quantity, which may give fairly acute results. The use of a particular method or a formula for a particular case has, therefore, to be decided by the intelligence and foresightedness of the various types of water demands, which a city may have, may be broken down into the following classes:

* Domestic water demand
* Industrial water demand
* Institution and commercial water demand
* Demand for public use
* Fire demand

i. **Domestic Water Demand**

Minimum domestic water consumption for communities with population up to 20,000 and without flushing system at water supply through stand post is 70 to 80lpcd (as per IS-1172-1993) Let us consider the **demand as 75 lpcd** .It includes all types of uses like drinking, cooking, bathing etc.

ii. **Fire Demand**

In thickly populated and industrial areas fires generally breakout and may lead to serious damages, if not controlled effectively. Big cities, therefore, generally maintain full fire- fighting squads. Fire-fighting personnel require sufficient quantity of water, so as to through it public water supply schemes for fighting the fire. The quantity of water

required for extinguishing of fires should be easily available & kept always scored in storage reservoir Fire demand usually taken as 1 liter/head/day

Total water demand   = 75+1 = 76 LPCD

Therefore total design population at end of **3 decades: 6183**

1. Average daily demand = water demand * population

   = 76 * 6183

   =4,69,908 lit/ day

2. Maximum daily draft may be assumed as 180% of annual average of daily draft

   M.D.D =

   =180*4,69,908

   =8,45,82,900

   =0.845 MLD

2. Maximum hourly draft of the maximum day, It may be assumed as 270% of annual average hourly draft

   Therefore, Maximum hourly demand of maximum day

   = 270* 4, 69,908

   = 12, 68,74,350 **M.D.D. = 1.26 MLD**
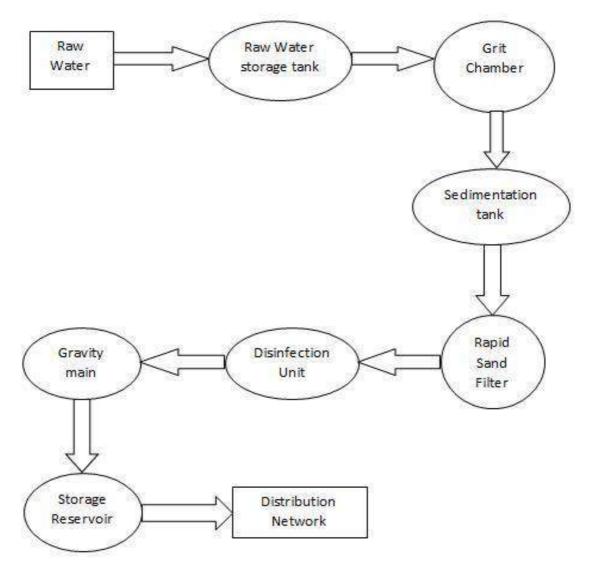
Fig No.02: Flow Diagram of the Water Treatment Plant

2.11 DESIGN OF INTAKE STRUCTURE

The basic function of intake structure is to help in safely withdrawing of water from source over a predetermined range of pools levels and then to discharge this water into the withdrawal conduit. From conduit, it flows to the Jack well to pump the water to the treatment plant, in case the treatment plant is at higher elevation then the intake structure.

The factors for selecting site for intake structure are:

- The site should be near treatment plant.

- The structure must be located in the purer zone.

- The site should permit greater withdrawal of water.

- Intake must be located at a place from where it can draw water even during the driest periods of the year.

2.12 DESIGN OF RISING MAIN

For a given discharge, if smaller diameter of pipes is selected the velocity of flow increases. However the increased velocity results in higher frictional loss and hence increases total pumping head, which requires increased HP of the pump. This leads to higher pumping cost and may offset the reduction in initial cost due to the smaller diameter pipe. Normally, the combined effect is a net increase in cost. On the other hand if too large a diameter of the pipe is used the cost of pumping will be less, but the initial cost of the pipe will be more than resulting saving in pumping cost. This initial investment in cost of pipeline and pumps has an annuity, which depends on the rate of interest and period of repayment of loan taken for capital investment. The annual operating cost of the pumps will vary depending on HP/KW of pumps. For the most economical condition we must choose such a pipe size whose annuity due to initial cost together with the annual pumping cost will make the total annual expenditure minimum. The size of such a pipe is called „economical size of the pipe". The optimum velocity for most economical sizes of pipes is likely to be about 1m/sec.

2.13 PUMPS

In very few water supply schemes, the originate from mountainous areas such that the consumers get water supply entirely by gravity in majority of cases, pumping is required to lift the water from a river , lake or reservoir to the treatment plant. After the treatment, another lift mains or to the overhead storage tanks from where water may flow under gravity

2.13.1 Design of Pump

➢ Delivery head = 3.71 m

➢ F = 0.01m

➢ Pumping hrs. = 8 hrs.

➢ Distance b/w the source & intake& treatment plant L=125 m

➢ Efficiency of pump = 70%

➢ Assuming velocity through the pipe = V=1.5 m/s

A=Q/V

=0.0218/1.5

$$A = 0.015 \text{ m}^2$$

$$\pi/4 \, d^2 = 0.015$$

$$d = (4/\pi*0.015)^{1/2}$$

$$d = 15 \text{ cm}$$

$$H = H_S + H_d + h$$

$$= 0.138 \text{ m} = d = 0.15 \text{ m}$$

Head loss, h = f'l v^2/2gd

$$= 0.04*125*1.5^2/2*9.81*0.15$$

$$= 3.822 \text{ m}$$

H = H$_s$+H$_d$+h

$$H = 10\text{m}+3.71\text{m}+3.82 = 17.53 \text{ m}$$

Water Horse Power of Pump

$$WHP = \Upsilon_W \, QH/0.735$$

$$= 9.81*0.0218*17.53/0.735$$

$$WHP = 3.75 \text{ HP}$$

$$BHP = WHP/\eta$$

$$= 3.75/ (70/100)$$

$$BHP = 5.36 \text{ HP} = 6 \text{ HP}$$

Provide 3 pumps each of 3 HP

Two Running, one backup in case of emergency

2.14 DESIGN OF TREATMENT PLANT UNITS

2.14.1 Screens

Screens are provided before the intake works, water when derived from the surface sources, may contain suspended matter which may range from floating debris such as sticks, branches, leaves etc. to fine particles such as sand, silt etc., Causing turbidity. Screens serve as a protective device for the remainder of the plant rather than as a treatment process.

Fig No.04: Screens

Design of Screens:-

Peak flow = 1.26 MLD

$$= \frac{\quad\quad\quad}{\quad} *(24*60*60)$$

$= 0.015 \text{ m}^3/\text{sec}$

Assuming the velocity (0.8 to 1m/sec) through screens = 0.8 m/sec

The net area of screen openings required = Q/V

$= 0.015/0.8$

$= 0.018$

A = 0.02 m^2

PRINCIPAL
Principal
RAJARAJESWARI
COLLEGE OF ENGINEERING
Ramohalli Cross, Bengaluru-74

2.14.2 Sedimentation Tank

Sedimentation is the removal of suspended particles by gravitational settling. Sedimentation tanks are designed to reduce the velocity of flow of water so as to permit suspended solids to settle out the water by gravity

Primary sedimentation of sewage also reduces the organic load on secondary treatment units. Primary sedimentation of domestic sewage may be accomplish 30 to 45 % removal of BOD and 45 to 60% removal of SS depending on concentration and characteristics of solids in suspension.

Design of Sedimentation Tank

MDD = 0.845 MLD

Detention period = 4 hrs.

Velocity of flow = 0.15 m/minute

Quantity of water to be treated during $= 0.845*10^6*4/24$
D.P of 4 hrs.
$$= 140833.3$$
$$= 0.14 \text{MLD}$$
$$= 0.14*10^6 \text{ liters}$$
$$= 140 \text{ cum}$$

The capacity of tank required = 140 cum

Velocity = 0.15 m/min

The length of tank required = velocity X DP of flow

$$= 0.15 \text{ X } 4 \text{ X } 60$$

$$= 36 \text{ m}$$

C/s area of the tank required = capacity of tank/ length of the tank

$$= 140/36$$

$$= 3.89 \text{ m}^2$$

$$= 4 \text{ m}^2$$

PRINCIPAL
Principal
RAJARAJESWARI
COLLEGE OF ENGINEERING
Ramehalli Cross, Bengaluru-74

Assuming the water depth in the tank as 2m

Width of the tank required = Area/depth = 4/2

=2 m

Using a free board of 0.5m the overall depth=0.5+2=2.5 m

Hence, a rectangular sedimentation tank with an overall size of **36 m X 2 m X 2.5 m** can be used
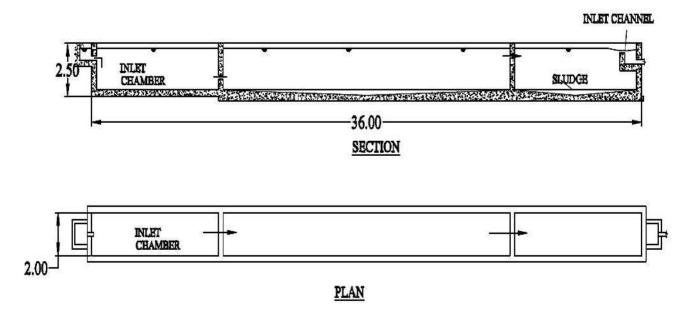
Fig No.05: Sedimentation Tank

2.14.3 Filters

Filtration is one of the most important operations in the water purification process. Though screening and sedimentation remove a large proportion of suspended matter, but they do not effectively remove fine floc particles, color, dissolved minerals and micro-organisms. In filtration, water is passed through a filter medium in order to remove the particulate matter not previously removed by sedimentation. During the turbidity and colloidal matter of non-settle able type removed.

Design of Filters

Rapid Sand Gravity Filters

MDD = 0.845 MLD

Water demand / hrs. = $0.845*10^6 /24$

$$=35208.3 \text{ lit/hr.}$$
$$=35*10^6 \text{ lit/hr.}$$

Assume rate of filtration=8000 lit/hr./m^2

(3000 to 6000 lit/hr./m^2 of filter area)

Area of the filter bed=water demand/rate of

filtration $=35*10^3/3000$

$=11.67=12 \text{ } m^2$

Since 2units are to be required

Area of each units $=12/2=6 \text{ } m^2$

Assuming L=1.5B

$1.5B^2=6$

$B = (6/1.5)^{1/2}=2.5$

m L=1.5*2.5=3.15 m

=3.5 m

Hence 2 units of size 3.5 m *2 m are required

One additional unit as standby may also be provided for break down repairs or cleaning operations (The depth of the tank may vary from 2.5 to 3m In order to achieve uniform distribution of water, the area of the filter units should not be kept larger, and is generally limited to about 10 to 80m^2 for each unit)

Total = depth +free board

=2.5 +0.5=3 m

Sand layer =0.75 m

Gravel layer =0.6 m

(Water 0.6 to 15 m, sand 0.75, gravel 0.6)
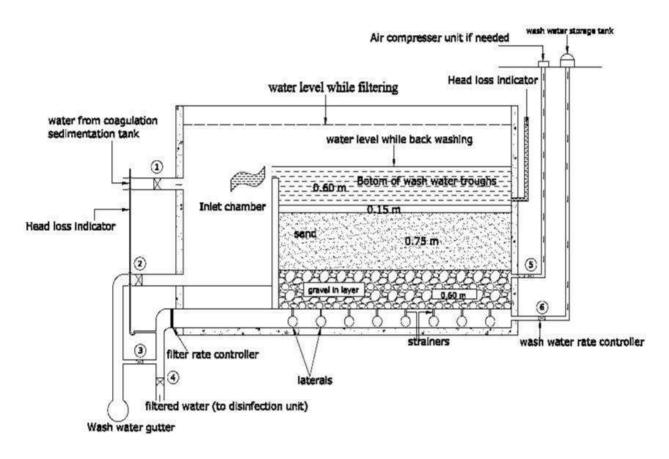
Fig No.06:-Rapid Sand Gravity Filter

2.14.4 Prechlorination

Chlorination unit:-Disinfection of treatment plant effluent is done to further reduce the pathogens. Chemical oxidants such as chlorine, ozone and hydrogen peroxide are used for disinfection. In this design chlorine is used as disinfectant.

  a) Chlorine is very effective in destroying pathogenic bacteria on contact of low concentration and it remains effective for a long period.
  b) It is easily available and has low cost.

Importance of Chlorination:
  a) Chlorination assists in the formation of floc in coagulation process together with other chemicals.
  b) Chlorination assists the process of treatment of some type of industrial waste.
  c) Chlorination controls foaming in sludge digestion tank and controls the odor by the prevention of formation of hydrogen sulphide.
  d) Chlorination controls possible fly nuisance due to sewage.
  e) Chlorination increases efficiency of sewage treatment units.

f) Chlorination reduces BOD.

g) Chlorination removes oil, grease, etc. from the effluent.

2.14.5 Disinfection (Chlorine demand)

Design data:-

➢ Population =6183

➢ Demand=76 lpcd

➢ M.D.D   =0.845 MLD

Assuming that the disinfection used in the BP having 30% of available chlorine and 0.3 mg/lit of chlorine is for disinfection

Amount of chlorine required/day = $0.3*10^{-6}*0.845*10^{6}$ kg

/lit =0.2535 kg=255 gm.

Since amount of chlorine contained in 100kg of bleaching powder is 30%

Amount of bleaching powder required daily = 0.2535*100/30 =0.845 kg

Annual consumption of BP =0.845 kg *365 =308.43

            =**310kg**

2.14.6 Design of clear water reservoir

Distribution reservoir or Storage tanks are used to store the water so that the water is supplied whenever it is required. The main function is to meet the fluctuating demand with a constant rate of supply from the treatment plant.

Treated water stored in clear water reservoir =0.47Mld

= $0.47*10^{6}/10^{3}$

=470 m^{3}/day

Assume 1/3rd of discharge as a thumb rule for volume of tank /day =157 m^{3}

■ Assume depth of tank =5 m

■ c/s area of tank   =157/5 =31.4 m^{2}

■ Providing circular tank, diameter of tank

$\pi d^{2}/4$ =31.4

d= 6.32 =6.35 m

Assume free board of =0.5 m

Total depth of tank = 6.85 m

2.14.7 Design of inlet pipe

Assuming the average flow velocity of 0.9m/s and daily flow of 8hours

Discharge=377.2 m^3/ (8*60*60)

Area of inlet pipe required=discharge/velocity

$$= (377.2/ (8*60*60)^3*(1/.9)$$

$$m^3/sec =.0145 \ m^2$$

$$=145 \ cm^2$$

Diameter of the inlet pipe = $(4*145)^{1/2}$

D=13.5=14 cm

Diameter of the outlet pipe may be taken as1.5 time that of inlet =14+7=21 cm

2.15 DISTRIBUTION SYSTEM

Distribution system is meant to deliver the adequate amount of treated water to the consumers. In this system, proper networks of pipes are laid, to distribute the water with sufficient quantity and pressure, maintained in the system.

Depending upon the local conditions and orientation of roads, generally there are four different types of pipe networks are laid. They are,

a) Dead end system
b) Grid iron system
c) Ring system
d) Radial system

PRINCIPAL
Principal
RAJARAJESWARI
COLLEGE OF ENGINEERING
Ramehalli Cross, Bengaluru-74

Each one of these has its own merits and demerits. Depending on the present conditions, for this project, pipe networks of dead end system can be laid, considering the following points,

a) Most of the area in the villages is covered under single main line.

b) There are very few number of sub lanes.

c) There is less number of planned networks of roads.

d) The network can be easily expanded, if any future development occurs.

e) Lesser number of cutoff valves can be provided.

f) Construction is simple, easy and economical.

The flow of water through the networks of pipe can be made possible by the following methods of distribution,

a) Gravitational system

b) Pumping system

c) Combined gravitational and pumping system.

The area under consideration is on the lower grounds, when compared to the source of supply and the treatment plant. The water treated from the treatment plant can be stored at a higher altitude to make the flow of watering the distribution networks, merely under the action of gravity. Also due to the large difference in altitude between the distribution reservoir and the supply points, sufficient head of water can be attained at various points

PRINCIPAL
Principal
RAJARAJESWARI
COLLEGE OF ENGINEERING
Ramohalli Cross, Bengaluru-74

2.16 WASTE WATER TREATMENT

INTRODUCTION

Definitions:

- **Sewage:** sewage indicates the liquid waste from the community. It includes sullage, discharge from latrines, and toilets.

- **Sullage:** It is a term used to indicate waste water from kitchen, bathroom and wash basin.

- **Sanitary Sewage:** It is wastewater generated from the domestic and industrial establishments.

- **Sewer:** Sewer is an artificial underground closed conduit in which sewage is carried from the point of generation to discharge or disposal.

Sewage:

Sewage is the mixture of waste products and water that's carried away through the underground drainage systems of pipes knows as sewers. These waste products can consist of such organic and inorganic materials derived from domestic, commercial and industrial waste streams together with storm-water run-off, such as human waste, garbage, mineral salts, floating debris, inert solids, plastics, rags and other debris.

Sanitation:

Sanitation literally means measures necessary for improving and protecting health and well-being of the people. Sanitation is any system that promotes proper disposal of human and animal wastes, proper use of toilet, etc. Sanitation basically is a hygienic disposal or recycling of waste. It also considered as a practice that allows protecting health only with the help of hygienic measures. It is also commonly understood as term that is used for treatment of waste water.

Sewage treatment is the process of removing contaminants from wastewater and household sewage, both runoff (effluents), domestic, commercial and institutional. It includes physical, chemical, and biological processes to remove physical, chemical and biological contaminants. Its objective is to produce an environmentally safe fluid waste stream (or eated effluent) and a solid waste (or treated sludge) suitable for disposal or reuse (usually as farm fertilizer)

Since treatment of sewage from even small towns along with solid waste management is necessary, the following systems are proposed:

a) Oxidation pond or Aerobic lagoon for sewage treatment

b) Sanitary landfill

Domestic sewage:

Domestic sewage carries used water from houses and apartments; it is also called sanitary sewage. Domestic sewage is in the range of 180-200L/head. This is based on normal per capita water consumption of 150L/head/day, plus some leakage and sewer infiltration. Frequently, the domestic flow is taken to include normal commercial discharges from premises such as public houses, restaurants and similar establishments and a total figure of order of 225L/head per day may be appropriate based on major flow surveys.

Basic Design Considerations:

In designing wastewater collection, treatment and disposal systems, planning generally begins from the final disposal point going backwards to give an integrated and optimum design to suit the topography and the available hydraulic head, supplemented by pumping if essential. Once the disposal points are tentatively selected, further design is guided by the following basic design considerations:

1. Engineering

2. Environment

3. Process

4. Cost

2.16.1 Design Period

Sewage projects may be designed normally to meet the requirements over a thirty year period after their completion. The period between design and completion should also be taken into account which should be between three to six years depending on the type and size of project. This quantity should be worked out with due provision for the estimated requirements of the future. The future period for which a provision is made in the water supply scheme is known as the ***design period***. It is suggested that the construction of sewage treatment plant may be carried out in phases with an initial design period ranging from 5 to 10 years excluding the construction period.

Design period is estimated based on the following:

1. Useful life of the component, considering obsolescence, wear, tears, etc.

2. Expandability aspect.

3. Anticipated rate of growth of population, including industrial, commercial developments & migration-immigration.

4. Available resources

5. Performance of the system during initial period

Table No.02.Design Periods for Components of Sewerage System and Sewage Treatment

SI. NO	COMPONENTS	RECOMMENDED DESIGN PERIOD	CLARIFICATION
1	Collection System i.e. Sewer Network	30	The system should be designed for the prospective of 30 years as replacement is not possible during its use
2	Pumping Stations(Civil works)	30	Duplicating machinery within the pumping station would be easier/cost of civil works will be economical for full design period.
3	Pumping machinery	15	Life of pumping machinery is generally 15 years
4	Sewage Treatment Plant	30	The construction may be in a faced manner as initially the flows may not reach the design levels, and it will be uneconomical to build the full capacity plant initially.
5	Effluent disposal and utilization	30	Provisions of design capacities in the initial stages itself is economical.

2.16.2 Existing condition of sanitation in India

India has population of almost 1.2 billion people. 55% of this population (nearly 600 million people) has no access to toilets. Most of these numbers are made up by people who live in urban slums and rural areas. A large populace in rural areas still defecates in the open.

Slum dwellers in major metropolitan cities, reside along railway tracks and have no access to toilets or a running supply of water. The situation in urban areas in terms of scale is not as serious as rural areas. However what escalate problems in urban areas is poor sewerage systems and highly congested living.

Sewerage system if present at all, suffer from poor maintenance which offer leads to overflow of raw sewage. Today, cities are highly populated. Over 20 cities have over a million residents, including metropolises of Mumbai, New Delhi and Kolkata. In these places the existing sewerage systems, built to serve population of around 3 million people, can"t handle the wastewater produced by an average of 12-14 million residents.

Wastewater treatment facilities are inadequate-India does not have enough water to flush out cities effluents, nor have enough sewage treatment plants. A report suggests that only 30% of water used is treated in India. The rest of water makes its own way into streams and rivers inducing major problem-water pollution. According to the country"s tenth 5 year plan, 75% of India"s surface water resources are polluted and 80% of this is due to sewage alone.

Needless to say this has a severe impact on human health. The water pollution aids the transmission of disease like diarrhea and other intestinal infections such as round worm and hook worm. Diarrhea alone accounts for over 5, 35,000 deaths in children under 5 years of age. Polluted water is breeding ground for mosquitoes. Mosquitoes, carriers of disease like Malaria and Dengue fever are responsible for another 3, 00,000 deaths in our country annually.

In addition to health issues, poor sanitary measures set India back by billions of dollars every year. Illnesses are costly to families and to the economy as a whole in terms of productivity losses and expenditures on medicines and health care. The economic repercussions are also evident in other areas like fisheries and tourism which are also hit by water related problems. As per World Bank statistics India"s nominal GDP stands at 1.3 trillion dollars and we are currently ranked 11th in the world on basis of nominal GDP. If we could cut down expenses incurred due to illnesses and lack of productivity due to illness, our economy would get the impetus it needs to flourish even more. This in turn would enable governmental agencies to improve sanitation standards and medical infrastructure which would in turn help improve living standards of people. Overcoming the demons of poor sanitation and addressing health issues arising out of the same will surely help us become a global superpower in a holistic sense

Reconnaissance Survey

Following information was collected in reconnaissance survey:

1. Topographical survey: from topo sheets, Google maps.

2. Soil conditions: Red soil, hard rock.

3. Present utility services like house connections for water supply and sewerage, electric and telephone poles, Cisterns.

4. Location of streets and adjoining residential area.

Field procedure:

Leveling along the proposed main center line of the sewer line:

Centre line for the sewer is marked from the treatment plant to the pumping station. Using ranging rod, leveling staff and dumpy level point along the center line at every 10m are marked and staff reading are taken by holding the staff at the points and the levels of each points are reduced by applying Height of instrument method (collimation method) or Rise & Fall method. The survey is carried out by dumpy level. There are two methods of booking and reducing levels of the points from the observed staff reading.

1. Height of instrument method (collimation method)
2. Rise & Fall method

The first method that is Height of instrument is been used for booking and reducing the elevation of points. In this method Height of instrument is calculated for each setting of the instrument station by adding the back sight reading to the elevation of the bench mark (BM) or the change point. The reduced level of the turning point is then calculated by subtracting from the Height of instrument. The beginning point is back sighted at the distribution tank and the intermediate sights are sighted at a chainage of 10m.

2.16.3.a Grit chamber (aerated)

Grit removal basins, such as grit chambers or grit channels or detritus tanks are the sedimentation basin placed in front of the waste water treatment plant to remove the in organic particles such as sand, gravel, grit, egg shells, bones and other non-putrescible material that may clog channels or damage pumps due to abrasion and to prevent their accumulation in sludge digesters Many a times, the grit chambers are aerated by providing outside air through compressors. The diffused air creates spiral current within the grit, as to help in its settlement.
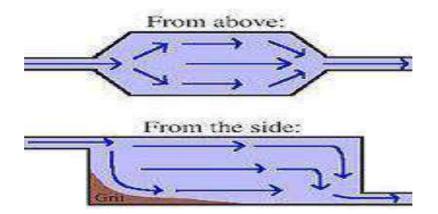
Fig No.07: Grit Chamber

Grit Chamber Design

MHD = 1268752 lit/day 80 % will be waste water

MHD = 1015002 lit/day

Velocity of flow = 0.9

Peak flow = 1015002 lit/day

$$=1015005/ (24*60*60*10^3)$$

$$= 0.012 \text{ m}^2/\text{sec}$$

Assume the peak flow rate as 3 times the average =0.012*3=0.036 m^3/sec

2.17 MUNICIPAL SOLID WASTE

Composition and Quantity of the Generated Municipal Solid Waste or Refuse:

The municipal solid waste is a heterogeneous mixture of various kinds of solid waste which are not transported with water as sewage, and may include biodegradable food waste called garbage, and the non-putrescible solid waste like paper, glass, rags, metal items etc. called rubbish.

The quantity of municipal solid waste produced by a society depends upon the living standards and its residents.

2.17.1 Solid Waste Management:
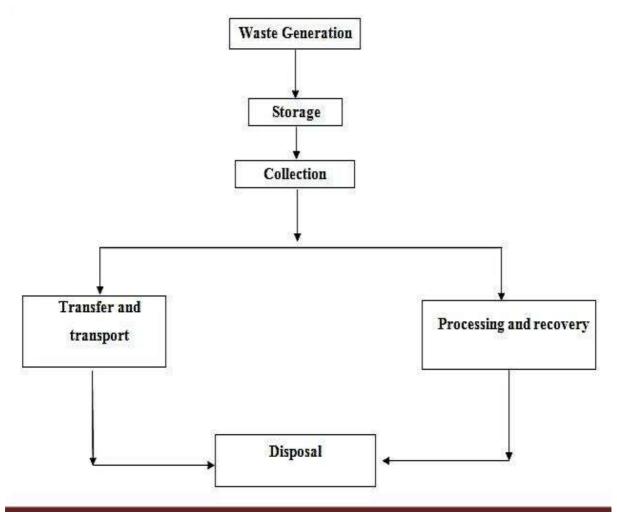
Solid waste management is the discipline associated with the control of waste generation, its storage, collection, transfer, and transport, processing and disposal in a manner that in accordance with best principles of public health, economics, engineering, conservation aesthetics, public attitude and environmental considerations.

2.17.2 Functional Elements of Solid Waste Management:

The activities associated with management of solid waste from point of generation to final disposal have been grouped into 6 functional elements. :

➢ Waste generation:

➢ On-site handling, storage, and processing:

➢ Collection:

➢ Transfer and transport:

➢ Processing and recovery: and Disposal.

Interrelationship of Functional Elements Comprising a Solid Waste Management System:-

Table No.03: Description of the Functional Elements of Solid Waste Management.

Functional element	Description
Waste generation	Those activities in which materials are identified as no longer being of value and are either thrown away or gathered together for disposal
On- site handling, Storage, and processing	Those activities associated with the handling, storage, and processing of solid wastes at or near the point of generation
Collection	Those activities associated with the gathering of solid wastes and the hauling of wastes after collection to the Location where the collection vehicle is emptied.
Transfer and transport	Those activates associated with (1) the transfer of wastes from the smaller collection vehicle to the larger transport equipment and (2) the subsequent transport of the wastes, Usually over long distance to the disposal site.
Processing and recovery	Those techniques equipment and facilities used both to improve the efficiency of the other functional elements and to recover usable materials, conversion products, or energy From solid wastes.
Disposal	Those activities associated with ultimate disposal of solid wastes including those wastes collected and transported directly to a landfill site, semisolid wastes (sludge) from wastewater treatment plants incinerator residue compost, or other substances from the wires solid waste processing Plants that are of no further use.

For the onsite storage of solid waste generated in selected area, stationary receptacles such as open masonry enclosures, concrete pipe sections are used. For collection of solid waste, curb side collection method is used. The system of collection used is stationary container system is used. For transportation motor vehicle transportation is used and finally the collected waste is 1disposed of by ordinary open dumping in low lying areas situated near by the village.

Disposal

After water is collected and treated it is disposed to nearby water source

Solid Waste Management

Solid waste:

The term solid waste includes all those solid and semi-solid materials that are waste discarded by a community. The solid generated through domestic and commercial waste activities is classified as municipal solid and is also called „REFUSE".

In general the solid wastes are usually divided into following two categories;

➢ Municipal solid waste

➢ Industrial solid waste

The safe disposal of solid wastes of a society was not a serious problem, as long as the population was small and the land available for assimilation of waste was large.

Solid Waste Management

CHAPTER-3

<u>HIGHWAY PROJECT</u>

3.0 INTRODUCTION

Transportation contributes to economic, industrial, social & cultural development of any country. Transportation is a vital infrastructure for the speedy economic growth of a developing country, since every commodity produced needs transport at all stages from production to distribution. Highways have been rightly compared to the arteries of a human being and their importance in the social and economic up lift of a nation cannot be over emphasized.

In the present era planning is considered as a pre-requisite and basic need for any new project or an expansion program. Thus highway planning is also a basic need for highway development.

3.1 NECESSITY OF HIGHWAY PLANNING

In the present era, planning is considered as a pre-requisite before attempting any development program me. This is particularly true for any engineering work, as planning is the basic requirement for any new project. Thus highway planning is a basic need for highway development. Planning plays an important role when the funds available are limited whereas the total requirement is much higher. By proper planning we can execute the work for available funds or we can decide whether to take up project or not. This is the problem in developing country like India as the best utilization of available funds has to be made in a systematic and planned way.

3.2 OBJECTIVES

The objectives of highway planning are as follows,

1. To plan a road network for efficient and safe traffic operation, but at minimum cost.
2. Attainment of maximum utility.
3. Construction with locally available resources to minimize the cost of project.
4. Future requirements and improvements in view of anticipated developments.

5. Incorporation of technical recommendations framed by Indian Roads Congress (IRC) for various aspect of Highway construction.

6. Availability of funds and economic considerations.

3.3 PROPOSAL

Highway project deals with the design of road and can be executed in following manner,

1. An alignment is selected and detailed surveys including cross section and longitudinal sections are carried out.

2. Plan of road alignment –longitudinal section are drawn to scale and final alignment is fixed, as per IRC specifications, confirming to class of roads.

3. Block leveling for the culvert.

3.4 HIGHWAY ALIGNMENT

The position or the layout of the central line of the highway on the ground is called the alignment. Horizontal alignment includes straight and curved paths. Vertical alignment includes level and gradients.

A new road should aligned very carefully as improper alignment would result in following disadvantages,

- Increase in construction cost
- Increase in maintenance cost
- Increase in vehicle operating cost
- Increase in accident rate.

Once an alignment is fixed and constructed, it is not easy to change it due to increase in cost of adjoining land and construction of costly structures by the roadside.

3.4.1Requirements of Ideal Alignment

The basic requirements of an ideal alignment between two terminal stations are that it should be:

1. The alignment should be short as possible.
2. The road should be easy for construction & maintenance.
3. The road should be safe.
4. The road should be economical.

3.4.2 Factors Controlling Alignment:

The various factors which control the highway alignment in general may be listed as follows;

        (a) Obligatory points

        (b) Traffic

        (c) Geometric design

        (d) Economics

        (e) Drainage

        (f) Other considerations

a) Obligatory Points

(i)   Obligatory points through which the road alignment should pass. These will cause the alignment to often deviate from the shortest or easiest path.

(ii)   Points through which the alignment should not pass. These make it necessary to deviate from the proposed shortest alignment.

b) Traffic

The proposed alignment should suit the traffic requirements. Origin and destination study should be carried out in the area and desire lines be drawn showing the trend of traffic flow. The new road to be aligned should keep in view the traffic flow patterns and future trends.

c) Geometric Design

Geometric design factors such as gradients, radius of curve and sight distance also would govern final alignment of highway. If straight alignment is aimed at, often it may be necessary to provide very steep gradients. As far as possible while aligning a new road, the gradient should be flat and less than the ruling or design gradient. Thus it may be necessary to change the alignment in view of design speed, maximum allowable super elevation and coefficient of lateral friction. It may be necessary to make the adjustment in the horizontal alignment of roads keeping view the minimum radius of the curve and the transition curves.

These are the control points governing the alignment of the highways. These control points are divided into two categories, namely

d) Economy

The alignment should be economical. The initial cost, maintenance cost & vehicle operation cost should be minimum, high embankment or deep cuttings are avoided & choose the balance cutting & filling. These factors also control the alignments of road.

3.5 ENGINEERING SURVEYS FOR HIGHWAY LOCATION

Before a highway alignment is finalized in highway project, the engineering surveys are to be carried out. The stages of engineering surveys are,

3.5.1 Map Study

Map study gives a rough guidance of routes to be surveyed in the field. The main features like river, hills and valleys, etc. are known by map study. By careful study of maps, the idea of aligning a new highway can be obtained.

3.5.2 Reconnaissance Survey

In this survey, the land along the various proposed highway routes are inspected. All the relevant details not available in the map study are collected and noted down.

3.5.3 Preliminary Survey

This is carried out to collect all the physical information"s, which is necessary in connection with the proposed highway alignment. The quantity of earth work and cost of construction are worked out. The best proposal is selected after preliminary survey.

3.5.4 Detailed Survey

After preliminary survey, a detailed survey is carried out. Here Temporary Bench Marks are fixed and leveling works are performed. Here an elaborate and complete data are collected for preparing detailed plan and estimates of the project.

3.6 SURVEYING DETAILS

In road survey, the first step is leveling. This is carried out using, instruments such as dumpy level, cross staff and leveling staff. Other instruments used are prismatic compass to note the bearings, arrows and ranging rods which are used to mark the points on the field. The leveling operation starts from the benchmark. A benchmark is a point of known elevation. The road is aligned by two operations, namely

1. Longitudinal Sectioning.
2. Cross Sectioning
3. If there is a necessity of providing a culvert, block leveling is carried out.

3.6.1 Longitudinal Sectioning or Profile Leveling

Profile leveling is a process of determining the elevation of points at fixed intervals along the chain line. Here the line along which the section to be taken is marked by ranging rods, and the fore bearing of the line is taken with the help of a prismatic compass. The level

is then setup at a point. The telescope is then directed to a staff, held on the temporary benchmark of

RL 100.00m and the reading is taken. This reading is called as the back sight. Height of collimation is determined. All these readings are noted down in a level book. Then the intermediate sight is taken on the starting point of the line by holding the staff. For each setup, intermediate sights should be taken after the fore sight on the next turning station has been taken. To find the R.L. the intermediate sights are subtracted from the height of collimation. When the instrument is removed, a change point is selected and a staff is held on the same point and read it, which is fore sight.

 It is then subtracted from the height of instrument to find the R.L. of the change point. The instrument is then transferred to the second position. Having adjusted the instrument, a back sight is taken on the change point just established. This reading when added to the change point gives the R.L. of the new line of collimation. Then successive intermediate sights are taken.

The horizontal distances are plotted along the horizontal axis to some convenient scale and the distances are also marked. The elevations are plotted along the vertical axis. The various points obtained are joined by straight lines

3.6.2 Checking the Levels

For checking the levels, we use the technique called Fly Leveling. In this, we start from the last point and go to the first point, taking back sights and fore sights only, At the end, the last point should be in the vicinity of the bench mark.

3.6.3 Cross Sectioning

Cross sections arc run at right angles to the horizontal profile and at either side of it for the purpose of lateral outline of the, round surface. It provides data for estimating quantities of earth work and other purposes. The cross sections are plotted in the same manner as the longitudinal sections.

3.6.4 Contouring

On a plan, the relative altitudes of the points can be represented by contour lines as they indicate the elevators directly. The area to be surveyed is divided into a number of squares. The levels on the comer of these squares are determined by direct leveling. The contour interpolation is done by graphical methods or by arithmetic calculation method.

3.7 GEOMETRIC DESIGN

The geometric design of a highway deals with the dimensions & layout of visible features of highway such as alignment, sight distance, curves, super elevation & intersections etc. The geometrics of highway should be designed to provide optimum efficiency in traffic operation with maximum safety at reasonable cost. The designer may be exposed to planning of new highway network to meet the requirements of the anticipated traffic. The design also includes the sizes of drainage, aggregates, cross slopes, super elevation etc

3.7.1 Terrain Classification

Topography and physical features play an important role in the location and design of a highway. The various design elements should be related to topographical features if an economical and sound design is to emerge. The classification of the terrain is normally done by means of the cross slope of the country. Terrain Classification is done according to Road User Cost Study.

Table No. 3.1 Terrain Classification

Sl. No.	Terrain Classification	Rise and Fall (m / km)
1	Plain	0-15
2	Rolling	16 – 30
3	Hilly	Over 31

3.7.2 Design Speed

"Design speed" is a speed determined for design and correlation of the physical features of a highway that influence vehicle operation. It is the speed to which a road is designed. It is the maximum safe speed that can be maintained over a specific section of a highway when conditions are favorable that the design features of the highway govern.

PRINCIPAL
Principal
RAJARAJESWARI
COLLEGE OF ENGINEERING
Ramohalli Cross, Bengaluru-74

Table No. 3.2 Design speeds on Rural highways

Road Classification	Design speed in Kmph for various terrains							
	Plain		Rolling		Mountainous		Steep	
	Rolling	Min	Rolling	Min	Rolling	Min	Rolling	Min
National and State Highway	100	80	80	65	50	40	40	30
MDR	80	65	65	50	40	30	30	20
ODR	65	50	50	40	30	25	25	20
VR	50	40	40	35	25	20	25	20

3.7.3 Camber:

Cross slope or camber is the slope provided to the road surface in the transverse direction to drain off the rainwater from the road pavement surface. It usually maximum at center of the road & at edge camber value is zero in a stretch.

Table No. 3.3 IRC recommended values of camber

SL. No.	Types of road Surfaces	Range of cambers in areas of rainfall range	
		Heavy	Light
1.	Cement concrete and high type bituminous surface	1 in 50 (2%)	1 in 60 (1.7%)
2.	Thin bituminous surfaces	1 in 40 (2.5%)	1 in 50 (2%)
3.	WBM and gravel pavement	1 in 33(3%)	1 in 40 (2.5%)
4.	Earth	1 in 25(4%)	1 in 33(3%)

3.7.4 Width of Roadway or Formation

It is the sum of widths of pavements or carriageway including separators if any and shoulders. Formation width is the top width of the highway embankment or the bottom width of the highway cutting excluding the side drains.

Table No. 3.4 Width of roadway recommended by IRC

Sl. No.	Road Classification	Width of roadway	
		Plain and Rolling terrain	Mountainous and Steep terrain
1.	NH & SH (a) Single lane (b) Two lane	12.0 12.0	6.25 8.80
2.	M D R (a) Single lane (b) Two lane	9.0 9.0	4.75 --
3.	O D R (a) Single lane (b) Two lane	7.5 9.0	4.75 --
4.	V R – single lane	7.5	4.0

3.7.5 Width of Pavement

The pavement or carriageway width depends on the width of traffic lane and number of lanes. The carriageway intended for one line of traffic movement is called a traffic lane. The lane width is determined on the basis of the width of the vehicle and the minimum side clearance which may be provided for the safety. Fig (3.5).

- When the side clearance is increased there is an increase in operating speed of vehicles and hence increase in capacity of the traffic lane.

- By considering these in view, a width of 3.75 m is considered durable for a road having single lane for vehicles of maximum width 2.44 m.

- For pavements having two or more lanes, width of 3.5 m per lane is considered sufficient.

3.7.6 Right of Way

Right of way is the area of land acquired for the road, along its alignment. The width of this acquired land is known as land width and it depends on the importance of the road

and possible future development. A minimum land width has been prescribed for each category of road. A desirable range of land width has also been suggested for each category. While acquiring land for a highway it is desirable to acquire more width of land as the cost of adjoining land invariably increases very much, soon after the new highway is constructed.

Table No. 3.5 Recommended land width for different classes of roads (m).

Sl. No.	Road Classification	Plain & Rolling terrain		Mountainous and Steep terrain	
		Open areas	Built – up areas	Open areas	Built – up areas
1.	NH & SH	45	30	24	20
2.	M D R	25	20	18	15
3.	O D R	15	15	15	12
4.	V R	12	10	9	9

3.7.7 Kerb

Kerbs are provided at the edge of road between the road & shoulders. It prevents the direct entry of road vehicles in to the shoulders.

3.7.8 Shoulders

It is the thin strip of land provided along the road edge for the emergency lane for parking or to repair the damaged vehicles. The minimum shoulder width recommended by IRC is 2.5m.

3.7.9 Sight Distance

The safe and efficient operation of vehicles on the road depends very much on the visibility of the road ahead of the driver. Thus the geometric design of the road should be done such that any obstruction on the road length could be visible to the driver from some distance ahead. This distance is said to be the sight distance.

Sight distance available from a point is the actual distance along the road surface, over which a driver from a specified height above the carriage way has visibility of stationary or moving objects.

Three sight distance situations are considered for design:

- Stopping sight distance (SSD) or absolute minimum sight distance.
- Safe overtaking or passing sight distance, and
- Safe sight distance for entering into uncontrolled intersections.

3.7.9.1 Stopping Sight Distance (SSD)

Stopping sight distance (SSD) is the minimum sight distance available on a highway at any spot having sufficient length to stop a vehicle traveling at design speed, safely without collision with any other obstruction.

For the purpose of measuring the SSD, IRC has suggested the height of eye level of driver as 1.2 m and the height of the object as 0.15 m above the road surface.

3.7.9.1 Overtaking Sight Distance

The overtaking sight distance is the minimum distance open to the vision of the driver of a vehicle intending to overtake the slow vehicle ahead safely against the traffic in the opposite direction.

The overtaking sight distance or passing sight distance is measured along the center line of the road over which a driver with his eye level 1.2m above the road surface can see the top of an object 1.2 m above the road surface.

3.7.10 Design of Horizontal Alignment

3.7.10.1 Horizontal Curves

When the centerline of the road changes the direction along the horizontal plane, horizontal curves are provided & the same are designed as follows:

3.7.10.2 Super Elevation

To counteract the effect of centrifugal force and to reduce the tendency of vehicle to overturn or skid the, outer edge of pavement is raised with respect to inner edge. Such provision of transverse slope is provided on horizontal curves.

3.7.10.3 Extra Widening:

Extra widening is provided to provide extra space required for mechanical and psychological reasons along the horizontal curve, which is provided as per the table below.

Table No. 3.6 Extra Widening

SL. No.	Radius of curve (m)	Extra width for two lane road (m)
1	Up to 20m	1.5
2	20-40m	1.5
3	41-60m	1.2
4	61-100m	0.9
5	101-300m	0.6
6	Above 300m	Nil

3.7.10.4 Horizontal Transition Curve

A transition curve is introduced between the straight and a circular curve. It has a radius, which decreases from infinity at the tangent point to a designed radius of circular curve. The rate of change of radius of transition curve will depend on the equation of the curve or its shape.

3.7.10.5 Set Back Distance

Requisite sight distance should be available across the inner side of the horizontal curve. Lack of the horizontal curve. Lack of visibility in the lateral direction may arise due to obstruction, like wall hill cut, wooded area, high slope etc. the sight distance is measured along the middle of the inner lane. However, on single lane road, sight distance is measured along the center of the carriageway.

The setback distance depends on following factors:

i) Required sight distance.

ii) Radius of horizontal curve, R.

iii) Length of curve, L $_c$ which is greater or lesser than S.

I) When L $_c$> S

For narrow roads, such as single lane, m= R – R cos–

Where, – =——— degress

For wide roads, such as two or more lanes, m= R – (R- d) cos –

Where, ‾ = ———— degress

II) When Lc< S

m= R – (R- d) cos

3.7.11 Design of vertical alignment

3.7.11.1 Gradient

It is the rate of rise or fall along the length of the road with respect to the horizontal. I while aligning a highway, the gradient is decided for designing the vertical curve. Very steep gradients are avoided as it is not only difficult to climb the grade, but also the vehicle operation cost is increased. Gradients are divided into four types.

a) **Ruling gradient**: It is the maximum gradient within which the designer attempts to design the vertical profile of the road.

b) **Limiting gradient**: It is the gradient steeper than the ruling gradient.

c) **Exceptional gradient**: It is the unavoidable steeper gradient provided for a smaller road stretch of the road.

d) **Minimum gradient**: It is the minimum gradient provided in the roads for the drainage of rain water as quick as possible. It will depends on the soil property, rainfall, runoff, etc.

Table No. 3.7 Gradient according to IRC

Terrain	Ruling Gradient	Limiting Gradient	Exceptional gradient
Plain and rolling	3.3% (1 in 30)	5% (1 in 20)	6.7%(1 in 15)
Mountainous having elevation >3000m above MSL	5%(1in 20)	6%(1 in 16.7)	7%(1 in 14.3)
Steep terrain up to 3000m above MSL	6%(1 in 16.7)	7%(1 in 14.3)	8%(1 in 12.5)

3.7.11.2 Vertical Curve

Due to changes in grade in the vertical alignment of highway, it is necessary to introduce vertical curve at the intersections of different grades to smoothen out the vertical profile and thus ease off the changes in gradients for the fast moving vehicles. The vertical curves used in highway may be classified in to two categories.

1. Summit curve or crest curves
2. Valley curve or sag curves

1) Summit curve

A curve with convexity up wards is called a summit curve. This occurs when an ascending intersect a descending gradient or when an ascending meets on other ascending gradient or an ascending gradient meeting a horizontal a summit curve is provided here as there is change in gradient matching the requirements of a summit curve.

2) Valley Curve

A vertical curve, concave upwards is called as valley curve. This is formed when a descending gradient intersect an ascending gradient or when a descending gradient meets another descending gradient or when a descending gradient gains a horizontal path, they should be designed for:

1. Comfort condition
2. Head light sight distance condition.

3.7.12 Pavement Design (IRC: SP 20-2002)

For the safety and comfort ability of fast vehicles road surface should be even along the longitudinal profile. The surface should also so be stable and unyielding in different conditions and it should allow the heavy load of traffic to move with least possible resistance. In order to provide a stable and even surface for traffic the road way is provided with a suitably designed and constructed pavement structure. Pavement is designed and to distribute wheel load in larger area and elastic deformation caused by the load to fall within the permissible limit.

The thickness of pavement is designed on the basis of projected number of commercial vehicles for the design life using the current commercial vehicles per day and its growth rate. Further, it requires the subgrade strength value in terms of CBR. It is expected that rural road will not have more than 450 CVPD in any case. The design chart may be referred to obtain the total pavement crust thickness required over the subgrade for the design life of pavement.

Based on strength of granular materials that are used, the total design thickness is divided into base and subbase thickness.

3.8 DIFFERENT DESIGN ASPECTS

3.8.1 Terrain classification according to road user study

Average rise and fall (RF) of is given by;

RF = $h_1+h_2+h_3$...... + h_m + h_n / distance AB (km)

RF = 17.24m

The terrain obtained is a **rolling terrain**

3.8.2 Design speed

Design speed is selected   according to class of road and type of terrain

There is an existing village road present with construction of both earthen pavement and flexible pavement throughout the alignment. We are proposing to widen the existing pavement and change the village road to other district road (ODR). The design speed is **50 kmph**

3.8.3 Stopping Sight Distance;

SSD = (0.278Vt) + (V^2 /254f)

Where, V = design speed in kmph =50kmph.

S.S.D= Stopping Sight Distance.

t = reaction time of the driver in seconds = 2.5sec

f= longitudinal frictional coefficient = 0.148 for 50kmph.

Then,

SSD = (0.278Vt) + (V^2 /254f)

   = (0.278*50*2.5) + (50^2/254*0.148)

= 101.25 102 m

     SSD= 102 m

3.8.4 Over taking sight distance (OSD)

Speed of overtaking vehicle V_a=50 kmph

Speed of overtaken vehicle V_b= 40kmph

 Therefore, V_a= 50/3.6 = 13.89 m/sec

V_b= 40/3.6 = 11.11 m/sec

Avg. acceleration during overtaking vehicle

 a = 1.11 m/sec^2

PRINCIPAL
Principal
RAJARAJESWARI
COLLEGE OF ENGINEERING
Ramohalli Cross, Bengaluru-74

Over taking sight distance (OSD) for two way traffic

OSD = $d_1 + d_2 + d_3 = v_b t + v_b T + 2S + v_a T$

$d_1 = V_b t = 11.11 * 2.5$

$d_1 = 27.775$ m

$d_2 = V_b * T + 2S$

$S = 0.7 V_b + 6$

$= 0.7 * 11.11 + 6$

$= 13.78$ m

$T = \sqrt{(4S/a)} = \sqrt{(4*13.78/1.11)}$

$= 7.047$

$d_2 = (11.11 * 7.047) + (2 * 13.78)$

$d_2 = 105.85$ m

$d_3 = V_a * T = 13.89 * 7.047$

$= 97.88$ m

Therefore OSD = $d_1 + d_2 + d_3$

$= 27.775 + 105.85 + 97.88$

OSD = 231.505 m   232m .

Minimum length of overtaking zone

$= 3 * OSD$

$= 3 * 232$

OSD $_{(min)}$ = 696 m

Desirable length of overtaking zone

$= 5 * OSD$

$= 5 * 232$

OSD $_{(Max)}$ = 1160 m

3.8.5 Radius Horizontal Curve Design

Road design speed = 50 kmph

Ruling minimum radius of the curve of ruling speed of 50kmph is given by

$R_{-ruling} = V^2 / 127(e+f)$

Where,

e = Rate of super elevation

f = Design value for lateral friction coefficient = 0.15

v= Speed of vehicle m/sec

R= Radius of horizontal curve

g= acceleration due to gravity= 9.81 m/sec^2

e=According to IRC recommendations, maximum limit of super elevation 'e' in plain and rolling terrain is 7%

f= Maximum value of transverse skid resistance T force, for design purpose is 0.15

$R_{ruling}= V^2/ (127(e+f))$

$=50^2/127(0.07+0.15)$

$= 89.47$ m ~ 90 m

$R_{ruling}= 90$ m

3.8.6 Design of super elevation

The super elevation for 75% of design speed is neglecting the

friction e = V^2 /225R

e = 50^2/225*90

e = 0.123 > 0.07

As the value of 'e' is 0. 123, which is greater than maximum limit of 0.07 it is not safe for speed of 50km/hr.

Check for transverse skidding developed

f = $(V^2/ 127R)$-e

$= (50^2/127*90)$-0.07

$= 0.148$

The value of f obtained is slightly less than the allowable limit, the provided super elevation is safe against sliding of vehicles moving with design speed.

3.8.7 Extra Widening

The extra widening required at the curve is given by,

We = Wm + Wps

We= $(nl^2/2R)$ + $(V/9.5 R^{0.5})$

Where, n= number of traffic lanes.

l= Length of wheel base of longest vehicle, 6m.

V= design speed, kmph.

R=radius of horizontal curve.

$$= ((1*6^2)/(2*90)) + (50/(9.5*90^{0.5})) \text{ We} = 0.754m$$

3.8.8 Design of Transition Curve

1) Length of transition curve by considering the rate of change of acceleration. Length of transition curve is given by, Ls = V³ / (46.5CR)

Rate of change of centrifugal acceleration(C) is given

by, C = 80 / (75+V)

= 80/ (75+50)

= 0.64 m/sec³

Therefore, Ls = V³ / (46.5CR)

Ls = 50^3/ (4605*0.64*90)

Ls = 46.67 m

2) Length of transition curve by considering the rate of introduction of super elevation. Considering that the road rotates with respect to inner edge.

Ls = eN

(W+We) Where, e =0.07

N= rate of change of super elevation is 75. (Which is b/n 150 and 60, as per IRC 73-1980 page no. 25)

W= width of carriage way = 7m.

I = length of wheel base = 6m.

The extra widening required at the curve is given by,

We = Wm + Wps

We= (nl²/2R) + (V/9.5 R$^{0.5}$)

= ((1*6^2)/ (2*90)) + (50/(9.5*90$^{0.5}$) =0.754m

Then,

Ls = eN (W+We)

Ls = 0.07x 75(7+0.754) = 40.70m

3) Length of transition curve according to IRC.

Length of horizontal transition curve is given by,

Ls = (2.7V² /R)

$$= (2.7*50^2)/90$$

$$=75m$$

The length of transition curve is highest of the above three values, therefore Ls= 75m

3.8.9 Set Back Distance

1) When   L$_c$> S

  When length of curve Lc is greater than the sight

    distance S = sight distance

   R = radius of horizontal curve.

L$_c$= length of the curve.

    D=distance b/w the center line of the road and the center line of the inside lane in (m)

Given

S=102m (SSD)

L$_c$=105m

R=90m

The sight distance is measured along the middle of the inner side lane and the setback distance in m is given by

ᾰ/2 = 180S/ (2π(R-d) degree

ᾰ/2 =180*102/(2π (90-1.90))

ᾰ/2=33.16 degree

m^1=R-(R-d) cos ᾰ/2

= 90-(90-1.9) cos (33.16)

m^1=16.24m ~17m

Therefore a setback distance of 17m on the inner side of the horizontal curve

2) When L$_c$<S

If the length of the curve L$_c$ is less than the required right distance (S) the angle is subtended at the center

ᾰ/2=180L$_c$/(2π(R-d)) degree

=34.14degree

M^1 =R-(R-d) cos ᾰ/2 + (S-L$_c$)/2*sin ᾰ/2

=90-(90-1.9) cos 34.14) + (102-105/2) sin (34.14)

M^1=16.24

Therefore obstruction to vision should be kept clear on the inner side of the horizontal curve to that adequate right distance is available.

3.8.10 Design of Vertical Curve

1) Length of Summit Curve

Two cases are to be considered in deciding the length.

- When length of the curve is greater the sight distance [L>SSD]
- When length of the curve is less than sight distance

[L<SSD] Assuming L<SSD

L= 2S- [($\sqrt{2H}$+$\sqrt{2h}$)^2 /N]

Where,

      L= length of summit curve,

      m S=stopping sight distance

      N=deviation angle

      H= height of eye level of driver above road way surface m

      =1.2m h=height of the object above pavement surface m=0.125m

      L=2S-4.4/N

      = 2*102-4.4/0.0267

      = 39.2 m

      L<SSD is Assumption correct

2) Length of Valley Curves

      Assumption L>SSD

      L=NS^2/ (1.5+0.0355)

Where

      N= (-n_1)-(n_2)

      S=SSD m

      L= 0.0267*102^2(1.5+0.035*102)

      L=54.79

      L> SSD assumption is wrong.

ASSUMPTION : <u>L<SSD</u>

L=2S —[(√2H-√2h)^2/N]

L = 3.43M

L<SS assumption is correct.

3.8.11 Curve Setting

Chainage (PI) = 1125m

Deflection angle = 60^0

Radius of curve = 40m

Peg interval = 10m

Tangent length (T) = R tan (Deflection angle/2)

$\qquad$ = 40 tan (60/2)

$\qquad$ T = 23.1m

Length of the (T_1) = chainage of PI –T

$\qquad$ = 1125-23.1

$\qquad$ = 1101.9m

Chainage of PI (T_2) =chainage of T_1+L

$\qquad$ = 1101.9+42

$\qquad$ =1143.9m

Length of 1^{st}subchord = C= 1110-1101.9

$\qquad$ = 8.1m

Length of last chord = C^1 = 1143.9-1140

$\qquad$ = 3.9 M

Number of normal chord = (1140-1110)/10

$\qquad$ = 3number

Total number of chords = 1+3+1 =5

$_1$ = 1718.9C/R = (1718.9*8.1/40)/60

$\qquad$ = 5 48$'$ 4.64$''$

$_2$ to $_4$ = 1718.9*10/40 = 7 9 43.5"

$_5 = 1718.9 *3.9/40 = 2° 47' 35.57"$

$_n = 30° 4' 50.71"$

Table No. 3.8 Curve Setting Details

Point	Chainage (M)	Chord length (M)	Tangential angle( )	Deflection angle ( )	Theodolite reading
T$_1$	1101.9	-	-	-	-
A	1110	8.1	5° 48' 4.64"	5° 48' 4.64"	5° 40'
B	1120	10	7° 9' 43.5"	12° 57'48.14"	13°
C	1130	10	7° 9' 43.5"	20° 7'31.64"	20°
D	1140	10	7° 9' 43.5"	27° 17'15.14"	27° 20'
T$_2$	1143.9	3.9	2° 47'35.57"	30° 4'50.71"	30°

CHECK: $\mathbf{-} = 60/2 = 30$

3.8.12 Design of Culvert

The pipes, which are to be provided, are non-pressure (IS-458) of MP3

grades. The mean amount of rain fall = 700mm =70cm

The rain fall of a bad year is always taken 2/3 of mean amount of rain fall

Therefore bad year rain fall is 2/3 *70 = 46.66cm

Run off co efficient usually assumed as 15% to 30%

Annual yield = (30/100) *46.66

           = 13.998 ~ 14cm

Yield from catchment $=9*10^6*14/100$

           $=1.26*10^6$cumecs/year

Therefore yield @ site = $1.26*10^6$cumecs/year

Q= 1.26cumec.

Assumed Velocity of flow, V= 2.0m/s

Width of the road= 18 m.

We know that Q=AV, where A is area of the pipe

A = Q/v =1.26/2 = 0.63m²

We know that,

A = (3.14d²)/4

0.63 = (3.14d ²)/4

Therefore,

d = 0.89m

From IS 458-1971, adopt an internal diameter 0.90m (d) with external diameter 1.1m (D).

Table No. 3.9 Soil Investigation Report

Sl. No.	Type of test	Result	Code of refers
1	Liquid limit	37.28	1920 (part 5)
2	Plastic limit	23.49	1920 (part 5)
3	Specific gravity of soil	2.36	1920 (part 3)
4	Grain size analysis	C_u = 5.25 C_c =2.09	1920 (part 4)
5	Light compaction	MDD=1.89 OMC =11%	1920 (part 7)
6	Heavy compaction	MDD=1.95 OMC =13%	1920 (part 8)
7	CBR Test	10 %	1920 (part 16)

3.8.14 Pavement thickness Design (IRC: SP 20-2002)

For the thickness design, CBR and traffic datas are needed. These are obtained and thickness is designed according to IRC: SP 20-2002.

CBR = 10%.

Traffic Volume= 100 CVPD (assumed).

Computation of Design Traffic:

$A= P (1+r)^{n+x}$

A=Number of commercial vehicles per day for design P=

Number of commercial vehicles per day at last count r=

annual growth rate of commercial traffic (7.5%)

n= number of years between last count and year of completion of

construction x= design life in years
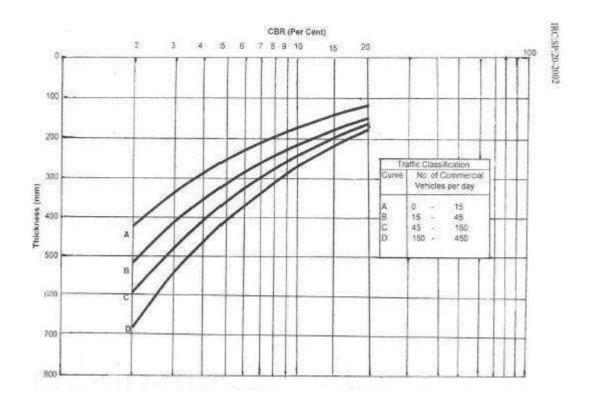
$A= 100(1+0.075)^{2+15}$

A= 341 CVPD

The below design chart may be referred to obtain the total pavement crust thickness

Total Pavement Thickness= 275 mm(from graph)

The total design thickness is divided into base and sub base thicknesses.

Sub Base = 125mm.

Base   = 150 mm.

Surfacing= PMC or MSS can be provided if necessary for smooth riding surface

PRINCIPAL
Principal
RAJARAJESWARI
COLLEGE OF ENGINEERING
Ramohalli Cross, Bengaluru-74

3.8.14 The Summary of our Project is as Follows

1. Road length   : 3000.00m

2. Design speed   : 50kmph

3. Camber   : 1 in 5

4. Width of pavement   : 3.8.0m

5. Width of roadway   : 7.5.0m

6. Width of the shoulder   : 1.85m

7. Right of way   : 18m

8. Culvert   : 01

3.8.15 Details of Curves

Table No 3.10 Details of curves

Sl. No.	Chainage	Type of curve
1	50.00	Vertical curve
2	500.00	Horizontal curve
3	1500.00	Horizontal curve
4	2050.00	Vertical curve
5	2600.00	Vertical curve

3.9 CONCLUSION

The highway is designed to serve the people and helps in connecting the nearby existing roads. The village people therefore can easily access the city. Transportation will be much easier than before. The people travelling through this road will have a healthy atmosphere and it gives good aesthetic appearance. Hence there are chances of development of villages in the future.

CHAPTER-04

<u>OLD TANK PROJECT</u>

4.0 INTRODUCTION

Tanks are important for conserve precious water resources in semi-arid areas. It is well known that tanks traditionally performed a useful role in providing irrigation, water for domestic use, including livestock and for supporting livelihoods of the poor, protecting local environment and sustainable water resources. Tanks are small storage reservoir (ponds) created on the upstream of a small earthen dam constructed across a stream. The depth of water in a tank is usually less than 4.5 m. However in exceptional cases it may be more than 4.5 m but not greater than 12 m. If the depth of water is exceeds 12 m the tank is termed as reservoir.

The tanks may be having independent catchment drawing their supplies from the run- off from the catchment areas. These tanks fully depend upon the rainfall in the catchment area.

An old tank generally consists of the following.

➢ An earthen bund across the valley creating storage.

➢ A surplus weir to dispose of flood discharge.

➢ Sluice to feed the channel.

➢ Channel from the sluices to feed the command area.

Every rainy season surface run-off brings large amount of the silt in to reservoir. The deposited silt reduces storage capacity of the reservoir every year. Hence, old tank or irrigation tank generally faces the fallowing problems are.

1. Reduction in the gross capacity of the tank, due to silting.
2. Reduction in the safety of the bund, due to bad maintenance and wearing out of the standard dimensions of the bund.

The above two problems can be overcome by restoring the tank. Restoration of the tank is done by raising the height of the existing bund, thereby allowing for increased storage and improved safely. This operation is called restoration of an old tank.

4.1 REASONS FOR INCREASING THE HEIGHT OF THE EXIXTING BUND

The primary reasons for increasing the height of an existing bund are

I. Increased storage capacity

The storage available at the upper bunds of a reservoir for a given increase in bund height can be significant depending upon the topography of the reservoir. In many cases, significant increased storage can be obtained with only a small increase in the height of the dam. This is because the surface area of an existing reservoir at the spillway level is large and adding a few meters to the reservoir depth can effectively increase the reservoir storage capacity by several thousands of hectare- meters.

II. Spill-way adequacy

Inadequacy spillway capacity and the potential for the catastrophic overtopping of the crest of the bund under design flood conditions is the most prevalent dam safety issue faced today. In some cases the original bund and spillway design criteria was less strengthen than criteria imposed by current regulation. In other cases the hazard classifications of the dam increases after the original bund construction because of changes in downstream flood plain. By increasing the height of the bund, additional free board is provided resulting in increased reservoir surcharge storage capacity and a greater discharge capacity for the spillway.

III. Strengthening

Quite frequently the most feasible means of strengthening an existing bund to with stand the various loading combinations acting on the bund and possible an increase in the height of the dam. An obvious by- product of rising a bund for strengthening purposes is increased storage capacity.

4.2 FACTORS TO BE CONSIDERED IN DESIGNING RAISES FOR EXISTING BUND

The issues associated with the design of raise for an existing bund is that a special attention must be paid for developing a full understanding of the configuration and physical properties of existing bund so that the raised portion is compatible with the existing portion.

However there are a number of general factors that need to be considered and these are outlined briefly below.

i. Environmental Permitting

The raising of an existing bund or dam result in higher reservoir water levels and corresponding greater areas of land in undated by which may have serious environmental implications other signified environmental permitting issues that could impact the design related to borrow sources, in stream flow releases, wet lands, archaeological sites and stream modification.

ii. Spill Way

Depending on the size of the raise and the resulting increase in reservoir level, a major modification of the existing spillway or perhaps even a completely new spillway is required. This can have a significant influence on the cost of the raise and careful planning of this aspect will be required to minimize costs.

iii. Outlet Works

Modifications to the outlet works of dams or bunds are often required as a part of the raise. Typically, this involves extending the outlet conduit to the new embankment toe location and possibly relocating the intake structure or sitting basin control towers located at the centre line of bunds or dams also need to be raised.

iv. Reservoir Operation

Whether or not the reservoir can be lowered or emptied during construction will have significant influence on both feasibility and the design of the raise. If the reservoir can be lowered, the raised portion can be constructed partially upstream of the existing dam and thus could significantly facilitate the toe into the existing core of the dam. Moreover depending on the materials availability and or environmental constraints on the location of borrow areas, borrow areas may be confined to the inundated portions of the reservoir. Has the added advantage of the increasing reservoir storage by an amount equal to the borrow volume. The benefits of an upstream or a partial upstream raise are offset by a need to improve extend the outlet works upstream. If the reservoir cannot be lowered during construction. Materials for construction on the raise may have to be imported from the outside.

v. Central Core

For a very small increase in height compared to the original height of the dam or bund it is typically most economical to the core of the addition to the core of the existing dam or bund. For significantly greater raises, a completely new core, may be have to be constructed such that existing dam or bund may not be feasible for use.

vi. Drainage System

Embankment drains are frequently included in the design of raises to be existing dams or bunds. Even if the original dam/bund did not include a drain system the designer carefully evaluate whether drainage needs to be incorporated into the raised embankment section. The design considerations outlined above apply in the general sense to any proposed dam or bund raise. Yet, each dam or bund is unique and has its own site of design issues that need to be addressed.

4.3 STUDY AREA

The study area is located approximately 4.5 km North-East of Rajivgandhi pura, Ramanagar district, Karnataka. It is covered by the Survey Of India Toposheet. The purpose of the project is to provide water stored for irrigation and for public water supply for the surrounding villages. However because of silting up of the reservoir, the usable storage has been severely curtailed. Also it is evident from inspection that the original dimensions of the bund are worn out and the dam safety may be deficient. Corrective measures are now being designed to restore the usable storage and increase safety.

I. Project Configuration

The bund impounds about 4.8 ha-m of water at FTL 563.705 m. The present work involves the restoration of the bund by raising the bund height by 1m with a corresponding increase in storage of 9.1 ha-m. The tank has a catchment area of 5.47 km². The bund under study is a zoned embankment dam approximately 4 m high measured from the d/s toe to the crest of the bund. The crest of the bund is approximately 325 m long and 5 m wide. The u/s slope is 1:1 and d/s slope is 1.5:1. The u/s slope is protected by a layer of rip-rap whereas the d/s slope is turfed. The embankment materials including the details of the u/s impervious blanket and foundation details can be obtained by conducting a borehole test.

The bund has a stepped apron type surplus weir of length 27.00 m to dispose the surplus water during floods. It has no temporary storage arrangements for storing surplus water up to MWL. The bund is provided with a plug sluice, which takes off from the tank to irrigate the area on the d/s side of the tank. The sluice barrel is buried under the tank bund and has a masonry side walls and the roof is of R.C.C. slab. The size of the barrel is 75cmx60cm. The head wall platform of the sluice is provided at an R.L. of 561.640 m. The cistern is located at a distance of 6.40m from the toe of the bund.

4.4 SURVEYS TO BE CONDUCTED

I. Plan of the Existed Bund

The tracing of plan of the bund is done by using compass. The compass is set up at the begin of bund and north direction is noted here and mark starting point (A) of bund. The point A is located by using basic principal of survey.

Procedure

➤ Plan of the existing bund is traced on a sheet with help of bearings that are with help of prismatic compass. Set the compass at zero chainage (from point A) and take the bearings at every 20 m interval. While taking the fore bearing noted own back bearing also.

➤ Repeat the same procedure up to the point B.

II. Longitudinal and Cross Section along the Center Line of the Existing Bund

Survey is conducted from starting point of the bund the longitudinal and cross section is taken. Longitudinal section is taken at every 10 m interval and cross section is taken at every 5 m interval on the both upstream and downstream side of bund.

Equipment's
➤ Chain
➤ Tape
➤ Arrows
➤ Ranging Rod
➤ Dumpy level with Stand (Theodolite)
➤ Leveling staff
➤ Plane table with accessories

PRINCIPAL
Principal
RAJARAJESWARI
COLLEGE OF ENGINEERING
Ramohalli Cross, Bengaluru-74

Procedure

1. The R.L of existing Top Bund Level (TBL) is determine by carrying fly levelling from permanent bench mark on to the top of the masonry abutment of surplus weir.

The R.L of the top of the abutment = R.L of the existing Top Bund Level (TBL).

Note: - The horizontal surface of the notch stone indicates the TBL. The notch stones are usually providing all along the length of the bund at regular intervals. Since the notch stones are missing on the bund, the top of abutment is taken as R.L of existing TBL.

2. A point along the center line of the existing bund is located whose R.L is one meter greater than the R.L of Top Bund Level (TBL). i.e., the height of the existing bund is raised by 1m.

R.L of proposed TBL = R.L of existing TBL + 1 m.

3. On the extended center line of the existing bund, search for the R.L of proposed TBL at the ends of the bund, these points are the beginning and end points/ stations of the proposed bund. The location of these two points should be fixed with respect to three permanent objects.

R.L of beginning and end points = R.L of proposed TBL.

4. R.Ls of longitudinal section is taken at every 10 m interval on the centerline of the bund from the beginning point to the end point of the proposed bund. Cross sections are taken at every 20m intervals and where ever there is change in alignment of bund.

5. Salient features such as sluice; Beginning and end of surplus weir and R.L of crest of surplus weir (FTL) should be noted at respective chainages.

6. The cross section is taken at points L_1, L_2, L_3----- and R_1, R_2, R_3------ as shown in below figure(c/s @ 5m interval except point L_1 & R_1). The horizontal distances of 15m are with reference to the centerline on either sides of bund.
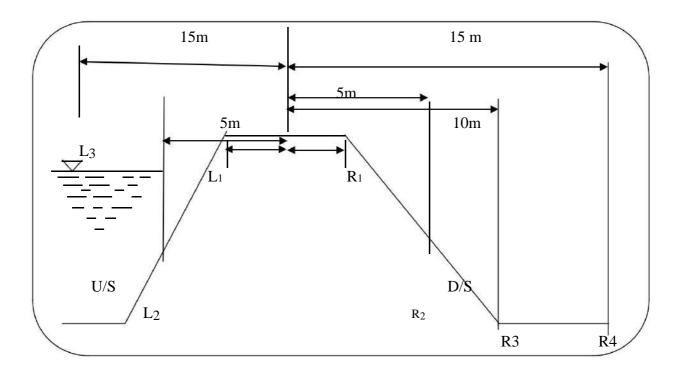
Fig. 4.1 Cross Section of Bund.

III. Block Levelling at the Surplus Weir Site

Blocks of 5 m x 5 m are constructed for a width of 30m on the upstream side and 60m on the downstream side. Length along the center line of the bund is equal to the length of the existing surplus weir plus 10m. At the corners of all the blocks, levels are taken and reduced levels are calculated. Block leveling is a method of indirect contouring. The method is used when the area to be surveyed is small and the ground is not very much undulating.

Procedure for Indirect Contouring

➢ The area to be surveyed is divided into a number of squares.

➢ The size of the square may vary from 5-20m depending upon the nature of the contours and contour interval. Size of square is 5m x 5m.

➢ The elevations of the corners of the square are then determined by means of a level and a staff.

➢ The contour lines may then be drawn by interpolation. It is not necessary that the squares may be of same size sometimes, rectangles are also used, when there are appropriate

breaks in the surface between corners, guide points in addition to these at corners may also be used.

IV. Capacity Contours at the Existing and Proposed Full Tank Levels

Center line of the bund along with the three well defined points is transformed from the plan on a new drawing sheet. Capacity contours are plotted by the method of direct contouring using tachometer for distance measurement. Scale 1cm = 10 m.

Procedure

1. Taking the sill of waste weir as bench mark point or any nearer permanent bench mark on the contour are located and determine the height of the instrument.

2. The plane table is set up over a good commanding station and oriented.

3. The plane table and leveling instrument are kept as close as possible each other, so that the distance of contour points are measured by tachometry and plotted on the plane table by method of radiation.

4. Whenever the plane table and level are shifted choose a commanding position by conducting reconnaissance.

5. The plane table and the level are shifted to the new commanding position and its position on the plane table sheet is marked.

6. Three point problem shall be solved for every third plane table position in order to orient the table accurately.

7. The contour work should be ended at the starting point on the waste weir.

PRINCIPAL
Principal
RAJARAJESWARI
COLLEGE OF ENGINEERING
Ramohalli Cross, Bengaluru-74

REFERENCE

1. Text book of irrigation engineering & hydraulic structures - **R.K.Sharma**, Oxford & IBH publishing Co., New Delhi (2002).

2. Irrigation$ Water resources engineering – **G.L.Asawa**, New Age International Publishers, New Delhi (2005).

3. Soil Mechanics and Foundation Engineering – **Punmia B.C**. (2005), 16th Edition Laxmi Publications Co., New Delhi.

4. Water supply engineering – **S.K.Garg**, Khanna publishers

5. Environmental engineering-I & II- **B.C.Punimia**&**Ashok Jain**.

PRINCIPAL
Principal
RAJARAJESWARI
COLLEGE OF ENGINEERING
Ramohalli Cross, Bengaluru-74

.

CHAPTER- 5
TOWN PLANNING

5.0 INTRODUCTION

The art and science of ordering the use of land and sitting of building and communication routes so as to secure the maximum practicable degree of economy, convenience, and beauty, An attempt to formulate the principles that should guide us in creating a civilized physical background for human life whose main impetus   is thus…forecasting and guiding change.

WHAT IS TOWN PLANNING?

- Physical, social economical planning of an urban environment
- It encompasses many different disciplines and bring them all under a single umbrella.
- The simplest definition of town planning's that it is the organization of all elements of town environment

5.1 AIMS & OBJECTIVES OF TOWN PLANNING

- To preserve the individuality of the town
- To create and promote healthy condition and environments for all the people
- To make right use of the land for the right purpose by zoning
- To ensure orderly development
- To preserve the aesthetics in the design of all elements of town plan

5.2 NEED OF TOWN PLANNING

- Urbanization is increasing
- Population is growing. Planning is needed to make better use of resources ⬚ Social inequality
- Realizing a settlement's economical potential by overcoming weakness such as:
    1. Lack of innovative urban development vision
    2. Lack of coordination between departments responsible for urban development
    3. Unsustainable development
    4. Environmental degradation
- Facing new socio-economical and climatic challenge
    1. Urban security
    2. Public health and safety
    3. Global warming and climatic changes
    4. Social changes

5.3 TOWN PLANNING

A survey we conducted to prepare an outline of village showing the dwelling houses, tanks, streets, electronic poles, water supply lines and other important details of the area. In additional to this, another sketch indicating our personal to modernize the village with particular reference to residential locality, business area, recreation spaces etc.

The following instruments were used for this work:

1. Total station with tripod
2. Plane table with stand and accessories
3. Chain with arrows
4. Tape
5. Ranging rods

The field work may be arranged as fallows

1. Rcconnoiter the area and prepare a rough sketch.
2. Select the traverse station as suitable place.
3. The starting station are fixed with reference to three permanent points and setup the plane table, add and mark the station on the sheet.
4. Traverse the area using the plane table and all important features are filled up intersection.
5. The plane tabling work is checked by taking 3 permanent object in the area as check points.
6. And is plotted to the scale of 1:100.

Town planning involves both control of existing and new development. "strategic planning" is required to ensure our resources are carefully managed to match our future needs and expectations. In the present scenario, variety of technique have emerged for collection of data, assessment of existing conditions in a town, existing land use survey, etc. town planners use these techniques in survey, analysis, planning, implementation and monitoring stages of the planning process.

PLANNING SURVEYS The preparation of any for the development of an urban area, city or town requires reliable factual regarding physical and socio-economic conditions such as housing, transport, industries, employment and social services such as schools, hospitals and recreation facilities. The process of collecting such data is called a "planning survey".

The census provides valuable information, which could be used as the basis for a planning survey. It consist of three primary documents (1) House list, (2) Household schedule, and (3) Individual slip. The house list contains information about the use to which a census house was put, on the material of its walls and roof, whether, it was owned or rented and the number of rooms, if it was used for dwelling, together with essential data concerning houses that were used as establishments, workshops or factories like name of establishment or proprietor, name of product produced, repaired or serviced, number of persons working and kind of fuel or power, if machinery was used, etc.

In the household schedule information is given on the extent of land cultivated by the Household, either owned or on lease from the Government, or held from private persons, or institutions for payment in money, kind or share or partly held from government and party from private person for payment in money, kind, or share; the nature of household industry conducted by the household; the duration of the industry in a year, the number of family workers engaged in cultivation or household industry or both etc. In the individual-slip, essential demographic data, like relationship to head of household, age, marital status, birth place, social and cultural data like nationality, religion, literacy and mother tongue and economic data like, occupation, industry, class of worker and activity etc. are given.

The preliminary planning survey may be considered to consist of the following components: preparation of base Map of the urban area.

- Existing land use survey.
- Utilities and land surveys.
- Survey of community facilities like schools, Hospitals, Clinics, parks and playgrounds, etc.
- Sample household survey for collecting essential data on housing, transport services and amenities.

5.4 PREPARATION OF BASE MAP

In the absence of an accurate base map, no planning exercise can be undertaken. The base map should show all streets, lane and open spaces and division of area by plots with survey members. The base map should show all physical features including contours. In most of the urban areas, this map may not be available readily and where available, it may be out dated. The first therefor, would be get any available map on a scale in which the individual plots with their survey numbers, are/can be shown and then proceed to check that map, from part to whole. While checking, omission and error and new sub- divisions should be entered on the map. For this survey, a team of experienced field staff working it up-to-date, The town planner supervising the work may undertaken other surveys which do not required a detailed base map. The amount of information to be represented on the map depends on scale, projection, conventional signs, draughting skill, methods of map-making purpose of map, etc. and hence would vary from map to map. uniformity of base map with regard to presentation of features, ale, size and notations would facilitate the readability of these maps and comparison of one map with another. Every base map must be provided with a key map, chosen to a suitable scale at the right hand upper corner. A map will not make sense unless a list comprising of various symbols, etc. used for various types of elements shown is provided in the form of legend which is usually shown in the right hand side of the map. It is essential to give map a title. In the practice, titles of the study/project are which in a horizontal line at the bottom of the map. For urban development plans the base maps are to be drawn on large scale and should show all or part of the physical, topography and cultural features and administrative and planning boundaries as per the details given in below:

a) Physical (i) hills (ii) water bodies (iii) agricultural land and forest areas

b) Topography (i) transport network (airport, railways, roads, street, lanes, etc.) (ii) utility and service lines (iii) built-up areas by plot and parcels preferably with survey numbers (iv) contours at an interval of less than 5meters depending on physiography of town and scale of the map. 4

c) Cultural features (i) parks and gardens (ii) public and semi-public buildings (important landmarks) (iii) important archacological and historical monuments

d) Planning and administrative boundaries (i) municipal boundary (ii) census ward (iii) administrative subdivision limit (if any) (iv) planning area boundary (if identified) (v) gaothan area/abadi/settlement area (urban village or rural settlement within the municipal limits or on the fringe of the municipal town) (vi)cantonment area boundary (if any) (vii) grids (artificial or latitude and longitudes)

North point every base map must have a north point. Indication of north point is essential on the drawing and it could be located immediately above the tittle block of the map. Wherever possible north point should be shown along with the wind rose diagram. The north point on a map should, as far as possible, point upwards.

5.5 Application of Innovative Techniques for preparation of base maps

Aerial photography

Now a days, aerial photography is used for preparation of base map. Large scale aerial photography is being used for generation of base maps and thematic maps for urban areas as it proves to be cost and time effective reliable. Wealth of information pertaining to land features, land use, built-up areas, city structure and urban form, physical aspects of environment, etc. is available from the aerial photography. It is the skill of the interpreter who can extract the information useful for generation of various thematic map and graphic data required for preparation of urban development plan.

Geographical Information System

GIS is a compute based system, capable of input, storage, manipulation, analysis data useful for planning, decision-making and implementation. GIS is a powerful tool which helps planner to view different scenarios and their outcome so that an optimal strategy may be chosen for planning and development. It is basically a map processing technique and not for generation of base map. Once the spatial and attribute data is generated in GIS, its application areas are many and varied. These include resource inventory and management, planning and monitoring, land records for taxation and ownership controls, facilities and services management, environment impact assessment, etc. the PC-based GIS system is available in the market both in raster and vector modes and

data from remote sensing and other sources can be integrated. Planning agencies can acquire such system tohave quick analysis of geo-referenced data for planning and development.

Satellite Remote Sensing

Remote sensing data is used to study and monitor land features, natural resources and dynamic effects of human activities on urban areas. Today, with the resolution available, the application of remote sensing data for urban development plans could mainly be for assessment of natural resources, land use monitoring and planning and map-marketing. A broad base map of the city-region, indicating physical features including major road network, may be prepared quickly with the help of satellite imageries. Application of remote sensing data are numerous and it can be interpreted with the help of computer aided analysis. Both methods require certain amount of ground support information which should normally be collected by an interpreter to develop a key and is generally referred as ground truth. Using the ground truth or interpretation key, the remote sensing data is analyzed, interpreted and maps related to existing features, land use, broad settlement structure, resource 7 analysis, etc. could be generated. Visual interpretation is an easy technique and personnel having elementary training can make use of remote sensing data for generation of maps

5.6 EXISTING LAND USE SURVEY AND CLASSIFICATION OF LAND USES

The base map will complete the groundwork for conducting the existing land use survey. This is a basic survey carried out plot and is a pre-requisite for all planning work as well as plan enforcement. The accuracy of the existing land use map is very important as it will be used as the statutory requirement for giving or refusing planning permission and for compensation.

5.7 Conditions for roads in layout

The road width of different length of roads in layout shall be as per the table below:

Sl no	Type of road (m)	Width of road (m)	Maximum length of road (in meter)	
			plains	Hilly areas
1	Cul-de-sac	6.0	Upto 50.0	Upto 75.0
		7.5	Upto 75.0	Upto 100.0
		9.0	Upto 100.0	Upto 150.0
2	Residential roads	6.0	Upto 30.0	Upto 50.0
		7.5	30.0 to 100.0	50.0 to 150.0
		9.0	100.0 to 250.0	150.0 to 350.0
		12.0	250.0 to 400.0	350.0 to 500.0
		15.0	400.0 to 600.0	500.0 to 750.0
3	Commercial roads	12.0	Upto 250.0	Upto 350.0
		15.0	250.0 to 500.0	350.0 to 600.0
		18.0	500.0 to 750.0	600.0 to 1000.0
A		24.0	750.0 to 1250.0	1000.0 to 1500.0
B		30.0	Above 1250.0	Above 1500.0
4	Industrial roads	15.0	Upto 300.0	Upto 500.0
		18.0	300.0 to 500.0	500.0 to 750.0
C		24.0	500.0 to 750.0	750.0 to 1000.0
D		30.0	Above 750.0	Above 1000.0

1. Cul-de-sac shall be permitted only for residential roads.
2. Turning radius preferably 9m, not less than 7.5m shall be provided.
3. Roads having width greater than 18m and above are treated as commercial road, even in the residential layout.
4. Vertical alignment of roads in plains shall not be steeper than 1 in 30 and in hilly area, not steeper than 1 in 15.

5.7.1 Conditions for storm water drains in layout

1. Finalize the formed ground levels of entire layout including levels of roads.
2. Locate the position of storm water drains, both for road side drains and main drains 3. Cross section of each segment drain shall be based on following criteria.
   a. The rainfall of the region
   b. Soil porosity
   c. The extent of catchment area of each segment of the drain.
   d. Quality of water flowing from upstream
   e. Longitudinal slope of drains.

5.7.2 Condition for building sites in layout

1. All building sites have to be of regular size and shape. Exemption shall be provided in hilly areas due to undulating profile.
2. Minimum size of residential building site shall be 54.00sq.m, except for EWS housing.
3. Minimum size of non residential building site shall be 108sq.m.
4. Minimum size of non commercial building site shall be 216sq.m.

5.7.3 Conditions for space requirement for public utilities in layout

1. Water supply system:
   a. OHT,GLSR and pump house
   b. Fresh water filtration plant
   c. Rain water harvesting system 2. Sewage system:
   a. STP, storage tank and pump
house 3. Power supply system:
   a. Transformer yard and sub station
   b. Generator

PRINCIPAL
Principal
RAJARAJESWARI
COLLEGE OF ENGINEERING
Ramohalli Cross, Bengaluru-74

REFERENCE

1. Text book of irrigation engineering & hydraulic structures - **R.K.Sharma**, Oxford & IBH publishing Co., New Delhi (2002).

2. Irrigation$ Water resources engineering – **G.L.Asawa**, New Age International Publishers, New Delhi (2005).

3. Soil Mechanics and Foundation Engineering – **Punmia B.C**. (2005), 16th Edition Laxmi Publications Co., New Delhi.

4. Water supply engineering – **S.K.Garg**, Khanna publishers

5. Environmental engineering-I & II- **B.C.Punimia**&**Ashok Jain**.

PRINCIPAL
Principal
RAJARAJESWARI
COLLEGE OF ENGINEERING
Ramohalli Cross, Bengaluru-74

VISVESVARAYA TECHNOLOGICAL UNIVERSITY
BELGAUM-590014, KARNATAKA, INDIA

PROJECT REPORT

On

"Estimation of Water Demand and Adequacy of Existing Sewerage System for the proposed expansion at RRMCH"

Submitted in the partial fulfillment of the requirement for the award of the degree of
Bachelor of Engineering Degree in Civil Engineering

By

MAISNAM CHITTANKUMAR	**(1RR15CV044)**
MOHAMAD RAHIL	**(1RR15CV051)**
GEETA KAMMAR	**(1RR15CV111)**
AKASH G	**(1RR16CV401)**

Under the Guidance of

DR. D C SHARMA
Professor
Dept of civil Engineering,RRCE

DEPARTMENT OF CIVIL ENGINEERING
RAJARAJESWARI COLLEGE OF ENGINEERING
KUMBALAGODU, BENGALURU – 560074

RAJARAJESWARI COLLEGE OF ENGINEERING

#14, Ramohalli, Kumbalagodu, Mysore Road,
Bengaluru - 560074.
(Affiliated to Visvesvaraya Technological University & Approved by AICTE, New Delhi)

DEPARTMENT OF CIVIL ENGINEERING

CERTIFICATE

Certified that the project work entitled, "Estimation of Water Demand and Adequacy of Sewerage System for the proposed expansion at RRMCH" is a bonafide work carried out by **Maisnam Chittankumar(1RR15CV044), Mohamad Rahil(1RR15CV051), Geeta Kammar(1RR15CV111), Akash G(1RR16CV401)** a bonafide student of **Rajarajeswari College of Engineering** in the partial fulfillment for the VIII semester BE in Civil Engineering of the Visvesvaraya Technological University (VTU), Belgaum during the academic year 2018 - 2019. It is certified that the project report has been approved as it satisfies the academic requirements in respect of project work prescribed for the said degree.

Signature of the Guide

Dr. D C SHARMA

Professor

Dept. of civil engg.

R.R.C.E

Signature of the HOD

Dr. V RAMESH
Professor & HOD

Department of Civil Engineering
RAJARAJESWARI COLLEGE OF ENGINEERING
Dept. of civil engg.
Bengaluru-74

R.R.C.E

Signature of the Principal

Dr. R. BALAKRISHNA

Principal

R.R.C.E

PRINCIPAL
Principal
RAJARAJESWARI
COLLEGE OF ENGINEERING
Ramohalli Cross, Bengaluru-74

Name of the Examiners

1. RANJITHA K.P

2. ....

Signature with date

....

VISVESVARAYA TECHNOLOGICAL UNIVERSITY
"Jnanasangma", Belgaum-560014

A Project Report

on

"EXPERIMENTAL STUDY ON PARTIAL REPLACEMENT OF FINE AGGREGATE WITH GLASS POWDER IN CONCRETE"

Submitted in the partial fulfillment of requirement for the award of the degree of

BACHELOR OF ENGINEERING

In

CIVIL ENGINEERING

Submitted By

HEMANTHGOWDA P	**1RR16CV410**
SACHIN S M	**1RR16CV427**
SHARATH S	**1RR15CV084**
SAVITHA N	**1RR16CV428**

Under the guidance of
Mrs. BABITHA M
Assistant Professor,
Dept of Civil Engineering, RRCE

PRINCIPAL
Principal
RAJARAJESWARI
COLLEGE OF ENGINEERING
Ramohalli Cross, Bengaluru-74

DEPARTMENT OF CIVIL ENGINEERING

RAJARAJESWARI COLLEGE OF ENGINEERING

(#14, RAMOHALLI CROSS KUMBALGODU, MYSORE ROAD, BANGALORE 560074)
(An ISO 9001:2008 Certified Institute)

RAJARAJESWARI COLLEGE OF ENGINEERING

DEPARTMENT OF CIVIL ENGINEERING

CERTIFICATE

Certified that project Report entitled

"EXPERIMENTAL STUDY ON PARTIAL REPLACEMENT OF FINE AGGREGATE WITH GLASS POWDER IN CONCRETE"

Carried out by

HEMANTHGOWDA P	**1RR16CV410**
SACHIN S M	**1RR16CV427**
SHARATH S	**1RR15CV084**
SAVITHA N	**1RR16CV428**

Bonafied student of Rajarajeswari College of Engineering in partial fulfillment for the award of degree of Bachelor of engineering in the Project work of Civil Engineering during the year 2018-2019 as a part of Visvesvaraya Technological University, Belgaum. The project report has been approved as it satisfies the academic requirement in respect of project work prescribed for the said degree.

Signature of Guide	Signature of HOD	Signature of Principal
Mrs. BABITHA M	Dr. V RAMESH	Dr. R BALAKRISHNA
Assistant Professor,	Dept of Civil Engineering,	Principal
Dept of Civil Engineering,	R.R.C.E	R.R.C.E
R.R.C.E		

Name of the Examiners   **Signature**

1. M.C MALARVIZHI RRCE

2.

VISVESVARAYA TECHNOLOGICAL UNIVERSITY

"Jnanasangma",Belgaum-560014

A Project Report

on

"STRUCTURAL EVALUATION OF PERVIOUS CONCRETE USING GLASS FIBRES"

Submitted in the partial fulfillment of requirement for the award of the degree of

BACHELOR OF ENGINEERING

In

CIVIL ENGINEERING

Submitted By

SATHISHA B C	**1RR14CV078**
SHREYAS K	**1RR14CV082**
BEERESH L E	**1RR16CV404**
DIGAMBAR SUTAR	**1RR16CV407**

Under the guidance of
Mr. ANUP D P
Assistant Professor,
Dept of Civil Engineering,RRCE

PRINCIPAL
Principal
RAJARAJESWARI
COLLEGE OF ENGINEERING
Ramohalli Cross, Bengaluru-74

DEPARTMENT OF CIVIL ENGINEERING

RAJARAJESWARI COLLEGE OF ENGINEERING

(#14,RAMOHALLI CROSS KUMBALGODU, MYSORE ROAD,BANGALORE 560074)
(An ISO 9001:2008 Certified Institute)

2019

RAJARAJESWARI COLLEGE OF ENGINEERING

DEPARTMENT OF CIVIL ENGINEERING

CERTIFICATE

Certified that the project work entitled

"STRUCTURAL EVALUATION OF PERVIOUS CONCRETE
USING GLASS FIBRES"

carried out by

SATHISHA B C	1RR14CV078
SHREYAS K	1RR14CV082
BEERESH L E	1RR16CV404
DIGAMBAR SUTAR	1RR16CV407

Bonafide students of Rajarajeswari College of Engineering in partial fulfillment for the award of degree of Bachelor of engineering in the project work of Civil Engineering during the year 2018-2019 as a part of Visvesvaraya Technological University, Belgaum. The project report has been approved as it satisfies the academic requirement in respect of project work prescribed for the said degree.

Signature of Guide
Mr. ANUP D P
Assistant Professor,
Dept of Civil Engineering,
R.R.C.E

Signature of HOD
Dr. V RAMESH
Professor & HOD
Dept of Civil Engineering,
Department of Civil Engineering
RAJARAJESWARI R.R.C.E COLLEGE OF ENGINEERING
Bengaluru-74

Signature of Principal
Dr. R. BALAKRISHNA
Principal
R.R.C.E

Name of the Examiners

Signature with date

1. M.C. MALARVIZHI. RRCE 12/06/19

2. ...PRATHASH.D................... 18/06/19

PRINCIPAL
Principal
RAJARAJESWARI
COLLEGE OF ENGINEERING

VISVESVARAYA TECHNOLOGICAL UNIVERSITY
"Jnana sangma", Belgavi-560018

A Project Report

on

"EXPERIMENTAL STUDY OF PERVIOUS CONCRETE AS A PAVEMENT AND STRENGTH IMPROVEMENT USING POLYPROPYLENE FIBERS"

Submitted in the partial fulfilment of requirement for the award of the degree

of

BACHELOR OF ENGINEERING
In
CIVIL ENGINEERING

Submitted By

AKSHAY KUMAR SHETTY	1RR15CV004
BANDESH PASODI	1RR15CV010
BASAVARAJ NUCHCHI	1RR15CV011
HEMA H	1RR16CV409

Under the guidance of
Mr. GOKUL G
Assistant Professor,
Dept of Civil Engineering, RRCE

PRINCIPAL
Principal
RAJARAJESWARI
COLLEGE OF ENGINEERING
Ramohalli Cross, Bengaluru-74

DEPARTMENT OF CIVIL ENGINEERING

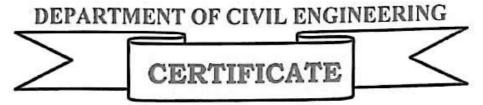# RAJARAJESWARI COLLEGE OF ENGINEERING
(#14, RAMOHALLI CROSS KUMBALGODU, MYSORE ROAD, BANGALORE 560074)
(An ISO 9001:2008 Certified Institute)

2019

RAJARAJESWARI COLLEGE OF ENGINEERING

PRINCIPAL
Principal
RAJARAJESWARI
COLLEGE OF ENGINEERING
Ramohalli Cross, Bengaluru-74

DEPARTMENT OF CIVIL ENGINEERING

CERTIFICATE

Certified that the project work entitled

"EXPERIMENTAL STUDY OF PERVIOUS CONCRETE AS A PAVEMENT AND STRENGTH IMPROVEMENT USING POLYPROPYLENE FIBERS"

Carried out by

AKSHAY KUMAR SHETTY	1RR15CV004
BANDESH PASODI	1RR15CV010
BASAVARAJ NUCHCHI	1RR15CV011
HEMA H	1RR16CV409

Bonafied students of Rajarajeswari College of Engineering in partial fulfillment for the award of degree of Bachelor of engineering in the project work of Civil Engineering during the year 2018-2019 as a part of Visvesvaraya Technological University, Belgaum. The project report has been approved as it satisfies the academic requirement in respect of project work prescribed for the said degree.

Signature of Guide	Signature of HOD	Signature of Principal
Mr. GOKUL G 07/06/2019	Dr. V RAMESH	Dr. R BALAKRISHNA
Asst Professor ,	Professor,	Principal,
Dept Of Civil Engg,	Dept Of Civil Engg,	RRCE
RRCE	RRCE	

Name of the Examiners   Signature with date

1. RANJITHA. K.P

2. Anup D.P

RAJARAJESHWARI COLLEGE OF ENGINEERING

No 14 Ramohalli cross, mysore road, kumbalgodu,

Bangalore-560074

RajaRajeswari
College of Engineering

CERTIFICATE

This is to Certify that Mr. Sunil M Alur USN:1RR16CV083. Has successfully completed Internship Programme in Turnkey Construction Engineers. A bonafide student of Rajarajeshwari college of Engineering in partial fulfilment for the award of Bachelor of Engineering in Civil Engineering of the Visveswaraiah Technological University, Belgaum during the year 2019-20. It is certified that he has completed the Internship Program Successfully.

Signature of Guide   Signature of HOD   Signature of Principal

[Ashwini L.K]   [Dr. V. Ramesh]   [Dr. T. Chandrashekar]

Professor & HOD
Department of Civil Engineering
RAJARAJESWARI COLLEGE OF ENGINEERING
Bengaluru

Principal
RAJARAJESWARI
COLLEGE OF ENGINEERING
Ramohalli Cross, Bengaluru-74

Name of the examiners Signature with date

1. ....

2. ....

PRINCIPAL
Principal
RAJARAJESWARI
COLLEGE OF ENGINEERING
Ramohalli Cross, Bengaluru-74

DEPARTMENT OF CIVIL ENGINEERING-RRCE   2

Turnkey Construction Engineers.

Supplies | Real Estate Services | Manpower.

TURNKEY

Date: 10 FEB 2020

Place: Bengaluru

TO WHOMSOEVER IT MAY CONCERN

This is to certify that **Mr. Sunil M. S/o Muniraju R. [USN:1RR16CV083]** B.E- Civil Engineering 4th Year Student of RajaRajeshwari College of Engineering, Bengaluru, has Successfully Completed Internship Training in Turnkey Construction Engineers. From 3rd Jan 2020 to 3rd Feb 2020.

We Wish him all the best for his Carrier and His Future endeavor.

Thanking You,

No.39/1, 2nd floor, Sannidhi Road, NR Colony, Basavanagudi Bengaluru, Karnataka 560004.
+91-86602 59406
turnkeyconstruction@gmail.com

PRINCIPAL
Principal
RAJARAJESWARI
COLLEGE OF ENGINEERING
Ramohalli Cross, Bengaluru-74

RAJARAJESHWARI COLLEGE OF ENGINEERING

No 14 Ramohalli cross, mysore road, kumbalgodu,

Bangalore-560074

RajaRajeswari
College of Engineering

CERTIFICATE

This is to Certify that Mr. Sangamesh L Alur USN:1RR16CV068. Has successfully completed Internship Programme in Turnkey Construction Engineers. A bonafide student of Rajarajeshwari college of Engineering in partial fulfilment for the award of Bachelor of Engineering in Civil Engineering of the Visveswaraiah Technological University, Belgaum during the year 2019-20. It is certified that he has completed the Internship Program Successfully.

The Internship report has been approved as it satisfies the academic requirements in respect of Internship work prescribed for the said Degree.

Signature of Guide   Signature of HOD   Signature of Principal

[Ashwini L.K]   [Dr. V. Ramesh]   [Dr. T. Chandrashekar]

Principal
RAJARAJESWARI
COLLEGE OF ENGINEERING
Ramohalli Cross, Bengaluru-74

Name of the examiners Signature with date

1. ....

2. ....

DEPARTMENT OF CIVIL ENGINEERING-RRCE

PRINCIPAL
Principal
RAJARAJESWARI
COLLEGE OF ENGINEERING
Ramohalli Cross, Bengaluru-74   2 | P a g e

Turnkey Construction Engineers.

TURNKEY

Supplies | Real Estate Services | Manpower.

Date: 10 FEB 2020

Place: Bengaluru

TO WHOMSOEVER IT MAY CONCERN

This is to certify that **Mr. Sangamesh L Alur, S/o Laxman G Alur [USN:1RR16CV068]** B.E. Civil Engineering 4th Year Student of RajaRajeshwari College of Engineering, Bengaluru, has Successfully Completed Internship Training in Turnkey Construction Engineers. From 3rd Jan 2020 to 3rd Feb 2020.

We Wish him all the best for his Carrier and His Future endeavor.

Thanking You,

PRINCIPAL
Principal
RAJARAJESWARI
COLLEGE OF ENGINEERING
Ramohalli Cross, Bengaluru-74

No 39/1, 2nd floor, Sannidhi Road, NR
Colony, Basavanagudi Bengaluru,
Karnataka 560004
+91-86602 59406
turnkeyconstruction@gmail.com

RAJARAJESHWARI COLLEGE OF ENGINEERING

No 14 Ramohalli cross, mysore road, kumbalgodu,

Bangalore-560074

RajaRajeswari
College of Engineering

CERTIFICATE

This is to Certify that Mr. Sanjay D Alur USN:1RR16CV069. Has successfully completed Internship Programme in Turnkey Construction Engineers. A bonafide student of Rajarajeshwari college of Engineering in partial fulfilment for the award of Bachelor of Engineering in Civil Engineering of the Visveswaraiah Technological University, Belgaum during the year 2019-20. It is certified that he has completed the Internship Program Successfully.

The Internship report has been approved as it satisfies the academic requirements in respect of Internship work prescribed for the said Degree.

Anil

Signature of Guide

Signature of HOD   Signature of Principal

[Ashwini L.K]

[Dr. V. Ramesh]

[Dr. T. Chandrashekar]
Principal
RAJARAJESWARI
COLLEGE OF ENGINEERING
Ramohalli Cross, Bengaluru-74

Name of the examiners Signature with date

1. ....

2. ....

PRINCIPAL
Principal
RAJARAJESWARI
COLLEGE OF ENGINEERING
Ramehalli Cross, Bengaluru-74

Department of Civil Engineering, RRCE.

2 | P a g e

Turnkey Construction Engineers.

Supplies | Real Estate Services | Manpower.

TURNKEY

Date: 10 FEB 2020

Place: Bengaluru

TO WHOMSOEVER IT MAY CONCERN

This is to certify that Mr. Sanjay D. S/o Dayananda [USN:1RR16CV069] B.E- Civil Engineering 4th Year Student of RajaRajeshwari College of Engineering, Bengaluru, has Successfully Completed Internship Training in Turnkey Construction Engineers. From 3rd Jan 2020 to 3rd Feb 2020.

We Wish him all the best for his Carrier and His Future endeavor.

Thanking You.

No.39/1, 2nd floor, Sannidhi Road, NR Colony, Basavanagudi Bengaluru, Karnataka 560004.
+91-86602 59406
turnkeyconstruction@gmail.com

PRINCIPAL
Principal
RAJARAJESWARI
COLLEGE OF ENGINEERING
Ramohalli Cross, Bengaluru-74

RAJARAJESHWARI COLLEGE OF ENGINEERING

No 14 Ramohalli cross, mysore road, kumbalgodu,

Bangalore-560074

RajaRajeswari
College of Engineering

CERTIFICATE

This is to Certify that Mr. Sanjay N Alur USN:1RR16CV070. Has successfully completed Internship Programme in Turnkey Construction Engineers. A bonafide student of Rajarajeshwari college of Engineering in partial fulfilment for the award of Bachelor of Engineering in Civil Engineering of the Visveswaraiah Technological University, Belgaum during the year 2019-20. It is certified that he has completed the Internship Program Successfully.

The Internship report has been approved as it satisfies the academic requirements in respect of Internship work prescribed for the said Degree.

V. Professor & HOD
Department of Civil Engineering
RAJARAGESWARI COLLEGE OF ENGINEERING
Bengaluru-76

20|8|-20

Signature of Guide   Signature of HOD   Signature of Principal

[Ashwini L.K]   [Dr. V. Ramesh]   [Dr. T. Chandrashekar]

Principal
RAJARAJESWARI
COLLEGE OF ENGINEERING
Ramohalli Cross, Bengaluru-7/

Name of the examiners Signature with date

PRINCIPAL
Principal
RAJARAJESWARI
COLLEGE OF ENGINEERING
Ramohalli Cross, Bengaluru-74

1. ....

2. ....

Turnkey Construction Engineers.

TURNKEY
CONSTRUCTION

Supplies | Real Estate Services | Manpower.

Date: 10 FEB 2020

Place: Bengaluru

TO WHOMSOEVER IT MAY CONCERN

This is to certify that **Mr. Sanjay N. S/o G Narayana swamy [USN:1RR16CV070]** B.E- Civil Engineering 4th Year Student of RajaRajeshwari College of Engineering, Bengaluru, has Successfully Completed Internship Training in Turnkey Construction Engineers. From 3rd Jan 2020 to 3rd Feb 2020.

We Wish him all the best for his Carrier and His Future endeavor.

Thanking You,

PRINCIPAL
Principal
RAJARAJESWARI
COLLEGE OF ENGINEERING
Ramohalli Cross, Bengaluru-74