1.3.2 Average percentage of courses that include experiential learning through project work/field work/internship during last five years (10)

Program name	Program code	Name of the Course that include experiential learning through project work/field work/internship	Course code	Year of offering	Name of the student studied course on experiential learning through project work/field work/internship
		2017-2018			
BE Biotechnology Engineering	18	Microbial Technology	318352(18)	2017-18	RATIKA BHARGAVA, HEENA CHANDRAKAR, YOGENDRA KUMAR
BE Biotechnology Engineering	18	Agriculture Technology	318833(18)	2017-18	SUSHMA SAHU, ANUJ KUMAR RAJWADE, ARNAV KSHAYARSH, TARUN RAM, DEEPAK KUMAR, KHUSHBOO KORRAM, SUNANDA YADAV, INDU, MITALI HEMANT ALONE, Dikesh Kumar Gurupahachan, Kamlesh Patel, Velupula kartik
BE Biotechnology Engineering	18	Recombinant DNA technology	318454(18)	2017-18	AYUSHMAAN DEV MURARI
BE Biotechnology Engineering	18	Industrial Biotechnology	318831(18)	2017-18	SHAYRA FATIMA, MINALI KOSLEY
BE Biotechnology Engineering	18	Bioprocess Technology	318651 (18)	2017-18	Ankita Sharma
BE Biotechnology Engineering	18	Medical Biotechnology, Phytochemistry	318456(18), 318354(11)	2017-18	Aparna Tiwari
BE Biotechnology Engineering	18	Biofuel technology	318743(18)	2017-18	Dikesh Kumar Gurupahachan, Kamlesh Patel, Velupula kartik
BE Biotechnology Engineering	18	Recombinant DNA technology	318454(18)	2017-18	Prateek Jaswani, Bhavya Singh, Shreyas Raju, Yamank Banjare
BE Biotechnology Engineering	18	Environmental Biotechnology	318653 (18)	2017-18	Rajeshwari Sahu, Chandra Mohan Jangde
BE Biotechnology Engineering	18	Tissue Culture	318555(18)	2017-18	Shanta, Shivani Sharma, Shashank Sahu, Rahul Sahu
BE Chemical Engineering	19	Separation Processes - II	319733(19)	2017-18	AMAN SHARMA, IVAN ALI, NAYNA AGRAWAL, RAVI POPTANI, RAHUL KUMAR CHAUHAN, TAPAN SHARMA, ASHIT KU. SINGH , SOMYA MANDLOI, YASH BONTALWAR, ANUP MISTRI, RISHI RAH TRIPATHI, MOHIT CHAWDA, MAHIPAL SINGH RAJPUROHIT
BE Chemical Engineering	19	Non conventional energy sources	300809(19)	2017-18	NEERAJ VISHWAKARMA
BE Chemical Engineering	19	Environmental Pollution and Control	319452(19)	2017-18	ALIK KU. SAHU, BHARTI KOSHTI, VENKATESHWAR
BE Chemical Engineering	19	Fuel Technology	319455(19)	2017-18	KAVYA CHANDRAKAR SUMIT KUMAR CHINMAYEE MOHANTY
B.E Chemical Engineering	19	Process Stoichiometric Calculations,	319453(19)	2017-18	AMIT NAYAK, ANAM MASOOD, ANKITA, PARUL SINGH, RUKMANGAD CHANDRAKAR, S JAID MOHEMMED, SHRUTI SAHU, VIDHYA SAGAR VERMA, YEESHU PATEL
		Heat Transfer,	319453(19)		
		Separation Process I	319653 (19)		

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B.E Chemical Engineering	19	Fuel Technology	319455(19)	2017-18	PRACHI SAHU, PIYUSH KUMAR SAHU, TARUN SAHU, BALWANT KUMAR CHAUHAN, ANJULATA PANDEY, ANUJ DANDEKAR, DIVYA TURHATE, JAY PRAKASH DEWANGAN, PALLAV PATHE, PRAFUL VERMA, RAHUL KASHIPURI, RESHMA RAJU, SANDHYA MAHANT, SHEIKH IMRAN ALI, SHRISTI KALKAR, SHUBHI SONI, SUMIT AGARWAR, T ABHIVANDAN, UMASHANKAR SAHU, Y SHUBHAM, PRACHITI APTE
		Organic Process Technology	319456(11)		
		Inorganic Process Technology	319733(19)		
		Material Technology,	319653 (19)		
		Organic Chemistry	319453(19)		
		Fluid and Paticle Operation	319352(19)		
BE Civil Engineering	20	Building Construction	320455 (20)	2017-18	ABHISHEK RAHANGDELE
					DEVASHISH BAGHEL
					NALINI SINGH
					PRIYANKA KUSHWAHA
					GAGAN SAHU
					ROHIT KU. SINGH
BE Civil Engineering	20	Environmental Engineering - II	320733(20)	2017-18	NEERAJ SINGH THAKUR
					JASMEET SINGH MATHARU
					VAIBHAV SINGH RAJPUT
					ROSHNI BHONSLE
					VIBHA CHANDRAWANSHI
					VARENDRA PAL GAYAKWAD
					JYOTI DUBEY
					CHANDAN VERMA
					TRILOKEE NATH SINHA
					RAVIKANT VERMA
					SATYANT SONKAR
					RAMAN MALADHARE
BE Civil Engineering	20	Environmental Engineering -`II	320733(20)	2017-18	DEEPESH AGRAWAL
					JAGDEEP SUNHARE
					TEKESHWAR KANNAUJE
					VIKAS KU. JANGDE
BE Civil Engineering	20	Concrete Technology	320654 (20)	2017-18	ATUL GUPTA
					BHUMIKA YADAV
					JYOTI SAHU
					PRAKASH TIWARI
					PRAVIN JAISWAL
					RAHUL AMBAST
					RAJU VERMA
					YOGESH SINGH
BE Civil Engineering	20	Concrete Technology	320654 (20)	2017-18	SIDDHARTH RAMTEKKAR
					NIKHIL SAHU
					HARSH SHARMA
					SATYANARAYAN KASTURIYA
					PRATIK MITTAL
					GAURAV VERMA
					PRITIKA CHAUBEY
BE Civil Engineering	20	Building Construction	320455 (20)	2017-18	ADARSH DAHAYAT
					ANKIT DAHARIYA
					CHETNA SAHU
					HAREESH SAHU
					SHRADDHA VERMA
					ADITI GOSWAMI
					AZADCHAND MAHAJAN
					GAGAN SINGH KURREY
					VIKRAM VASHISHTHA ADITYA

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BE Civil Engineering	20	Building Construction	320455 (20)	2017-18	RINTU DAS
					NIKHIL BRAHAMBHATT
					MANISH KU. SAHU
					ABHAS CHANDRAKAR
					DIKESH JANGDE
					SHEETAL TIGGA
					MOHNISH DEO
					DEEPIKA JHADI
					SUBHASH CHAND SAHU
					AAKRITI JERRY
					DEEKSHA VERMA
					SAKSHI CHANDRAKAR
					PRASHANT SIRSAJ
					SUSHMITA SINGH SUMAN
BE Civil Engineering	20	Building Construction	B020414(020)	2017-18	AAMIR AHMED
		Surveying and Geomatics Surveying	B020413(020)		ABHISHEK GOLDAR
		Structural Analysis – I	B020411(020)		ABHISHEK RATHORE
		Building Materials	B020315(020)		ALOK KUMAR GUPTA
		Structural Engineering Design-I	C020511(020)		ANKIT MANEKAR
		Environmental Engineering	C020612(020)		ANKUR MINZ
					BHARTI ODEDARA
					BIPUL KASHYAP
					BITTU SAHU
					DHARMA CHARYA DINDAYAL S KUMAR
					ESHA PAKARIYA
BE Civil Engineering	20	Building Construction	B020414(020)	2017-18	GAJENDRA SINGH RAGHUWANSHI
		Surveying and Geomatics Surveying	B020413(020)		GULESH SAHU
		Structural Analysis – I	B020411(020)		HARSH KUMAR THAKUR
		Building Materials	B020315(020)		HARSHIT JAISWAL
		Structural Engineering Design-I	C020511(020)		ISHA MUKHERJEE
					JAYAWANT TIRKEY
					KSHITIJ NAMDEO
					KUNDAN KUMAR SAHU
					MANISH FARIKAR
					MD MOKARRAM MUMTAZ
BE Civil Engineering	20	Building Construction	B020414(020)	2017-18	MOHIT VISHWAKARMA
		Surveying and Geomatics Surveying	B020413(020)		MONIKA LODHI
		Structural Analysis – I	B020411(020)		NEERAJ NAIK
		Building Materials	B020315(020)		NIKET CHANDRAKAR
		Structural Engineering Design-I	C020511(020)		NISHANT JAIN
		Environmental Engineering	C020612(020)		PARAG AGRAWAL
					PRINCI PRIYANTI DHANSON
					QUAZI MD ATAUR RAHIM KHAN
					RAHUL MEENPAL
					RAJBHARTI NEVENDRA
BE Civil Engineering	20	Surveying and Geomatics Surveying	B020413(020)	2017-18	RAKESH RANJAN
		Structural Analysis – I	B020411(020)		RISHABH KUMAR SONI
		Building Materials	B020315(020)		RITESH KOSMA
		Structural Engineering Design-I	C020511(020)		RITUSHA NISHAD
		Concrete Technology	C020632(020)		SACHIN KUMAR GUPTA
					SAGAR SHRIVASTAVA
					SANDEEP SINGH
					SAURABH KANWAR

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BE Civil Engineering	20	Surveying and Geomatics Surveying	B020413(020)	2017-18	SHIKHA NAMDEO
		Engineering economics, estimating and costing	C020613(020)		SHREY MANDAVI
		Building Materials	B020315(020)		SHUBHAM VIMAL PATEL
		Structural Engineering Design-I	C020511(020)		STUTI TRIPATHI
		Concrete Technology	C020632(020)		SUDHANSHU SHARMA
					TRISHANK CHANDRAKAR
					VIJAY LAXMI TUMRETI
					VIKESH GHORMARE
					VISHAL KUMAR CHAUHAN
BE Civil Engineering	20	Surveying and Geomatics Surveying	B020413(020)	2017-18	VIVEK PRAJAPATI
		Engineering economics, estimating and costing	C020613(020)		YOGESH MAHILANG
		Building Materials	B020315(020)		AMAR SINGH
		Structural Engineering Design-I	C020511(020)		ISHU KUMAR SAHU
		Concrete Technology	C020632(020)		LOKESHWAR SAHU
					SETUVENDRA JAIN
					TILAK RAM SAHU
					VIVEK GIREPUNJE
					RAKESH SONKAR
					TOSHAN SAHU
BE Civil Engineering	20	Building Construction	B020414(020)	2017-18	AKHILESH KUMAR SAHU
		Surveying and Geomatics Surveying	B020413(020)		AMIT KUMAR DEWANGAN
		Structural Analysis – I	B020411(020)		ANKIT KUMAR CHANDRAKAR
		Building Materials	B020315(020)		ANMOL CHANDRAKAR
		Structural Engineering Design-I	C020511(020)		AZIMUR RAHMAN
		Environmental Engineering	C020612(020)		BRIJESH SINHA
					DEEKSHA SINGH
					DEEPAK KUMAR
BE Civil Engineering	20	Surveying and Geomatics Surveying	B020413(020)	2017-18	DEEPAK RAJPUT
		Engineering economics, estimating and costing	C020613(020)		DIPTI JANGHEL
		Building Materials	B020315(020)		GAGAN PREET SINGH
		Structural Engineering Design-I	C020511(020)		GARIMA SINHA
		Concrete Technology	C020632(020)		GITESH KUMAR BHARTI
					HIMANSHU SINHA
					HIMANSHU YADU
					ISTIYAQ AHMAD RAZA
BE Civil Engineering	20	Surveying and Geomatics Surveying	B020413(020)	2017-18	JHANENDRA BAGHEL
		Geotechnical Engineering	C020513(020)		KETAN PATEL
		Building Materials	B020315(020)		KHAGENDRA KUMAR PATEL
		Transportation Engineering	C020514(020)		KIUSH SHARMA
		Traffic Engg	320750(20)		MD SADDAM
		Environmental Engineering	C020612(020)		NAVRATN VERMA
					NITISH SAHU
					PARTH KOTAK
					PRAVEEN KUMAR DEWANGAN

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BE Civil Engineering	20	Building Construction	B020414(020)	2017-18	PRITAM MANI
		Surveying and Geomatics Surveying	B020413(020)		RAJEEV DEWANGAN
		Computer Aided Civil Engineering Drawing lab	C020623(020)		RAVIKISHAN KOSLE
		Building Materials	B020315(020)		SADAB KHERANI
		Structural Engineering Design-I	C020511(020)		SANJAY KUMAR KEWAT
					SAWAN SINGH PARIHAR
					SHUBHAM SINGH THAKUR
					SPARSH RAO
					SUDHEER KUMAR
BE Civil Engineering	20	Building Construction	B020414(020)	2017-18	SUJEET KUMAR SHARMA
		Surveying and Geomatics Surveying	B020413(020)		SUNIL KUMAR
		Building Materials	B020315(020)		SURAJ PRAKASH
		Structural Engineering Design-I	C020511(020)		TAKESHWER DEWANGAN
		Engineering economics, estimating and costing	C020613(020)		UMESH KUMAR SAHU
					VIKRAM SINGH RAJPUT
					YASHWANT KUMAR
					YUVRAJ SAHU
					DEVESH NANDANWAR
					ANUPAM SHUKLA
					BHAVESH SAHU
					BHUPENDRA KOSHLE
BE Civil Engineering	20	Building Construction	B020414(020)	2017-18	DIPAK KU.DEWANGAN
		Surveying and Geomatics Surveying	B020413(020)		DEKESHWAR RAMANANADI
		Structural Analysis – I	B020411(020)		DEVENDRA KOTE
		Building Materials	B020315(020)		KULDEEP SEN
		Structural Engineering Design-I	C020511(020)		MITHILESH SINHA
		Environmental Engineering	C020612(020)		PRAKASH SINHA
					VIKASH KUMAR
					SATYENDRA CHANDRAKAR
					SAURABH SAWAN
					VINAY KUMAR YADAV
BE Computer Science & Engineering	22	Database Management System	322556(22)	2017-18	SIDDHARTH CHANDRAKAR
					RAJNISH SINGH
BE Computer Science & Engineering	22	Database Management System	322556(22)	2017-18	MONIKA CHHABDA
					SHRISHTI JHA
					NIKITA THOURANI
BE Computer Science & Engineering	22	Software Engineering & Project Management	322654(22)	2017-18	MAYANK PATEL
					Md. HASSAN
					KAHAT RAM KORACHE
BE Computer Science & Engineering	22	Artificial Intelligence & Expert Systems	322831(22)	2017-18	HARSHITA SINGH
					RUPALI GUPTA
					KHUSHBOO SAHU
BE Computer Science & Engineering	22	Database Management System	322556(22)	2017-18	AKASHDEEP
					NISHANT SONI
					PUSHKAR JHA
BE Computer Science & Engineering	22	Real Time Systems	322845(22)	2017-18	BINISH SHAMES
					ASTHA PATHAK
					ITIKA RAJPUROHIT
					GOMTI BAIS
BE Computer Science & Engineering	22	Artificial Intelligence & Expert Systems	322831(22)	2017-18	PRIYANKA SINHA
					SOMA MUKHERJEE
					RUCHI PRIYA
BE Computer Science & Engineering	22	Database Management System	322556(22)	2017-18	KRISHNA KUMAR RAY
					RAGHVENDRA VERMA
BE Computer Science & Engineering	22	Cryptography & Network Security	322734(22)	2017-18	ANJALI SINGH
					PRIYAKAMARI

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		Security			R. RESHMA
BE Computer Science & Engineering	22	Pattern Recognition	322846(22)	2017-18	RAGINI KASHYAP
					SHALINI SONI
					SHRADDHA NAYAK
BE Computer Science & Engineering	22	Database Management System	322556(22)	2017-18	ABHISHEK TUPPARWAR
					RAJA SINGH
					K. V. PAWAN SHIRISH
BE Computer Science & Engineering	22	Digital Image Processing	322740(22)	2017-18	YASH BAID
					MAYANK JAIN
BE Electronics & Telecommunication Engineering	28	Automatic Control System	328556(28)	2017-18	DILENDRA KUMAR NISHAD
					HARI SHANKAR SHARMA
					TANYA KARMAKAR
BE Mechanical Engineering	37	Energy Systems	337652 (37)	2017-18	SATYAM SHARMA, SIDDHANT BAJAJ, UMASHANKAR VERMA, YOGENRA SAHU, RAJUL MESHRAM, VIJAY KUMAR, GHANSHYAM SAHU, JITENDRA SAHU, IJESH KU. SAHU, DEVENDRA
BE Mechanical Engineering	37	Finite Element Methods	337832(37)	2017-18	ADITYA KUMAR
					ASHISH RATHORE
					HIMANSHU SINGH
					MITHILESH VERMA
					ADITYA KUMAR KAUSHIK
BE Mechanical Engineering	37	Robotics	337831(37)	2017-18	ABHISHEK SAHU, DINESH MANHARE, LAXMIKANT SAHU, NARESH DHIWAR, RAHUL KUMAR MANDAL, VINAY KUMAR DANSENA, VIVEK SHARMA, ABHISHEK GARDIYA, HEMANT KUMAR
BE Mechanical Engineering	37	Machine Design – II	337651 (37)	2017-18	AMAR AGRAWAL
					ARUN SAHU
					DEEPAK SAHU
					NEWTON KUMAR
					RAMPRIYA TIWARI
BE Mechanical Engineering	37	Internal Combustion Engines	337653 (37)	2017-18	AMIT YADAV
					DEVANAND JANGDE
					INDRAJEET SINGH
					RAGHVENDRA DIWAN
					SACHIN SHORI
					SHAIL KUMARI
BE Mechanical Engineering	37	Turbo Machinery	337552 (37)	2017-18	ADITYA KU. RATHORE
					LAXMAN SHRIVAS
					MRITYUNJAY SHARMA
					RAKESH VERMA
					SRIJAN KUMAR
BE Mechanical Engineering	37	Manufacturing Science - II	337555 (37)	2017-18	SUDHIR DEWANGAN
					SHUBHAM SINGH
					ANIBHAV PAWAR
					AJAY SAHU
					VIKAS SINGH
					PUSPKAR VERMA
BE Mechanical Engineering	37	Computer Aided Design & Manufacturing	337733(37)	2017-18	VIKAS KU. SINGH
					AKASH BISHI
					M. SRIKANTH
					VIKAS YADAV
					RUPESH KUMAR
BE Mechanical Engineering	37	Refrigeration & Air-conditioning	337732(37)	2017-18	VISHWAJEET AHIRWAR
					VIRENDRA KUMAR GAVEL,
					SANDIP KUMAR
					SHAILESH RAJ
BE Mechanical Engineering	37	Machine Tool Technology	337734(37)	2017-18	PURUSHOTTAM KUMAR, BHAWANI KUMAR BHATT, GANPATI BISHWAS, RAHUL SAO, MUKESH

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		Technology			KUMAR, ROHIT YADAV, RAVISHEKHAR, RAHUL KUMAR,
BE Mechanical Engineering	37	Machine Design – II	337651 (37)	2017-18	RISHIKESH KUMAR
					RANJEEV KUMAR SINGH
					SIDDHARTH SINGH
					ABHAY KU. MINZ
BE Mechanical Engineering	37	Kinematics of Machines	337454(37)	2017-18	JAYJAY RAM RAUT
					KAPOOR P.
					SANAT RATHORE
					MORDHWAJ YADAV
M. Tech. Environmental Engineering	30	Water Pollution Control	530114 (19)	2017-18	NAGARJUN BOOREPALLI, PARULOKHADE, ROHIT KUMAR SHRIVASTAVA, DIKSHARUGHTA, OMKAR VERMA,ROLLY VAISHNAVA
M. Tech. Environmental Engineering	30	Energy & Environment	530131 (19)	2017-18	MANISH KUMAR SHARMA, YOGESH KUMAR BANI
M.Tech Computer Science & Engineering	22	Digital Image Processing (Prerequisite Digital Signal Processing)	522235 (22)	2017-18	Sachin Paswan, Deepika Ingle, Rajeev Kumar Sao, Ankita Sonwani
M.Tech Computer Science & Engineering	22	Analysis and Design of Algorithms	522134 (22)	2017-18	Priyanka Indoria, Sonia Jain
M.Tech Computer Science & Engineering	22	Advanced Operating System	522111 (22)	2017-18	Aakash Kulmitra
M.Tech Computer Science & Engineering	22	Advanced Computer Architecture	522113 (22)	2017-18	Chandra Kiran Sahu
M.Tech Computer Science & Engineering	22	Advanced Computer Networks	522114 (22)	2017-18	Akanksha Dewangan
M.Tech Computer Science & Engineering	22	Software Engineering Techniques	522213 (22)	2017-18	Sangita Vishwkarma
M.Tech Computer Science & Engineering	22	Neural Networks	522231 (22)	2017-18	Megha Kadam
M.Tech Computer Science & Engineering	22	Computer Graphics & Multimedia	522214 (22)	2017-18	Ruchi Pandey
M.E.Power Electronics	5062	Power Electronics in wind & Solar Power Converters	562333(24)	2017-18	Mr. Roshan Lal Koshle
M.E.Power Electronics	5062	Power Electronics Drives	562212(24)	2017-18	Ms. Deepshikha Nayak
M.E.Power Electronics	5062	Microcontroller & Embedded System Design	562113(24)	2017-18	Mr. Brijesh Rajput
M.E.Power Electronics	5062	Modelling & Analysis of Electrical Machines	562132(24)	2017-18	Ms. Shobha Goswami
M.E.Power Electronics	5062	Power Electronics Drives	562212(24)	2017-18	Mr. Sourabh Sahu
M.E.Power Electronics	5062	Microcontroller & Embedded System Design	562113(24)	2017-18	Mrs. Bhawana Deshmukh
M.E.Power Electronics	5062	Power Converters	562111(24)	2017-18	Mr. Shreya Anant Srndiman
M.E.Power Electronics	5062	Microcontroller & Embedded System Design	562113(24)	2017-18	Mr. Vidya Sagar
M.E.Power Electronics	5062	Microcontroller & Embedded System Design	562113(24)	2017-18	Ms. Nivedita Hedau
M.Tech.Thermal Engineering	64	Modeling & Simulation of Thermal Systems	564211 (37)	2017-18	KETAN KUMAR CHOUHAN
M.Tech.Thermal Engineering	64	Energy Management	564421 (37)	2017-18	NEHA SONKAR, AVI VERMA

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M.Tech.Thermal Engineering	64	Advance Fluid Mechanics	564113 (37)	2017-18	UTTAM KUMAR
M.Tech.Thermal Engineering	64	Non Conventional Energy Systems	564134 (37)	2017-18	Kamlesh Kumar Naik
M.E. Energy Management	83	Energy Audit & Management	583211(37)	2017-18	ABHISEK SAXNA
Master of Computer Application	21	Database Management System	521252(21)	2017-18	Aishwarya Soni, Shubham Sonkar, Aasma Banjare, Mitesh Sahu, Lavan Kumar, Shubham Nag, Dheeraj Kumar Sahu
Master of Computer Application	21	System Programming	521476(21)	2017-18	Ravi Sagar Soni
Master of Computer Application	21	Software Engineering	521453(21)	2017-18	Pranshu Soni, Meetesh Nand
Master of Business Administration	76	Product and Brand Management (New)	576431(76)	2017-18	AJAY KUMAR, AJAY VERMA, BHUMIKA SANGHAI, BHUPENDRA SINDOR, CHAMANDEEP KAUR, DHANENDRA SAHU, FAREEZA KHAN, GULSHAN KUMAR, HARSH SACHDEV, JITESH SAHU, GITRISH YADAV, KAJAL AGRAWAL, KIRTI WADHWANI, MITALI BHARIA, NISHA TAMBOLI, RAJDEEP SINGH BASU, RICHA AGRAWAL, SAKSHI SHARMA, SHEFALI MISHRA, SHIVENDRA YADU, SONALI SHARAM, SHRISHTI CHIMNANI, TARUN DUBEY, SATYAM AGRAWAL
Master of Business Administration	76	Emerging Issues in HR Management (New)	576455(76)	2017-18	ALANKAR SONWANI, ANUSHA PANJWANI, ASHISH VERMA, AYESHA SHAGUFTA, CHANDANI RETNANI, DANESHWAR VERMA, NUPUR SHRIVASTAVA, PANKHURI BATRA, TRAMAN KUMAR YADU, TRIPTI SAHU, VIVEK SHRIVAS,
Master of Business Administration	76	International Financial Management (New)	576442(76)	2017-18	KRITIKA BHARGAV, PRIYANKA PASI, SHIVLAYAK KHUSHWAHA, SHREYA PRITHWANI, SHUBHAM AGRAWAL, SURABHI JAIN, YUVIKA MALLAH
Master of Business Administration	76	Supply Chain Management (New)	576471(76)	2017-18	SANTOSHI MISHRA, RAHUL KUMAR
Master of Business Administration	76	MARKETING MANAGEMENT	576213(76)	2017-18	GULSHAN KUMAR, ANUSHA PANJWANI, PANKHURI BATRA
Master of Business Administration	76	ADVANCED FINANCIAL MANAGEMENT	576214(76)	2017-18	BHUPENDRA SINDOOR, TRAMAN YADU, AYESHA SHAGUFTA, GULSHAN YADAV
Master of Business Administration	76	HUMAN RESOURCE MANAGEMENT	576215(76)	2017-18	AJAY KUMAR, KIRTI WADHWANI, NISHA TAMBOLI

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CHHATAUNA, MANDIRHASAUD, RAIPUR (C.G.)

Chhattisgarh Swami Vivekanand Technical University, Bhilai

Name of program:	**Bachelor of Engineering**		
Branch:	**Biotechnology**	Semester:	IV
Subject:	**Medical Biotechnology**	Code:	318456(18)
Total Theory Periods:	**30**	Total Tutorial Periods:	10
Class Tests:	**Two (Minimum)**	Assignments:	**Two (Minimum)**
ESE Duration:	**Three Hours**	**Maximum Marks: 80**	**Minimum Marks: 28**

Course Objectives:

1. To make the students understand about human genetics, disorders and diseases associated.
2. To familiarize the students with diagnostic techniques used in medicine.
3. To make the students aware with ethical issues associated with techniques in human genetics

UNIT- I **Introduction:** Human genetics (types of diseases: Chromosomal disorders, Numerical disorders e.g. trisomies & monosomies, Structural disorders e.g. deletions, duplications, translocations & inversions, chromosomal instability syndromes; Gene controlled diseases: Autosomal and X-linked disorders, mitochondrial disorders), inheritance pattern, general study of causes of genetic disorders.

UNIT-II **Diseases and their causes:** Genetic diseases: Huntington's Disease, Myotonic muscular dystrophy, sickle cell anaemia, cystic fibrosis, Duchenne muscular dystrophy, hemophilia, phenylketoneurea, Familial Hypercholesterolemia, Congenital hypothyroidism, Tay-Sachs, Alzheimer, Parkinsonism, Mongolism, Cri-du-chat, Edwards syndrome, Turner's syndrome, klinefelter's syndrome, down's syndrome, cleft palate.
Cancer and oncogenes: Types of Cancer, properties of cancer, genetic basis of cancer; Oncogenes: Tumor suppressor genes function and mechanism of action of pRB and p53.

UNIT- III **Diagnosis:** Gene testing (prenatal, new born screening, carrier detection screening, predictive and presymptomatic testing, forensic testing) Immunodiagnostics for pregnancy: Diagnosis using protein and enzyme markers, monoclonal antibodies, invasive techniques : Amniocentesis, Chorionic Villi Sampling (CVS), non-invasive techniques : ultrasonography, X-ray, maternal serum and fetal cells in maternal blood, microarray technology- genomic and c - DNA arrays, probe, biosensors, FISH cytogenetics.

UNIT-IV **Therapy:** Gene Knockouts /silencing, gene disruption-p53, immunological (MAb, vaccines); Gene therapy for non-inheritable diseases: somatic cell gene therapy and germ line gene therapy; Stem cell therapy; Radiotherapy; Chemotherapy; Enzyme therapy.

UNIT-V **Ethical issues in medicine:** *In vitro* fertilization, surrogate therapy; Prenatal sex determination; Genetic counseling; Germline gene therapy; IPR, patenting; Human transgene.

Text Books:

1. Medical Biotechnology, Albert Sasson (2006), United Nations Publications
2. Medical Biotechnology, S. N. Jognand (2000), Himalaya Publication

Reference Books:

1. Human Molecular Genetics 3rd Edition Tom Strachan and A.P.Read, Garland science pulications.
2. A textbook of Genetics (2010), 3rd Edition, S.S.Randhawa, PV books, www.pvbooks.com.
3. Molecular Biology of the Gene (2007) 6th Edition , James Watson, T.A.Baker, S.P.Bell, A.Gann, M.Lenin, R.Losick, Benjamin Cummings Publication.
4. Biotechnology and Biopharmaceuticals (2003), Rodney J.Y. Ho and milo Gilbaldi, Wiley John & sons.
5. Biotechnology Demystified Sharon Walker (2006) Mc Graw Hill Publication.
6. The Cell, Geoffrey MCooper and Robert E. Hausman.
7. Molecular Cell Biology, H. Lodish, A. Berk, S.L.Zipursky, P. Matsudaira, D. Baltimore, J. Darnell.
8. Kuby, RA Goldsby, Thomas J. Kindt, Barbara, A. Osborne.
9. Biochemistry – Lubert Stryer.
10. Lehninger's Principles of Biochemistry- David L Nelson & Michael M Cox.

Course Outcome:

1. The students will gain knowledge of human genetics and molecular mechanisms of the diseases using which they can apply the concepts in research related works.

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CASE STUDY ON INFERTILITY AND ASSISTED REPRODUCTIVE TECHNOLOGY

A MAJOR PROJECT REPORT SUBMITTED TO

CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY BHILAI (C.G.)

FOR PARTIAL FULFILLMENT OF REQUIREMENT FOR THE AWARD OF DEGREE

OF

BACHELOR OF ENGINEERING

In

BIOTECHNOLOGY

SUBMITTED BY

MITALI ALONE
ENROLLMENT NO: AO9097

UNDER THE GUIDANCE
OF
MS. MRINALINI SINGH
(ASSISTANT PROFESSOR)

DEPARTMENT OF BIOTECHNOLOGY
RAIPUR INSTITUTE OF TECHNOLOGY, RAIPUR

CHHATAUNA, MANDIR HASAUD, RAIPUR (C.G.) INDIA – 492101

Phone.No. +91-0771-3250790, 4036053 , Fax – 91-0771-2537634

E-mail-contactus@rit.edu.in, Website – www.rit.edu.in

SESSION : 2017-18

PRINCIPAL
RAIPUR INSTITUTE OF TECHNOLOGY
CHHATAUNA, MANDIRHASAUD, RAIPUR (C.G.)

CERTIFICATE OF THE SUPERVISOR

This is to certify that the work incorporated in the project **"A case study on Infertility and Assisted Reproductive Technology"** is the record of research work carried out by Mitali Alone bearing Roll no. 3121814001 under the guidance and supervision of my coordinator,Ms. Mrinalini Singh (Assistant Prof., RIT, Raipur) for the award of the degree of Bachelors of Engineering in Biotechnology from Chhattisgarh Swami Vivekananda Technical University, Bhilai (C.G.), India.

To the best of my knowledge and belief the thesis:

1. Embodies the work of candidate themself
2. Has duly been completed
3. Fulfills the requirements of the ordinance relating to the B.E. Degree of the University &
4. Is up the desired standard both in respect of concepts and language for being referred to the examiners

M Singh

(signature of the guide)

Ms. Mrinalini Singh
Department of Biotechnology
Raipur Institute of Technology

Forwarded to the Chhattisgarh Swami Vivekananda Technical University, Bhilai

(signature of the Head of the department)

Dr. Tanushree Chatterjee
Department of Biotechnology
Raipur Institute of Technology

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CHHATAUNA, MANDIKHASAUD, RAIPUR (C.G.)

TABLE OF CONTENTS

Chhattisgarh Swami Vivekanand Technical University, Bhilai

Name of program:	**Bachelor of Engineering**	Semester:	**III**
Branch:	**Biotechnology**	Code:	**318352(18)**
Subject:	**Microbial Technology**	Total Tutorial Periods:	**NIL**
Total Theory Periods:	**40**	Assignments:	**Two (Minimum)**
Class Tests:	**Two (Minimum)**	**Maximum Marks: 80**	**Minimum Marks: 28**
ESE Duration:	**Three Hours**		

Course Objectives:

1. To make the students familiar with the science of microbiology and its significance in everyday life.
2. To make the students well acquainted with basic principles of Microbiology.

UNIT I **Introduction and classification:** Course introduction, evolution of micro-organisms, habitat; **Classification and taxonomy and identification of the various microbes** (Methods in microbial ecology: Different approaches to identifying specific microorganisms and their function in microbial communities; Culturing; DNA-based methods, microscopy, radioisotopes and microelectrodes); **Classification of bacteria** and salient features according to Bergey's manual of determinative Bacteriology; Microbial diversity in different ecosystems (halophiles, mesophiles, thermophiles, acidophiles, alkalophiles, barophiles and other extremophiles); Structure and function of viruses; **classification of viruses**, replication of viruses, bacteriophages, plant viruses and animal viruses; **Classification of fungi** according to Alexopoulus and Mims, cell structure, specialized somatic structure; Reproduction in fungi, asexual, sexual and parasexual cycle, life cycles of fungi; **Structure and Classification of Algae**, ultrastructure and life histories of microalgae belonging to various algal classes, Cyanobacteria, Prochlorales and Cyanelles.

UNIT II **Morphology and growth:** Bacterial morphology, structure and characterization, cellular components of bacteria, sporulation and its mechanics; Autotrophs, heterotrophs; Growth and nutrition, nutritional requirements, enrichment culture, growth curve, kinetics of Growth, mathematical expression of exponential growth phase; Measurement of growth and growth yields, Batch Culture, Synchronous growth; Techniques of pure culture.

UNIT III **Microbial mechanisms: Microbial genetics** (control of gene expression at transcriptional and translational level, role of chromatin in gene expression and gene silencing, phages and viruses), **Physiology** (growth yield and characteristics strategies of cell division, stress response) microbial growth and reproduction, **Microbial pathogenesis** (Host parasite interaction recognition and entry process of different pathogens, molecular mechanism of infectious diseases).

UNIT IV **Microbes and their uses:** Bioremediation; Detoxification of inorganic and organic pollutants by microorganisms and challenges of microbiological degradation of recalcitrant pollutants, role of microorganisms in petroleum biodegradation, water purification, water treatment and bioremediation; Soil and plant microbial habitats and implications for use of legumes; Organic farming and biologic pest control; Animal-microbial symbiosis (ruminants and dairy farms as sources of methane production).

UNIT V **Industrial application:** Industrial and commercial applications of microorganisms; Climate control and detoxification of pollutants; Genetically modified microorganisms and their application in medicine, Industry and agriculture.

Text Books:

1. Microbiology, Pelzar, Chan & Kreig (1986), Tata McGraw-Hill Education (2001)
2. Microbiology, Presscott, Harley & Klein (1986) Tata McGraw-Hill Education (2007)

Reference Books:

1. Foundation of Microbiology (1999), K.P. Talaro & A. Talaro, 3rd Edition, W.C.B. MegrawHill
2. An Introduction to Microbiology , P. Tauro, K.K. Kapoor and K.S. Yadav
3. Microbiology and Biotechnology , D.P. Singh and S.K. Dwivedi, (2004) New Age International Pvt Ltd
4. Industrial Microbiology, L.E. Casida.
5. Introduction to soil and Agricultural Microbiology, G. Prabakaran.

Course Outcome:

1. Practical aspect of the course brings awareness in the students during handling of the microorganisms in a much protected way so as to minimize the hazardous consequences.
2. The students will be able to utilize the knowledge of industrial application for welfare of the community and their betterment.

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PRINCIPAL
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CHHAIAUNA, MANDIRHASAUD, RAIPUR (C.G.)

EXPERIMENTAL STUDY ON MICROBIAL FUEL CELL

A major project report submitted to

Chhattisgarh Swami Vivekanand Technical University
Bhilai (C.G.)

for partial fulfillment of the award of degree

BACHELOR OF ENGINEERING
In
Biotechnology
By

Ratika Bhargava
Roll No: 3121814002
Yogendra Sori
Roll No: 3121814015
Heena Chandrakar
Jan-May 2018

Under the guidance
Of
Dr. Tanushree Chatterjee

DEPARTMENT OF BIOTECHNOLOGY
RAIPUR INSTITUTE OF TECHNOLOGY,RAIPUR
Chhatauna Mandir Hasaud, Raipur (C.G) -492101
Phone-0771-3250790, 3208842,Fax- 0771-2537634
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Session: 2014- 2018

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CHHATAUNA, MANDIRHASAUD, RAIPUR (C.G.)

CERTIFICATE OF THE SUPERVISOR

This is to certify that the work incorporated in the project **"Experimental study on microbial fuel cell"** is a record of research work carried out Ratika Bhargava bearing Roll No: 41218140027, Yogendra Sao bearing Roll No: 41218140015, Heena Chandrakar bearing Roll No: 41218140009 under my guidance and supervision for the award of Degree of Bachelor of Engineering in Biotechnology of Chhattisgarh Swami Vivekanand Technical University Bhilai (C.G).

to the best of my knowledge and belief the project

1. Embodies the work of the candidate him/herself.
2. Has duly been completed.
3. Fulfils the requirement of the ordinance relating to the B.E. degree of the university.
4. Is up to the desired standard both in respect of contents and language for being referred to the examiner.

Signature of the Guide

Forwarded to Chhattisgarh Swami Vivekanand Technical University
Bhilai

HEAD,
Deptt. of Biotechnology,
Raipur Institute of Technology,
RAIPUR, (C.G.) 492101

(Signature of the Head of the Department with seal)

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CHHATAUNA, MANDIRHASAUD, RAIPUR (C.G.)

ABSTRACT

Today we are witnessing a global energy crisis due to huge energy demands and limited resources. Non-renewable energy sources are depleting and renewable energy sources are not properly utilized. There is an immediate need for search of alternate routes for energy generation. Microbial fuel cell (MFC) technology, which uses microorganisms to transform chemical energy of organic compounds into electricity is considered a promising alternative. Extensive studies have corroborated new insights into MFC, which show that a wide array of carbon sources including wastes can be employed using a variety of microbes. Consequently, microbial transformation of wastes using novel bioremediation strategies such as MFC for energy generation is considered as an efficient and environmentally benign approach.

A microbial fuel cell (MFC) is a bio inspired energy converter which directly converts biomass into electricity through the catalytic activity of a specific species of bacteria. Unlike most of MFC research, which targets the long term goals of renewable energy production and wastewater treatment, a niche application that may be used immediately in practice, namely powering sensors from soils or sediments.

There are two major goals in this study. The first goal is to examine the performance characteristics of MFCs in this application. Specifically we investigate the relationship between the percentage of organic matter in the samples and the electrical capacity of MFCs fueled by those samples. We observe that higher percentage of organic matter in a sample results in higher electricity production of MFCs powered by that sample. We observe that the electricity production of MFCs decreases almost linearly over a period of 10 days. The second goal is to determine the conditions under which MFCs work most efficiently to generate electricity. We compare the capacity under a variety of conditions of sample types (cow dung, algae, soil , waste water, glucose). The study demonstrates that the electricity production of MFCs can be increased by selecting the right condition of sample type, temperature, and chamber size. The goal of this project is to build low cost, multi chambered MFC's.

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Chhattisgarh Swami Vivekanand Technical University, Bhilai (C.G.)

Name of program: **Bachelors of Engineering**
Branch: **Biotechnology**
Subject: **Agriculture Technology**
Total Theory Periods: **40**
Class test: **Two (Minimum)**
ESE Duration: **Three hours**

Semester: **VIII**
Code: **318833(18)**
Total Tut Periods: **10**
Assignments: **Two (Minimum)**
Maximum Marks: **80** Minimum Marks: **28**

Course Objectives:

1. To give the students a clear knowledge of current scenario of agriculture and rural development.
2. To make the students learn different agricultural techniques.

UNIT I Introduction to agriculture; Indian agriculture: history; Crops, classification, general principles of crop production and introductory agronomy; Soil, characteristics, types, importance; Agriculture and biotechnology: artificial seeds, genetically modified crops, virus free plants, micropropagation, development of hybrids.

UNIT II Soil microbiology: useful and harmful microorganisms, their importance; Diseases: disease classification, causal agent, effect of disease, disease control; Crop management: nutrition, weeding, irrigation, types, scheduling of irrigation and fertilizers

UNIT III Soil conservation and water Harvesting: Soil erosion, causes, effects, methods of erosion control, Crop mixing and crop rotation, strip Cropping, etc.; Water harvesting; importance, methods, farm pond, percolation pond, dry farming techniques for improving crop production.

UNIT IV Crop harvesting, methods; post harvesting techniques: importance, drying, cleaning, grading, shelling, milling; Storage, purpose, types, loss in storage, methods, packaging, types, packaging methods and materials, techniques.

UNIT V Applied agriculture: horticulture, methods, regions and crops; sericulture; apiculture; floriculture; pisciculture; Agricultural economics: Nature and scope of agricultural and its role in economic development, employment, Sustainable agriculture and organic farming, Use of land, water and energy and other demands, production supply and capital formation; Agribusiness: planning, motivation, communication, leadership, formulation; Biofuel cropping system.

Text Books:

1. A History of Agriculture in India Vol.I to IV , M.S. Randhawa, 1980-1986, Indian Council of Agricultural Research, New Delhi.
2. Principles and Practices of Agronomy (2001) P. Balasubramaniyan and S.P. Palaniappan AgroBios (India) Ltd., Jodhpur.

Reference Books:

1. Principles and Practices of Management (2005) L.M Prasad, Sultan Chand and Sons Educational Publishers, New Delhi.
2. Post harvest technology for Cereals, Pulses and oilseeds (2000) 3rd ed, A.Chakraverty, Oxford &IBH publication Pvt Ltd, New Delhi
3. Principles of Agronomy (1999) S.R. Reddy, Kalyani Publishers, Ludhiana.
4. The Nature and Properties of Soils (2002) 13th ed, N.C. Brady and R.R. Well, Pearson Education, Delhi.
5. Introduction to Soil and Water Conservation Engineering (2002) B. C.Mal, Kalyani Publishers, New-Delhi.

Course Outcome:

1. Clear knowledge of the subject will enable the students to develop innovative and advanced agricultural techniques.
2. Small scale industry/ business in the related area can be developed.

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CHHATAUNA, MANDIRHASAUD, RAIPUR (C.G.)

CASE STUDY OF SOIL AND WATER SAMPLE OF VARIOUS REGIONS OF CHHATTISGARH

A MAJOR PROJECT REPORT SUBMITTED TO

CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY BHILAI (C.G.)

FOR PARTIAL FULFILLMENT OF REQUIREMENT FOR THE AWARD OF DEGREE

OF

BACHELOR OF ENGINEERING

In

BIOTECHNOLOGY

SUBMITTED BY

ARNAV KSHAYARSH TARUN RAM
ENROLLMENT NO:AO9111

KHUSHBOO KORRAM
ENROLLMENT NO:AO9124

ANUJ KUMAR RAJWADE
ENROLLMENT NO: AO9108

SUSHMA SAHU
ENROLLMENT NO:AO9107

DEEPAK SORI
ENROLLMENT NO:AO9119

SUNANDA YADAV
ENROLLMENT NO:AO9130

UNDER THE GUIDANCE
OF
Dr. TANUSHREE CHATTERJEE

DEPARTMENT OF BIOTECHNOLOGY
RAIPUR INSTITUTE OF TECHNOLOGY, RAIPUR

CHHATAUNA, MANDIR HASAUD, RAIPUR (C.G.) INDIA – 492101

Phone.No. +91-0771-3250790, 4036053 , Fax – 91-0771-2537634

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SINCE 1995
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RIT

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RAIPUR INSTITUTE OF TECHNOLOGY
CHHATAUNA, MANDIRHASAUD, RAIPUR (C.G.)

SESSION : 2017-18

CERTIFICATE OF THE SUPERVISOR

It is certified that the work contained in the thesis entitled by "**Case study of soil and water sample of various regions of Chhattisgarh**" is a record of research work carried out by:

Name of the student	Roll No	Enrollment No
Arnav Kshayarsh Tarun Ram	3121814006	AO9111
Deepak Kumar Sori	3121814008	AO9119
Anuj Rajwade	3121814005	AO9124
Sushma Sahu	3121814004	AO9107
Sunanda Yadav	3121814014	AO9130
Khushboo Korram	3121814010	AO9124

Under my Supervision for the award of **Bachelor of Engineering** in **Biotechnology** of Chhattisgarh Swami Vivekanand Technical University, Bhilai (C.G) has been carried out under my supervision and that this work has not been submitted elsewhere for any degree.

To the best of my knowledge and beliefs of the project:

i. Embodies the work of the candidates by him/herself
ii. Fulfils The requirements of the Ordinance relating to the B.E Degree of the University
iii. Has Duly completed
iv. Is up to the desired Standard Both in respect of contents and Language for being referred to the Examiners.

Signature of the Supervisor

Name Dr. Tanushree Chatterjee

R.I.T. Raipur

2017-2018

Forwarded to Chhattisgarh Swami Vivekanand Technical University, Bhilai

HEAD,
Deptt. of Biotechnology,
Raipur Institute of Technology,
RAIPUR (C.G.) 492101

(Signature of the Head of the Department)

PRINCIPAL
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CHHATAUNA, MANDIRHASAUD, RAIPUR (C.G.)

Abstract:

The natural environment is clean, but due to multifarious activities of man, it gets polluted resulting in what is called environmental pollution. In the present study it was preferred to investigate the soil samples for its physico-chemical analysis of some parameters. Agricultural research has been profited by technical advances such as automation, data mining.. This research aims at analysis of soil and water using different techniques. It focuses on classification of soil and water using various parameters available. Another important purpose is to predict untested attributes using regression technique, and implementation of automated soil sample classification. This Physical Chemical study of soil and water is based on various parameter like PH, Electrical Conductivity(EC),Total Organic Carbon, Available Nitrogen (N), Available Phosphorus (P2O5) and available Potassium (K2O).calcium,magnesium etc; This study lead us to the conclusion of the quality and properties of soil and water of Ambikaur,Rajnandgaon,Raipur,Kanker distict of Chhattisgarh State. This information will help farmers to decide the problems related to soil nutrients amount of fertilizers to be added to soil to make production economic,As well as the quality of Water.

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Chhattisgarh Swami Vivekanand Technical University, Bhilai

Name of program: **Bachelor of Engineering**
Branch: **Chemical Engineering**
Subject: **Separation Process –II**
Total Theory Periods: **40**
Class Tests: **Two (Minimum)**
ESE Duration: **Three Hours**

Semester: **VII**
Code: **319733(19)**
Total Tutorial Periods: **10**
Assignments: **Two (Minimum)**
Maximum Marks: 80 **Minimum Marks: 28**

Course Objectives:

1. To impart the basic concepts of mass transport.
2. To develop understanding about, humidification, crystallization drying. Extraction and Leaching operations and problems.
3. To impart the basic concepts of mass transfer in, humidification, crystallization drying. Extraction and Leaching process and parameters.
4. To develop understanding about design and analysis of humidification, crystallization drying. Extraction and Leaching units

Course outcomes:

1. Create awareness among students with new and unconventional separation processes; acquire sufficient knowledge in energy intensive processes for separation of components, Students will be equipped with the applications in Down-streaming processes
2. Mechanisms: Separation factors and its dependence on process variables, classification and characterization, thermodynamic analysis and energy utilization, kinetics and mass transport.
3. Theory of cascades and its application in single and multistage operation for binary and multi component separations.

UNIT- I **Crystallization:** Introduction to Crystallization, Classification of Crystallizer, Equilibrium data (Solubility), Calculation of Yields, Material and Energy balance, Theory of Crystallisation, Miers super saturation theory, Nature of Nucleation's, Rate of Crystal growth.

UNIT- II **Humidification:** Humidification and Air Conditioning, Humidity Chart (Phychrometric Chart) and use, Wet bulb and Dry bulb temperature, Adiabatic Cooling line, General case of interaction between humid air and water, Levies relation, Dehumidification.

UNIT- III **Drying:** Introduction to Drying, Phase Equilibrium Moisture, Bound and Unbound Moisture, Free Moisture, Drying operation-Constant drying rate, Drying Curve, Calculation the drying time under constant drying conditions.

UNIT- IV **Extraction:** Liquid extraction, Liquid equilibrium, System of Three Liquids-one Pair Partially soluble, Choice of Solvents, Stage wise Contact-Single Stage Extraction, Multi stage cross current extraction, Insoluble Liquids, Continues counter current multistage extraction.

UNIT- V **Leaching:** Introduction to Leaching, (Solid-Liquid Extraction), Factor's affecting leaching operations, Single stage leaching, Multistage cross current leaching, Multistage counter current leaching, Solid –Liquid Extraction calculation-Triangular diagram.

Text Books:

1. 1. Treybal R.E., Mass Transfer Operations, McGraw Hill
2. McCabe W.L., Smith J.C. & Harriott P., Unit Operations in Chemical Engineering, McGraw Hill
3. Coulson J.M. & Richardson J.F., Chemical Engineering, Vol. II, ELBS, Pergamon

Reference books:

1. Seader J.D.& Henley E.J Separation Process Principles, Wiley India.
2. Foust A.S. et al, Principles of Unit Operations, John Wiley
3. Geankoplis C.J., Transport Processes and Unit Operations, Prentice Hall India.

PRINCIPAL
RAIPUR INSTITUTE OF TECHNOLOGY
CHHATAUNA, MANDIRHASAUD, RAIPUR (C.G.)

"EXPERIMENTAL INVESTIGATIONS ON EXTRACTED ESSENTIAL OIL FROM OCIMUM BASILLICUM / SWEET BASIL (TULSI) PLANT"

A Major Project Report Submitted To

Chhattisgarh Swami Vivekanand Technical University
Bhilai (India)

for fulfillment of the award of degree

BACHELOR OF ENGINEERING

in

CHEMICAL ENGINEERING

Under The Guidance of

Dr. Harendra Kumar

Advisor/Professor

Submitted by

Aman Sharma (AO-9152)

SINCE 1995
RITEE

RAIPUR INSTITUTE OF TECHNOLOGY
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RAIPUR

DEPARTMENT OF CHEMICAL ENGINEERING

RAIPUR INSTITUTE OF TECHNOLOGY

MANDIRHASAUD, RAIPUR

PRINCIPAL
RAIPUR INSTITUTE OF TECHNOLOGY
CHHATAUNA, MANDIRHASAUD, RAIPUR (C.G.)

April-May 2018

CERTIFICATE BY THE SUPERVISOR

This is to certify that the major project report entitled **"Experimental Investigations on Extracted Essential Oil from Ocimum Basillicum / Sweet Basil (Tulsi) Plant"** is a record of research work carried out under my guidance and supervision for the partial fulfillment of the award of degree of Bachelor Of Engineering in the faculty of Chemical Engineering of Chhattisgarh Swami Vivekananda Technical University, Bhilai (C.G.) India.

To the best of my knowledge and belief the report.

i) Embodies the work of the candidate himself.

ii) Has duly been completed.

iii) Fulfills the partial requirement of the ordinance relating to the B.E. degree of the university.

iv) Is up to the desired standard both in respect of contents and language for being referred to the examiners.

27.4.2018

(Signature of the Supervisor)

Prof. Dr. Harendra Kumar

Dept of Chemical Engineering

RITEE

Raipur

(Signature of Head of the Department)

Prof. Mr. Amit Khare

Dept of Chemical Engineering

RITEE

Raipur

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CHHATAUNA, MANDIRHASAUD, RAIPUR (C.G.)

TABLE OF CONTENT

Chhattisgarh Swami Vivekanand Technical University, Bhilai

Name of program: **Bachelor of Engineering**
Branch: **Chemical Engineering**
Subject: **Non Conventional Energy Sources**
Class Tests: **Two (Minimum)**
Total Theory Periods: **40**
ESE Duration: **Three Hours**

Semester: **VIII**
Subject Code: 300809(19)
Maximum Marks: 80 Minimum Marks: 28

Note: Internal choices may be given in any three units.

Course Objectives: Energy is the key input to drive and improve the life cycle. The primary source of energy is fossil fuel, however the finiteness of fossil fuel reserves and large scale environmental degradation caused by their widespread use, particularly global warming, urban air pollution and acid rain, strongly suggests that harnessing of non-conventional, renewable and environment friendly energy resources is vital for steering the global energy supplies towards a sustainable path. This subject describes in brief such non-conventional energy sources and their usage.

Unit I An introduction to energy sources, Environmental Aspects of Power Generation.
Heat Transfer from **Solar Energy**, Physical principles of conversion of solar radiation into heat utilization, Flat Plate Collectors (FPC), Thermal losses and efficiency of FPC, Practical considerations for flat plate collectors, Applications of FPC – Water heating and drying, Focusing Type Collectors: orientation and sun tracking systems, Types of concentrating collectors – cylindrical parabolic collector, compound parabolic collector, Thermal performance of focusing collectors,

Unit II **Solar energy** storage system, Application of solar energy: solar water heating, space heating and cooling, solar photovoltaic, solar cooking, solar distillation & desalination , Solar industrial process heating, Solar power generation. Solar Green Houses, Solar thermo mechanical power, solar refrigeration & air conditioning, Solar ponds.

Unit III **Energy from Biomass**: Type of biomass sources, Energy plantation, Methods for obtaining energy from biomass, Biomass conversion technologies-wet and dry processes, Biodigestion, Community/Industrial biogas plants, Factors affecting biodigestion, Design of a biogas plant, Classification, advantages and disadvantages of biogas plants, Problems related to biogas plants, Utilization of biogas.
Thermal gasification of biomass, Gasifier- classification, chemistry, advantages, disadvantages and application.
Alcohol fuels from biomass: overview, feedstock, methods for alcohol production, Ethanol as an alternative liquid fuel; engine performance with alcohol fuels, biodiesel from biomass.

Unit IV **Wind Energy**: Basic principles of wind energy conversion: power in the wind, maximum power, forces on the blades, lift and drag, Components of wind energy conversion systems (WEC), Classification, advantages and disadvantages of WEC systems, Types of wind machines, Performance of wind machines, Design considerations, Energy storage, Application of wind energy, Environmental aspect.
Tidal Energy. Components of tidal power plants, Single and double basin arrangements, Estimation of energy and power, Advantages and limitations of tidal power.
Wave energy- its advantages and disadvantages, energy and power from wave energy.

Unit V **Chemical Energy Sources**: Fuel cells: Design, principle, classification, types, advantages and disadvantages, Work output and EMF of fuel cells, Application of fuel cells, Hydrogen energy, Properties of hydrogen, Methods of hydrogen production, Storage and transportation of hydrogen, Advantages and application.

Text Books:

1. G D Rai, 'Non-Conventional Energy Sources', Khanna Publishers. Delhi, 2010
2. S P Sukhatme, 'Solar Energy-Principles of Thermal Collection & Storage', Tata McGraw Hill Publishing Company Ltd., New Delhi

Reference Books

1. John A Duffie & William A Beckman, 'Solar Energy Thermal processes', Wiley Interscience publication
2. P Garg & J Prakash,' Solar Energy - Fundamentals and Applications', Wiley Interscience publication.

"STUDY OF NON-CONVENTION ENERGY SOURCES"

A Major project Report Submitted to

CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY
Bhilai (C. G.), INDIA

In partial fulfillment of requirement for the award of degree

Of

BACHELOR OF ENGINEERING

In

CHEMICAL ENGINEERING

Under the Guidance of

Prof. MUKESH THITE

Submitted by

Neeraj Vishwakarma (AO9169)

SINCE 1995
RITEE

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RAIPUR INSTITUTE OF TECHNOLOGY
CHHATAUNA, MANDIRHASAUD, RAIPUR (C.G.)

Department of Chemical Engineering

Raipur Institute of Technology

May-June, 2018

CERTIFICATE

This is to certify that the work in this minor project **"Study of Non-conventional energy sources"** submitted by **Neeraj Vishwakarma** in partial fulfillment of the requirements of the prescribed curriculum for Bachelor of Engineering in Chemical Engineering, Session 2014-18 in the department of Chemical Engineering, RITEE, Raipur is an authentic work carried out by them under my supervision and guidance. To the best of my Knowledge to matter embodied in the thesis in their bonafide work.

Project Guide

Mr. Mukesh Thite

Department of Chemical Engineering

Raipur Institute of Technology, Raipur

(C.G.)

This minor project work as mentioned above is being recommended and forwarded for examination and evaluation.

Head of the Department

Mr. Amit Khare

Department of Chemical Engineering

Raipur Institute of Technology, Raipur

(C.G.)

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CONTENTS

ABSTRACT

While fossil fuels will be the main fuels for thermal power, there is fear that they will get exhausted eventually in this century. Therefore other systems based on non-conventional and renewable sources are being tried by many countries. These are solar, wind, sea, geothermal and biomass. After making a detailed preliminary analysis of biomass energy, geothermal energy, ocean thermal energy, tidal energy and wind energy, I focused mainly on Wind power for 7th semester. In wind power, I have studied mechanical design of various types of wind turbines, their merits, demerits and applications, isolated and grid-connected wind energy systems with special attention to power quality. In the end I wrote, compiled and successfully executed a MATLAB program to assess the impact of a wind farm on the power system.

Solar radiation represents the earth's most abundant energy source. This energy resource has a number of characteristics that make it a very desirable option for utilization. The perennial source of solar energy provides unlimited supply, has no negative impact on the environment, is distributed everywhere, and is available freely. In India, the annual solar radiation is about 5 kWh/m^2 per day; with about 2300-3200 sunshine hours per year.

Solar energy can be exploited for meeting the ever-increasing requirement of energy in our country. Its suitability for decentralized applications and its environment-friendly nature make it an attractive option to supplement the energy supply from other sources. In 8th Semester, I have made an attempt to study the ways through which solar energy can be harnessed and stored. I have also written MATLAB program to evaluate performance of fuel cell.

Chhattisgarh Swami Vivekanand Technical University, Bhilai

Name of program:	**Bachelor of Engineering**		
Branch:–	**Chemical Engineering**	Semester:	**IV**
Subject:	**Environmental Pollution and Control**	Code:	**319452(19)**
Total Theory Periods:	**40**	Total Tutorial Periods:	**10**
Class Tests:	**Two (Minimum)**	Assignments:	**Two (Minimum)**
ESE Duration:	**Three Hours**	**Maximum Marks: 80**	**Minimum Marks: 28**

Course Objectives:

1. The students will understand various aspects of industries for pollution control in their premises so as to comply with newer and tougher laws and acts that are being enforced in India and globally.
2. The principles and methods to control air, water and soil pollution to the students of chemical engineering.
3. The topics cover sources of water, air and land pollution; legislation and standards; Recycle and reuse of waste, energy recovery and waste utilization.
4. Air pollution and its measurement, design of pollution abatement systems for particulate matter and gaseous constituents.

UNIT- I Air pollution and meteorology, Air pollution from major industrial operations and some typical chemical industries, Air pollution control methods and equipment.

UNIT-II Air pollution sampling and measurement (Analytical methods), Air pollution legislation and regulation.

UNIT- III Water pollution- Sources of water pollutants, classification and characteristics of waste water, water pollution control methods and equipment, primary, secondary and tertiary treatment of waste water, legislation regarding prevention and control of water Pollution.

UNIT-IV Nuclear waste materials and their disposal, hazards of radioactive materials and their handling, Treatment and disposal of nuclear waste materials, source reduction and recycling of solid wastes.

UNIT-V Noise Pollution- evaluation, International standards for control, Noise control criteria, Administrative and engineering control, Effects of noise in Communication, working efficiency, industrial accidents etc, monitoring and control of Noise pollution, Noise measuring instruments.

Text Books:

1. RaoM.N and RaoH.V.N, Air Pollution, Tata McGraw Hill, 1989.
2. RaoS., Environmental Pollution control engineering, Wiley Eastern Limited, 1st Edition.

Reference books:

1. PandeyG.N. and Carney G.C., Environmental engineering,Tata McGraw Hill.
2. SingalS P, Noise Pollution and control, Narosa publishing House, New Delhi 2005.
3. Gill LMc.,Haldan F.R., Air Pollution Handbook, Tata McGraw Hill.

Course outcomes:

1. After studying the students are able to treatindustrial effluent.
2. Student must be able to understand the concept of water, air and land pollution as well as methods to control air, water and soil pollution.

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"REMOVAL OF FLUORIDE IN GROUND WATER"

A Major project Report Submitted to

CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY
Bhilai (C. G.), INDIA

In partial fulfillment of requirement for the award of degree
Of
BACHELOR OF ENGINEERING

In

CHEMICAL ENGINEERING

Under the Guidance of

Prof. MUKESH THITE

Submitted by

Alok Kumar Sahu (AO9192)

Bharti Koshti (AO9196)

Venkteshwar (AO9189)

SINCE 1995
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CHHATAUNA, MANDIRHASAUD, RAIPUR (C.G.)

Department of Chemical Engineering

Raipur Institute of Technology

May-June, 2018

CERTIFICATE

This is to certify that the work in this minor project **"Removal of fluoride in Ground Water"** submitted by **Alok Kumar Sahu, Bharti Koshti, Venkteshwar** in partial fulfillment of the requirements of the prescribed curriculum for Bachelor of Engineering in Chemical Engineering, Session 2014-18 in the department of Chemical Engineering, RITEE, Raipur is an authentic work carried out by them under my supervision and guidance. To the best of my Knowledge to matter embodied in the thesis in their bonafide work.

Project Guide

Mr. Mukesh Thite

Department of Chemical Engineering

Raipur Institute of Technology, Raipur

(C.G.)

This minor project work as mentioned above is being recommended and forwarded for examination and evaluation.

Head of the Department

Mr. Amit Khare

Department of Chemical Engineering

Raipur Institute of Technology, Raipur

(C.G.)

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ABSTRACT

The water fluoridation is the most controlled addition of fluoride to the public water supply to reduce tooth and bone decay or hazardous deices. In these project we are using some techniques which have been carried out for the removal of fluoride from water. The different techniques are first one is Activated Charcoal (Granules, 1-2 mm long) for water basic impurities removal, second one is Activated alumina (Balls, 1-3 mm dia.) with small stone (Granules 1-3 mm dia.) and marble stone (Granules, 2-4 mm long) for fluoride removal. We identify the properties of water such as Total hardness, Salinity, conductivity, pH, DO, BOD, COD, alkalinity, Calcium, Sulfate, Chloride, Fluoride. Some basic properties are match with their standard value of water and some are not matched before the treatment. After the treatment all of the water parameter is satisfied the water standard value. And the fluoride sample we taken that's value is 3 ppm and after the treatment the fluoride value of water is 1-1.5 ppm, which is normal value for any drinking water.

For treatment of water we are using the technique of BARC Technology which is based on the polsulphone membrane. This technique is very useful and low cost. This technique is gone on process and used those places where fluoride level is high.

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Chhattisgarh Swami Vivekanand Technical University, Bhilai

Name of program:	**Bachelor of Engineering**		
Branch:	**Chemical Engineering**	Semester:	**IV**
Subject:	**Fuel Technology**	Code:	**319455(19)**
Total Theory Periods:	**40**	Total Tutorial Periods:	**NIL**
Class Tests:	**Two (Minimum)**	Assignments:	**Two (Minimum)**
ESE Duration:	**Three Hours**	**Maximum Marks: 80**	**Minimum Marks: 28**

Course Objectives:

1. To study the types of fuel and their characteristics and uses.
2. To study the classification, preparation and storage of solid fuels.
3. To understand the carbonization process and physical and chemical properties of coke.
4. To understand the composition manufacturing, testing and treatment of liquid fuels.
5. To know the composition and calorific values of different types of gaseous fuels.

UNIT- I Types of coal, classification of coal, Indian coal reserves, Preparation and pretreatment of coal, Storage of coal, Coal washing process, Mechanical stokers.

UNIT-II Coal carbonization & bye product recovery, Physical & chemical properties of coke. Pulverized fuel, Proximate and Ultimate analysis.

UNIT- III Origin of petroleum, Classification of crude petroleum, Indian petroleum resources. Thermal & catalytic cracking, Knocking & Octane Number, Flash & Fire Point ,Cloud & Pour Point, Redwood Viscometer.

UNIT-IV Diesel oil composition, Ignition Lag &Cetane number, Kerosene and Lubricants, Coal tarFuels, Sampling & Testing of liquid fuels, Liquid fuel burners, Atomizing oil burners, Vaporizing oil burners, Fractional Distillation.

UNIT-V Composition of different gaseous fuels & their calorific values, Study producer gas, Coal gas, water gas, carbureted water gas & natural gas, Combustion process and calculations.

Text Books:

1. Sarkar Samir,Fuels& Combustion, Orient Longman Limited 2nd Edition.
2. Brame& King, Fuels, Solid, Liquid and Gases, London, E. Arnold [1961, ©1955] 4th Edition.

Reference books:

1. Gupta O.P., Elements of Fuels Furnace & Refractories, Khanna Publishers, 3rd Edition.

Course outcomes:

1. The students will be able to understand the origin of fuels and their characteristics.
2. The students will be able to understand the application of fuel in daily life as well as in industries.
3. The students will be able to understand how the quality of fuel to be enhances.
4. The students will be able develop the instrument in which these fuels are used.

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"EXPERIMENTAL STUDIES ON BIODIESEL BLENDING WITH ETHANOL, METHANOL AND BUTANOL FOR QUALITY IMPROVEMENT"

A Major project Report Submitted to

CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY

Bhilai (C.G.), India

In partial fulfillment of requirement for the award of degree

Of

BACHELOR OF ENGINEERING

In

CHEMICAL ENGINEERING

Submitted to

Mr. JITENDRA VERMA

Submitted by

Kavya Chandrakar (AO9163)

Sumit Kumar (AO9228)

Chinmayee Mohanty (AQ8886)

SINCE 1995
RITEE

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CHHATAUNA, MANDIRHASAUD, RAIPUR (C.G.)

Department of chemical engineering

Raipur Institute of Technology

April –May 2018

CERTIFICATE

This is to certify that the work in this major project **"EXPERIMENTAL STUDIES ON BIODIESEL BLENDING WITH ETHANOL AND METHANOL FOR QUALITY IMPROVEMENT"** submitted by **Kavya Chandrakar, Sumit Kumar, Chinmayee Mohanty** in partial fulfillment of the requirements of the prescribed curriculum for Bachelor of Engineering in Chemical Engineering, Session 2017-18 in the Department of Chemical Engineering, RITEE, Raipur is an authentic work carried out by them under my supervision and guidance. To the best of my Knowledge to matter embodied in the thesis in their bonafide work.

Project guide
Mr.Jitendra Verma

Department of chemical engineering
Raipur institute of technology, Raipur (CG)

This major project work as mentioned above is being recommended and forwarded for examination and evaluation.

Head of the Department
Mr. Amit khare

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CHHATAUNA, MANDIRHASAUD, RAIPUR (C.G.)

Department of chemical engineering
Raipur institute of technology, Raipur (CG)

ABSTRACT

Diesel fuels from fossil source are widely used in automobiles and transportation vehicles because of its drivability and thermal efficiency. The strict governmental regulation on exhaust emissions and the fast depletion of worldwide petroleum reserves provide a strong encouragement to the research for alternative fuels. So fuels from renewable sources such as biodiesel or bioalchohols are getting more attention because of their less environmental impact. Mixtures of fossil fuel and biofuels are also promising. Our current investigation is focusing on the use of alcohol as a blending component in diesel fuels. The high oxygen content of the alcohols can improve the burning efficiency of the fuel blend and also can reduce emissions of the particulate matter (PM), carbon monoxide (CO), hydrocarbon (HC) and nitrogen oxides (NOx). The solubility of the alcohols depends on the temperature and also on the hydrocarbon chain length (non-polar part).

CHAPTER – 1

1.1. Energy resource
1.1.1. Non-renewable energy resources (Fossil fuels)
1.1.2. Need of hour- Renewable energy

1.2. Biofuel status today

1.3. Biodiesel-A fuel of future
1.3.1. Benefits of biodiesel
1.3.2. Advantage of using of biodiesel

CHAPTER-2

2.1. History of biodiesel

2.2. General

2.3. Early works

2.4. Modern engines-Modern fuel

CHAPTER-3

Biodiesel status

3.1.Biodiesel companies in Tamilnadu

3.2. Biodiesel companies in India
3.2.1. Biodiesel activities in India
3.2.1.1 Indian railways to set up four biodiesel plants
3.2.1.2 Biodiesel producer looking for tie-ups with telecom tower firms
3.2.1.3 Advanced biofuels- the nation's fleet and military vehicles
3.2.1.4 IOC wants 50,000 acres for biofuel cultivation in UP
3.2.1.5 Railways develops engines powered by biodiesel
3.2.2. Bio-Diesel policy of India

3.3. Biodiesel companies in world
3.3.1. Recent developments on biodiesel across the globe

Chhattisgarh Swami Vivekanand Technical University, Bhilai

Name of program:	**Bachelor of Engineering**	Semester:	**IV**
Branch:	**Chemical Engineering**	Code:	**319453(19)**
Subject:	**Process Stoichiometric Calculations**		
Total Theory Periods:	**40**	Total Tutorial Periods:	**10**
Class Tests:	**Two (Minimum)**	Assignments:	**Two (Minimum)**
ESE Duration:	**Three Hours**	**Maximum Marks: 80**	**Minimum Marks: 28**

Course Objectives:

1. To provide an understanding of gas behavior.
2. To understand the concept of humidity.
3. To impart significance of theoretical and excess air.
4. To familiar with the material balance, recycle, bypass and purging.

UNIT- I Basic and derived units, Expressing compositions on mass basis, mole basis, normality etc and interconversions. Concept of stoichiometric relations. Numerical problems to illustrate these principles.

UNIT-II Calculations of pressure, volume and temperature using ideal gas law. Gaseous mixtures, vapor pressure, partial pressure. Gases in chemical reaction.

UNIT- III Humidity and saturation, Wet and dry bulb thermometry, Solubility and crystallization, Illustrative numerical problems based on above.

UNIT-IV Material Balance with chemical reactions, Limiting reactant and excess reactant,conversion, yield. Recycle operations.

UNIT-V Energy balances, Combustion calculations, Fuel and flue gas analysis, Air fuel ratio, Percentage excess air, Heat capacity calculations. Enthalpy changes associated with chemical reactions.

Text Books:

1 Bhatt B.I. and Vora S.M., Stoichiometry, McGraw Hill Publications, 4th Edition.

2 Hougen and Watson, Chemical Process Principles (Part – I Material and Energy Balance), CBC Publishers, 2ndEdition

Reference Books:

1. Himmelblaue David M, Basic Principles and Calculations in Chemical engineering, Prentice Hall, 6th Edition.
2. Ghoshal, Sanyal, &Datta, Introduction to Chemical Engineering, Tata McGraw Hill, 5th Edition.

Course outcomes:

1. Students will gain an understanding of gas and liquid behavior.
2. Students will be familiar with the material balance, recycle, bypass and purging.
3. Students will be able to understand the concept of Energy balances, Combustion calculations.

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Chhattisgarh Swami Vivekanand Technical University, Bhilai

Branch: **Chemical Engineering** Semester: **VI**
Subject: **Separation Process – I** Code: **319653 (19)**
Total Theory Periods: **48** Total Tutorial Periods: **12**
No. of class Tests to be conducted: **2 (Minimum)** No. of assignments to be submitted: **2 (Minimum)**
ESE Duration: **Three Hours** Maximum Marks in ESE: **80** Minimum Marks in ESE: **28**

Course Objective:

1. The general objectives of Separation Process-I are to discuss the fundamental concepts of Mass Transfer principles to apply those concepts to real engineering problems.
2. This course will provide an overview of Mass Transfer Operations at basic to an intermediate level.
3. This course will applies the concepts of diffusion mass transfer, mass transfer coefficient, convective mass transfer, inter-phase mass transfer, equipments for gas liquid operations, absorption and distillation.

Course outcome:

Under graduate Chemical Engineering students will be able to understand the basic principles of mass transfer and to apply these principles aided by computational tools to the design of equipments used in chemical process industries.

UNIT I Diffusion – Fick's law of Diffusion, steady state molecular diffusion in fluid under stagnant Laminar conditions, Diffusion through variable cross sectional area, Diffusion coefficient measurement and prediction, Measurement of liquid phase diffusion coefficient, Multi- component diffusion, Diffusivity in solids and it's applications.

UNIT II Mass Transfer Coefficient: Individual and over all mass transfer coefficient, Inter-phase Mass Transfer Theory, Penetration Theory, Boundary Layer Theory, Reynolds, Prandtl and Taylor Analogy, Mass Transfer with Chemical Reaction.

UNIT III Distillation: Introduction to distillation, Rault's law, Relative volatility, Vapor liquid equilibrium (VLE), Boiling point diagram, Partial vaporization and condensation, Flash and Differential distillation for binary mixtures, Steam distillation, Azeotropes and Extractive distillation.

UNIT IV Continuous distillation with rectification, Calculation of Number of plates - Lewis Sorel Method, McCabe Thiele Method, Reflux Ratio- Optimum and Minimum Reflux Ratio, Underwood Fens key Equation, Plate efficiency, Enthalpy - Concentration diagram.

UNIT V Absorption: Introduction to absorption, Henery's Law, Design of packed absorption tower based on Over all mass transfer coefficient, Counter current multistage, absorption, Continuous contact equipments.

Text Books:

1. Treybal, R.E., "Mass Transfer Operations", McGraw –Hill International Edition, 3rd Ed., 1998
2. McCabe, W.L., Smith, J. and Harriot, P., " Unit Operation of Chemical Engineering", McGraw-Hill International Edition, 6th Ed., 2001

References Books:

1. Geankoplis, C.J., " Transport Process and Unit Operations", Prentice Hall, 3rd Ed., India, 1993.
2. Badger, W.L., Banchero, J.T. " Introduction to Chemical Engineering", Tata McGraw Hills Publishing Company Limited , 3rd Ed., 1997

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राष्ट्रीय प्रौद्योगिकी संस्थान रायपुर
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Phone: (0771) 225 42 00
Fax: (0771) 225 46 00
Email: director.nitrr@rediffmail.com
Website: www.nitrr.ac.in

Date: 20/08/2018

To Whomsoever It May Concern

This is to certify that **Mr. S. Jaid Mohemmed, S/o Mr. S.M. Kamrul Hak,** (Roll No. 301201916010) student of B.E. (Chemical Engineering) in the Raipur Institute of Technology, Raipur has completed summer training for five weeks (from 5th June to 4th of July) in the academic year of 2018-19 in the Department of Chemical Engineering, NIT Raipur, as partial fulfillment of B.E. course. During the period of his training with us, he was found to be punctual, hardworking and inquisitive.

I wish him success in every future endeavor.

20/08/18

Dr. Prabir Ghosh
Assistant Professor
Department of Chemical Engineering
NIT, Raipur

RAIPUR INSTITUTE OF TECHNOLOGY RIT RAIPUR

Department of Chemical Engineering
National Institute of Technology
Raipur 492010 (C.G.)

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Chhattisgarh Swami Vivekanand Technical University, Bhilai

Name of program:	**Bachelor of Engineering**		
Branch:	**Chemical Engineering**	Semester:	**IV**
Subject:	**Organic Chemistry**	Code:	**319456(11)**
Total Theory Periods:	**40**	Total Tutorial Periods:	**NIL**
Class Tests:	**Two (Minimum)**	Assignments:	**Two (Minimum)**
ESE Duration:	**Three Hours**	**Maximum Marks: 80**	**Minimum Marks: 28**

Course Objectives:

1. To make students familiar and aware about various important concept of organic chemistry like preparation, properties and uses of aliphatic compounds, organometallic compounds, amines, urea, esters, carbohydrates, benzene and its derivatives, heterocyclic compounds etc.
2. Make them learn about important organic compounds and their industrial application.
3. For giving them idea about important mechanisms of chemical reaction like electophillic substitution reactions, Cannizaro reaction, Benzoine condensation, Riemer-Tiemann reaction, Perkin reaction,Aldol condensation etc which will help in managing industrial processes and conditions.
4. Make students to perform experiments related to organic compound synthesis, organic compound identification, and functional group test to create better ways of productions.
5. Make students able to do some important chemical production.

UNIT- I Preparations properties and uses of electronic theory and its application to organic reactions. Various types of isomerism, Aliphatic compounds, Dicorboxilic acids - oxalic & succinic acid, Hydroxy acids, lactic acid, citric acid & tartaric acid, Unsaturated acids – malic &fumeric acid.

UNIT-II Malonic esters &acetoacetic esters, preparations & uses, Organometallic compounds – Grignard reagent, Nitrogen compounds - amines & urea.

UNIT- III Carbohydrates – nomenclature & classification of glucose, fructose, sucrose cellulose & starch, Aromatic compounds- properties and uses, benzene and homologue, substitution in benzene, Huckel's rule of aromaticity.

UNIT-IV Benzene and halogen derivatives: nitrobenzene, aniline, phenol, diazocompounds, benzoic acid, pthalicacid, benzaldehyde, benzophenone, benzene sulphonic acids.

UNIT-V Naphthalene and naphthalene derivatives, Heterocyclic compounds: preparations, properties & uses of furan, pyrrole, thiophene, pyridine and quinoline.

Text Books:

1. Bahal A., Bahal B.S. , A Text Book of Organic Chemistry S. Chand &Cooperation, 14th Edition.
2. Soni P.L., A Text Book of OrganicChemistry,S. Chand& Company.
3. Ahluwalia V. K., Goyal M., A Text Book of Organic Chemistry, Narosa Publishing House.

Reference Books:

1. Finar I.L, Organic Chemistry Volume I &II,Elbs Publishers, (Longman)
2. Morrison T. R.& Boyd, Organic Chemistry, Prentice Hall Publication, 6th Edition.

Course outcomes:

1. The students will be able to understand the concept of state of matter.
2. The students will be able to understand the practical knowledge of titration.
3. Familiar and aware about various important concept of organic chemistry.

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Chhattisgarh Swami Vivekanand Technical University, Bhilai

Name of program:	**Bachelor of Engineering**		
Branch:	**Chemical Engineering**	Semester:	**III**
Subject:	**Inorganic Process Technology**	Code:	**319352(19)**
Total Theory Periods:	**40**	Total Tutorial Periods:	**NIL**
Class Tests:	**Two (Minimum)**	Assignments:	**Two (Minimum)**
ESE Duration:	**Three Hours**	**Maximum Marks: 80**	**Minimum Marks: 28**

Course Objectives:

1. To study the industries with reference to its available raw materials, manufacturing process and process flow diagrams, Unit operations and Unit process involved.
2. To study economic aspects and general engineering problems associated with present status of the industry.

UNIT- I Fundamentals of inorganic process technology, Soda Ash, Caustic Soda, Salt Industries, Chlor - alkali industries, Br_2 and Cl_2 from sea water, Glauber Salts, Problems related to industries.

UNIT-II Sulfur, Sulfuric Acid Industries, Production of sulfuric acid by contact process, DCDA process and Chamber process, Production of alumina from bauxite ore, electrochemical industries, Use of Cl_2, Br_2, and I_2 in industries.

UNIT- III Nitrogen industries and nitrogen related compounds, Production of NH_3 and HNO_3 , Production of urea , production of ammonium sulfate, Fertilizer industries, Biofertilizers, Explosive.

UNIT-IV Acetylene (C_2H_2), Hydrogen by steam reforming process. Uses of industrial gases. Phosphoric acid, Single super phosphate, Triple super phosphate, Portland cement production.

UNIT-V Carbohydrates and fermentation industry: Cane sugar refining and decolorization, Sucrose from sugarcane, Beet sugar manufacture, production of ethyl alcohol.

Text Books:

1. Gopalarao, M, Dryden's Outline of Chemical Technology,EWP publishers,3rd Edition.
2. Austin, G T, Shreve's Chemical Process Industries, Tata McGraw Hill, 5th Edition

Reference Book:

1. Pandey G.N., A Text Book of Chemical Technology Volume 1, Vikash Publishers, 2nd Edition.

Course outcomes:

1. After undergoing this course the students will acquire knowledge regarding various technological aspects of chemical industries.
2. After undergoing this course the students will acquire knowledge regarding manufacturing process, aspects and general engineering problems associated with it.
3. Students get the overview of production of acid and fertilizers.

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Chhattisgarh Swami Vivekanand Technical University, Bhilai

Name of program:	**Bachelor of Engineering**	Semester:	**IV**
Branch:	**Chemical Engineering**	Code:	**319454(19)**
Subject:	**Material Technology**		
Total Theory Periods:	**40**	Total Tutorial Periods:	**10**
Class Tests:	**Two (Minimum)**	Assignments:	**Two (Minimum)**
ESE Duration:	**Three Hours**	**Maximum Marks: 80**	**Minimum Marks: 28**

Course Objectives:

1. To give the students knowledge of corrosion and their control method.
2. To give the students knowledge of oxidation and reduction reactions as they relate to engineering applications, such as corrosion.
3. To give the students knowledge of behavior of materials useful in chemical equipments.

UNIT- I Introduction to materials, Properties and behavior of materials useful in structure, machines and equipments, Atomic arrangements in material and imperfections, Elasticity, micro elasticity and phase transformation, Theories of corrosion and methods of corrosion control.

UNIT-II Theory of alloying and their construction, Applications of alloys in industries, Constitutional diagrams, Cast iron as material of construction with reference to its application in chemical Engineering.

UNIT- III Materials of construction with reference to application in chemical industry, Mild steel, High carbon steel, Stainless steel, High silicon steel, Molybdenum and tungsten steel.

UNIT-IV Nonferrous metals – Copper, Aluminum, Lead, Chromium, Tin, Brass, Bronze and Monel metal.

UNIT-V Non-metals – Glass, Enamels, Chemical stonewares, Graphite, Wood, Plastics, Rubber, Polymers and Ceramics.

Text Books:

1. AgrawalB.K., Introduction to EnggMaterials,TataMcgraw Hill, Edition 1988.
2. Khurmi R.S., Materials Science,S Chand ,1st edition.

Reference Books:

1. Gupta K.M., Material Science &Engineering,UmeshPublication, 1st Edition.

Course outcomes:

1. Students will gain an understanding of oxidation and reduction reactions as they relate to engineering applications, such as corrosion.
2. To study and behavior of materials useful in chemical equipments

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सेल SAIL

भिलाई इस्पात संयंत्र
BHILAI STEEL PLANT

मानव संसाधन विकास विभाग
HUMAN RESOURCES DEVELOPMENT DEPARTMENT

प्रमाणपत्र
CERTIFICATE

पंजीयन क्रमांक
Regn. No. V-18/1137

प्रमाणित किया जाता है कि श्री / कुमारी
This is to certify that Shri / Ku. Prachi Sahu

वर्ष/सेमे. विद्यार्थी
Seme Fourth Student of B.E. (Chemical Engg.)

अभियांत्रिकी
Engineering of R.I.T.E.E., Raipur

ने अवकाश कालीन प्रशिक्षु के रूप में दिनांक से तक प्रशिक्षण प्राप्त किया ।
has undergone vacational training from 04/06/2018 to 16/06/2018

इस अवधि में उनका कार्य निष्पादन रहा ।
His / her performance during the training period has been Very Good

भिलाई, दिनांक
Bhilai, Dated 18/06/2018

प्रभारी (प्रशिक्षण)
Incharge (Training)
AMRESH KUMAR
Asst. General Manager (HRD)

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Chhattisgarh Swami Vivekanand Technical University, Bhilai

Name of program:	**Bachelor of Engineering**		
Branch:	**Civil Engineering**	Semester:	**IV**
Subject:	**Building Construction**	Code:	**320455 (20)**
Total Theory Periods:	**40**	Total Tutorial Periods:	**10**
Class Tests:	**Two (Minimum)**	Assignments:	**Two (Minimum)**
ESE Duration:	**Three Hours**	**Maximum Marks: 80**	**Minimum Marks: 28**

Course Objectives:

1. Make student to understand various parts of building.
2. Make student to understand foundations of structures.
3. To understand the safety precautions & sound proofing.
4. To prepare a base for Civil Engineering Drawing.
5. To provide an understanding about the relevance and application in Civil Engineering Projects.

UNIT- I **Foundations -** Brief study of different types of foundations, nature of soil (expansive or non-expansive, alluvial or residual, sandy or clayey for settlement etc.), approximate values of bearing capacities, breadth and depth of foundation, typical cross sections for foundations under walls and R.C.C. Columns. Foundations in black cotton soils, under reamed pile foundations, foundation failures and remedial measures.

UNIT-II **Masonry -** Technical terms in masonry, classification and brief specifications of stone masonry, bonds in brick masonry, general principles to be observed in stone and Brick Masonry Construction. Walls Different types (load bearing, cavity-walls and partition walls), thickness considerations.Doors, Windows And Lintels Different types based on materials and methods of construction, technical terms, size and locations.

UNIT- III **Floors -** Ground and upper floors, various types, their suitability, construction details of concrete and terrazzo floors, Floor tiles. **Roofs -**Technical terms and different types of pitched and flat roofs.Various roof coverings for pitched and flat roofs. **Ceiling –** Purpose & types of ceiling. Formwork -Different types of formwork, stripping times.

UNIT-IV **Damp Proofing** Causes and effect of Dampness, parts of a building likely to be affected most, methods of dampproofing in different locations including roofs. **Plastering and Pointing -**Types and considerations during plastering and pointing.**Joints-** Construction Contraction and Expansion Joints.

UNIT-V **Stairs** Types based on geometry and material, suitability, proportioning of stairs, lifts and escalators. **Sound Proofing-** Materials and Methods of sound proof construction. Safety Precautions- Safe Practices, Basic First Aid Procedures Construction Teams, Light Construction and Heavy Construction Ceiling, Balcony - Functions, Method of construction

Text Books:

Building Construction – B.C. Punmia (Laxmi Publication Pvt. Ltd.),,
Building Construction – Sushil Kumar (Standard Publication Distributors)

Reference Books:

1. Building Construction – Gurucharan Singh (Standard Publication Distributors)
2. Building Construction – S. C. Rangwala (Charotar Publishing House, Anand, Gujarat)

Course Outcome:

1. Students are expected to understand various parts of building.
2. Students are expected to understand various types of bonds.
3. Students are expected to read construction drawing of form work.
4. Students are expected to understand importance of safety in construction.

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A

MAJOR PROJECT REPORT

BASED ON

"A CASE STUDY OF DRAINAGE SYSTEM IN RAIPUR & ITS INTEGRATION INTO CATCHMENTS"

SUBMITTED TO

CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY BHILAI (C.G.)

IN PARTIAL FULFILLMENT OF REQUIREMENT FOR THE AWARD OF DEGREE OF

BACHELOR OF ENGINEERING

In

CIVIL ENGINEERING

SUBMITTED BY

ABHISHEK RAHANGDALE
NALINI SINGH
GAGAN SAHU

DEVASHISH BAGHEL
PRIYANKA KUSHWAHA
ROHIT KUMAR SINGH

UNDER THE GUIDANCE OF

PROF – VISHAL SINGH
B.E. (CIVIL)

SESSION 2017-18

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CHHATAUNA, MANDIRHASAUD, RAIPUR (C.G.)

SINCE 1998 RITEE

RAIPUR INSTITUTE OF TECHNOLOGY, RAIPUR
CHHATAUNA, MANDIR HASAUD, RAIPUR (C.G.) INDIA – 492101
Ph.No. +91-07710253485, 4036053, Fax - 91-0771-2537634
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ABSTRACT

Recently one of the most prominent activity focusing in Indian cities is the retrofitting the urban drainage system. Millions of rupees spend on the construction of stormwater drains in towns and cities to prevent flooding during the rains. These drains that extend several kilometers across the town or city are expected to feed all the collected surface runoff into the nearest surface water body such as a lake or a river. In this case a case study was done on improvement of the stormwater management in Raipur city in India. The study suggested that flooding can be prevented in the city by interlinking of stormwater drain with the existing lakes in the city. The lakes can act as the storage reservoir which dampen the effect of flooding and also reduce the chances of getting lakes dried during summer. Site reconnaissance revealed that most of the drains damaged and the sewage also entering to lakes. The sewerage system in the city observed very poor, creating health and safety issues for the general public. The city municipal corporation is making an effort in restoring these systems. This technical article will try with the following describes and provide with a glimpse into the massive effort that Raipur City undertook in order to inspect and clean its drainage and sanitary sewer systems.

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RAIPUR INSTITUTE OF TECHNOLOGY
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Chhattisgarh Swami Vivekanand Technical University, Bhilai (C.G.)

Name of program: Bachelor of Engineering

Semester: 7th

ESE Duration: 3 Hours

Total Theory Periods: 50

Class Tests: 2

Maximum Marks: 80

Branch: Civil Engineering

Subject: Environmental Engineering-II

Subject Code:320733(20)

Total Tutorial Periods: 12

Assignments: 2

Minimum Marks: 28

Objectives of the Subject:

1. To give an overview of importance of proper sewage disposal and various sewerage systems.
2. To introduce the students the estimation of domestic sewage and other sewer appurtenances.
3. To impart a detailed knowledge in the design of various sewage treatment processes.
4. To impart knowledge about the different industrial waste treatment technique.
5. To provide knowledge about the environmental social and health implications of solid waste and its management.

Outcomes of the Subject:

1. A student must be capable of designing a sewer system for a city taking into consideration the variations in flow.
2. The student should be capable of managing controlling the sewage treatment plant with complete knowledge of the design values and this functioning.
3. The student must be able to decide upon the quantum of treatment to be given to the wastewater from different sources before they are discharged to open water courses.
4. The student must be able to analyze coming from various processes in an industry and decide upon the techniques of treatment to be given.
5. The student will be socially responsible and aware of the social, environmental and health implications of solid waste and its management.

Unit-1: Estimation of Sewage

Sewage and Sewerage, definitions and some common terms, object of sewage disposal. System of sanitation: Conservancy systems, Water system, sewage system-combined, separate and partially separate, patterns of collection system.

Amount of sewage: Estimation of domestic and storm sewage, variations in the quantity of sewage, Design of sewers (Only circular sewer) Manholes, Pumping stations, Wet well capacity.

Unit-2: Sewage Treatment

Characteristics of sewage: Physical, chemical and biological characteristics, fundamentals of aerobic & anaerobic process.

Sewage treatment: Preliminary treatment systems, Racks and screens, comminute Grit chambers.

Primary treatment systems: Plain sedimentation, detention time and over-flow rates, types of inlets and outlets, onsite wastewater treatment- septic tank, Imhoff tank, oxidation pond .

Unit-3: Secondary treatment systems

Attached growth process: Trickling filters, standard and high rates, efficiency (NRC) formula, and operational problems of trickling filters. Suspended growth process, principle of suspended growth process, Activated sludge process, Oxidation ditch aeration and mixing techniques, Operational problems of activated sludge systems, stablisation tools aerobic, anaerobic and facultative lagoon.

Unit-4: Sewage Sludge Treatment and Sewage Disposal

Importance, amount and characteristics of sludge, sludge digestion, Anaerobic digestion, aerobic digestion, sludge drying beds.

Disposal by dilution, self purification of polluted streams, factors affecting self purification, Sag curve, disposal on land surfaces. Stream standards, Effluent standards, theories of waste treatment (Volume reduction, strength reduction, new Equalization and proportioning) Summery of Industrial waste, its origin, character and treatment.

Unit-5: Solid Waste Management

Solid waste management, source and characteristics, environmental and health implications, refuse characteristics, collection methods, disposal of solid waste by land filling, composting and incineration methods. Collection and disposal of refuse, Composting of refuse.

Text Books:

1. Environmental Engineering – Peavy & Rowe (Tata McGraw Hill, New Delhi).
2. Waster Water Engineering – S.K. Garg (Khanna Publication).
3. Waste Water Engineering – B.C. Punmia (Laxmi Publication, New Delhi)

Reference Books:

1. Environmental Science and Engineering – Henry and Heinke (Pearson Education).
2. Waste Water Engineering – Metcalf Eddy (Tata McGraw Hill, New Delhi).
3. Introduction to Environmental Science – Y Anjaneyulu (B S Publications).
4. Environmental Science and Engineering – henry and heinke (Pearson Education).
5. Waste Water Engineering – Metcalt Eddy (Tata McGraw Hill, New Delhi)

A
MAJOR PROJECT REPORT
BASED ON

"STABILITY OF SOFT SOIL USING INDUSTRIAL WASTES"

SUBMITTED TO

CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY BHILAI (C.G.)

IN PARTIAL FULFILLMENT OF REQUIREMENT FOR THE AWARD OF DEGREE OF

BACHELOR OF ENGINEERING

In

CIVIL ENGINEERING

SUBMITTED BY

NEERAJ SINGH THAKUR
JASMEET SINGH MATHARU
VAIBHAV SINGH RAJPUT
ROSHNI BHONSLE
VIBHA CHANDRAVANSHI

RAIPUR INSTITUTE OF TECHNOLOGY RIT * RAIPUR *

PROF – MR. VISHAL KUMAR
B.E. (CIVIL)

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CHHATAUNA, MANDIRHASAUD, RAIPUR (C.G.)

SESSION 2017-18

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CHHATAUNA, MANDIR HASAUD, RAIPUR (C.G.) INDIA – 492101
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ABSTRACT

This project deals with stabilization of soft soil using industrial waste. Sometimes, before construction of a structure, the soil beneath it requires stabilization to improve its properties. Industrial wastes can be used effectively for the purpose of soil stabilization, making it economical. In this project the Indiustrial wastes used are Fly Ash, Pond Ash and Random fibre reinforcement. The project are planned to conduct various experiment like Specific gravity, sieve analysis, proctor compaction test and unconfined compressive strength test to inerease strength properties and behaviour of soft soil. Then the results and graphs of various mixes are compared to see their effects in soil stabilization. This stabilization technique has an additional benefit of providing an environment friendly way to deal with industrial wastes.

Chhattisgarh Swami Vivekanand Technical University, Bhilai

Branch:	**Civil Engineering**	Semester:	**VI**
Subject:	**Concrete Technology**	Code:	**320654(20)**
Total Theory Periods:	**40**	Total Tutorial Periods:	**10**
No. of class Tests to be conducted:	**2 (Minimum)**	No. of assignments to be submitted:	**2 (Minimum)**
ESE Duration:	**Three Hours**	Maximum Marks in ESE: **80**	Minimum Marks in ESE: **28**

Objective of the Subject:

1. To develop Fundamental knowledge of properties of concrete and its ingredients.
2. To acquire an interest in concrete technology and admixture and its filled requirements.
3. Developing a good skill of various methods of concrete making, placing and special formwork.
4. Developing a professional skill of concrete mix design by IS Code Method.

Outcomes of the Subject:

1. Ability to measure quality of concrete making materials.
2. Ability to design concrete mixes according to IS, ACI, BS Code methods.
3. Capable of understanding field requirements of various types of concrete.
4. Understanding the process of selection of materials and testing, uses of admixtures, professional practices in ready mix concrete.

UNIT I **Concrete Making Materials:** Hydration of cement, Structure of hydrated cement, General Purpose cements, Special purpose cements, Blended cements, Classification of Aggregates, Properties, Grading requirements, Methods of combining aggregates, Surface index, specified grading, Alkali aggregate reaction, Quality of mixing and curing water.

UNIT II **Admixtures and Fresh Concrete:** Chemical admixtures – Functions of Admixtures, Classification of Admixtures, Mineral Additives, effects on concrete properties. Workability, Factors affecting workability, Measurement of Workability, Requirements of Workability, Segregation, Bleeding

UNIT III **Hardened Concrete and Durability:** Compressive strength and parameters affecting it, Gain of strength with age, Maturity Concept, Elasticity, Creep and shrinkage, Permeability of Concrete, Durability of Concrete, relation between durability and permeability, corrosion of steel rebars.

UNIT IV **Concrete Mix Design:** Principles of concrete mix design, Concrete mix design steps as per Indian, American & British methods, destructive and non-destructive tests on concrete.

UNIT V **Special Concrete & Concreting Methods**: Need of special concrete, properties, ingredients, method of development and applications of Light weight concrete, Fibre reinforced concrete, Polymer Concrete, self-compacted concrete, High performance concrete, Ready mix concrete, Extreme weather concreting, special concreting methods, Vacuum dewatering - underwater concrete, special from work.

Text Books:

1. Concrete Technology – M.L. Gambhir (Tata McGraw Hill)
2. Concrete Technology Theory and Practice - M. S. Shetty, (S.Chand and Company Ltd. Delhi)

Reference Books:

1. Concrete Technology – A. M. Neville, J. J. Brooks, (Pearson Education)
2. Light Weight Concrete Academic Kiado – Rudhani G. (Publishing Home of Hungarian Academy of Sciences)
3. Concrete Technology – R.S. Varshney (Oxford, IBH Publishers)

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CHHATAUNA, MANDIRHASAUD, RAIPUR (C.G.)

A

Major Project Report

on

"AN EXPERIMENTAL INVESTIGATION ON MECHANICAL PROPERTIES OF AAC BLOCK WITH TEXTILE REINFORCED ECO-FRIENDLY MASONRY MORTAR"

Submitted to

CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY, BHILAI

In partial fulfilment of requirement for the Award of Degree of

Bachelor of Engineering

in

Civil Engineering

By

Atul Gupta	Prakash Tiwari	Raju Verma
Bhumika Yadav	Pravin Kumar Jaiswal	Yogesh Singh
Jyoti Sahu	Rahul Kumar Ambast	

Under the Guidance of

Prof. Rajan Mishra

B.E. (Civil), M.E. (Structure)

E-MBA, PGDBM, DIP. IN TOTAL QUALITY CONTROL

SESSION – 2017-18

RAIPUR INSTITUTE OF TECHNOLOGY, RAIPUR

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ABSTRACT

In general, masonry structures are considered to be optimal for low-rise structures in many countries due to easy and fast construction, abundant material, and no special technique for construction. Also masonry structures are strong enough to resist large compressive stress. These structures have poor ductility and thus are vulnerable under dynamic loading such as earthquake. Unreinforced masonry (URM) structures represent a significant portion of existing historical structures around the world. Recent earthquakes have shown the need for seismic retrofitting for URM structures. Various types of strengthening methods have been used for URM structures.

Again behavior of masonry structure is dependent on the properties of its constituents such as brick units and mortar separately and together as a united mass. Brick properties vary largely from region to region as bricks are made with locally available raw materials with inherent randomness. Therefore, the analysis and design of brick masonry structures considering the mean values of material properties may underestimate or overestimate the structural capacity. Due to increase in the growth of industrial sectors the power requirement of the country is rapidly increasing. India depends on Thermal Power as its main source, thus increase in power requirement every year. Present scenario of our country shows 75 % of country's total installed power generation is thermal of which coal-based generation is 90%. In our country about 100 million tons of fly ash is generated each year. Also Chhattisgarh is 2nd rank in coal production in India. Hence a lot of thermal and steel power plants are established around the state. Hence a large volume of pond ash and fly ash are generated day by day. Only 56% of these produced coal ash are utilized in various sector on present day. Remaining ashes are dumped in open land. The Indian government passed a law in October 2005 stating that a minimum of 25 percent of fly ash must be used in the manufacture of clay bricks for use in construction activities within a 50 km radius of coal burning thermal power plants.

Chhattisgarh Swami Vivekanand Technical University, Bhilai

Branch: **Computer Science & Engineering**
Subject: **Data Base Management System**
Total Theory Periods: **40**
No. of class Tests to be conducted: **2 (Minimum)**
ESE Duration: **Three Hours**

Semester: **V**
Code: **322556 (22)**
Total Tutorial Periods: **10**
No. of assignments to be submitted: **One per Unit**

Maximum Marks in ESE: **80** . Minimum Marks in ESE: **28**

COURSE OBJECTIVE:

- To understand the role of a database management system and its users in an organization.
- To understand database concepts, including the structure and operation of the relational data model.
- Can successfully apply logical database design principles, including E-R diagrams and database normalization.
- Construct simple and moderately advanced database queries using Structured Query Language (SQL).
- To understand the concept of transaction, its properties and how to persist the data in complex concurrent users environment.

COURSE OUTCOME:

- Will be able to describe the basic concepts of RDMBS and relational data model
- Be familiar with the relational database theory & be able to write relational algebra expressions for queries
- Understand DML, DDL and will be able to construct queries using SQL by knowing the importance of data &its requirements in any applications.
- Be familiar with the basic issues of transaction, its processing and concurrency control.
- Be familiar with basic database storage structures and access techniques: file and page organizations, indexing methods including B-tree, and hashing.

UNIT I Data base System Applications, data base System VS file System – View of Data – Data Abstraction – Instances and Schemas – data Models – the ER Model – Relational Model – Other Models – Database Languages – DDL – DML – database Access for applications Programs – data base Users and Administrator – Transaction Management – data base System Structure – Storage Manager – the Query Processor. History of Data base Systems. Data base design and ER diagrams – Beyond ER Design Entities, Attributes and Entity sets – Relationships and Relationship sets – Additional features of ER Model – Concept Design with the ER Model – Conceptual Design for Large enterprises.

UNIT II Introduction to the Relational Model – Integrity Constraint Over relations – Enforcing Integrity constraints – Querying relational data – Logical data base Design – Introduction to Views – Destroying altering Tables and Views. Relational Algebra – Selection and projection set operations – renaming – Joins – Division – Examples of Algebra overviews – Relational calculus – Tuple relational Calculus – Domain relational calculus – Expressive Power of Algebra and Calculus

UNIT III Form of Basic SQL Query – Examples of Basic SQL Queries – Introduction to Nested Queries – Correlated Nested Queries Set – Comparison Operators – Aggregative Operators – NULL values – Comparison using Null values – Logical connectivity's – AND, OR and NOT – Impact on SQL Constructs – Outer Joins – Disallowing NULL values – Complex Integrity Constraints in SQL Triggers and Active Data bases.

UNIT IV Schema refinement – Problems Caused by redundancy – Decompositions – Problem related to decomposition – reasoning about FDS – FIRST, SECOND, THIRD Normal forms – BCNF – Lossless join Decomposition – Dependency preserving Decomposition – Schema refinement in Data base Design – Multi valued Dependencies – FORTH Normal Form
Transaction Concept- Transaction State- Implementation of Atomicity and Durability – Concurrent – Executions – Serializability Recoverability – Implementation of Isolation – Testing for serializability- Lock – Based Protocols – Timestamp Based Protocols Validation- Based Protocols – Multiple Granularity

UNIT V Recovery and Atomicity – Log – Based Recovery – Recovery with Concurrent Transactions – Buffer Management – Failure with loss of nonvolatile storage-Advance Recovery systems- Remote Backup systems Data on External Storage – File Organization and Indexing – Cluster Indexes, Primary and Secondary Indexes – Index data Structures – Hash Based Indexing – Tree base Indexing – Comparison of File Organizations – Indexes and Performance Tuning- Intuitions for tree Indexes – Indexed Sequential Access Methods (ISAM) – B+ Trees: A Dynamic Index Structure.

TEXT BOOKS:

1. Data base System Concepts, Silberschatz, Korth, McGraw Hill, 5th edition.
2. Data base Management Systems, Raghurama Krishnan, Johannes Gehrke, TATA McGraw Hill 3rd Edition

REFERENCES:

1. Data base Systems design, Implementation, and Management, Peter Rob & Carlos Coronel 7th Edition.
2. Fundamentals of Database Systems, Elmasri Navrate Pearson Education
3. Introduction to Database Systems, C.J. Date Pearson Education

PRINCIPAL
CHHATAUNA INSTITUTE OF TECHNOLOGY
CHHATAUNA, MANDIRHASAUD, RAIPUR (C.G.)

" SERVICE ON DOOR STEP"

A Project report submitted to

Chhattisgarh Swami Vivekananda Technical University Bhilai(C.G.), India

For Partial fulfillment of the award of the Degree

Bachelor of Technology in

Computer Science and Engineering

By

SIDDHARTH CHANDRAKAR

RAJNISH SINGH

Under the Guidance of

Mr. R. N. GIRI

Asst. Profesor, Department of CSE
RITEE, Raipur(C.G.)

SINCE 1995
RITEE

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING
RAIPUR INSTIUTE OF TECHNOLGY, RAIPUR
Chhataunna, Mandir Hassaud, Raipur, Chhattisgarh
Phone:0771-3208842,3250790 Fax: 0771-2537634
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PRINCIPAL
RAIPUR INSTITUTE OF TECHNOLOGY
CHHATAUNA, MANDIRHASAUD, RAIPUR (C.G.)

SINCE 1995
RITEE

Department of Computer Science and Engineering

Raipur Institute of Technology

Chhatauna, Mandir Hasaud, Raipur (C.G.)

CERTIFICATE BY THE EXAMINERS

'he project entitled "SERVICE ON DOOR STEP" Submitted by siddharth chandrakar, Enrollment No.: AO9360 ,Rajr ingh,Enrollment no.: AO9248, has been examined by the undersigned as a part of the examination and is he ecommended for the award of the degree of Bachelor of technology in Computer Science & Engineering of Chhattisg wami Vivekananda Technincal University Bhilai,(C.G.).

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nternal Examiner

External Examiner

RAIPUR INSTITUTE OF TECHNOLOGY
RIT
RAIPUR

PRINCIPAL
RAIPUR INSTITUTE OF TECHNOLOGY
CHHATAUNA, MANDIRHASAUD, RAIPUR (C.G.)

ABSTRACT

This paper introduces that the current problems of the society and general peoples who are connected with smartphones and technology for all we propose to Door step service provider in Android technology for users. User can search provided services and use accordingly. Services providing sector is a one of the most demanded sector now a day. The motive of this application is to provide workers for the household works such as an electrician, plumbers and many more.as per our analysis Other applications do not provide such services in the construction area Generally there are applications in market which provides selected works such as providing maid etc. And we are try to deal with labors and also services provider.

TABLE OF CONTENTS

Chhattisgarh Swami Vivekanand Technical University, Bhilai

Branch:	**Computer Science & Engineering**	Semester:	**VI**
Subject:	**Software Engineering & Project Management**	Code:	**322654(22)**
Total Theory Periods:	**40**	Total Tutorial Periods:	**10**
No. of class Tests to be conducted:	**2 (Minimum)**	No. of assignments to be submitted:	**One per Unit**
ESE Duration:	**Three Hours**	Maximum Marks in ESE: **80**	Minimum Marks in ESE: **28**

COURSE OBJECTIVE:

- To introduce software project and to understand about the different software processes & their uses.
- Understanding good coding practices, including documentation, contracts, regression tests and daily builds.
- To introduce ethical and professional issues and to explain why they are concern to software engineers.

To understand how Software engineering & Project Management is concerned with theories, methods and tools for professional software development.

COURSE OUTCOME:

After completion of this course, the students would be able to

- Select and implement different software development process models
- Extracting and analyzing software requirements specifications for different projects
- Developing some basic level of software architecture/design
- Applying standard coding practices, Identification and implementation of the software metrics
- Defining the basic concepts and importance of Software project management concepts like cost estimation, scheduling and reviewing the progress.
- Applying different testing and debugging techniques and analyzing their effectiveness.
- Analyzing software risks and risk management strategies
- Defining the concepts of software quality and reliability on the basis of International quality standards.

UNIT I **Introduction to Software Engineering:** The evolving role of software, Changing Nature of Software, legacy software, Software myths. A Generic view of process: Software engineering- A layered technology, a process framework, The Capability Maturity Model Integration (CMMI), Process patterns, process assessment, personal and team process models. Process models: The waterfall model, Incremental process models, Evolutionary process models, specialized process models, The Unified process.

UNIT II **Software Requirements Specification (SRS):** Functional and non-functional requirements, User requirements, System requirements, Interface specification, the software requirements document. Requirements engineering process: Feasibility studies, Requirements elicitation and analysis, Requirements validation, Requirements management. System models: Context Models, behavioural models, Data models, Object models, structured methods.

UNIT III **Software Design:** Basic Concept of Software Design, Architectural Design, Low Level Design: Modularization, Design Structure Charts, Pseudo Codes, Flow Charts, Coupling and Cohesion Measures, Design Strategies: Function Oriented Design, Object Oriented Design, Top-Down and Bottom-Up Design. Software Measurement and Metrics: Various Size Oriented Measures: Hallstead's Software Science, Function Point (FP) Based Measures, Cyclomatic Complexity Measures: Control Flow Graphs.

UNIT IV **Testing Strategies:** A strategic approach to software testing, test strategies for conventional software, Black-Box and White-Box testing, Validation testing, System testing, the art of Debugging. Product metrics: Software Quality, Frame work for Product metrics, Metrics for Analysis Model, Metrics for Design Model, Metrics for source code, Metrics for testing, Metrics for maintenance. Metrics for Process and Products: Software Measurement, Metrics for software quality.

UNIT V **Software Project Management**: People – Product-Process-Project. Project scheduling and tracking: Basic concepts-relation between people and effort-defining task set for the software project-selecting software engineering task. Computer aided software engineering tools - CASE building blocks, taxonomy of CASE tools, integrated CASE environment.**Software Risk management:** Reactive vs Proactive Risk strategies, software risks, Risk identification, Risk projection, Risk refinement, RMMM, RMMM Plan. Quality Management: Quality concepts, Software quality assurance, Software Reviews, Formal technical reviews, Statistical Software quality Assurance, Software reliability, The ISO 9000 quality standards.

TEXT BOOKS:

1. Software Engineering: A practitioner's Approach, Roger S Pressman, sixth edition. McGrawHill International Edition, 2005
2. Software Engineering, Ian Sommerville, seventh edition, Pearson education,2004

REFERENCE BOOKS:

1. Software Engineering,A Precise Approach,Pankaj Jalote,Wiley India,2010.
2. Software Engineering : A Primer, Waman S Jawadekar, Tata McGraw-Hill, 2008
3. Fundamentals of Software Engineering,Rajib Mall,PHI, 2005
4. Software Engineering, Principles and Practices,Deepak Jain,Oxford University Press.
5. Software Engineering1: Abstraction and modeling, Diner Bjorner, Springer International edition, 2006.

" EVM MACHINE"

A Project report submitted to

Chhattisgarh Swami Vivekananda Technical University Bhilai(C.G.), India

For Partial fulfillment of the award of the Degree

Bachelor of Technology in

Computer Science and Engineering

By

MAYANK PATEL

MD.HASSAN

KAHAT RAM KORACHE

Under the Guidance of

Mr. Avinash Dhole

Asst. Profesor, Department of CSE

RITEE, Raipur(C.G.)

SINCE 1995

RITEE

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

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CHHATAUNA, MANDIRHASAUD, RAIPUR (C.G.)

Department of Computer Science and Engineering
Raipur Institute of Technology
Chhatauna, MandirHasaud, Raipur (C.G.)

CERTIFICATE BY THE EXAMINERS

The project entitled "EVM MACHINE" Submitted by MAYANK PATEL, Enrollment No.: AJ0144 ,MD HASSAN,Enrollm o.: AJ2489, KAHAT RAM KORACHEEnrollment No. : AH7059has been examined by the undersigned as a part of xamination and is herbyrecommended for the award of the degree of Bachelor of technology in Computer Science ngineering of Chhattisgarh Swami Vivekananda Technincal University Bhilai,(C.G.).

Internal Examiner

External Examiner

RAIPUR INSTITUTE OF TECHNOLOGY * RAIPUR * RIT

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RAIPUR INSTITUTE OF TECHNOLOGY
CHHATAUNA, MANDIRHASAUD, RAIPUR (C.G.)

ABSTRACT

It has always been an arduous task for the election commission to conduct free and fair polls in our country, the largest democracy in the world. Crores of rupees have been spent on this to make sure that the elections are riot free. But, now- a -days it has become common for some forces to indulge in rigging which may eventually lead to a result contrary to the actual verdict given by the People. This paper aims to present a new voting system employing biometrics in order to avoid rigging and to enhance the accuracy and speed of the process. The system uses thumb impression for voter identification as we know that the thumb impression of every human being has a unique pattern. Thus it would have an edge over the present day voting systems.

CHHATTISGARH SWAMI VIVEKANAD TECHNICAL UNIVERSITY
BHILAI (C.G.)

Semester: VIII | **Branch: Computer Science & Engg.**
Subject: Artificial Intelligence & Expert Systems | **Code: 322831(22)**
Total Theory Periods: 50 | **Total Tutorial Periods: 12**
Total Marks in End Semester Exam: 80 | **Minimum number of CT to be conducted: 02**

Course objective:

- Introduce the basic principles of AI towards problem solving, inference, perception, knowledge representation and learning.
- Investigate applications of AI techniques in intelligent agents, expert systems, artificial neural Networks and other machine learning models.
- Experiment with a machine learning model for simulation and analysis.
- Explore the current scope, potential, limitations, and implications of intelligent systems.
- To have a basic proficiency in a traditional AI language including an ability to write simple to intermediate programs and an ability to understand code written in that language.

UNIT I Overview & Search Techniques:

Introduction to AI, Problem Solving, State space search, Blind search: Depth first search, Breadth first search, Informed search: Heuristic function, Hill climbing search, Best first search, A* & AO* Search, Constraint satisfaction. Game tree, Evaluation function, Mini-Max search, Alpha-beta pruning, Games of chance.

UNIT II Knowledge Representation (KR):

Introduction to KR, Knowledge agent, Predicate logic, WFF, Inference rule & theorem proving forward chaining, backward chaining, resolution; Propositional knowledge, Boolean circuit agents.
Rule Based Systems, Forward reasoning: Conflict resolution, backward reasoning: Use of Back tracking, Structured KR: Semantic Net - slots, inheritance, Frames- exceptions and defaults attached predicates, Conceptual Dependency formalism and other knowledge representations.

UNIT III Handling uncertainty & Learning:

Source of uncertainty, Probabilistic inference, Bayes' theorem, Limitation of naïve Bayesian system, Bayesian Belief Network (BBN), Inference with BBN, Dempster-Shafer Theory, Fuzzy Logic, Fuzzy function, Fuzzy measure, Non monotonic reasoning: Dependency directed backtracking, Truth maintenance systems. Learning: Concept of learning, Learning model, learning decision tree, Paradigms of machine learning, Supervised & Unsupervised learning, Example of learning, Learning by induction, Learning using Neural Networks.

UNIT IV Natural Language Processing (NLP) & Planning:

Overview of NLP tasks, Parsing, Machine translation, Components of Planning System, Planning agent, State-Goal & Action Representation, Forward planning, backward chaining, Planning example: partial-order planner, Block world.

UNIT V Expert System & AI languages:

Need & Justification for expert systems- cognitive problems, Expert System Architectures, Rule based systems, Non production system, knowledge acquisition, Case studies of expert system. Ai language: Prolog syntax, Programming with prolog, backtracking in prolog, Lisp syntax, Lisp programming.

Course outcome: After successful completion of the course, students will be able

- Demonstrate fundamental understanding of artificial intelligence (AI) and expert systems.
- Apply basic principles of AI in solutions that require problem solving, inference, perception, knowledge representation, and learning.
- Demonstrate awareness and a fundamental understanding of various applications of AI techniques in intelligent agents, expert systems, artificial neural networks and other machine learning models.
- Demonstrate proficiency in applying scientific method to models of machine learning.

Text Books:-

1. Artificial Intelligence by Elaine Rich and Kevin Knight, Tata MeGraw Hill.
2. Introduction to Artificial Intelligence and Expert Systems by Dan W.Patterson, Prentice Hall of India.

Reference Books :-

1. Principles of Artificial Intelligence by Nils J.Nilsson, Narosa Publishing house.
2. Programming in PROLOG by Clocksin & C.S. Melish, Narosa Publishing house.
3. Rule based Expert Systems-A practical Introduction by M. Sasikumar, S.Ramani, et. al., Narosa Publishing House.

" Home Automation Using Sensor"

A Project report submitted to

Chhattisgarh Swami Vivekananda Technical University Bhilai(C.G.), India

For Partial fulfillment of the award of the Degree

Bachelor of Technology in

Computer Science and Engineering

By

HARSHITA SINGH

RUPALIGUPTA

KHUSHBOOSAHU

Under the Guidance of

Mr. YogeshRathore

Asst. Profesor, Department of CSE
RITEE, Raipur(C.G.)

SINCE 1995
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CHHATAUNA, MANDIRHASAUD, RAIPUR (C.G.)

Department of Computer Science and Engineering
Raipur Institute of Technology
Chhatauna, MandirHasaud, Raipur (C.G.)

CERTIFICATE BY THE EXAMINERS

The project entitled "Home automation using sensor" Submitted by harshitasingh, Enrollment No.: AO9236,rupaligupta I AO9249, khushboosahuEnrollment No. : AO9279has been examined by the undersigned as a part of the examination and hereby recommended for the award of the degree of Bachelor of technology in Computer Science & Engineering Chhattisgarh Swami Vivekananda Technincal University Bhilai,(C.G.).

Internal Examiner

External Examiner

RAIPUR INSTITUTE OF TECHNOLOGY RIT RAIPUR

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RAIPUR INSTITUTE OF TECHNOLOGY
CHHATAUNA, MANDIRHASAUD, RAIPUR (C.G.)

ABSTRACT

The main objective of this project is to develop a home automation system using an Arduino board with Bluetooth being remotely controlled by any Android OS smart phone. As technology is advancing so houses are also getting smarter. Modern houses are gradually shifting from conventional switches to centralized control system, involving remote controlled switches. Presently, conventional wall switches located in different parts of the house makes it difficult for the user to go near them to operate. Even more it becomes more difficult for the elderly or physically handicapped people to do so. Remote controlled home automation system provides a most modern solution with smart phones. In order to achieve this, a Bluetooth module is interfaced to the Arduino board at the receiver end while on the transmitter end, a GUI application on the cell phone sends ON/OFF commands to the receiver where loads are connected. By touching the specified location on the GUI, the loads can be turned ON/OFF remotely through this technology. The loads are operated by Arduino board through optoisolators and thyristors using triacs.

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CHHATTISGARH SWAMI VIVEKANAD TECHNICAL UNIVERSITY, BHILAI (C.G.)

Semester: VIII
Subject: Real Time Systems
Total Theory Periods: 50
Total Marks in End Semester Exam: 80
Branch: Computer Science.& Engg.
Code: 322845(22)
Total Tutorial Periods: NIL
Minimum number of CT to be conducted: 02

Course Objective:

- To study real-time computer control systems and their implementation techniques.
- Provide examples of real-time systems including functionality and implementation platforms.
- Describe and exemplify design parameters for real-time systems including execution time, implementation, communication & user interface.
- Study a range of methodologies for specifying and designing real time systems.
- Understand hardware and software design and implementation of real-time systems
- Describe and apply systems engineering methods and techniques in the design and analysis of real-time systems.

Unit-I: Basic Real- Time Concepts, Computer Hardware, Language Issues:
Basic component Architecture, terminology, Real Time Design Issues, CPU, Memories, Input- Output, Other Devices Language Features, Survey of Commonly Used Programming Languages, Code Generation

Unit-II: Software life cycle, Real Time Specification and Design Techniques, Real Time Kernels: Phases of software life cycle, Non-temporal Transition in the software life cycle, Spiral model, Natural languages, Mathematical Specification, Flow Charts, Structure Charts, Pseudocode and programmable Design Languages, Finite state Automata, Data Flow Diagrams, Petrinets, Statecharts, Polled Loop Systems, phase/State Driven Code, Coroutines, Interrupt Driven System, Foreground/Background Systems Full Featured Real Time OS

Unit-III: Intertask Communication and Synchronization, Real Time memory Management, System Performance Analysis and Optimization: Buffering Data, Mail boxes Critical Region, Semaphores, Event Flags and Signals, Deadlock, Process Stack Management, Dynamic Allocation, Static Schemes, Response Time Calculation, Interuupt Latency, Time Loading and its Measurement, Scheduling NP Complete, Relocating Response Times And time Loading, Analysis of Memory Requirements, Reducing Memory Loading, I/O Performance.

Unit-IV: Queuing Models, Reliability, Testing, And Fault Tolerance, Multiprocessing Systems:
Basic Buffer size Calculation, Classical Queuing Theory, Little's Law, Faults, Failures ,bugs AND effects. Reliability, Testing, Fault Tolerence, Classification of Architectures, Distributed Systems, Non Von Neumann Architectures.

Unit-V: Hardware/ Software Integration, Real Time Applications:
Goals of Real Time System Integration, Tools, Methodology, The Software Hesisenberg Uncertainity Principle, Real Time Systems As Complex System, First Real Time Application Real Time Databases, Real time Image Processing Real Time UNIX, building Real Time Applications with Real Time Programming Languages.

Course outcome:

- Clearly differentiate the different issues that arise in designing soft and hard real-time, concurrent, reactive, safety-critical and embedded systems.
- Explain the various concepts of time that arise in real-time systems.
- Describe the design and implementation of systems that support real-time applications. Justify and critique facilities provided by real-time operating systems and networks.
- Design, construct and analyze a small, concurrent, reactive, real-time system.
- Select and use appropriate engineering techniques, and explain the effect of your design decisions on the behavior of the system.

Text Books :

1. Real Time System, Jane W.S.Liu
2. Real Time Systems Design and Analysis by Phillip A. Laplante,PHI

Reference Books:

1 Hard Real Time Computing Systems Predictable Scheduling Algorithms and applications by Giorgio C. Buttazzo
2 Real Time Design Patterns: Robust Scalable Architecture for Real Time System by BrucePowel Douglass
3. Real Time System: Scheduling, Analysis and Verification by Albert M.K. Change

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CHHAUNA, MANDIRHASAUD, RAIPUR (C.G.)

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" enhancement of satelite underwater and real time images"

A Project report submitted to

Chhattisgarh Swami Vivekananda Technical University Bhilai(C.G.), India

For Partial fulfillment of the award of the Degree

Bachelor of Technology in

Computer Science and Engineering

By -

BINISH SHAMES

ASTHAPATHAK

ITIKARAJPUROHIT

GOMTIBAIS

Under the Guidance of

Mr. YogeshRathore

Asst. Profesor, Department of CSE

RITEE, Raipur(C.G.)

SINCE 1995

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SINCE 1995
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Department of Computer Science and Engineering
Raipur Institute of Technology
Chhatauna, MandirHasaud, Raipur (C.G.)

CERTIFICATE BY THE EXAMINERS

'he project entitled "enhancement of satelite underwater and real time images" Submitted by BINISH SHAMS, Enrollm Jo.: AO9265,ASTHA PATHAKEnrollment no.: AO9234, ITIKA RAJPUROHITEnrollment No. : AO9275, Gomati BaisEnrollment AO9269has been examined by the undersigned as a part of the examination and is herbyrecommended for the awarc ıe degree of Bachelor of technology in Computer Science & Engineering of Chhattisgarh Swami Vivekanar 'echnincal University Bhilai,(C.G.).

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nternal Examiner

External Examiner

RAIPUR INSTITUTE OF TECHNOLOGY
RIT
RAIPUR

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RAIPUR INSTITUTE OF TECHNOLOGY
CHHATAUNA, MANDIRHASAUD, RAIPUR (C.G.)

ABSTRACT

An RGB YCbCr Processing method (RYPro) is proposed for underwater images commonly suffering from low contrast and poor color quality. The degradation in image quality may be attributed to absorption and backscattering of light by suspended underwater particles. Moreover, as the depth increases, different colors are absorbed by the surrounding medium depending on the wavelengths. In particular, blue/green color is dominant in the underwater ambience which is known as color cast. For further processing of the image, enhancement remains an essential preprocessing operation. Color equalization is a widely adopted approach for underwater image enhancement. Traditional methods normally involve blind color equalization for enhancing the image under test. In the present work, processing sequence of the proposed method includes noise removal using linear and non-linear filters followed by adaptive contrast correction in the RGB and YCbCr color planes. Performance of the proposed method is evaluated and compared with three golden methods, namely, Gray World (GW), White Patch (WP), Adobe Photoshop Equalization (APE) and a recently developed method entitled "Unsupervised Color Correction Method (UCM)". In view of its simplicity and computational ease, the proposed method is recommended for real-time applications. Suitability of the proposed method is validated by real-time implementation during the testing of the Autonomous Underwater Vehicle (AUV-150) developed indigenously by CSIR-CMERI.

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PAGE NO.

CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY
BHILAI (C. G.)

Semester: **VIII**
Subject: **Cryptography and Network Security**
Total Theory Periods: **40**
Total Marks in End Semester Exam: **80**
Minimum number of class tests to be conducted: **02**

Branch: **Computer Science & Engg.**
Code: **322734(22)**
Total Tutorial Periods: **12**
Assignments: **1 per Unit**

Course Objective:

- To understand the principles and practices of cryptography and network security
- To understand the practical applications that have been implemented and are in use to provide network security

UNIT I: Overview: Security trends, The OSI Security Architecture, Security Attacks, Security Services, Security Mechanisms, A Model for Network Security. **Symmetric (Private Key) Ciphers: Classical Encryption Techniques:** Symmetric Cipher Model, Substitution Techniques, Transposition Techniques, Rotor Machines, Steganography. **Block Ciphers and the Data Encryption Standard:** Block Cipher Principles, The Data Encryption Standard (DES), The Strength of DES, Differential and Linear Cryptanalysis, Block Cipher Design Principles.

UNIT II: Symmetric Ciphers (continued): **Basic Concepts in Number Theory and Finite Fields:** Groups, Rings, and Fields, Modular Arithmetic, the Euclidian algorithm, Finite Fields of the Form GF(p), Polynomial Arithmetic, Finite Fields of the Form GF($2n$). **Advanced Encryption Standard:** The Origins AES, Evaluation criteria for AES, the AES Cipher. **Stream cipher**: Stream ciphers and RC4. **Confidentiality using symmetric encryption**: Placement of encryption function, traffic confidentiality, key distribution.

UNIT III: Asymmetric (Public Key) Ciphers: Introduction to Number Theory: Prime Numbers, Fermat's and Euler's Theorems, Testing for Primality, The Chinese Remainder Theorem, Discrete Logarithms. **Public-Key Cryptography and RSA:** Principles of Public-Key Cryptosystems. **Key Management-Other Public-Key Cryptosystems:** Key management, Diffie-Hellman Key Exchange, Elliptic Curve Arithmetic, Elliptic Curve Cryptography.

UNIT IV: **Asymmetric Ciphers (continued): Message Authentication and Hash functions**: Message authentication requirements, authentication functions, Message authentication codes, Hash functions, Security of Hash functions and MAC, SHA, HMAC, CMAC. **Digital Signatures and Authentication protocols**: Digital signature, Authentication protocols, Digital signature standards,

UNIT V: Network Security applications: Authentication applications: Kerberos, X.509 Authentication services, Public key infrastructure. **Electronic mail security**: PGP, S/MIME. Overview of IP Security. **Web Security**: Web security considerations, SSL and TLS, Secure electronic transaction. **System Security:** Intruders, Intrusion detection, password management, viruses and related threats, virus counter measures, Firewall design principles, and trusted systems.

Course Outcome: after successful completion of this course, the students will be able to explain

- Conventional encryption algorithms for confidentiality and their design principles
- Public key encryption algorithms and their design principles
- Use of message authentication codes, hash functions , digital signature and public key certificates
- Network security tools and applications
- System-level security issues like threat of and countermeasures for intruders and viruses, and the use of firewalls and trusted systems.

Text Book:

1. William Stallings, "Cryptography and Network Security, Principles and Practices", Pearson Education, Prentice Hall, 4th Edition.
2. Cryptography and Network Security, Atul Kahate, McGraw Hill Education (India) Private Limited; Third edition.

Reference books:

1. Applied Cryptography: Protocols & Algorithms, Schneier & Bruce, MGH International.
2. Cryptography and Security – by Dr T R Padmanabhan N Harini , Wiley India Pvt Ltd, 2011.

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RAIPUR INSTITUTE OF TECHNOLOGY
CHHATAUNA, MANDIRHASAUD, RAIPUR (C.G.)

" CRYPTOGRAPHY AND DATA SECURITY"

A Project report submitted to

Chhattisgarh Swami Vivekananda Technical University Bhilai(C.G.), India

For Partial fulfillment of the award of the Degree

Bachelor of Technology in

Computer Science and Engineering

By

Anjali Singh

Priyanka Kumari

R. Reshma

Under the Guidance of

Ms. Shahana Gajala Qureshi

Asst. Profesor, Department of CSE

RITEE, Raipur(C.G.)

SINCE 1995

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Department of Computer Science and Engineering

Raipur Institute of Technology

Chhatauna, MandirHasaud, Raipur (C.G.)

CERTIFICATE BY THE EXAMINERS

'he project entitled "Cryptography and network security" Submitted by ANJALI SINGH, Enrollment No.: BD6611, R RESH Enrollment no.: AO9245, PRIYA KUMARI Enrollment no. : AO9244 has been examined by the undersigned as a part of xamination and is herbyrecommended for the award of the degree of Bachelor of technology in Computer Science Engineering of Chhattisgarh Swami Vivekananda Technincal University Bhilai,(C.G.).

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nternal Examiner

External Examiner

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RAIPUR INSTITUTE OF TECHNOLOGY
CHHATAUNA, MANDIRHASAUD, RAIPUR (C.G.)

ABSTRACT

Network Security & Cryptography is a concept to protect network and data transmission over wireless network. Data Security is the main aspect of secure data transmission over unreliable network. Network security involves the authorization of access to data in a network, which is controlled by the network administrator. Users choose or are assigned an ID and password or other authenticating information that allows them access to information and programs within their authority. Network security covers a variety of computer networks, both public and private, that are used in everyday jobs conducting transactions and communications among businesses, government agencies and individuals. Networks can be private, such as within a company, and others which might be open to public access. Network security is involved in organizations, enterprises, and other types of institutions. In this paper we also studied cryptography along with its principles. Cryptographic systems with ciphers are described. The cryptographic models and algorithms are outlined.

" IMAGE PROCESSING TOOLKIT USING MATLAB"

A Project report submitted to

Chhattisgarh Swami Vivekananda Technical University Bhilai(C.G.), India

For Partial fulfillment of the award of the Degree

Bachelor of Technology in

Computer Science and Engineering

By

YASH BAID

MAYANK JAIN

Under the Guidance of

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CHHATTISGARH SWAMI VIVEKANAD TECHNICAL UNIVERSITY
BHILAI (C.G.)

Semester: VII | **Branch: Computer Science & Engg.**
Subject: Digital Image Processing | **Code: 322740(22)**
Total Theory Periods: 50 | **Total Tutorial Periods: NIL**
Total Marks in End Semester Exam: 80 | **Minimum number of CT to be conducted: 02**

Course Objective

- Cover the basic theory and algorithms that are widely used in digital image processing
- Expose students to current technologies and issues that are specific to image processing systems
- Develop hands-on experience in using computers to process images
- Develop critical thinking about shortcomings of the state of the art in image processing

UNIT I: Introduction:
Image formation model, Spatial & Gray level resolution, Image enhancement in special domain: Piecewise transformation functions, Histogram equalization, Histogram specification, image averaging, spatial filters-smoothing and sharpening, Laplacian filter, Canny edge detector.

UNIT II: Image Enhancement in Frequency Domain & Image segmentation :
2D discrete Fourier transform & its inverse, filtering in frequency domain, Ideal & Gaussian low pass filters, High pass filtering, FFT, Line detection, Edge detection, Edge linking & boundary detection, Thresholding, Region based segmentation.

UNIT III: Morphological Image Processing:
Logic operations involving binary image, Dialation & Erosion, Opening & Closing, Applications to Boundary extraction, region filling, connected component extraction.

UNIT IV: Image compression:
Coding redundancy- Huffman coding, LZW coding, run length coding, Lossy compression- DCT, JPEG, MPEG, video compression.

UNIT V: Image representation & 3D:
Boundary descriptors, Shape numbers, Texture, Projective geometry, Correlation based and feature based stereo correspondence, shape from motion, optical flow.

Outcomes: After successful completion of the course, student will be able to

- Describe, analyze and reason about how digital images are represented, manipulated, encoded and processed, with emphasis on algorithm design, implementation and performance evaluation.
- Apply principles and techniques of digital image processing in applications related to digital imaging system design and analysis.
- Analyze and implement image processing algorithms.

Name of Text Books:-

1. Ganzalez and Woods, Digital Image Processing, Pearson education.
2. Sonka and Brooks, Image Processing, TSP ltd,

Name of Reference Books:-

1. Jain and Rangachar, Machine Vision, MGH.
2. Schalkoff, Digital Image Processing, John Wiley and sons.

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ABSTRACT

'he Matlab program is extensively used in engineering and scientific circles for numeric intensive computing.[1,2,9] There are many oolboxes available, the DSP toolbox & others in areas of optimization, spline, control and estimation, and system identification. There are ome useful functions in the DSP toolbox for 2-dimensional signal processing: 2-D DFT's, convolution, correlation, and graphing. eparable and non separable processing is conveniently described in terms of matrices. Also many topics in image enhancement and estoration are conveniently described in terms of matrices. PC-Matlab is a very convenient tool for processing small images or blocks, 64 64 often being an upper limit for processing, although larger blocks can be imported and displayed. In spite of these restrictions, it is ossible to display and process full size 600 x 800 images using PC Matlab and a graphics processor. The signal processor adds the ossibility of accelerating numeric intensive operations by a factor of 10 to 40. In this paper, some methods of augmenting Matlab with rogrammable DSP's and graphics processors are described which provide the mentioned capability for fast processing, fixed-point and inary representation and manipulation, and image display. [3, 4].These capabilities are attained by using three separate processors, the 'exas Instruments (TI) TMS320C25 fixed-point DSP, the TMS34010 graphics processor, and a PC-AT. In addition, we are using Super 'GA (600 X 800 pixel) monochrome monitors. The two T.I. processors are widely available from many suppliers for many PC's and ngineering workstations, but we are using TI expansion slot boards for PC-AT compatibles. The functions in the two toolboxes are a ufficient starting point for image processing. They can be used to write Matlab script functions for 2-D filtering, multi resolution rocessing, etc. These functions can be further accelerated with additional toolbox functions which directly link the two processors, an ctivity in progress.

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SINCE 1995
RITEE

Department of Computer Science and Engineering

Raipur Institute of Technology

Chhatauna, MandirHasaud, Raipur (C.G.)

CERTIFICATE BY THE EXAMINERS

'he project entitled "IMAGE PROCESSING TOOLKIT USING MATLAB" Submitted by YASH BAID, Enrollment N ,R0348 ,MAYANK JAIN,Enrollment no.: AR3600, has been examined by the undersigned as a part of the examination an erbyrecommended for the award of the degree of Bachelor of technology in Computer Science & Engineering 'hhattisgarh Swami Vivekananda Technincal University Bhilai,(C.G.).

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nternal Examiner

External Examiner

PRINCIPAL
RAIPUR INSTITUTE OF TECHNOLOGY
CHHATAUNA, MANDIRHASAUD, RAIPUR (C.G.)

RAIPUR INSTITUTE OF TECHNOLOGY
RIT
RAIPUR

Chhattisgarh Swami Vivekanand Technical University, Bhilai

Branch:	**Electronics & Telecommunication**	Semester:	**V**
Subject:	**Automatic Control System**	Code:	**328556 (28)**
Total Theory Periods:	**40**	Total Tutorial Periods:	**10**
No. of class Tests to be conducted:	**2 (Minimum)**	No. of assignments to be submitted:	**2 (Minimum)**
ESE Duration:	**Three Hours**	Maximum Marks in ESE: **80**	Minimum Marks in ESE: **28**

Course Objectives:

1. To study the applicationof automatic linear control system.
2. To study the time response analysis of control system.
3. To study the frequency response analysis of control system.

Course outcome:

1. Student is able to do the mathematical modeling of control system.
2. Student is able to analyse the performance of control system.
3. Student is able to improve the performance of control system.

UNIT –I **Mathematical Models of Physical Systems:** Introduction, Differential Equation of Physical systems(Mechanical and Electrical Systems), Transfer functions, Block Diagram Algebra, Signal Flow Graphs.

UNIT-II **Feedback Characteristics of Control Systems:** Feedback & Non feedback systems, Reduction of parameter variation by use of feedback, Control over system dynamics by use of feedback, Control of the effects of disturbance signals by use of feedback, Regenerative feedback.

Time Response Analysis: Standard Test signals, Time response of first and second order system, steady state error and error constants, Effect of adding a zero to a system. Design specifications of second order systems, Response with P, PI, PD and PID Controllers.

UNIT-III **Stability Analysis & The Root Locus Technique:** The concept of Stability, Routh- Hurwitz stability criterion , Relative stability analysis, Introduction to The Root locus concept, Construction for Root loci, Root contours, System with Transportation Lag.

UNIT-IV **Frequency Response Analysis:** Introduction, Correlation between Time and Frequency Response, Polar Plots, Bode Plots, All-Pass and Minimum-phase Systems.

Stability in Frequency Domain: Nyquist stability criteria, Assessment of relative stability using Nyquist Criterion.

UNIT-V **State Variable Analysis and Design:** Concepts of state, state variables and state model, State models for linear continuous time systems, Diagonalization, Solution of state equations, Concepts of controllability and observability, Pole placement by state feedback.

Name of Text Books:

1.Control System Engineering, L.Nagrath and Gopal, New Age International Publications
2.Automatic Control System, B.C.Kuo,PHI

Name ofReference Books:

1.Modern Control Engineering, Ogata, Pearson Education
2.Modern Control Engineering ,Roy Choudhury,PHI
3.Introduction to Control Engineering, Ajit K. Mandal, New Age International Publications.
4. Control Systems, A. Anand Kumar, PHI

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CHHATAUNA, MANDIRHASAUD, RAIPUR (C.G.)

SINCE 1995
RITEE

DEPARTMENT OF ELECTRONICS AND TELECOMMUNICATION ENGINEERING
RAIPUR INSTITUTE OF TECHNOLOGY, RAIPUR
Chhatauna, Mandir Hasaud, Raipur, Chhattisgarh
Ph.: 0771-3208842, 3250790 Fax: 0771-2537634
Email: contactus@rit.edu.in

CERTIFICATE

This is to certify that the report of the project entitled " SMART HOME SOLUTION WITH SUN TRACKING SOLAR PANEL" is a record of project work carried ort by

NAME OF STUDENT	ROLL NO	ENROLLMENT NO.
DILENDRA KUMAR NISHAD	3122814008	AO9030
HARISHANKAR SHARMA	3122814003	AO9009
TANAYA KARMAKAR	3122814006	AO9021

under my guidance and supervision for the award of Degree of Bachelor of Engineering in Electronics & Telecommunication branch of Chhattisgarh Swami Vivekanand Technical University, Bhilai (C.G.), India.

To the best of my knowledge ad belief the report

i) Embodies the work of the candidate himself,

ii) Have duly been completed,

iii) Fulfills the requirement of the Ordinance relating to the BE degree of the University and

iv) Is up to the desired standard both in respect of contents and language for being referred to the examiners.

(Signature of HOD)
MRS. ZOONUBIYA ALI
H.O.D (ET&T)
RITEE, Raipur

(Signature of Guide)
MR. RITESH DIWAN
ASSOCIATE PROF. (ET&T)
RITEE, Raipur

Principal
RITEE, Raipur, Chhattisgarh

PRINCIPAL
Raipur Institute of Technology

PRINCIPAL
RAIPUR INSTITUTE OF TECHNOLOGY
CHHATAUNA, MANDIRHASAUD, RAIPUR (C.G.)

RAIPUR INSTITUTE OF TECHNOLOGY * RAIPUR * RIT

A

Major Project Report

on

SMART HOME SOLUTION WITH SUN TRACKING SOLAR PANEL

Submitted

To

CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY BHILAI (C. G.), INDIA

in partial fulfillment

for

the award of Degree

of

Bachelor of Engineering

in

ELECTRONICS & TELECOMMUNICATION ENGINEERING

By

DILENDRA KUMAR NISHAD

HARISHANKAR SHARMA

TANAYA KARMAKAR

Under the esteemed guidance of

MR. RITESH DIWAN

Associate Prof. (ET&T)

RAIPUR INSTITUTE OF TECHNOLOGY RIT RAIPUR

PRINCIPAL

RAIPUR INSTITUTE OF TECHNOLOGY

CHHATAUNA, MANDIRHASAUD, RAIPUR (C.G.)

SINCE 1995

RITEE

DEPARTMENT OF ELECTRONICS AND TELECOMMUNICATION ENGINEERING

RAIPUR INSTITUTE OF TECHNOLOGY, RAIPUR

Chhatauna, Mandir Hasaud, Raipur, Chhattisgarh

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Email: contactus@rit.edu.in

Session: 2017-2018

ABSTRACT

Home automation is a famous and most used technology in the world. The object of this project is to develop a home automation system based on environmental monitoring system, which can be monitored from all over the world. Besides the system will have an individual sun tracking solar panel based power supply technology. The system employs an embedded web server based on Arduino Uno microcontroller, with internet protocol connectivity for accessing and controlling electronic appliances remotely. Additionally, the proposed system does not require a dedicated server PC like other available systems and offers a specific communication protocol to monitor and control the home environment with more than just the switching functionality. To demonstrate the feasibility and effectiveness of this system, devices such as light switches, power plug, temperature sensor, gas sensor, water flow sensor, water level sensor and motion sensors, smart touch-pad control door security have been integrated with the proposed smart home control system.

Chhattisgarh Swami Vivekanand Technical University, Bhilai

Branch:	**Mechanical Engineering**	Semester:	**VI**
Subject:	**Energy Systems**	Code:	**337652(37)**
Total Theory Periods:	**40**	Total Tutorial Periods:	**10**
No. of class Tests to be conducted:	**2 (Minimum)**	No. of assignments to be submitted:	**2 (Minimum)**
ESE Duration:	**Three Hours**	Maximum Marks in ESE: **80**	Minimum Marks in ESE: **28**

Course Objectives

- To understand the construction and operation of various jet and rocket engine
- To analyze jet engine and rocket engine from fluid and thermodynamic principle
- To study important non-conventional energy resources and the technologies for harnessing these.

Course Outcome:

- Demonstrate a basic understanding of jet and rocket engine design, function and performance.
- Acquire knowledge and hands-on competence in the design and development of mechanical systems.
- Compare different non-conventional energy resources and choose the most appropriate based on local conditions
- Perform simple techno-economical assessments of non-conventional energy resources
- Perform and compare basic environmental assessments of non-conventional energy resources and conventional fossil fuel systems
- Design renewable/hybrid energy systems that meet specific energy demands, are economically feasible and have a minimal impact on the environment

UNIT I **Propulsion Devices:** Types of jet engines, Ram Jet, pulse jet, Turbojet, Turbo propulsion, principle and operation. Energy flow through jet and variation of pressure and temperature, thrust equation, specific thrust and velocity of fluid. Thermodynamics of turbojet, efficiency & performance, parameters affecting performance, after burn, Injection of water & alcohol mixture.

UNIT II **Rocket Propulsion:** Basic theory, Physics equations, classifications, types of rocket engines, liquid propellant rockets, efficiency and performance, orbital & escape velocity application of space flight.

UNIT III **Non-Conventional Energy Conversion:** Classical sources of energy crisis and search for alternative sources of energy. **Solar energy:** Introduction,, earth sun angles, resolution, solar measurement, collection of solar energy, flat plate and focusing collector analysis, calculations ,design parameters.
Applications of solar energy. Introduction to photovoltaic cell energy conversion techniques.

UNIT IV **Bio-Mass:** Introduction, Bio-mass conversion technologies, bio-gas generation, classification of bio-gas plant, Gasifiers, Gobar gas plant, applications. **Wind Energy:** Basic principles of wind energy conversion, wind energy estimation, site selection consideration, basic components of wind energy conversion system, classification, advantages & disadvantages of WECS.

UNIT V **Additional Alternate Energy Sources & Improved Energy Utilization:** Fuels cell technology, wave energy conversion, tidal energy conversion, ocean thermal energy conversion. (OTEC). Principle of Magneto hydrodynamics (MHD)power system, types of MHD system, advantages, materials for MHD system.
Geothermal energy, nature of geothermal fields, geothermal sources, prime movers for geothermal energy, advantages, disadvantages of geothermal energy over other energy forms, its application.

TEXT BOOKS

1. Fundamentals of Compressible Flow with Aircraft and Rocket Propulsion – S.M.Yahya – New Age International Publishers, Delhi
2. Non-Conventional Energy Sources - G.D. Rai – Khanna Publishers

REFERENCE BOOKS

1. Gas Dynamics & Space Propulsion – N. Shanmugam, M. Palani – Anuradha Agencies
2. Fundamental of Compressible Fluid Dynamics – P. Balachandran – PHI
3. Gas Turbine Theory & Jet Propulsion – J.K. Jain – Khanna Publishers,Delhi
4. Solar Energy -Fundamentals and Applications– H.P.Garg & J. Prakash – TMH ,Delhi
5. Non Conventional Energy Sources – Saeed, Hasan and DK Sharma, SK Kataria,Delhi
6. Non Conventional Energy Resources- DSChauhan, and Srivastava, New Age,Delhi
7. Biogas Technology-B.T.Nijaguna,- New Age ,Delhi
8. Solar Energy – Principles of Thermal Collection and Storage- R Sukhatme- THM Delhi
9. Non Conventional Energy Resources: Alternative Energy Sources And Systems- R.K.Singhal, Katania Publishers

A

Major Project Report

on

"ENERGY GENERATION USING BHASKARA's WHEEL"

Submitted to

SINCE 1995
RITEE

"CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY BHILAI"

Bachelor of Engineering in

MECHANICAL ENGINEERING

Guided by

Mr. Dinesh Dhiwar
(Asst. Professor)

Submitted by

Satyam Sharma (3123714060)

Siddhant Bajaj (3123714065)

Umashankar Verma (3123714074)

Yogendra Sahu (3123714082)

Rajul Meshram (3123714103)

Vijay Kumar (3123714112)

ABSTRACT

The main aim of our project is to produce /study "**ENERGY GENERATION USING BHASKARA'S WHEEL**". This device is used to produce energy on small scale, which can be either stored or use after production. It is a nonconventional energy source device, which produces energy by the continuous shifting of mass on the periphery of the wheel, this phenomenon is termed as **OVERBALANCING** . Here in order to make Bhaskara's wheel to obtain the shifting mass on the periphery, we tried to use different materials in different proportion, such as, High carbon steel balls, salt water solution, water, for which several observations were taken which are mentioned further on this report. The observation concluded that taking 3 or 5 bottle on the rim resulted in providing maximum RPM , while using only water which was 50% of the total volume of the bottle.

Chhattisgarh Swami Vivekanand Technical University, Bhilai

Name of program: **Bachelor of Engineering**
Branch: **Mechanical Engineering** Semester: **VIII**
Subject: **Finite element methods** Code: **337832(37)**
Total Theory Periods: **40** Total Tutorial Periods: **10**
Class Tests: **Two (Minimum)** Assignments: **Two (Minimum)**
ESE Duration: **Three Hours** **Maximum Marks: 80 Minimum Marks: 28**

Course objective

- Understand the fundamental concepts of FEM.
- Understanding the use and knowledge of fundamental stiffness matrix.
- Know the behaviour and usage of each type of elements covered in this course.
- Be able to prepare a suitable FE model for structural mechanical analysis problems.
- Can interpret and evaluate the quality of the results
- Be aware of the limitations of the FEM.

Unit-I : Formulation of Finite Element Equation starting from governing differential equation, Domain residual and minimization, Weighted residual method, Weak form of weighted residual method, solution of weak form using trial function, piecewise continuous trial function solution, formulation of one dimensional bar element using weak form of weighted residual element
Minimization of potential energy, Rayleigh-Ritz method, Piece-wise continuous trail function, finite element form of Rayleigh-Ritz method, finite element formulation derived from a functional, formulation of bar element and heat transfer element using Rayleigh-Ritz method

Unit-II : One dimensional finite element analysis, generic form of total potential for one dimensional case, determination of shape functions for linear bar finite element and quadratic bar finite element, stiffness matrix, one dimensional problems of structure mechanics and heat conduction

Unit-III : Stiffness matrix formulation for beam and frame element, Determination of shape functions and element matrices, Application problems

Unit-IV : Two dimensional finite element analysis, simple three node triangular elements, four node rectangular element, six node triangular element, natural coordinates, coordinate transformation, simple two dimensional problems, Gauss Quadrature Technique

Unit-V : Finite element analysis for plane stress and plane strain problem, Strain displacement matrix for 2-D elements, two-dimensional integrals. Application problems, Scalar field problems including heat conduction and flow problems.

TEXT BOOKS

1. Textbook of Finite Element Analysis – Seshu P – Prentice Hall of India.
2. Fundamentals of Finite Element Analysis - David Hutton – TMH, Delhi

REFERENCE BOOKS

1. Finite Element Method: Basic concepts & Applications- Alavala – PHI, Delhi
2. Finite Element in Engineering - T.R. Chandrupatla and Belegundu, Pearson,Singapore
3. Concepts and Applications of Finite element analysis - Cook, Robert – John Wiley
4. The Finite Element Method, A Practical Course - Liu and Quek. – McGraw Hill
5. The Finite Element Method in Engineering - S.S. Rao.
6. An Introduction to the Finite Element Method – J.N. Reddy – TMH, Delhi
7. Finite Element Method – Zienkiewicz. O C - TMH, Delhi
8. Finite Element Analysis: Theory And Programming – Krishnamoorthy C.S.- TMH, Delhi
9. Finite Element Procedure – K.J.Bathe – Prentice Hall of India
10. A First Course in The Finite Element Method – Logan – Cenegage Learning

Course Outcome

- Apply knowledge of finite element method for understanding, formulating and solving engineering problems.
- Acquire knowledge and hands-on competence in applying the concepts finite element method in the analysis of structural and thermal systems.
- Demonstrate creativeness in designing new systems components and processes in the field of engineering.
- Identify, analysis, and solve mechanical engineering problems useful to the society.
- Work effectively with engineering and science teams as well as with multidisciplinary problems.

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RAIPUR INSTITUTE OF TECHNOLOGY RIT RAIPUR

A

Major Project Report

on

"STUDY AND TESTING OF NOTCHES AND THEIR EFFECTS ON A METAL SPECIMEN"

Submitted to

SINCE 1995
RITEE

"CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY BHILAI"

Bachelor of Engineering in

MECHANICAL ENGINEERING

Guided by

DINESH DHIWAR
(Asst. Professor)

Submitted by

ADITYA KUMAR	**(3123714003)**
ASHISH RATHORE	**(3123714011)**
HIMANSHU SINGH	**(3123714028)**
MITHLESH VERMA	**(3123714037)**
ADITYA KUMAR KAUSHIK	**(3123714005)**

PRINCIPAL
RAIPUR INSTITUTE OF TECHNOLOGY
CHHATAUNA, MANDIRHASAUD, RAIPUR (C.G.)

RAIPUR INSTITUTE OF TECHNOLOGY
RIT
RAIPUR

A

Major Project Report

on

"SOLAR OPERATED FLOOR CLEANER MACHINE"

Submitted to

SINCE 1995
RITEE

"CHHATTISGARH SWAMI VIVEKANAND
TECHNICAL UNIVERSITY, BHILAI (C.G.)"

Bachelor of Engineering

In

MECHANICAL ENGINEERING

Guided by

RAJLALAN AGNIHOTRI
(Asst. Prof.)

Submitted by

Jayjayram Raut	-	(3123714092)
Kapoor Prasad	-	(3123714094)
Mordwaj Yadav	-	(3123714097)
Sanat Rathore	-	(3123714108)

ABSTRACT

A **Notch** in mechanical and materials engineering refers to a deliberately introduced v-shaped, U-shaped or circular defect in a planar material whereby stress is concentrated. Notch geometries play an important role in fracture mechanics and materials characterization.

In this experiment we provide different type of notches such as "U" notch ,"V" notch and circular motion , In different type of specimen of different material such as Mild steel , Stainless steel, Brass and Aluminium .

Different shapes of specimen are Rectangular plate, Rectangular bar and Cylindrical rod and welded rod . We performed different types of test like Tensile test , Charpy impact test .

While performing the test we found that in tensile test the bigger the notch area the more the tendency of failure. And While performing the impact test Brittle Material breaks easily .

ABSTRACT

Automated floor cleaning machines are commonly used in developing countries since many years because of high cost of labour, time, efforts and affordability. The concept is not popular in developing or emerging economic countries. Reasons for non-popularity are cost of machine and operational charges in terms of power tariff. This article is based upon on our innovative project to design, development and manufacturing of semi-automatic floor cleaning machine which will work on solar energy, battery or electricity. A semi-automatic floor cleaning machine is developed by keeping basic consideration for less energy consumption, machine as well as operational cost reduction, reduce the human effort, environment friendly and easy to handle. Base of the project was to use renewable energy which is abundant in most of the countries, will have less environmental impact and easy to construct for commercial scale in future.

Chhattisgarh Swami Vivekanand Technical University, Bhilai

Name of program:	**Bachelor of Engineering**		
Branch:	**Mechanical Engineering**	Semester:	**IV**
Subject:	**Kinematics of Machines**	Code:	337454(37)
Total Theory Periods:	**40**	Total Tutorial Periods:	**10**
Class Tests:	**Two (Minimum)**	Assignments:	**Two (Minimum)**
ESE Duration:	**Three Hours**	**Maximum Marks: 80**	**Minimum Marks: 28**

Course Objectives:

- To synthesis, both graphically and analytically, multilink mechanisms.
- To perform mechanism analyses to find the position, velocity, acceleration, and dynamics of multi-bar mechanisms.
- To synthesis mechanism to perform certain prescribed task/motion
- To analyze gear trains.
- To analyze thrust bearings, Brakes and dynamometers.

UNIT- I **Relative velocity:** Elements, pairs, Mechanism, Four bar chain and its inversion, Velocity diagrams, Relative velocity method, Instantaneous centre method.

UNIT-II **Relative Acceleration:** Synthesis of mechanism, Pantograph, Lower pair mechanism, Relative acceleration diagram, Kliens construction, Coroillis component of acceleration.

UNIT- III **Cams:** Classification of cams and followers, Nomenclature of a radial cam, Description of follower movement, Displacement diagrams, Uniform and modified uniform motion, Simple harmonic motion, Uniform acceleration motion and its modifications, Cycloidal motion, Synthesis of cam profile by graphical approach, Considerations of pressure angle. Cams with specified contours: Circular arc cam & tangent cam.

UNIT-IV **Gear:** Types of gears, Gear terminology, Law of gearing, Gear tooth forms, Involute and Cycloid tooth profile, Interference and Undercutting of Involutes teeth, Minimum number of teeth on pinion to avoid interference.
Gear trains: Simple, Compound, Reverted, and Epicyclical gear trains, computation of velocity ratio in gear trains by different methods.

UNIT-V **(a) Friction:** Applications of friction, Pivot and collar friction, Thrust bearing.
(b) Belt-Drives: Ratio of tensions for flat belt & V-belt, Centrifugal tension, condition for maximum power transmission.
(c) Brakes and dynamometer: Simple block and shoe brake, Band brake, Band and block brake, and internal expanding shoe brake, Absorption dynamometer, Transmission dynamometer.

Text Books:

1. Theory of Machine – S. S. Ratan-Tata McGraw Hill.
2. The Theory of Machine – Thomas Beven – CBS Publishers.

Reference Books:

1. Theory of mechanism and machine – A. Ghosh, A.K. Mallik –EWP Press.
2. Theory of Machine – Shigley, JE
3. Theory of Machine Jagdish Lal
4. Theory of machine – J.E. Singh – McGraw Hill.

Course Outcomes:

- Apply knowledge of Kinematics of machine for understanding, formulating and solving engineering problems.
- Acquire knowledge and hands-on competence in applying the concepts kinematics of machine in the design and development of mechanical systems.
- Demonstrate creativeness in designing new systems components and processes in the field of engineering
- Identify, analysis, and solve mechanical engineering problems useful to the society.
- Work effectively with engineering and science teams as well as with multidisciplinary designs.

Chhattisgarh Swami Vivekanand Technical University, Bhilai

Branch:	**Mechanical Engineering**	Semester:	V
Subject:	**Manufacturing Science - II**	Code:	337555 (37)
Total Theory Periods:	**40**	Total Tutorial Periods:	**10**
No. of class Tests to be conducted:	**2 (Minimum)**	No. of assignments to be submitted:	**2 (Minimum)**
ESE Duration:	**Three Hours**	Maximum Marks in ESE: **80**	Minimum Marks in ESE: 28

Course Objectives:

- To understand grinding and other surface finishing operations.
- To understand various non conventional machining processes and their applications.
- To get knowledge of various metal forming processes.
- To understand principle of sheet metal forming operations
- To understand the process of Gear Shaping and Gear Hobbing.
- To understand the design considerations of Jigs and Fixtures.

Course Outcomes:

- Acquire knowledge and hands on competence in applying concept of manufacturing science in design and development of mechanical and other engineering systems.
- Skillfully use modem engineering tools and techniques for mechanical engineering design, analysis and application.
- Demonstrate creativeness in designing new system components and processes in the field of engineering in general and mechanical engineering in particular.
- Work effectively with engineering and science teams as well as with multidisciplinary design.

UNIT I **Grinding :** Processes. Grinding wheels, compositions- abrasives, bonding materials. Grinding wheel characteristics-abrasive type, grain size, bonding material, structure, and grade. Wheel specification and selection. Wheel life. Types of grinding operations, design consideration for grinding, specification of grinding wheel, process parameters, economics of grinding.

Surface finishing operations: Honing, lapping, super finishing, polishing, buffing, process parameters and attainable grades of surface finish.

UNIT II **Unconventional Machining:** Advantages, application and limitation, Processes- Electro Discharge Machining (EDM), Electro Chemical Machining (ECM), Ultrasonic Machining (USM), Abrasive Jet Machining (AJM), Electron Beam Machining (EBM), Laser Beam Machining (LBM), Electro Chemical grinding(ECG) .Mechanics of metal removal, tooling, equipment, process parameters and surface finish obtained & specific applications.

UNIT III **Introduction to metal forming:** Classification, Hot and Cold working.

Forging: Principle. Forging operations, drawing out and upsetting. Types of forging method-smith, drop, press and machine forging. Forging equipment. Forging dies. Tools and fixture of forging, forging dies. Forging design, Forging designs factors. Drop forging die design, Upset forging die design. Forging practice – sequence of steps. Forging defects. Inspection and testing of forged parts.

Extrusion: Principle, extrusion processes-hot extrusion, cold extrusions. Process parameters. Extrusion equipment. Extrusion of seamless tubes. Extrusion defects.

UNIT IV **Rolling :** Principle, classification of rolled products, Types of rolling mills, rolling mill train components, Roll pass sequences-break down passes, roughing passes, finishing passes. Roll passes design for continuous mill. Roll separating force. Rolling load calculation. Power required in rolling. Effect of front and back tensions. Effect of friction. Shape rolling operations-ring rolling, thread rolling. Defects in rolled products.

Drawing: Principle. Wire drawing, tube drawing. Drawing equipments and dies. Calculation of drawing load and power requirement

UNIT V **Sheet metal forming**

Types of presses: Selection of press, components of a simple press, press working operations – shear, bending. **Shearing operations**: Blanking, piercing, trimming, shaving, nibbling and notching .Calculation of punching force and shear force. Punch and die size calculation. **Drawing operation:** Principle of operation. Draw die design. **Bending operation:** Principle of operation. Bend allowances. Bending force. Length of sheet estimation. Bend radius. Spring back effect. **Other operation:** Spinning. Stretch forming, Embossing and Coining.

TEXT BOOKS:

1. Manufacturing Technology (Vol. - I & II) – P.N. Rao – Tata McGraw Hill Pub. Company, New Delhi
2. A Text Book of Production Technology (Manufacturing Processes) – P.C. Sharma – S. Chand and Company Ltd., New Delhi

REFERENCE BOOKS:

1. Manufacturing Engineering and Technology – S. Kalpakjian & S.R. Schmid – Addision Wesley Longman, New Delhi
2. Tool Engineering & Design – G.R. Nagpal – Khanna Publishers – New Delhi
3. A Text Book of Production Technology – O.P. Khanna – Dhanpat Rai & Sons, New Delhi
4. Manufacturing Science – A. Ghosh & A.K. Mallik – East West Press Pvt. Ltd., New Delhi
5. Production Technology – R.K. Jain – Khanna Publishers, New Delhi

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RAIPUR INSTITUTE OF TECHNOLOGY
CHHATAUNA, MANDIRHASAUD, RAIPUR (C.G.)

RAIPUR INSTITUTE OF TECHNOLOGY * RAIPUR * RIT

A

MAJOR PROJECT REPORT

ON

"STUDY OF SMART HELMET"

SINCE 1995
RITEE

[CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY BHILAI]

Guided by

H.C.Dewangan. (Asst. Prof.)

Submitted by

ANUBHAV PAWAR

In particular fulfillment for the award of the degree

Of

MECHANICAL ENGINEERING

PRINCIPAL
RAIPUR INSTITUTE OF TECHNOLOGY
CHHATAUNA, MANDIRHASAUD, RAIPUR (C.G.)

RAIPUR INSTITUTE OF TECHNOLOGY
RIT
RAIPUR

ABSTRACT

Rode traffic crashes take the lives of nearly 1.3 million every year and injure 20-50 million more in the world. Traffic accidents in India have increased year by year. The first step is to identify the helmet is web or not. If helmet is wear then ignition will start otherwise it will remains off till helmet is not wear. For these we use obstacle sensor. The second step is alcohol detection. Alcohol sensor is use as breath analyzer which detect the presence of alcohol in rider breathe if it is exceeds permissible range ignition cannot start. It will send the message to transmitter and transmitter send to receiver. When these two conditions are satisfied then ignition will start. The smart helmet that w made is fixed with sensors which act as to detect wear helmet or not. 4. As we see many accidents occurs due to the stand, Almost 36% of total accidents. so here we are introducing Automatic stand in which stand automatically moves up when bike starts. Since too much use of the helmet internal temperature rises which is not comfortable for the rider, hence we make use of exhaust fan to maintain the temperature.

Chhattisgarh Swami Vivekanand Technical University, Bhilai

Branch:	**Mechanical Engineering/Mechatronics Engineering**	Semester:	**VI**
Subject:	**Machine Design II**	Code:	**337651(37)**
Total Theory Periods:	**40**	Total Tutorial Periods:	**10**
No. of class Tests to be conducted:	**2 (Minimum)**	No. of assignments to be submitted:	**2 (Minimum)**

ESE Duration: Four Hours **Maximum Marks in ESE: 80** **Minimum Marks in ESE: 28**

Note: Design data book by PSG and ISI data sheets are allowed in the examination.

Course Objectives

- To design and analyze coil, leaf and laminated springs.
- To design and analyze spur, helical and bevel gears.
- To design and analyze rolling contact bearings.
- To design and analyze journal bearing.
- To design and analyze chain and belt drive.

Course outcomes:

- Apply knowledge of machine design for understanding, formulating and solving engineering problems.
- Acquire knowledge and hands-on competence in applying the concepts in the design and development of mechanical systems.
- Demonstrate creativeness in designing new systems components and processes in the field of engineering in general and mechanical engineering in particular.
- Identify, analysis, and solve mechanical engineering problems useful to the society.
- Work effectively with engineering and science teams as well as with multidisciplinary designs.

UNIT I **Spring:** Spring materials and their mechanical properties, equation for stress and deflection, helical coil springs of circular section for tension, compression and torsion, dynamic loading, fatigue loading, Wahl line, leaf spring and laminated spring.

UNIT II **GEARS: Spur Gears -** Gear Drives, Classification of Gears, Selection of Type of Gears, Law of Gearing, Force Analysis, Gear Tooth Failures, Selection of Material, Number of Teeth, Face Width, Beam Strength of Gear Tooth, Effective Load on Gear Tooth, Estimation of Module Based on Wear Strength, Lewis equation, Gear Design for Maximum Power Transmitting Capacity, Gear Lubrication.

UNIT III **Helical Gears:** Helical Gears, Terminology of Helical Gears, Virtual Number of Teeth, Tooth Proportions, Force Analysis, Beam Strength of Helical Gears, Effective Load on Gear Tooth, Wear Strength of Helical Gears.
Bevel Gears: Bevel Gears, Terminology of Bevel Gears, Force analysis, Beam strength of Bevel Gears, Wear Strength of Bevel Gears, Effective Load on Gear Tooth.

UNIT IV **Bearings: Rolling Contact Bearings -** Types of ball and roller bearings, selection of bearing for radial and axial load, bearing life, Mounting and lubrication, shaft scales – contact type and clearance type.
Journal Bearings: Types of lubrication, viscosity, Hydrodynamic theory of lubrication, Sommerfeld number, heat balance, self-contained bearings, bearing materials.

UNIT V **Chain Drives:** Chain drives, roller chains, geometric relationships, dimensions of chain components polygonal effect, power rating of roller chains.
Belt Drives: Flat and V-belts, belt constructions, geometrical relationships for length of the belt, analysis of belt tensions, condition for maximum power, selection of flat & V-belts, adjustment of belt tensions, Wire ropes, stresses in wire ropes

TEXT BOOKS:

1. Design of Machine Elements - V.B. Bhandari, TMH Publications, Delhi
2. Machine Design - Shigley – McGraw Hill, DelhiNoida

REFERENCE BOOKS:

1. Machine Design - Movnin – MIR Publishers, Moscow
2. Machine Design - Fundamental & Application – Gope –PHI, New Delhi
3. Machine Design - Sharma & Agrawal – Katson, New Delhi
4. Principles of Mechanical Design - R. Phelan – McGraw Hill, New Delhi.
5. Machine Design – Sundarajamoorthy & Shanmugum– Anuradha, Chainnai

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PRINCIPAL
RAIPUR INSTITUTE OF TECHNOLOGY
CHHATAUNA, MANDIRHASAUD, RAIPUR (C.G.)

A

Major Project Report

on

"STUDY OF MOTORIZED HOVER BOARD"

Submitted to

SINCE 1995
RITEE

CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY, BHILAI

Bachelor of Engineering in

MECHANICAL ENGINEERING

Guided by

SWAPNIL SHUKLA
(Asst. Prof.)

Submitted by:-

Rishikesh Kumar (3123714104)

Ranjeev Kumar Singh (3123714301)

Siddhrath Singh (3123714066)

Abhay Kumar Minz (3123714083)

Raju Mandal (3123714102)

Chhattisgarh Swami Vivekanand Technical University, Bhilai

Semester: **I M.E (Thermal Engg.)** Branch: **Mechanical Engineering**
Subject: **Advanced Fluid Mechanics** Code: 564113(37)
Total Theory Periods: **40** Total Tutorial Periods: **12**
Total Marks in End Semester Exam. : **100**
Minimum number of class test to be conducted: 02

Unit – I
Review of basic concept, concept of continuum, type of fluids, tensor analysis.
Basic laws in integral form, Reynold's transport theorem, mass, momentum and energy equations in integral form and their applications.

Unit – II
Differential fluid flow anaysis, continuity equation. Navier-Stokes equations and exact solutions, energy equation.

Unit-III
Ideal fluid flow analysis, two dimensional flow in rectangular and polar coordinates; continuity equation and the stream function; irrotationality and the velocity potential function; vorticity and circulation; plane potential flow and the complex potential function; vorticity and circulation; plane potential flow and the complex potential function. Sources, sinks doublets and vortices; Flow over bodies and D Alembert's paradox; aerofoil theory and its application.

Unit-IV
Low Reynolds no. flow, approximation of N-S equation, approximate solutions of Navier-Stokes equation, Stokes and Oseen flows, hydrodynamic theory of lubrication.
Large Reynolds number flow approximation, Prandtl's boundary layer equations, Blausius solutions, Falkner-Skan solutions, momentum integral equation, Halstein and Bohlen method, thermal boundary layers.

Unit-V
Compressible fluid flow, One dimensional isentropic flow, Fanno and Rayleigh flows, chocking phenomenon, normal and obligue shocks.

Text Books:

1. Kundu P.K. and Cohen, I.M., Fluid Mechanics, 3rd Edition, Academic Press (Indian reprint), 2004
2. Murlidhar K. and Biswas G., Advanced Engineering Fluid Mechanics, 2nd Edn., Narosa Pub., 2005
3. Yuan S.W., Foundation of Fluid Mechanics, Prentice Hall, 1968

References:

1. Schlichting H and Gersten K, Boundary Layer Theory, 8th Edn., Springer, 2001
2. Batchlor G.K., Introduction to Fluid dynamics, Cambridge, 2000
3. White F.M, Viscous Fluid Flow, 3rd Edn., McGraw Hill, 2006
4. Munson B.R, Young D.F & Okiishi T.H, Fundamentals of Fluid Mechanics, 5th Edn., Wiley, 2006

PRINCIPAL
RAIPUR INSTITUTE OF TECHNOLOGY
CHHATAUNA, MANDIRHASAUD, RAIPUR (C.G.)

"CFD ANALYSIS AND PARAMETER OPTIMIZATION OF DIVERGENT CONVERGENT NOZZLE"

A Thesis submitted
to
CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY BHILAI (C.G), INDIA

In the partial fulfillment of award of the degree
of
MASTER OF TECHNOLOGY

In

Mechanical Engineering
(Specialization in Thermal Engineering)
By

UTTAM KUMAR
(Roll No.: 501206416003)
Enrollment No : BB6582

Under the supervision and guidance of

Mr. SUDHIR SINGH RAJPUT
(Assistant Professor)
Department of Mechanical Engineering

Raipur Institute of Technology Chhtauna,
Mandir Hasaud, Raipur(C.G.) 492101
Session: 2016-18

SINCE 1995 RITEE

PRINCIPAL
RAIPUR INSTITUTE OF TECHNOLOGY
CHHATAUNA, MANDIRHASAUD, RAIPUR (C.G.)

RAIPUR INSTITUTE OF TECHNOLOGY RIT RAIPUR

CERTIFICATE OF THE SUPERVISOR

This is to certify that the thesis entitled ""**CFD analysis and parameter optimization of Divergent convergent nozzle"** is a record of bonafide research work carried out by **Uttam Kumar** bearing Roll no **501206416003**. & Enrolment No. **BB6582** under my guidance and supervision for the award of Degree of **Master of Technology** in **Thermal Engineering** of **Chhattisgarh Swami Vivekanand Technical University, Bhilai (C.G.), India.**

To the best of my knowledge and belief the thesis

i) Embodies the work of the candidate himself,

ii) Has duly been completed,

iii) Fulfils the requirement of the Ordinance relating to the Master of Technology degree of the University and,

iv) Is up to the desired standard both in respect of contents and language for being referred to the examiners.

Mr. Sudhir Singh Rajput, Assistant Professor

(Supervisor)

28.09.18

Dr. Pravin Kumar Borkar,

HOD, Department of Mechanical Engineering

Raipur Institute Of Technology, Raipur, C.G

Forwarded to Chhattisgarh Swami Vivekanand Technical University, Bhilai

28/09/18

(Principal)

Raipur Institute Of Technology

Mandir Hasoud ,Chhatauna, Raipur, C.G

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CHHATAUNA, MANDIRHASAUD, RAIPUR (C.G.)

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Table of Contents

Chhattisgarh Swami Vivekanand Technical University, Bhilai

Semester: **II M.E (Thermal Engg.)**
Subject: **Energy Management**
Total Theory Periods: **40**
Total Marks in End Semester Exam. : **100**
Minimum number of class test to be conducted: 02

Branch: **Mechanical Engineering**
Code: **564213 (37)**
Total Tutorial Periods: **12**

Unit – I
Introduction : Energy Scenario, various forms of energy, energy management and its importance, recent trends in energy conservation.
Energy Auditing and Instrumentation: Definition, methodology, analysis of past trends (plan data), closing the energy balance, laws of thermodynamics, measuring instruments, portable and online instruments. Role of Instrumentation in Energy Conservation.

Unit – II
Energy Economics : Simple payback period, time value of money, IRR NPV, life cycle costing, cost of saved energy, cost of energy generated.

Unit-III
Monitoring and Targeting: Defining monitoring and targeting, elements of monitoring and targeting, data and information, analysis techniques, energy consumption, production, cumulative sum of difference.

Unit-IV
Energy Efficiency in Thermal Utilities: Boilers, steam systems, furnaces insulation and refractories, FBC boilers, cogeneration, waste heat recovery.

Unit-V
Energy Efficiency in Electrical Utilities : Electrical systems, electric motors, compressed air system, HVAC and refrigeration systems, fans and blowers, pumps and pumping systems, cooling towers, lighting system, diesel generating system.

Text Books:

1. Witte L.C., Schmidt P.S., Brown D.R., Industrial Energy Management and Utilization, Hemisphere, 1982
2. Gyftopoulos E.P., Industrial Energy Conservation Manuals, MIT Press, 1988
3. Dryden IGC, The Efficient Use of Energy, 2nd Ed., Butterworth Heinemann, 1982

References:

1. Capehart B.L, Turner W.C., Kennedy W.J., Energy Management Handbook, John Wiley and Sons, 1982
2. Technology Menu for Efficient Energy Use: Motor Drive Systems, Prepared by National Productivity Council and Centre for Environmental Studies, Princeton University, 1993
3. F. Krieth & RE West, Economics of Solar Energy & Conservation Systems, Vol. I & II, CRC Press,
4. D.A. Reay, Industrial Energy Recovery, Wiley

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CHHARAUNA, MANDIRHASAUD, RAIPUR (C.G.)

RAIPUR INSTITUTE OF TECHNOLOGY * RAIPUR * RIT

EXPERIMENTAL INVESTIGATION ON THERMOELECTRIC GENERATOR USED FOR EXHAUST GAS OF A FOUR STROKE S.I. ENGINE

A Thesis Submitted

to

CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY,

BHILAI (C.G.), INDIA

In partial fulfillment

For the award of the Degree

of

Master of Engineering

in

Mechanical Engineering

(Specialization in Thermal Engineering)

by

SUSHIL KUMAR SHARMA

Roll Number- 5126414017

Enrollment Number – AP5663

Under the Guidance of,

MR. VISHNU PRASAD SHARMA

Assistant Professor

Department of Mechanical Engineering

DEPARTMENT OF MECHANICAL ENGINEERING

RAIPUR INSTITUTE OF TECHNOLOGY

Chatauna, Mandir Hasaud, Raipur, Chhattisgarh Pin- 4962101

SINCE 1995
RITEE

PRINCIPAL
RAIPUR INSTITUTE OF TECHNOLOGY
CHATAUNA, MANDIRHASAUD, RAIPUR (C.G.)

Session: 2017-18

CERTIFICATE BY THE SUPRVISOR

This is to certify that the report of the dissertation entitled "**Experimental Investigation on Thermoelectric Generator used for Exhaust Gas of a Four Stroke S.I. Engine**" is a record of research work carried out by **Sushil Kumar Sharma**, Roll number **5126414017**, Enrollment number **AP5663** under my guidance and supervision for the award of Degree of Master of Engineering in *Thermal Engineering* of Chhattisgarh Swami Vivekananda Technical University, Bhilai (C.G.), India.

To the best of my knowledge and belief the report

i) Embodies the work of the candidate himself.

ii) Has duly been completed.

iii) Fulfils the requirement of the Ordinance relating to the M.E. degree of the University and is up to the desired standard both in respect of contents and language for being referred to the examiners.

Prof. Vishnu Prasad Sharma

Project Guide

Department of Mechanical Engineering, RITEE, Raipur (C.G.)

HOD

Department of Mechanical Engineering, RITEE, Raipur (C.G.)

Principal

Raipur Institute of Technology, Raipur (C.G.)

RAIPUR INSTITUTE OF TECHNOLOGY RIT RAIPUR

PRINCIPAL
RAIPUR INSTITUTE OF TECHNOLOGY
G...A, MANDIRHASAUD, RAIPUR (C.G.)

ABSTRACT

In the present scenario, energy crisis and thermal energy management are the critical topics. A great deal of automotive industry's research and development efforts is focused on improving the overall efficiency of the vehicle. A major part (around 20%-30%) of the heat supplied in an internal combustion engine is not converted into useful energy, but dumped into the atmosphere as waste heat so it becomes necessary to recover this waste heat. The useful energy which drives the engine is also used to run generator, as a result of which the efficiency of such an engine is very low.

To improve the engine efficiency various methods are developed to utilize waste heat from the exhaust gas. One of the promising technology that is used for this purpose is thermoelectric generator. Thermoelectric generators are solid state devices that are used to convert thermal energy from a temperature gradient to electrical energy. This project involves conceptual model of power generation from the exhaust gas of a four stroke four cylinder S.I. engine using a single Bi_2Te_3 thermoelectric generator at different gears and at different cylinder cutoff. The output power from each cylinder of the engine was investigated using Morse test.

Thermoelectric generator generates DC type of electric power depending upon the temperature difference across the heat exchanger and the amount of exhaust gas temperature on Seebeck effect. An output voltage of 6.35V was generated using a single Bi_2Te_3 thermoelectric generator for a temperature difference of about 35^0C. This power is useful for running various accessories like head light, tail light, parking light, door light etc. Use of thermoelectric generator also reduces frictional power against alternator which in turns saves fuel and increase the efficiency of the engine. Results obtained from the present study states the concept of waste heat recovery where power is obtained to fulfill various auxiliary features.

Keywords- Thermoelectric generator, Seebeck effect, Waste heat recovery, S.I. engine, Morse test, Exhaust gas temperature and Temperature difference.

CHHATISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY, BHILAI (C.G.)

Semester: M. E. III Sem.
Subject: Robotics
Total Theory Periods: 40
Total Marks in End Semester Exam. : 100

Branch: Mechanical Engg.
Code: 548311 (37)
Total Tutorial Periods: 12

Unit-1
Robotics
Basic concepts in Robotics: Advances and application and application of robotics in Robots, Resolution, Accuracy and Repeatability, Point Continues part system control loops, types of manipulators, wrist & Grippers.

Unit-2
Kinematic Analysis of Robotics
Geometry based direct kinematics, Co-ordinate and vector transformation using matrix, Denant-Hartenberg Conversion, application of DH notation, Inverse Kinematics.

Unit-3
Robot –An Dynamics: Elementary treatment of Lagrange –Euler, Newton – Euler formulations, Generalized D'Alembert equation of motion.

Unit-4
Drives, Control of Trajectory: Hydraulic system stepper motor, Direct current servomotors, A-C servomotors, adaptive control, interpolars, trajectory planning, resolved motion rate control methods.

Unit-5
Robotic Sensors: Vision system, Range proximity, touch, force and torque Sensors, Assembly-Aid devices, Robot Programming, Artificial Intelligence.

Applications of Robot: Handling, loading unloading, welding, painting, assembly, Machining, Manufacturing, Work – cell, Installation of Robots.

Books Recommended:

Text Books

- M.P.Groover, M.Weiss, P.N.Nagal and N.G.Odrey, Industrial Robotics, Mcgraw Hill International Deduction, 1986
- K.S.Fu, R.C, Gonzaler C.S.G.Lee, Robothes (Control, Sensing vision & intelligence)

Reference Books

- Shimon Y.Nof (Editor) handbook of industrial robotics, John wiley and sons, 1985
- Fu K.S. , Gonzalez R.C and Lee C.S.G., Robotics : Control sensing vision and intelligence ,Mcgraw Hill ,1987
- D.T.Pham, Expert –System in Engineering, Springer Verlog, 1988
- Anthony C.McDonald, Robot Technology, theory, design and applications Prentice Hall, New Jersey 1986
- Yoren Koren, Robotes for Engineers.

RAIPUR INSTITUTE OF TECHNOLOGY RIT RAIPUR

PRINCIPAL
RAIPUR INSTITUTE OF TECHNOLOGY
CHHATAUNA, MANDIRHASAUD, RAIPUR (C.G.)

A Thesis on

"MECHANICAL PROPERTIES OF COMPOSITE MATERIALS REINFORCED WITH NATURAL FIBRES"

Submitted to

CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY, BHILAI (C.G.), INDIA

In the partial fulfilment

For the award of Degree

of

MASTER OF TECHNOLOGY

in

DESIGN

by

VAIBHAV GAUTAM

(University Roll No. 501204816002)

Under the Guidance of

ANOOP KUMAR

Assistant Professor

SINCE 1995

RITEE

Department of Mechanical Engineering

Raipur Institute of Technology

Chhatauna Mandir Hasaud, Raipur, (C.G.), India

Session: 2016-2018

RAIPUR INSTITUTE OF TECHNOLOGY * RAIPUR * RIT

PRINCIPAL
RAIPUR INSTITUTE OF TECHNOLOGY
CHHATAUNA, MANDIRHASAUD, RAIPUR (C.G.)

CERETIFICATE OF THE SUPERVISOR

This is to certify that the report of the project entitled "**Mechanical Properties of Composite Materials reinforced with Natural Fibres**" is a record of bonafide research work carried out by *Vaibhav Gautam* (University Roll No.: 501204816002, Enrolment No.: AJ5667) under my guidance and supervision for the award of degree of Master of Technology in Mechanical Engineering with Specialization in Design branch of Chhattisgarh Swami Vivekananda Technical University, Bhilai (C.G), India.

To the best of my knowledge and belief the thesis:

- Embodies the work of the candidate himself,
- Has duly been completed,
- Fulfils the requirement of the Ordinance relating to the M. Tech. degree of the University, and
- Is up to the desired standard both in respect of contents and language for being referred to the examiners.

ANOOP KUMAR

(Supervisor)

Assistant Professor

Department of Mechanical Engineering

SUDHIR SINGH RAJPUT

(Head of Department)

Department of Mechanical Engineering

PRINCIPAL
RAIPUR INSTITUTE OF TECHNOLOGY
CHHATAUNA, MANDIRHASAUD, RAIPUR (C.G.)

PRINCIPAL

Raipur Institute of Technology

Chhatauna, Mandir Hasaud, Raipur (C. G.)

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RAIPUR INSTITUTE OF TECHNOLOGY
CHHATAUNA, MANDIRHASAUD, RAIPUR (C.G.)

ABSTRACT

Natural Fibres are the abundantly found fibres which is very cheap and can be found in almost every part of India. They can be used to reinforce the epoxy to increase the strength and hardness and can affect their mechanical properties or we can say enhance it so their applications and uses thus can be increased to a level where they can be used efficiently and cheaply.

Here we are using natural fibres of jute and coconut as they are available in large quantity and are very cheap. Coconut coir which is natural fibre is throwed away in waste and is a waste product which can be used to reinforce the epoxy, which can impact its mechanical properties. And so, the jute fibres. In this work, the coconut coir and jute fibre will be used to see the impact they made on the mechanical properties of the Lapox L-12 mixed with the hardener K-12. The fibres will be first treated with the NaOH solution and will be kept soaked in it for 24 hrs and the samples then created will be tested for the mechanical properties like Tensile Strength, compressive strength, hardness, etc.

Thus, the result achieved from the above will show the effect natural fibres made in reinforcing the epoxy material and what effect they do on the properties of the epoxy material.

TABLE OF CONTENTS

Chhattisgarh Swami Vivekanand Technical University, Bhilai

Semester: **II M.E (Energy Management)** Branch: **Mechanical Engineering**
Subject: **Energy Audit & Management** Code: **583211(37)**
Total Theory Periods**: 40** Total Tutorial Periods: **12**
Total Marks in End Semester Exam. : **100**
Minimum number of class test to be conducted: 02

Unit I

Introduction : Energy Scenario, various forms of energy, energy management and its importance, recent trends in energy conservation.

Energy Auditing and Instrumentation: Definition, methodology, analysis of past trends (plan data), closing the energy balance, laws of thermodynamics, measuring instruments, portable and online instruments, role of Instrumentation in Energy Conservation.

Unit II

Energy Economics : Simple payback period, time value of money, IRR NPV, life cycle costing, cost of saved energy, cost of energy generated, Case study

Unit III

Monitoring and Targeting: Defining monitoring and targeting, elements of monitoring and targeting, data and information, analysis techniques, energy consumption, production, cumulative sum of difference.

Unit IV

Energy Efficiency in Thermal Utilities: Boilers, steam systems, furnaces insulation and refractories, FBC boilers, cogeneration, waste heat recovery, Case study

Unit V

Energy Efficiency in Electrical Utilities : Electrical systems, electric motors, compressed air system, HVAC and refrigeration systems, fans and blowers, pumps and pumping systems, cooling towers, lighting system, diesel generating system, case study

Text Books & References:

1. Witte L.C., Schmidt P.S., Brown D.R., Industrial Energy Management and Utilization, Hemisphere
2. Gyftopoulos E.P., Industrial Energy Conservation Manuals, MIT Press
3. Dryden IGC, The Efficient Use of Energy, 2nd Ed., Butterworth Heinemann
4. Capehart B.L, Turner W.C., Kennedy W.J., Energy Management Handbook, John Wiley and Sons
5. Technology Menu for Efficient Energy Use: Motor Drive Systems, Prepared by National Productivity Council and Centre for Environmental Studies, Princeton University
6. F. Krieth & RE West, Economics of Solar Energy & Conservation Systems, Vol. I & II, CRC Press,

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RAIPUR INSTITUTE OF TECHNOLOGY
G... ...AUNA, MANDIRHASAUD, RAIPUR (C.G.)

PLAN AND ANALYSIS OF SOLAR PANEL SUPPORTING STRUCTURE IN WIND EFFECT

A Thesis submitted

to

CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY

BHILAI (C.G), INDIA

In the partial fulfillment of award of the Degree

Of

Master of Technology

In

Mechanical Engineering

(Specialization in Energy Management)

By

VADAVALLI V G N SUDHIR
(Roll No. 501208316005)
Enrollment No.:BB7368

Under the Guidance of

Mr.ANOOP KUMAR
(Assistant Professor)
Department of Mechanical Engineering

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Chhtauna, Mandir Hasaud, Raipur (C.G.)492101

Session: 2016-18

PRINCIPAL
RAIPUR INSTITUTE OF TECHNOLOGY
CHHATAUNA, MANDIRHASAUD, RAIPUR (C.G.)

RAIPUR INSTITUTE OF TECHNOLOGY RIT RAIPUR

CERTIFICATE BY THE SUPERVISOR

This is to certify that the report of the thesis entitled **"PLAN AND ANALYSIS OF SOLAR PANEL SUPPORTING STRUCTURE IN WIND EFFECT"** is a record of bonafide research work carried out by **Mr. VADAVALLI V G N SUDHIR**(bearing Roll no.**501208316005** & Enrollment No.BB7368) under my guidance and supervision for the award of Degree of Master of Engineering in the field of Mechanical Engineering, of Chhattisgarh Swami Vivekananda Technical University, Bhilai (C.G.), India.

To the best of my knowledge and belief the thesis

i) Embodies the work of the candidate himself,

ii) Has duly been completed,

iii) Fulfills the requirement of the Ordinance to the M.E. degree of the University and

iv) Is up to the desired standard both in respect of contents and language for being referred to the examiners.

Dr.Pravin Kumar Borkar,
(Head of Department)
Department of Mechanical Engineering
Raipur Institute of Technology,
Raipur(C.G.)

Mr.Anoop Kumar
(Supervisor)
Assistant Professor
Department of Mechanical Engineering
Raipur Institute of Technology,
Raipur(C.G.)

Forwarded to Chhattisgarh Swami Vivekanand Technical University,
Bhilai(CG)

Principal
Raipur Institute of Technology
MandirHasaud, Raipur (C.G.)

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CHHATAUNA, MANDIRHASAUD, RAIPUR (C.G.)

TABLE OF CONTENTS

ABSTRACT

The use of renewable energy resources is increasing rapidly. Following this trend, the implementation of large area solar arrays is considered to be an essential. Many design approaches of the supporting structures have been presented in order to achieve the maximum efficiency. They are loaded mainly by aerodynamic pressures. International governance as well as the competition between industries defines that they must withstand the enormous loads that result from large air acceleration. Moreover, they must have a life assurance of more than 20 yrs. Optimization plays very key role in product design and prevent un-necessary inventory satisfying the functional needs. But optimization with apt design helps to build efficient products in the everyday competing market. Stress analysis plays important role in optimizing the design. Due to the advance in computer based finite element software's design process is made simple by easier simulation methods fast replacing prototype built up and testing. In the current work, a solar panel aiding structure is designed to take rotational loads for 90^{0} safe operation. So the design should consider the loads coming on the structure for 90^{0} rotation along with inertia effect of the rotating members. The mechanism should withstand the aerodynamic loads, inertia loads and rotation loads along with frictional loads. The model should look at aerodynamic circumstances for load calculations and design should satisfy all the functional requirements.

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RAIPUR

CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY, BHILAI

MBA SEM IV **576455(76): EMERGING ISSUES IN HR MANAGEMENT (New)**
ELECTIVE DISCIPLINE: HUMAN RESOURCES MANAGEMENT
CREDITS: 4 **LECTURE SCHEME: (L-3; T-1; P-0)** **Min. No. of CTs: 2**

OBJECTIVES

The objective of this paper is to acquaint students with the latest issues in human resource management.

COURSE CONTENTS

UNIT I	⇨ Changing Environment Human Resource Management, Changing Role of HRM, New practice in International Human Resource Management, Perspective of International HRM.
UNIT II	⇨ Managing Human Resource in Virtual Organization: Types of Virtual Organizations, Difference between traditional and virtual organization, Advantages and disadvantages. Human Resource Audit-components, process, benefits and scope in Globalization.
UNIT III	⇨ Human Resource Accounting- Meaning and Objectives, Advantages, Limitations, Methods of Valuation of Human Resource, Controlling Cost of Human Resources.
UNIT IV	⇨ Human Resource Information System-Need for HRIS, Advantages of HRIS, Uses of HRIS, designing of HRIS, Computerized HRIS, Limitations of HRIS.
UNIT V	⇨ Evaluation of Performance for Development: Competency Mapping, 360 Degree Concept, Six Sigma Practices, Flexi Work and Benefit to Organization, Induction Programme and its importance in Globalized Era.

The examination paper will include question from each unit. The list of cases / specific references including recent articles will be announced and discussed in the class.

REFERENCES

- Luis R, Gomez Mejia, Managing Human Resource, Pearson Education
- Michel V P, Human Resource Management & Relation, Himalaya Publication
- Punnett, International Perspectives on Organizational Behavior and Human Resource Management, ISBN: 978-81-203-2615-6, PHI
- Rao T V, HRD Instruments, Response Books, New Delhi
- Subba Rao P, Essential of HRM and Industrial Relation, Himalaya Publication
- Wayne Mondy, Human Resource Management, Pearson Education
- Rao T V, HR Audit, Response Books, New Delhi
- Bhattacharya S K, Acieving Managmerial Excellence, McMillan India, New Delhi
- Satish Pai Ed., "HRD Skills for Organizational Excellence", Bombay, Himalaya
- McNurlim , Information Systems management in Practice, Pearson Education.
- Khanka, S.S. Human Resource Management, S. Chand Publications

PRINCIPAL
RAIPUR INSTITUTE OF TECHNOLOGY
CHHATAUNA, MANDIRHASAUD, RAIPUR (C.G.)

A

Major Project Report

ON

"JOB SATISFACTION AT BSNL ,RAIPUR(C.G)"

Submitted for partial fulfillment of requirement for the award of degree

Master of Business Administration

OF

CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY BHILAI (C.G)

Submitted by
Nupur Shrivastava
MBA IV Semester
Subject Code:-576422(76)
Session 2016-2018

Approved By,
Dr.R.P.S Chauhan,
RITEE,Raipur,
Principal

Guided By,
Dr.Suchitra Rathi Mam,
Assistant Professor

FACULTY OF MANAGEMENT

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(Under the aegis of Mahanadi Education Society)
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DECLARATION

I the undersigned solemnly declare that the report of the project work entitled "Job Satisfaction at BSNL ,Raipur(C.G)", is based my own work carried out during the course of my study under the supervision of **Dr.Suchitra Rathi Mam.**

I assert hat the statements made and conclusions drawn are an outcome of the project work. I further declare that to the best of my knowledge and belief that the project report does not contain any part of any work which has been submitted for the award of any other degree/diploma/certificate in this University or any other University.

Nupur Shrivastava
Enrollment No:BB5695
Roll No.:501207616031

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NA, MANDIRHASAUD, RAIPUR (C.G.)

CERTIFICATE BY GUIDE

This to certify that the report of the project submitted is the outcome of the project work entitled "Job Satisfaction at BSNL ,Raipur(C.G)" carried out by Nupur Shrivastava bearing Roll No.:...501207616031... & Enrollment No.:BB5695... Carried by under my guidance and supervision for the award of Degree in Master of Business Administration of Chhattisgarh Swami Vivekananda Technical University, Bhilai (C.G), India.

To the best of the my knowledge the report

i) Embodies the work of the candidate him/herself,

ii) Has duly been completed,

iii) Is up to the desired standard for the purpose of which is submitted.

S Rathi

(Signature of the Guide)

Name:Dr.Suchitra Rathi Mam

Designation: Assistant Professor

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INTRODUCTION

Human resource is considerer to be the most valuable asset in any organization. It is the sum-total of inherent abilities, acquired knowledge and skills represented by the talents and aptitudes of the employed persons who comprise executives, supervisors and the rank and file employees. It may be noted here that human resource should be utilized to the maximum possible extent, in order to achieve individual and organizational goals. It is thus the employee's performance, which ultimately decides, and attainment of goals. However, the employee performance is to a large extent, influenced by motivation and job satisfaction.

The term relates to the total relationship between an individual and the employer for which he is paid. Satisfaction does mean the simple feeling state accompanying the attainment of any goal: the end state is feeling accompanying the attainment by an impulse of its objective. Job satisfaction does mean absence of motivation at work. Research workers differently described the factors contributing o job satisfaction and job dissatisfaction.

The survey made regarding the job satisfaction in BSNL will facilitate and enables the management to know the perceptions and inner feelings regarding the job they are performing on day-to-day basis. The term job satisfaction reveals and focuses on the likes and dislikes of the employees of BSNL. In this particular study the researchers tries to identify the causes for satisfaction and dissatisfaction among the employees. So this is the most effective and selective instrument for diagnosing and peeping into the employee's problems.

Job satisfaction survey can give the most valuable information the perceptions and causes. For satisfaction/dissatisfaction among the employees attitude towards job satisfaction may be either positive or negative. This positive feeling can be re-in forced and negative feelings can be rectified. This survey can be treated as the most effective and efficient way, which makes the workers to express their inner and real feelings undoubtedly.

For any future course of action/ development, which involves employee's participation, is considered. The management will get a picture their employee's acceptance and readiness. This survey also enables to avoid misinterpretations and helps management in solving problems effectively. It is observed during study some of the employees accepted the proposal survey research.

A perfectly contentment and satisfaction motivates an employees to be confident with a high morale, it is an asset to organization as a whole.

Thus the high motivation and morale of an employee make him to remain in the organization and encourage him to face cut throat competition and gives him enough dynamism to face challenges.

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A

Summer Internship Report

ON

"CONSUMER PERCEPTION TOWARDS BUYING FROM SHOPPERS STOP IN RAIPUR"

Submitted for partial fulfillment of requirement for the award of degree Master of Business Administration

OF

CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY BHILAI (C.G)

Submitted by
Gulshan Kumar
MBA III Sem.
Roll No.: 501207616019
Specialization: HR,MARKETING

Approved By.
Dr. R.P.S. Chauhan
Principle
RITEE Raipur

Guided By.
Dr. Prachi Sharma
Asst. Professor

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Date: August 14, 2017.

Certificate of Experience

This is to certify that Mr. Gulshan Kumar has done internship at Shoppers Stop Ltd. From July 01, 2017 to August 14, 2017 on **'CONSUMER PERCEPTION TOWARDS BUYING FROM SHOPPERS STOP IN RAIPUR'** under the guidance of Mr. Kuntal Dutta Choudhary.

We have found him to be a self starter who is motivated, duty bound and hard-working.

He worked sincerely on his assignments and his performance was **Par Excellence.**

We wish him best of luck for his future.

For Shoppers Stop Ltd.

Sinha

Sourav Sinha

(HR Head)

SHOPPERS STOP LTD.
City Center Mall
Ambuja Realty Development Ltd
Mowa Vidhan Sabha Marg
Raipur (C.G) 492007

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CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY, BHILAI

MBA SEM II **576213(76): MARKETING MANAGEMENT (New)**

CREDITS: 4 **LECTURE SCHEME: (L-3; T-1; P-0)** **Min. No. of CTs: 2**

OBJECTIVES

The objective of this course is to develop an understanding of the underlying concepts, strategies and issues involved in the marketing of products and services.

COURSE CONTENTS

UNIT I	⇨ Introduction to Marketing: Meaning, nature and scope of marketing; Marketing philosophies; Marketing management process; Concept of marketing mix.
UNIT II	⇨ Market Analysis Research: Understanding marketing environment; Consumer and Industrial buyer behavior; Market measurement; Market segmentation, selection and positioning.
UNIT III	⇨ Product Planning and Pricing: Product concept; Types of products; Major product decisions; Brand management; Product life cycle, New product development process; Pricing decisions; Determinants of price; Pricing process, policies and strategies.
UNIT IV	⇨ Promotion and Distribution decisions: Communication process; Promotion tools: Advertising, personal selling, publicity and sales promotion; Distribution channel decisions: Types and functions of intermediaries, Selection and management of intermediaries; Logistics decisions: Introduction to Inventory management, warehousing, transportation and insurance.
UNIT V	⇨ Marketing Organization and Control; Emerging trends and issues in marketing: Consumerism, Social marketing; Direct and online marketing; Green Marketing, Service Marketing and brand management. Building customer satisfaction, value and retention.

The examination paper will include question from each unit. The list of cases / specific references including recent articles will be announced and discussed in the class.

TEXT BOOKS

- Philip Kotler, Kevin Lane Keller, Abraham Koshy, Mithileswar Jha; "Marketing Management – A South Asian Perspective", Pearson Education India Limited, New Delhi, 13th Ed., 2009.
- Ramaswamy, V.K. & Namakumari; "Marketing Management: Indian Context", McMillan, 1995, 2nd Ed.

REFERENCE BOOKS

- Rajan Saxena; "Marketing Management", Tata McGraw Hill, 3rd Ed., 2006.
- S.N. Sontaki; "Marketing Management," Kalyani Publication.
- Berman, "Marketing in 21st Century, 8th Edition, Wiley Publication
- Dan Lacobucci, Dr.Avinash Kapoor; "MM-4LTR series" Cengage Learning, India Edition

REFERENCE JOURNALS

- Journal of Marketing, Vikalpa, IIMB Management Review, Decision, Harvard Business Review, MIT Sloan Management Review, Journal of Marketing, Journal of Marketing Research

CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY, BHILAI

MBA SEM II **576214(76): ADVANCED FINANCIAL MANAGEMENT (New)**

CREDITS: 4 **LECTURE SCHEME: (L-3; T-1; P-0)** **Min. No. of CTs: 2**

OBJECTIVES

The objective of this course is to acquaint the students with the broad framework of financial decision making in a business unit.

COURSE CONTENTS

UNIT I	⇨ Financial Management: Nature and objectives, profit maximization v/s wealth maximization, finance functions, time value of money (discounting and compounding techniques).
UNIT II	⇨ Cost of different sources of raising capital, weighted average cost of capital. ⇨ Types of dividend policy, dividend theories dividend practices in India.
UNIT III	⇨ Capital Structure: Factors determining capital structure, approaches and theories ⇨ Operating and Financial leverages: Impact, trading on equity
UNIT IV	⇨ Budget: Concept and Types, Budgetary Control, Capital budgeting, Zero based budgeting. ⇨ Ratio analysis: Liquidity, profitability and solvency. Analysis of Fund flow and cash flow statement.
UNIT V	⇨ Management of working capital: Concept of working capital, need and factors influencing, estimation of working capital, inventory and receivables management, management of cash.

The examination paper will include question from each unit. The list of cases / specific references including recent articles will be announced and discussed in the class.

TEXT BOOKS

- V.K. Bhalla, Financial Management and Policy. 2nd Edition, New Delhi, Anmol, 1998

SUGGESTED READINGS

- Hampton , john . Financial Decision Making. Englewood Cliffs, New Jersey, Prentice Hall Inc.
- Van Horne, James C. Financial Management and Policy , New Delhi, Prentice Hall of India.
- Winger, Bornard and Mohan, Nancy, Principles of Financial Management, New York, Macmillan Publishing Company.
- I.M. Pandey, Financial Management Vikas Pub. House, New Delhi.
- P. Chandra, Financial Management, TMH, New Delhi .
- S.C. Kuchhal, Financial Management, Chaityna Publishing House, Aligarh.
- R.M. Srivastava, Financial Decision Making, Himaylaya Publishing House, Mumbai.

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A

Summer Internship Report

ON

"Income Tax Filing of Jain's Professional Service"

Submitted for partial fulfillment of requirement for the award of degree Master of Business Administration

OF CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY BHILAI (C.G)

Submitted by
Bhupendra Sindoor
MBA III Sem.
Roll No.: 501207616011
Specialization: Finance & Marketing

Approved By,
Dr.R.P.S. Chauhan
Principal
RITEE Raipur

Guided By,
Dr. J.H. Vyash
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No. 05-06/Estt./Training /002

Raipur, dt. 23/11/2017

CERTIFICATE

This is to certify that **Shri Bhupendra Sindoor S/o Shri Lakhpati Sindoor** a student of MBA (3rd Sem.) **Institute of Management, RITEE Raipur (C.G.)** has undergone Vocational Training vide order **No.02-06/Trg.-7/Poly./2017-18/EE-II/KLP/2183 Raipur dtd 29.06.2017** read with **this office order No.05-06/Esstt./Tra./4762-62(A) dtd. 01.07.2017** in the O/o ED (Fin) CSPDCL Raipur w.e.f. 01.07.2017 to 14.08.2017 and submitted a detailed project report in this regard. He has completed the training successfully.

I Wish him/her all success in the future.

Executive Director (Fin.)
CSPDCL, Raipur

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CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY, BHILAI

MBA SEM IV **576431(76): PRODUCT AND BRAND MANAGEMENT (New)**

ELECTIVE DISCIPLINE: MARKETING MANAGEMENT

CREDITS: 4 **LECTURE SCHEME: (L-3; T-1; P-0)** **Min. No. of CTs: 2**

OBJECTIVES

The objective of this course is to impart in-depth knowledge to the students regarding the theory and practice of product and brand management.

COURSE CONTENTS

UNIT I	⇨ Product Management: Product Classification, Levels, Product Mix and Product Line Decisions, New Product Development Process ⇨ Marketing Organizations: Product Focused Organization, Market Focused Organization
UNIT II	⇨ Market Potential & Sales Forecasting: Forecasting target market potential and sales, Methods of estimating market and sales potential, Method of Sales forecasting ⇨ Developing Product Strategy: Objectives & Alternatives: Product Strategy in Product Life Cycle, Customer and Competitor Analysis, Factors Influencing Design of The Product, Changes Affecting Product Management
UNIT III	⇨ Branding (Definitions, Significance): Product Vs Brands, Brand Identity and Brand Image ⇨ Brand knowledge: Brand portfolios and market segmentation ⇨ Brand Building: Steps in Brand Building, Brand Positioning, Defining and establishing brand values
UNIT IV	⇨ Designing & Sustaining Branding Strategies: Brand Hierarchy, Brand Strategies (Product Brand, Line Brand, Range Brand, Umbrella Brand), Source Brand and Co Branding, Brand Extension, Types of brand extension, Managing Brand over Time ⇨ Brand Leveraging & Brand Performance: Establishing brand equity management system, Measuring sources of brand equity, Co-branding, Celebrity endorsement
UNIT V	⇨ Brand Equity (Concept, Significance): Brand Equity Models, Building Brand Equity, Measuring Brand Equity, Managing Brand Equity

The examination paper will include question from each unit. The list of cases / specific references including recent articles will be announced and discussed in the class.

TEXT BOOKS

- Gary, L. Lilien, Arvind Rangaswamy, New Product and Brand Management: Marketing Engineering Applications, Prentice Hall, ISBN-10: 0321046439; ISBN-13:978-0321046437
- Percy, Strategic Brand Management, ISBN: 9780195692280, Oxford University Press
- YLR Moorthi, Brand Management 1ed, Vikas Publication house Pvt Ltd

SUGGESTED READINGS

- Aaker David, A. Managing Brand Equity, New York. Free Press, 1991
- Cowley, Don. Understanding Brands. London, Kogan Page, 1991
- Czernlawski, Richard D. & MIcheal W. Maloney. Creating Brand Royalty, AMACOM, NY, 1999
- Kapferer, J.N. Strategic Brand Management, New York, Free Press, 1992
- Murphy, John A., Brand Strategy, Cambridge, The Director Books, 1990
- Steward, P. , Building Brands Directly, London, MacMillan, 1996.

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A

Summer Internship Report

ON

"Income Tax Filing of Shrivastava And Agarwal"

Submitted for partial fulfillment of requirement for the award of degree Master of Business Administration

OF CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY BHILAI (C.G)

Submitted by
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Asso Professor

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