

# RAIPUR INSTITUTE OF TECHNOLOGY

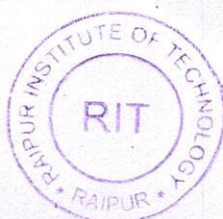
(Under the aegis of Mahanadi Education Society)

Approved by AICTE, New Delhi, Affiliated to CSVTU, Bhilai



## 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 |
|------------------------------|--------------|--|-------------------------|------------------|--|
| 2016-2017                    |              |  |                         |                  |  |
| BE Biotechnology Engineering | 18           | Microbial Technology   | 318352(18)              | 2016-17          | YOGENDRA KUMAR, RATIKA BHARGAVA, SUSHMA SAHU, SHAYRA FATIMA, ANUJ KUMAR                                |
| BE Biotechnology Engineering | 18           | Phytochemistry   | 318354(11)              | 2016-17          | KHUSHBOO KORRAM  |
|                              |              |  |                         |                  | MINALI KOSHLEY   |
|                              |              |  |                         |                  | SUNANDA YADAV  |
| BE Biotechnology Engineering | 18           | Environmental Biotechnology  | 318653 (18)             | 2016-17          | INDU, Kamlesh Patel  |
|                              |              |  |                         |                  | MITALI HEMANT ALONE  |
|                              |              |  |                         |                  | AYUSHMAAN DEV MURARI   |
| BE Biotechnology Engineering | 18           | Physiology, Biochemistry.  | 318453(18), 318455(18)  | 2016-17          | Indu Ware  |
| BE Biotechnology Engineering | 18           | Process Economics and Management   | 318553(19)              | 2016-17          | Mitali Alone   |
| BE Biotechnology Engineering | 18           | Computational Biology  | 318556 (18)             | 2016-17          | Ratika Bhargava  |
| BE Biotechnology Engineering | 18           | Tissue Culture   | 318555(18)              | 2016-17          | Shayra Fatima  |
| BE Biotechnology Engineering | 18           | Cellular and Molecular Biology, Stoichiometric Calculations                                      | 318351(18), 318355(19)  | 2016-17          | Sushma Sahu  |
| BE Biotechnology Engineering | 18           | Molecular Dynamics and Bioenergetics   | 318353(18)              | 2016-17          | Anuj Rajwade   |
| BE Biotechnology Engineering | 18           | Phytochemistry   | 318354(11)              | 2016-17          | Arnav Kshyarsh   |
| BE Biotechnology Engineering | 18           | Stem Cell in Health Care, Pharmaceutical Biotechnology   | 318733(18), 318734(18)  | 2016-17          | Ayushman Dev   |
| BE Biotechnology Engineering | 18           | Recombinant DNA technology, Instrumentation Techniques   | 318454(18), 318356(19)  | 2016-17          | Deepak Sori  |
| BE Biotechnology Engineering | 18           | Thermodynamics and Biochemical Reaction Engineering, Enzyme Technology                           | 318452(19), 318551(18)  | 2016-17          | Heena Chandrakar   |
| BE Biotechnology Engineering | 18           | Computational Biology, Phytochemistry  | 318556 (18), 318354(11) | 2016-17          | Khushboo Korram  |
| BE Biotechnology Engineering | 18           | Basic Immunology, Immunotechnology   | 318652 (18), 318732(18) | 2016-17          | Minali Koshley   |
| BE Biotechnology Engineering | 18           | Medical Biotechnology  | 318456(18)              | 2016-17          | Sunanda Yadav  |
| BE Biotechnology Engineering | 18           | Biochemistry, Medical Biotechnology  | 318455(18), 318455(18)  | 2016-17          | Yogendra Sori  |
| BE Biotechnology Engineering | 18           | Phytochemistry,  | 318354(11)              | 2016-17          | Ankita Sharma, Aparna Tiwari, Prateek Jaswani  |
|                              |              | Pharmaceutical Biotechnology   | 318734(18)              |                  |  |
|                              |              | Immunotechnology   | 318732(18)              |                  |  |
| BE Biotechnology Engineering | 18           | Industrial Biotechnology   | 318831(18)              | 2016-17          | Dikesh Kumar Gurupahachan  |
| BE Biotechnology Engineering | 18           | Biosafety & Bioethics,   | 318552(18)              | 2016-17          | Velupula kartik  |



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| 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  |
|--------------------------|--------------|--|-------------|------------------|---|
| BE Chemical Engineering  | 19           | Separation Processes - II  | 319733(19)  | 2016-17          | DIYA SEN GUPTA, DHANSHREE MONE, NISHA TOPPO, SUCHIT VISHWAKARMA, HASAN SARDAR, LOKESH PATEL, NIDHI VERMA, ROSHAN EKA, MANISHA POUDEL, AJAY TIWARI, YOGESH DAS, PRASHANT SINGH   |
| BE Chemical Engineering  | 19           | Environmental Pollution and Control  | 319452(19)  | 2016-17          | RAJESH KUMAR SINGH<br>CHANDRAMANI YADAV<br>RINKI YADAV<br>LOKENDRA KUMAR JAIN   |
| BE Chemical Engineering  | 19           | Process Stoichiometric Calculations  | 319453(19)  | 2016-17          | HEMANT VAIDHYA<br>MAMTA GWALA<br>RAHUL SAHU<br>TIKESHWAR SAHU   |
| BE Chemical Engineering  | 19           | Fuel technology  | 319455(19)  | 2016-17          | ALKA TANDAN<br>CHETAN SHRIVAS<br>J. DURGAVATI   |
| B.E Chemical Engineering | 19           | Organic Process Technology   | 319456(11)  | 2016-17          | ADIYA BANGANI, ANJULATA PANDEY, ANUJ DANDEKAR, DIVYA TURHATE, JAY PRAKASH DEWANGAN, PALLAV PATHE, PRACHITI APTE, AMAN SHARMA, ANUP MISTRI, IVAN ALI, KAVYA CHANDRAKR, NAYNA AGRAWAL, NEERAJ KUMAR, PRAFUL VERMA, RAHUL KASHIPURI, RESHMA RAJU, SANDHYA MAHANT, IMRAN ALI, |
|                          |              | Inorganic Process Technology,  | 319733(19)  |                  |   |
|                          |              | Material Technology  | 319653(19)  |                  |   |
|                          |              | Organic Chemistry,   | 319453(19)  |                  |   |
|                          |              | Separation Process I,  | 319454(19)  |                  |   |
|                          |              | Fluid and Particle Operation   | 319352(19)  |                  |   |
| B.E Chemical Engineering | 19           | Inorganic Process Technology   | 319733(19)  | 2016-17          | SHRISTI KALKAR, SHUBHI SONI, SUMIT AGARWAR, T ABHIVANDAN, UMASHANKAR SAHU, Y SHUBHAM, GHANSHYAM SAHU  |
| B.E Chemical Engineering | 19           | Process Dynamics and Control   | 319833(19)  | 2016-17          | RAVI KUMAR POPTANI, RISHI RAJ TRIPATHI, SOMYA MANDLOI, TAPAN SHARMA, VENKTESHWAR, YASH BONTALWAR, ALOK KUMAR SAHU, BHARTI KOSHTI, MAHIPAL   |
|                          |              | Modeling and Simulation  | 319832(19)  |                  |   |
|                          |              | Heat Transfer  | 319453(19)  |                  |   |
| BE Civil Engineering     | 20           | Environmental Engineering -II  | 320722(20)  | 2016-17          | YAMAN BAGHEL  |
| BE Civil Engineering     | 20           | Structural Engineering Lab   | 320661 (20) | 2016-17          | AMAR CHANDRAKAR<br>SUNIL PATEL<br>TUKESH KUMAR PATLE<br>SHWETA DHANKAR<br>NEERAJ PATHAK   |
| BE Civil Engineering     | 20           | Geotech Engineering-I  | 320552 (20) | 2016-17          | RATAN SHARMA<br>MISBAH HUDA<br>RAHUL SALECHA<br>ALOK PANDEY<br>SAURAV GUPTA<br>UMANG GUPTA<br>ASHWANI SAHU  |
| BE Civil Engineering     | 20           | Concrete Technology  | 320654 (20) | 2016-17          | KHAMCHAND BANJARE<br>MANOJ WANSKAR<br>VINAY KUMAR SINGH<br>DHANESH KUMAR<br>ANKIT SINGH<br>MANISH TIGGA   |

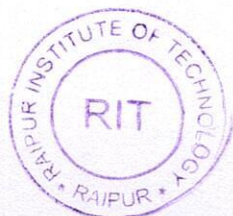


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|-----------------------|--------------|--|--------------|------------------|--|--|
| BE Civil Engineering  | 20           | Concrete Technology  | 320654 (20)  | 2016-17          | AYUSH AGNIHOTRI  |  |
|                       |              |  |              |                  | PRAGATI SHRIVASTAVA  |  |
|                       |              |  |              |                  | IMRAN KHAN   |  |
|                       |              |  |              |                  | AMIT TIWARI  |  |
|                       |              |  |              |                  | ANGAD SINGH GREWAL   |  |
|                       |              |  |              |                  | SHRADDHA KANDEL  |  |
|                       |              |  |              |                  | SUSHMITA KUMARI  |  |
|                       |              |  |              |                  | VIVEK CHAUBEY  |  |
|                       |              |  |              |                  | MEGHA SHARMA   |  |
|                       |              |  |              |                  | SIDDHARTH ASHATKAR   |  |
|                       |              |  |              |                  | NIDHI CHAUHAN  |  |
|                       |              |  |              |                  | ANKIT GUPTA  |  |
| B.E Civil Engineering | 20           | Building Construction  | B020413(020) | 2016-17          | JHANESH NIRWAN   |  |
|                       |              | Environmental Engineering  | C020612(020) |                  | AAKRITI JERY   |  |
|                       |              | Building Materials   | C020514(020) |                  | ABHAS CHANDRAKAR   |  |
|                       |              | Solid Mechanics  | B020313(020) |                  | ABHISHEK RAHANGDALE  |  |
|                       |              | Basic Civil Engineering  | 300216(20)   |                  | ADARSH DAHAYAT   |  |
|                       |              |  |              |                  | ADITI GOSWAMI  |  |
|                       |              |  |              |                  | ANJALI KUMARI MAHANT   |  |
|                       |              |  |              |                  | ANKIT KUMAR DAHARIYA   |  |
|                       |              |  |              |                  | AZAD CHAND MAHAJAN   |  |
|                       |              |  |              |                  | BHAVANA GAJENDRA   |  |
| B E Civil Engineering | 20           | Building Construction  | B020414(020) | 2016-17          | CHANDAN VERMA  |  |
|                       |              | Surveying and Geomatics Surveying  | B020413(020) |                  | CHETNA SAHU  |  |
|                       |              | Structural Analysis – I  | B020411(020) |                  | DEEKSHA VERMA  |  |
|                       |              | Building Materials   | B020315(020) |                  | DEVASHISH BAGHEL   |  |
|                       |              | Structural Engineering Design-I  | C020511(020) |                  | DIKESH KUMAR JANGDE  |  |
|                       |              |  |              |                  | GAGAN SINGH KURREY   |  |
|                       |              |  |              |                  | HAREESH KUMAR SAHU   |  |
|                       |              |  |              |                  | HARSH SHARMA   |  |
|                       |              |  |              |                  | JAGDEEP SUNHARE  |  |
|                       |              |  |              |                  | JASMEET SINGH MATHARU  |  |
| B E Civil Engineering | 20           | Building Construction  | B020414(020) | 2016-17          | JYOTI DUBEY  |  |
|                       |              | Surveying and Geomatics Surveying  | B020413(020) |                  | JYOTI SAHU   |  |
|                       |              | Building Materials   | B020315(020) |                  | MANISH KUMAR SAHU  |  |
|                       |              | Structural Engineering Design-I  | C020511(020) |                  | MOHANISH DEO   |  |
|                       |              | Engineering economics, estimating and costing  | C020613(020) |                  | NALINI SINGH   |  |
|                       |              |  |              |                  | NEERAJ SINGH THAKUR  |  |
|                       |              |  |              |                  | NIKHIL BRAHAMBHATT   |  |
|                       |              |  |              |                  | NIKHIL SAHU  |  |
|                       |              |  |              |                  | PRATIK MITTAL  |  |
|                       |              |  |              |                  | PRITIKA CHOUBEY  |  |
| B E Civil Engineering | 20           | Surveying and Geomatics Surveying  | B020413(020) | 2016-17          | PRIYANKA KUSHWAHA  |  |
|                       |              | Structural Analysis – I  | B020411(020) |                  | RAJU KUMAR VERMA   |  |
|                       |              | Building Materials   | B020315(020) |                  | RAVIKANT VERMA   |  |
|                       |              | Structural Engineering Design-I  | C020511(020) |                  | RINTU DAS  |  |
|                       |              | Concrete Technology  | C020632(020) |                  | SAKSHI CHANDRAKAR  |  |
|                       |              |  |              |                  | SATYA NARAYAN KASTURIYA  |  |
|                       |              |  |              |                  | SHEETAL TIGGA  |  |
|                       |              |  |              |                  | SHRADDHA VERMA   |  |
|                       |              |  |              |                  | TEKESHWAR KANNAUJE   |  |
|                       |              |  |              |                  | VAIBHAV SINGH RAJPUT   |  |



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|-----------------------|--------------|--|--------------|------------------|--|
| B.E Civil Engineering | 20           | Building Construction  | B020413(020) | 2016-17          | VARENDRA PAL GAYAKWAD  |
|                       |              | Environmental Engineering  | C020612(020) |                  | VIBHA CHANDRAVANSHI  |
|                       |              | Building Materials   | C020514(020) |                  | VIKAS KUMAR JANGDE   |
|                       |              | Solid Mechanics  | B020313(020) |                  | YOGESH SINGH   |
|                       |              | Basic Civil Engineering  | 300216(20)   |                  | ARJUN YADU   |
|                       |              |  |              |                  | ATUL GUPTA   |
|                       |              |  |              |                  | BHUMIKA YADAV  |
|                       |              |  |              |                  | DEEPESH AGRAWAL  |
|                       |              |  |              |                  | GAGAN SAHU   |
|                       |              |  |              |                  | GAURAV VERMA   |
|                       |              |  |              |                  | MANMOHAN NISHAD  |
|                       |              |  |              |                  | PRAKASH TIWARI   |
|                       |              |  |              |                  | PRAVIN KUMAR JAISWAL   |
|                       |              |  |              |                  |  |
| B.E Civil Engineering | 20           | Surveying and Geomatics Surveying  | B020413(020) | 2016-17          | RAHUL KUMAR AMBAST   |
|                       |              | Geotechnical Engineering   | C020513(020) |                  | RAMAN MALADHARE  |
|                       |              | Building Materials   | B020315(020) |                  | ROSHNI BONSLER   |
|                       |              | Transportation Engineering   | C020514(020) |                  | SATYAM SONKAR  |
|                       |              | Traffic Engg   | 320750(20)   |                  | SIDDHARTH RAMTEKKAR  |
|                       |              |  |              |                  | SUSHMITA SINGH SUMAN   |
|                       |              |  |              |                  | VIKRAM VASHISHTH AADITYA   |
|                       |              |  |              |                  | DEEPIKA JHADI  |
|                       |              |  |              |                  | ROHIT KUMAR SINGH  |
|                       |              |  |              |                  |  |
| B.E Civil Engineering | 20           | Building Construction  | B020414(020) | 2016-17          | 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) |                  | AMAN AGRAWAL   |
|                       |              | Environmental Engineering  | C020612(020) |                  | ANKIT MANEKAR  |
|                       |              |  |              |                  | ANKUR MINZ   |
|                       |              |  |              |                  | BHARTI ODEDARA   |
|                       |              |  |              |                  | BHUPENDRA SINGH NETAM  |
|                       |              |  |              |                  | BIPUL KASHYAP  |
|                       |              |  |              |                  | BITTU SAHU   |
|                       |              |  |              |                  |  |
| B.E Civil Engineering | 20           | Surveying and Geomatics Surveying  | B020413(020) | 2016-17          | DHARMA CHARYA DINDAYAL S KUMAR   |
|                       |              | Engineering economics, estimating and costing  | C020613(020) |                  | ESHA PAKARIYA  |
|                       |              | Building Materials   | B020315(020) |                  | GAJENDRA SINGH RAGHUWANSHI   |
|                       |              | Structural Engineering Design-I  | C020511(020) |                  | GULESH SAHU  |
|                       |              | Concrete Technology  | C020632(020) |                  | HARSH KUMAR THAKUR   |
|                       |              |  |              |                  | HARSHIT JAISWAL  |
|                       |              |  |              |                  | ISHA MUKHERJEE   |
|                       |              |  |              |                  | JAYAWANT TIRKEY  |
|                       |              |  |              |                  | KSHITIJ NAMDEO   |
|                       |              |  |              |                  | KUNDAN KUMAR SAHU  |



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|-------------------------------------|--------------|--|--------------|------------------|--|
| B.E Civil Engineering               | 20           | Surveying and Geomatics Surveying  | B020413(020) | 2016-17          | MANISH FARIKAR   |
|                                     |              | Geotechnical Engineering   | C020513(020) |                  | MD MOKARRAM MUMTAZ   |
|                                     |              | Building Materials   | B020315(020) |                  | MOHIT VISHWAKARMA  |
|                                     |              | Transportation Engineering   | C020514(020) |                  | MONIKA LODHI   |
|                                     |              | Traffic Engg   | 320750(20)   |                  | NAMAN SHARMA   |
|                                     |              | Environmental Engineering  | C020612(020) |                  | NEERAJ NAIK  |
|                                     |              |  |              |                  | NIKET CHANDRAKAR   |
|                                     |              |  |              |                  | NISHANT JAIN   |
|                                     |              |  |              |                  | PARAG AGRAWAL  |
|                                     |              |  |              |                  | PRINCI PRIYANTI DHANSON  |
| B.E Civil Engineering               | 20           | Building Construction  | B020413(020) | 2016-17          | QUAZI MD ATAUR RAHIM KHAN  |
|                                     |              | Environmental Engineering  | C020612(020) |                  | RAHUL MEENPAL  |
|                                     |              | Building Materials   | C020514(020) |                  | RAJBHARTI NEVENDRA   |
|                                     |              | Solid Mechanics  | B020313(020) |                  | RAKESH RANJAN  |
|                                     |              | Basic Civil Engineering  | 300216(20)   |                  | RISHABH KUMAR SONI   |
|                                     |              |  |              |                  | RITESH KOSMA   |
|                                     |              |  |              |                  | RITUSHA NISHAD   |
|                                     |              |  |              |                  | SACHIN KUMAR GUPTA   |
| B.E Civil Engineering               | 20           | Building Construction  | B020414(020) | 2016-17          | SAGAR SHRIVASTAVA  |
|                                     |              | Surveying and Geomatics Surveying  | B020413(020) |                  | SANDEEP SINGH  |
|                                     |              | Building Materials   | B020315(020) |                  | SATYENDRA KHUTE  |
|                                     |              | Structural Engineering Design-I  | C020511(020) |                  | SAURABH KANWAR   |
|                                     |              | Engineering economics, estimating and costing  | C020613(020) |                  | SHIKHA NAMDEO  |
|                                     |              |  |              |                  | SHREY MANDAVI  |
|                                     |              |  |              |                  | SHUBHAM SAHU   |
|                                     |              |  |              |                  | SHUBHAM VIMAL PATEL  |
|                                     |              |  |              |                  | STUTI TRIPATHI   |
|                                     |              |  |              |                  | SUDHANSHU SHARMA   |
| B.E Civil Engineering               | 20           | Building Construction  | B020414(020) | 2016-17          | TRISHANK CHANDRAKAR  |
|                                     |              | Surveying and Geomatics Surveying  | B020413(020) |                  | VIJAY LAXMI TUMRETI  |
|                                     |              | Structural Analysis – I  | B020411(020) |                  | VIKESH GHORMARE  |
|                                     |              | Building Materials   | B020315(020) |                  | VISHAL KUMAR CHAUHAN   |
|                                     |              | Structural Engineering Design-I  | C020511(020) |                  | VIVEK PRAJAPATI  |
|                                     |              | Environmental Engineering  | C020612(020) |                  | YOGESH MAHILANG  |
|                                     |              |  |              |                  | GULSHAN KUMAR SAHU   |
|                                     |              |  |              |                  | M ASHISH   |
| BE Computer Science & Engineering   | 22           | Cryptography & Network Security  | 322734(22)   | 2016-17          | ONKAR SAHU   |
| BE Computer Science & Engineering   | 22           | Database Management System   | 322556(22)   | 2016-17          | SAURAVRAJ  |
|                                     |              |  |              |                  | N. GANPATI   |
|                                     |              |  |              |                  | BHAWANIVERMA   |
| BE Computer Science & Engineering   | 22           | Computer Networks  | 322651(22)   | 2016-17          | PAWAN SINGH  |
|                                     |              |  |              |                  | SAHIL GUPTA  |
|                                     |              |  |              |                  | NEERAJ KUMAR   |
| BE Computer Science & Engineering   | 22           | Database Management System   | 322556(22)   | 2016-17          | GARGIAGRA- WAL   |
|                                     |              |  |              |                  | DIVYA RANIDEVDAS   |
|                                     |              |  |              |                  | MUNNA KUMAR  |
|                                     |              |  |              |                  | KUNAL KISHORE  |
| BE Computer Science & Engineering   | 22           | Database Management System   | 322556(22)   | 2016-17          | POONAM SINGH   |
|                                     |              |  |              |                  | K. SOUMYA  |
|                                     |              |  |              |                  | GOVINDKUMARSHARMA  |
| BE (Computer Science & Engineering) | 22           | Database Management System   | 322556(22)   | 2016-17          | HIMANSHU SHARMA  |
|                                     |              |  |              |                  | RAVI SHANKAR DUBEY   |
|                                     |              |  |              |                  | ABHISHEKMISHRA   |
| BE Computer Science & Engineering   | 22           | Cryptography & Network Security  | 322734(22)   | 2016-17          | SANDEEP YADAV  |

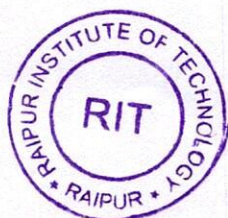


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| BE Computer Science & Engineering              | 22           | Database Management System   | 322556(22)  | 2016-17          | GHANSHYAM SAHU   |
|  |              |  |             |                  | MANISH SAHU  |
|  |              |  |             |                  | SHUBHAM KHANUJA  |
| BE Computer Science & Engineering              | 22           | Database Management System   | 322556(22)  | 2016-17          | MONIKA NIGAM   |
|  |              |  |             |                  | GEETA JAISWAL  |
|  |              |  |             |                  | TAMESHWARI VERMA   |
| BE Computer Science & Engineering              | 22           | Natural Languages Processing   | 322744(22)  | 2016-17          | MADHURIDURSHAN,  |
|  |              |  |             |                  | PREM KSHATRI   |
|  |              |  |             |                  | SHAKULSHARMA   |
| BE Computer Science & Engineering              | 22           | Database Management System   | 322556(22)  | 2016-17          | SAGAR SHARMA   |
|  |              |  |             |                  | ANKIT EKKA   |
|  |              |  |             |                  | NANDANI SINHA  |
| BE Computer Science & Engineering              | 22           | Database Management System   | 322556(22)  | 2016-17          | ARUN YADAV   |
|  |              |  |             |                  | TRIPTI NIGAM   |
|  |              |  |             |                  | NILESH SAHU  |
| BE Computer Science & Engineering              | 22           | Database Management System   | 322556(22)  | 2016-17          | ANKITA CHANDRAKAR  |
|  |              |  |             |                  | ARUN KUMAR CHANDRAKAR  |
|  |              |  |             |                  | KHUSHBOO SHARMA  |
| BE Computer Science & Engineering              | 22           | Database Management System   | 322556(22)  | 2016-17          | SUNAINA PATEL  |
|  |              |  |             |                  | NEHA KHADULE   |
|  |              |  |             |                  | AKANKSHA BANJARE   |
| BE Computer Science & Engineering              | 22           | Digital Image Processing   | 322740(22)  | 2016-17          | ARTI KASHYAP   |
|  |              |  |             |                  | DEEPSHIKHA GUPTA   |
|  |              |  |             |                  | ANJALI DEWANGAN  |
| BE Computer Science & Engineering              | 22           | Database Management System   | 322556(22)  | 2016-17          | DEEPTI SAHU  |
|  |              |  |             |                  | NISHA KOSHALE  |
|  |              |  |             |                  | MOHIT BARAI  |
| BE Computer Science & Engineering              | 22           | Parallel Processor and Computing   | 322732(22)  | 2016-17          | NIVISH TIWARI  |
|  |              |  |             |                  | TILAK DEWANGAN   |
|  |              |  |             |                  | POOJA KATHOTE  |
| BE Computer Science & Engineering              | 22           | Database Management System   | 322556(22)  | 2016-17          | RUPENDRA SONI  |
|  |              |  |             |                  | DEEPSHIKHA SAHU  |
|  |              |  |             |                  | SURABHI CHANDRAKAR   |
| BE Computer Science & Engineering              | 22           | Database Management System   | 322556(22)  | 2016-17          | SHRUTI SHUKLA  |
|  |              |  |             |                  | ARTI MISHRA  |
|  |              |  |             |                  | Arbinda Barik  |
| BE Electronics & Telecommunication Engineering | 3028         | Antennas and Wave Propagation  | 328553(28)  | 2016-17          | Deepak Kumar Prajapati   |
|  |              |  |             |                  | Diksha Chandrakar  |
|  |              |  |             |                  | Sapana Chandravanshi   |
| BE Electronics & Telecommunication Engineering | 3028         | Electronic Devices and Circuits  | 328353(28)  | 2016-17          | Divya Tiwari   |
|  |              |  |             |                  | Seema Dhruw  |
|  |              |  |             |                  | Soumya Sharma  |
| BE Electronics & Telecommunication Engineering | 3028         | Electromagnetic Fields & Transmission Lines  | 328456(28)  | 2016-17          | Praveen Kaushil  |
|  |              |  |             |                  | Rakesh Kumar   |
|  |              |  |             |                  | Renuka Verma   |
| BE Electronics & Telecommunication Engineering | 3028         | Electromagnetic Fields & Transmission Lines  | 328456(28)  | 2016-17          | Archana verma  |
|  |              |  |             |                  | Atul Kumar   |
|  |              |  |             |                  | Sudhanshu Pandey   |
| BE Electronics & Telecommunication Engineering | 3028         | Microcontroller & Embedded   | 328653(28)  | 2016-17          | Vikash Kumar   |
|  |              |  |             |                  | Prabha Biswas  |
|  |              |  |             |                  | Ruchi Gupta  |
| BE Electronics & Telecommunication Engineering | 3028         | Microcontroller & Embedded   | 328653(28)  | 2016-17          | Gopika Nirmalkar   |
|  |              |  |             |                  | Pinki Sao  |



*Principals*  
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| 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   |
|----------------------------------|--------------|--|-------------|------------------|--|
| BE Mechanical Engineering        | 37           | Energy Systems   | 337652 (37) | 2016-17          | FUNENDRA KUMAR SAHU, RAJESH RANJAN, DOMESHWAR KOTHALIA, GOPESH KUMAR SAHU, DEVESH SINGH, DILIP SAHU, VEDPRAKASH SAHU, VIVEK KUMAR DAS, RAJAN KUMAR, RISHABH SINHA, KUNAL KUMAR KESHARI, NAVEEN NAGER, DHARMENDRA BAGHEL, LAXMAN PRASAD SINGH, RAMGOPAL BISWAS, RAM NARAYAN JANGDE, SOURABH CHAKRABORTY |
| BE Mechanical Engineering        | 37           | Robotics   | 337831(37)  | 2016-17          | SURESH RATHORE, YASH PATEL, YUGAL KISHOR PRADHAN, ANIL KUMAR, BHUPENDRA CHANDRAKAR, SATISH LAKRA, SAURABH R KSHIRSAGAR, SHUBHAM PANDEY, JAYDEEP BISWAS, VIJENDRA K. SINGH  |
| BE Mechanical Engineering        | 37           | Machine Design – II  | 337651 (37) | 2016-17          | DARSAN DWIZ, MOHAR SAY, MUKESH SINGH, PRATIK DEWANGAN GADGIL, PALASH AGRAWAL, RAJAT K. PANIGRAHI, MANURAJ SHARMA, AJAY KUMAR SAHU, HEMSINGH SAHU, KHILESH S. SAHU, SALIM GHHRITLAHARE,   |
| BE Mechanical Engineering        | 37           | Dynamics of Machines   | 337553 (37) | 2016-17          | VISHAL ROY   |
|                                  |              |  |             |                  | MALAY PRADHAN  |
|                                  |              |  |             |                  | NAVEEN SINGH   |
|                                  |              |  |             |                  | RISHABH GANZEER  |
| BE Mechanical Engineering        | 37           | Machine Tool Technology  | 337734(37)  | 2016-17          | VIVEK K.   |
|                                  |              |  |             |                  | SHUBHAM SHARMA   |
|                                  |              |  |             |                  | VEERENDRA SAHU   |
|                                  |              |  |             |                  | SOMAN LAL SAHU   |
| BE Mechanical Engineering        | 37           | Manufacturing Science - II   | 337555 (37) | 2016-17          | ABHISHEK ADDANKI   |
|                                  |              |  |             |                  | SUNIL CHANDRAWANSHI  |
|                                  |              |  |             |                  | ADITYA K. PATHAK   |
|                                  |              |  |             |                  | AAYAM MISHRA   |
| BE Mechanical Engineering        | 37           | Machine Design – I   | 337551 (37) | 2016-17          | ABHISHEK KUMAR DWIVEDI,  |
|                                  |              |  |             |                  | BHAVESH K. SAHU  |
|                                  |              |  |             |                  | BHOLA RAM SAHU,  |
|                                  |              |  |             |                  | JAI PRAKASH CHANDRA  |
| BE Mechanical Engineering        | 37           | Internal Combustion Engines  | 337653 (37) | 2016-17          | LALIT K. SAHU  |
|                                  |              |  |             |                  | ABHINANDAN ANAND,  |
|                                  |              |  |             |                  | TARANG JAISWAL   |
|                                  |              |  |             |                  | SHANTAM KUMAR  |
| BE Mechanical Engineering        | 37           | Applied Thermodynamics   | 337453(37)  | 2016-17          | DEEPAK TIWARI,   |
|                                  |              |  |             |                  | SANJAY KURREY  |
|                                  |              |  |             |                  | ABHIRAJ DUBEY  |
|                                  |              |  |             |                  | ALSHAY PANDEY,   |
| M.Tech Environmental Engineering | 30           | Water Pollution Control  | 530114 (19) | 2016-17          | AMAN YADAV   |
|                                  |              |  |             |                  | RISHABH YADAV  |
|                                  |              |  |             |                  | VIVEK SINGH THAKUR   |
|                                  |              |  |             |                  | TUSHAR AWADHIY   |
| M.Tech Environmental Engineering | 30           | Water Pollution Control  | 530114 (19) | 2016-17          | TARUN SONWANI,   |
|                                  |              |  |             |                  | UJJAWAL TIWARI   |
|                                  |              |  |             |                  | SHUBHAM SAHU   |
|                                  |              |  |             |                  | IRFAN RIZVI, DHANANJAY CHATURVEDI, SAAKSHI PRADHAN   |

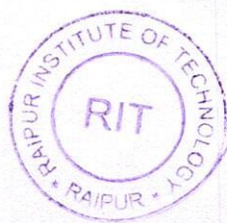


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CHHATAUNA, MANDIRHASAUD, RAIPUR (C.G.)



| 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 |
|---------------------------------------|--------------|--|-------------|------------------|--|
| M.Tech Environmental Engineering      | 30           | Principals of Environmental Engg   | 530111 (19) | 2016-17          | PRASAD M BHANDARI, RAHUL SHARMA, ADHIRHREE TIWARI, PRIYANKA SHARMA, SUGANDHA GUPTA, SACHIN TIWARI      |
| M.Tech Environmental Engineering      | 30           | Air Pollution Control  | 530112 (19) | 2016-17          | HARSH SAHU, PRIYANKA SHARMA  |
| M.Tech Environmental Engineering      | 30           | Energy & Environment   | 530131 (19) | 2016-17          | MONESH SAHU, SHUBHAVAGHMAREY   |
| M.Tech Computer Science & Engineering | 22           | Data Warehousing & Data Mining   | 522311 (22) | 2016-17          | Archana Mishra   |
| M.Tech Computer Science & Engineering | 22           | Digital Image Processing (Prerequisite Digital Signal Processing)                                | 522235 (22) | 2016-17          | Rakhi Choudhary  |
| M.Tech Computer Science & Engineering | 22           | Cryptography & Network Security  | 522232 (22) | 2016-17          | Namrata Jain   |
| M.Tech Computer Science & Engineering | 22           | Neural Network   | 522231 (22) | 2016-17          | Swati Mishra   |
| M.Tech Computer Science & Engineering | 22           | Software Engineering Techniques  | 522213 (22) | 2016-17          | Dilip Kumar Nayak, Shrishti Pardhi   |
| M.E.Power Electronics                 | 5062         | Power Electronics Drives   | 562212(24)  | 2016-17          | Ms. Srishti Sharma   |
| M.E.Power Electronics                 | 5062         | Microcontroller & Embedded System Design   | 562113(24)  | 2016-17          | Ms Purnasri Dewangan   |
| M.E.Power Electronics                 | 5062         | Power Converters   | 562111(24)  | 2016-17          | Mr Satish Tripathi   |
| M.E.Power Electronics                 | 5062         | Microcontroller & Embedded System Design   | 562113(24)  | 2016-17          | Mr. Saurabh Kumar Sahu   |
| M.E.Power Electronics                 | 5062         | Power Converters   | 562111(24)  | 2016-17          | Ms. Yogita Dubey   |
| M.E.Power Electronics                 | 5062         | Microcontroller & Embedded System Design   | 562113(24)  | 2016-17          | Mr. J. Sai Kumar   |
| M.E.Power Electronics                 | 5062         | Microcontroller & Embedded System Design   | 562113(24)  | 2016-17          | Mr. Ishwar Singh Chandra   |
| M.E.Power Electronics                 | 5062         | Power Converters   | 562111(24)  | 2016-17          | Ms. Chanchal Vemra   |
| M.E.Power Electronics                 | 5062         | Industrial Control Electronics   | 562112(24)  | 2016-17          | Ms. Divya Patel  |
| M.Tech .Thermal Engineering           | 64           | Advance Fluid Mechanics  | 564113 (37) | 2016-17          | DEVNARAYAN DEWANGAB, ABHISHEK SAHU, POSHAN KUMAR SAHU, K. APRNA SRIJANA                                |
| M Tech .Thermal Engineering           | 64           | Micro & Nano Scale Thermal Engineering   | 564334 (37) | 2016-17          | SHREE DEWANGAN, GIRISH KUMAR SAHU, NITISH PRATAP SINGH SENGAR, DEEPALI MESHRAM, HARISH KUMAR PATEL     |
| M Tech .Thermal Engineering           | 64           | Experimental Methods in Thermal Engineering  | 564212 (37) | 2016-17          | ABHINAV SAHAI  |
| M Tech .Thermal Engineering           | 64           | Experimental Methods in Thermal Engineering  | 564212 (37) | 2016-17          | KAMLESH DEWAGAN, ANRENDRA KUMAR SINHA  |
| M Tech .Thermal Engineering           | 64           | Computational Fluid Dynamics & Heat Transfer   | 564311 (37) | 2016-17          | Ruman Singh  |
| M.Tech .Thermal Engineering           | 64           | Energy Management  | 564213 (37) | 2016-17          | YESH JAIN  |
| M.Tech .Thermal Engineering           | 64           | Numerical Methods in Thermal Engineering   | 564111 (37) | 2016-17          | DHARMENDRA YADAV   |
| M.Tech .Thermal Engineering           | 64           | Advanced Heat Transfer   | 564114 (37) | 2016-17          | DEEPAK KUMAR GUPTA   |
| M.E.Energy Management                 | 83           | Advanced Thermodynamics  | 564112 (37) | 2016-17          | RAMESH KUMAR PATEL   |
| Master of Business Administration     | 76           | International Financial Management (New)   | 576442(76)  | 2016-17          | KARANVEER SINGH  |

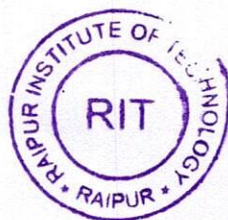


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| Program name                      | Program code | Name of the Course that include experiential learning through project work/field work/internship | Course code | Year of offering | Name of the student studied course on experiential learning through project work/field work/internship  |
|-----------------------------------|--------------|--|-------------|------------------|---|
| Master of Business Administration | 76           | Emerging Issues in HR Management (New)   | 576455(76)  | 2016-17          | NEHA VERMA, ABHISHEKH BANJARE, ANKI GAUTAM, DEEPAK KUMAR BERMAN, JASVINDER SINGH DUHA, LAV KUMAR KURRE, LAVINA M.A, MONIKA SAHU, PALLAVI TIWARI, RAHUL KUMAR YADAV, DISHA CHANDRAKAR, |
| Master of Business Administration | 76           | Supply Chain Management (New)  | 576471(76)  | 2016-17          | UMESH KU.VERMA  |
| Master of Business Administration | 76           | Product and Brand Management (New)   | 576431(76)  | 2016-17          | JYOTI MALHOTRA, MANEE PANNA   |



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

Name of programs: **Bachelors of Engineering**  
Branch: **Biotechnology**  
Subject: **Industrial Biotechnology**  
Total Theory Periods: **30**  
Class test: **Two (Minimum)**  
ESE Duration: Three Hours

Semester: **VIII**  
Code: **318831(18)**  
Total Tut Periods: **10**  
Assignments: **Two (Minimum)**  
**Maximum Marks: 80 Minimum Marks: 28**

### Course Objectives:

1. To impart the knowledge about the practical aspect of the course in different fields towards the welfare of the society.
2. To make the students understand about the importance of application of biotechnology in industry.

- UNIT I** Definition and introduction of industrial biotech; Basics of different field of biotech: genetic engineering, fermentation, plant tissue culture, animal biotechnology, environment, etc; Introduction of bioprocess and fermentation technology: primary and secondary metabolite- principles and methods.
- UNIT II** Raw material: availability, quality, processing; Role of microbes regulation of microbial catabolic and anabolic processes, induction nutritional repression, carbon catabolite repression, feedback inhibition, feedback repression.
- UNIT III** Principles and characteristics of bioprocess, Cell disruption for product release, mechanical and enzymatic and chemical methods, Pretreatment and stabilization of byproducts.
- UNIT IV** Adsorption, Solid liquid separation, Aqueous two phase extraction, Membrane separation, Filtration, reverse osmosis, Dialysis, Precipitation of protein by different methods.
- UNIT V** Industrial waste recycling, bio-waste management, standard norms of disposal of industrial waste: drying, crystallization in final product formulation, Industrial product packaging, transport and marketing

### Books:

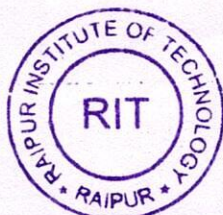
1. Biotechnology, (2006) Satyanarayana, U., Books and Allied (P) Ltd.
2. Microbiology, (2000) M. J. Pelczar and E.C.S. (Jr) Chan, Tata McGrawHill, Pub.Co.New"Delhi, 5<sup>th</sup> ed, 1986, digitized on july-2008.

### Reference Books:

1. Principles of Fermentation Technology, Peter F Stanbury.
2. Bioprocess Engineering, (1992) Shuler and Kargi, Prentice Hall.
3. Biochemical Engineering, Harvey W Blanch.
4. Biochemical Engineering, Aiba & Humphrey.
5. Fundamentals of Biochemical Engineering, Bailey & Ollis.
6. Biochemical Engineering, James Lee.

### Course Outcome:

1. The course will help the students to basic knowledge of applying the bioprocess principles in industry such as biofertilizers, etc.
2. This will also enlighten them with various therapeutic interventions and innovative ideas towards industrial research in many fields like medicine, food processing, environment etc.



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CHHATAUNA, MANDIRHASAUD, RAIPUR (C.G.)



**Insilco study of gene responsible for causing pain in  
some selected species**

A minor project report submitted to  
**Chhattisgarh Swami Vivekanand Technical University**  
**Bhilai (India)**

for partial fulfillment of the award of degree

**BACHLOR OF ENGENIREENG**

In

**Biotechnology**

By

**Raghav Sandeep Soni**

Enrollment No.:AO0180

**Shanoo Damahe**

Enrollment No.:AN1746

**Shivangi Raul**

Enrollment No.:AN1751

**Ajitesh Lall**

Enrollment No.:AN1689

**Under the Guidance**

of

**Dr. Prashant Shukla**



**DEPARTMENT OF BIOTECHNOLOGY**  
**RAIPUR INSTITUTE OF TECHNOLOGY, RAIPUR**  
Chhatauna, Mandir Hasaud, Raipur (CG) India - 492101  
Phone - 91- 0771 - 3250790, 3208842, Fax - 91-0771-253763  
E-mail - [contactus@rit.edu.in](mailto:contactus@rit.edu.in), Website - [www.rit.edu.in](http://www.rit.edu.in)

**Session: 2016-2017**



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## CERTIFICATE OF THE SUPERVISOR

This is to certify that the work incorporated in the project **Insilco study of gene responsible for causing pain in some selected species** is a record of research work carried out Raghav Soni, Shanoo Damahe, Shivangi Raul, Ajitesh Lall bearing Enrollment No.: AO0180, AN1746, AN1751, AN1689 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.), India.

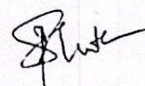
To the best of my knowledge and belief the project

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

ii) Has duly been completed,

iii) Fulfils the requirement of the Ordinance relating to the B.E degree of the University and

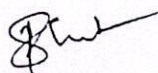
iv) Is up to the desired standard both in respect of contents and language for being referred to the examiners.



(Signature of the Guide)

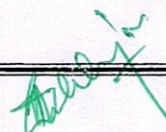
Dr. Prashant Shukla

Forwarded to Chhattisgarh Swami Vivekanand Technical University  
Bhilai



(Signature of the Head of the Department with seal)

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



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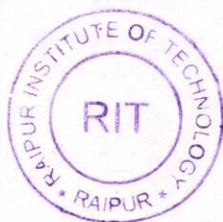


## ABSTRACT

The current work was done on one of the known gene responsible for causing pain (prdm12) using DNA, RNA and protein sequences available in bioinformatics database of various species. Pain affects every organism and can be acute or chronic. Pain is seen mostly as irritant but it has very important and beneficial evolutionary and biological function as it makes sense to the body of damage or danger.

We selected 10 species for homologous prdm 12 gene taking *homo sapiens* as standard source for prdm 12 gene and analyzed them using bioinformatics tools and servers for gene, mRNA, protein and phylogenetic analysis.

Seen that *homo sapiens* and *Pan paniscus* are close by gene analysis but their protein sequence analysis put them far apart. Likewise there is variation in protein of every species as shown by TMHMM analysis also by tertiary structure of each protein. There is also difference in exon and intron position in each species along with their numbers.



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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 (Psychrometric 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. 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.



*[Signature]*  
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**RAIPUR INSTITUTE OF TECHNOLOGY**  
C-1, Jyoti, Mandikhasud, Raipur (C.G.)



**“EXPERIMENTAL ANALYSIS OF  
MASS TRANSFER IN THREE PHASE FLUIDIZATION”**

A Major project Report Submitted To  
**Chhattisgarh Swami Vivekananda Technical University**  
**Bhilai (India)**



For fulfillment of the award of degree

**BACHELOR OF ENGINEERING**

in

**CHEMICAL ENGINEERING**

Under the Guidance of

**Mrs. Vaishali Pendse**

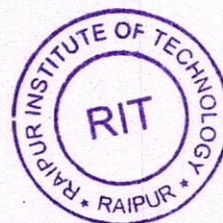
Submitted by

**Dhanshree Mone (AN1658)**

**Nisha Toppo (AN1673)**

**Suchit Kumar Vishwakarma (AN1677)**

**Hasan Sardar (AN1684)**



**DEPARTMENT OF CHEMICAL ENGINEERING**

**RAIPUR INSTITUTE OF TECHNOLOGY**

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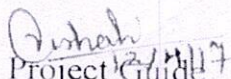
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CHHATAUNA, MANDIRHASAUD, RAIPUR (C.G.)

**APRIL-MAY 2017**



## CERTIFICATE

This is to certify that the work in this major project entitled "**EXPERIMENTAL ANALYSIS OF MASS TRANSFER IN THREE- PHASE FLUIDIZATION**" submitted by Ms. Dhanshree Mone, Ms. Nisha Toppo, Mr. Suchit Kumar Vishwakarma and Mr. Hasan Sardar in partial fulfillment of the requirements of the prescribed curriculum for Bachelor of Engineering in Chemical Engineering , Session 2013-17 in the Department of Chemical Engineering, Raipur Institute of Technology, 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 is their bonafide work.

  
Project Guide

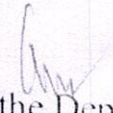
**Mrs. Vaishali Pendse**

Asst. Professor

Department of Chemical Engineering  
Raipur Institute of Technology, Raipur

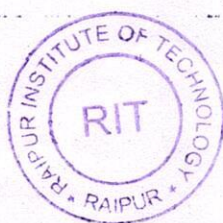
(C.G)

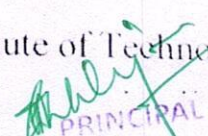
This major project work as mentioned above is being recommended and forwarded for examination and evaluation.

  
Head of the Department

**Mr. Amit Khare**

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

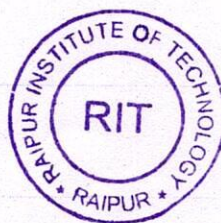


  
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CHHATAUNA, MANDIRHASAUD, RAIPUR (C.G.)



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 CHHATAUNA, MANDIRHASAUD, RAIPUR (C.G.)



## ABSTRACT

Fluidization is a process similar to liquefaction whereby a granular material is converted from a static solid-like state to a dynamic fluid-like state. This process occurs when liquid and gas are passed up through the granular material. Fluidization is mainly of two types i.e. Particulate fluidization and aggregative fluidization. Mass transfer finds extensive application in chemical engineering problems. It is used in reaction engineering, separations engineering, heat transfer engineering, and many other sub-disciplines of chemical engineering. Three phase fluidization and mass transfer is a subject of interest and research in the recent times. Three phase fluidization is used for studying the mass transfer by varying various parameters like water flow rate, air flow rate, particle size of solid material; we can calculate and analyze variations in mass transfer. From the experiment it can be concluded that the concentration and hence the rate of mass transfer increases with increase in gas and liquid flow rates. Also the bed height increases with increase in liquid and gas flow rates. Since the mass transfer increases, three phase fluidization process is an effective process for mass transfer in Chemical Engineering.



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# Chhattisgarh Swami Vivekanand Technical University, Bhilai

|                       |                         |                         |               |
|-----------------------|-------------------------|-------------------------|---------------|
| Name of program:      | Bachelor of Engineering | Semester:               | IV            |
| Branch:               | Chemical Engineering    | Code:                   | 319455(19)    |
| Subject:              | Fuel Technology         |                         |               |
| 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 tar Fuels, 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:

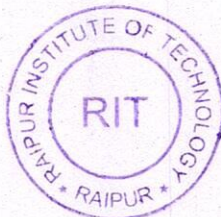
1. Sarkar Samir, Fuels & Combustion, Orient Longman Limited 2<sup>nd</sup> Edition.
2. Brame & King, Fuels, Solid, Liquid and Gases, London, E. Arnold [1961, ©1955] 4th Edition.

## 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.



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



**“Energetics of Coal Substitution by Rice Husk Briquettes”**

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

**Mr. Jitendra Verma**

Submitted by

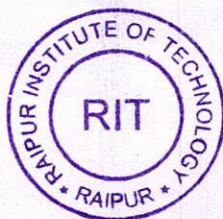
**ALKA TANDON (ENROLL NO AN1653)**

**CHETAN SHRIWAS (ENROLL NO AN1657)**

**J. DURGAVATI (ENROLL NO AN1661)**



**DEPARTMENT OF CHEMICAL ENGINEERING  
RAIPUR INSTITUTE OF TECHNOLOGY  
APRIL – MAY 2017**



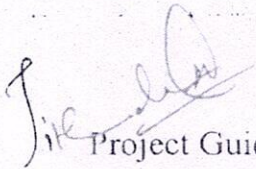
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**RAIPUR INSTITUTE OF TECHNOLOGY  
CHHATAUNA, MANDIRHASAUD, RAIPUR (C.G.)**



## CERTIFICATE

This is to certify that the work in this major project entitled "**Energetics of Coal Substitution by Rice Husk Briquettes**" submitted by Ms. Alka Tondan, Mr. Chetan Shriwas and Ms. J. Durgavati in partial fulfillment of the requirements of the prescribed curriculum for Bachelor of Engineering in Chemical Engineering, Session 2017 in the Department of Chemical Engineering, Raipur Institute of Technology, 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 is their bonafide work.

  
Project Guide

**Mr. Jitendra Verma**


Lecturer

Dept. of Chemical Engineering

Raipur Institute of Technology,

Raipur (C.G)

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

  
Head of the Department

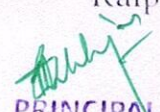
**Mr. Amit Khare**

Dept. of Chemical Engineering

Raipur Institute of Technology,

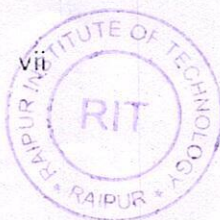
Raipur (C.G)



  
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CHHAIAUNA, MANDIRHASAUD, RAIPUR (C.G.)



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## ABSTRACT

Rice husk which is a large portion of biomass produced in the rice growing regions has been lying waste at the rice mills in most part of the country. It was investigated as a source of solid fuel. Two sets of solid fuel, two sets of solid fuel Briquettes were produced from rice husk using starch and gum Arabic as binder. The briquetting was carried out manually using a dead weight. Good and strong briquettes are produced. Water boiling tests were carried out which showed that 1kg of rice husk – gum Arabic briquettes and rice husk - starch briquette took 15 minutes respectively to boil 2 liters of water. Flame test also showed a pale yellow throughout and pale yellow to pale blue for rice husk – gum Arabic and rice husk - starch briquettes respectively. These indicate the advantage of briquette in terms of ease of handling and transportation.

  
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# 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:

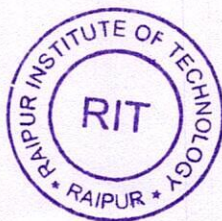
- 1 Bhatt B.I. and Vora S.M., Stoichiometry, McGraw Hill Publications, 4th Edition.
- 2 Hougen and Watson, Chemical Process Principles (Part – I Material and Energy Balance), CBC Publishers, 2nd Edition

## Reference Books:

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



*[Signature]*  
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**"PROCESS DEVELOPMENT FOR GLYCEROL PURIFICATION, AS  
BY PRODUCT OF BIODIESEL PLANT, RITEE RAIPUR"**

A Major Project Report Submitted To



**Chhattisgarh Swami Vivekanand Technical University**

**Bhilai (India)**

For partial fulfillment of the award of degree

**BACHELOR OF ENGINEERING**

**In**

**CHEMICAL ENGINEERING**

Under the guidance of

**Mr. Mukesh Thite**

**(Assistant Professor)**

Department of Chemical Engineering

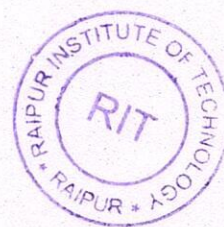
**Submitted By**

**Hemant Vaidhya (ENROLL NO-AN1660)**

**Mamta Gwala (ENROLL NO-AN1668)**

**Rahul Sahu (ENROLL NO-AN1674)**

**Tikeshwar Sahu (ENROLL NO-AN1678)**



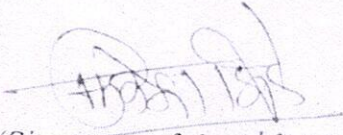
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RAIPUR INSTITUTE OF TECHNOLOGY  
CHHATAUNA, MANDIRHASAUD, RAIPUR (C.G.)

April-May 2017



## CERTIFICATE

This is to certify that the report of the project submitted by is an outcome of the project work entitled "**Process Development For Glycerol Purification, As By Product Of Biodiesel Plant, RITEE, Raipur**" carried out under my guidance and supervision for the partial fulfillment of the award of Degree in Bachelor of Engineering in Chemical Engineering of Chhattisgarh Swami Vivekananda Technical University, Bhilai (C.G.), India. To the best of my knowledge the report embodies the work of candidate him/herself, has duly been completed, fulfills the requirement of the ordinance relating to the BE Degree of the university and is up to the desire standard for the purpose of which is submitted.

  
(Signature of the Guide)

Mr. Mukesh Thite

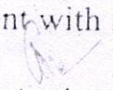
Assistant Professor

Department of Chemical Engineering

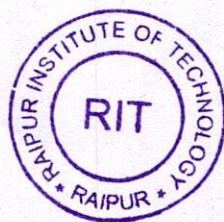
Raipur Institute of Technology

The Major Project work as mentioned above is being recommended and forwarded for examination and evaluation.

(Signature of the Head of the Department with seal)

  
Mr. Amit Khare  
Dept. of Chemical Engg.  
R.I.T., Raipur  
Department of Chemical Engineering

Raipur Institute of Technology

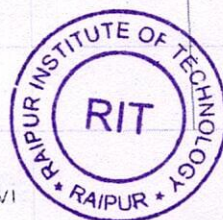


  
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PRINCIPAL



# Chhattisgarh Swami Vivekanand Technical University, Bhilai

|                       |                                     |                         |               |
|-----------------------|-------------------------------------|-------------------------|---------------|
| Name of program:      | Bachelor of Engineering             | Semester:               | IV            |
| Branch:               | Chemical Engineering                | Code:                   | 319452(19)    |
| Subject:              | Environmental Pollution and Control |                         |               |
| 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, 1<sup>st</sup> Edition.

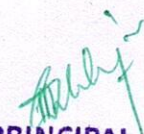
## Reference books:

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 EMc, Haldan F.R., Air Pollution Handbook, Tata McGraw Hill.

## Course outcomes:

- 1 After studying the students are able to treat industrial 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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RAIPUR INSTITUTE OF TECHNOLOGY  
CHHATAUNA, MANDIRHASAUD, RAIPUR (C.G.)



# DESIGN OF REVERSE OSMOSIS (RO) SYSTEM FOR RITEE RAIPUR

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

**Prof. Amit khare**

Submitted by

**Rajan kumar Singh (AD4539)**

**Chandramani Yadav (AO0260)**

**Rinki Kumari (AO1260)**

**Lokendra kumar Jain (AN1664)**



**DEPARTMENT OF CHEMICAL ENGINEERING**

**RAIPUR INSTITUTE OF TECHNOLOGY**

**APR-MAY 2017**




**PRINCIPAL**

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



## CERTIFICATE

This is to certify that the work in this major project entitled "**DESIGN OF REVERSE OSMOSIS (RO) SYSTEM FOR RITEE RAIPUR**" submitted by Mr. Rajan Singh, Mr. Chandramani Yadav, Ms. Rinki Kumari and Mr. Lokendra Kumar Jain in partial fulfillment of the requirements of the prescribed curriculum for Bachelor of Engineering in Chemical Engineering, Session 2013-17 in the Department of Chemical Engineering, Raipur Institute of Technology, 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 is their bonafide work.

  
Project Guide

**Mr. Amit Khare**


H.O.D.

Department of Chemical Engineering

Raipur Institute of Technology, Raipur

(C.G)

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

  
Head of the Department

**Mr. Amit Khare**

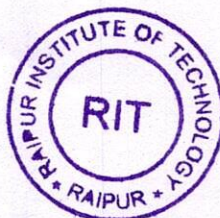
Department of Chemical Engineering

Raipur Institute of Technology, Raipur

(C.G)

  
PRINCIPAL

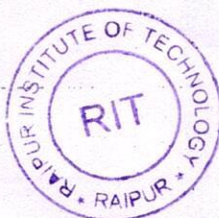
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CHHATAUNA, MANDIRHASAUD, RAIPUR (C.G.)





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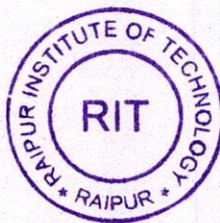


## ABSTRACT

In recent years, the increasing threat to groundwater quality due to human activities has become a matter of great concern. The groundwater quality problems present today are caused by contamination and by overexploitation, or by combination of both, which are faced by many Indian states. Today (RO) membranes are the leading technology for desalination and purification of groundwater because of their strong separation capabilities and exhibiting a great potential for treatment of waters worldwide. Reverse osmosis (RO) is a water purification technology that uses a semi permeable membrane to remove ions, molecules, and larger particles from water. In reverse osmosis, a semi permeable membrane is used which allows the passage of water molecules but not the majority of dissolved salts, organics, bacteria and pyrogens. Reverse Osmosis (RO) is a membrane based process technology to purify water by separating the dissolved solids from feed stream resulting in permeate and reject stream for a wide range of applications in domestic as well as industrial applications. In this project we study the detail process of purification of water through Reverse osmosis, with that we design a commercial reverse osmosis plant which will be used to purify drinking water for 1500 people per day for an educational institution.

This will basically consist of four parts.

1. Designing of RO plant
2. Selection of Membrane



  
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**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 Euclidean algorithm, Finite Fields of the Form  $GF(p)$ , Polynomial Arithmetic, Finite Fields of the Form  $GF(2^n)$ . **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

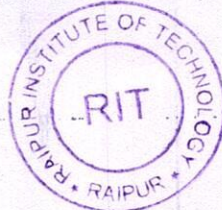
- Conventional encryption algorithms for confidentiality and their design principles
- Public key encryption algorithms and their design principles
- Use of message-authentication codes, hash functions, digital signature and public key certificates
- Network security tools and applications
- System-level 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, 4<sup>th</sup> 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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# **“ HACKERS WAY”**

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

Omkar sahu

Saurav Raj

N. Ganpati

Under the Guidance of  
**Dr. Sanjvani Shantiya**  
Asst. Profesor, Department of CSE  
RITEE, Raipur(C.G.)



DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING  
RAIPUR INSTITUTE OF TECHNOLOGY, RAIPUR

Chhataunna, Mandir Hassaud, Raipur, Chhattisgarh

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Department of Computer Science and Engineering

Raipur Institute of Technology

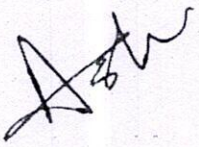


Chhatauna, Mandir Hasaud, Raipur (C.G.)

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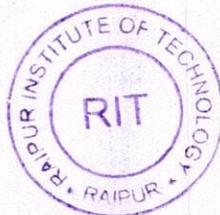
The project entitled "HACKRS WAY" Submitted by Onkar Sahu Enrollment No.: AN0977, Saurav Raj Enrollment No.: AN1062, N. Ganpati Enrollment no.: AN096 has been examined by the undersigned as a part of the examination and hereby recommended for the award of the degree of Bachelor of technology in Computer Science & Engineering Chhattisgarh Swami Vivekananda Technincal University Bhilai,(C.G.)



Internal Examiner



External Examiner

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



## ABSTRACT

The Hacker Way is an approach to building that involves continuous improvement and iteration. Hackers believe that something can always be better, and that nothing is ever complete. They just have to go fix it often in the face of people who say it's impossible or are content with the status quo.



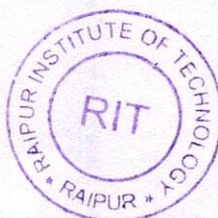
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# Chhattisgarh Swami Vivekanand Technical University, Bhilai

|                                     |                                |                                     |              |
|-------------------------------------|--------------------------------|-------------------------------------|--------------|
| Branch:                             | Computer Science & Engineering | Semester:                           | V            |
| Subject:                            | Data Base Management System    | Code:                               | 322556 (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 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.

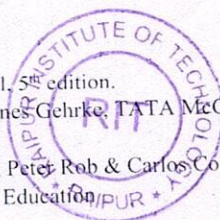
- UNIT I** Data base System Applications, data base System VS file System – View of Data – Data Abstraction – Instances and Schemas – data Models – the ER Model – Relational Model – Other Models – Database Languages – DDL – DML – database Access for applications Programs – data base Users and Administrator – 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.
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- 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  
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- 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:

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

## REFERENCES:

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



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CHHATAUNA, MANDIRHASAUD, RAIPUR (C.G.)

Name of the Programme: Bachelor of Engineering ..... Duration of the Programme: Four years



# **“ HACKERS WAY”**

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

Bhawani Verma

pawan singh

Sahil Gupta

Under the Guidance of

**Mr. R. N. Giri**

Asst. Profesor, Department of CSE

RITEE, Raipur(C.G.)



DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

RAIPUR INSTIUTE OF TECHNOLOGY, RAIPUR

Chhataunna, Mandir Hassaud, Raipur, Chhattisgarh

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Department of Computer Science and Engineering

Raipur Institute of Technology

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

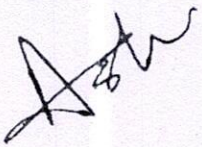
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## CERTIFICATE BY THE EXAMINERS

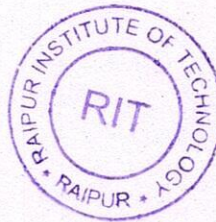
The project entitled "SECOND CHOICE" Submitted by Bhawani Verma Enrollment No.: AN1040 , Pawan Singh Enrollment no.: AN1044 , Sahil Gupta Enrollment no.: AN1070 has been examined by the undersigned as a part of the examination and is hereby recommended for the award of the degree of Bachelor of technology in Computer Science & Engineering of Chhattisgarh Swami Vivekananda Technincal University Bhilai,(C.G.)



Internal Examiner



External Examiner



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## ABSTRACT

Three project management approaches—traditional, agile, and hybrid—were considered in this study. Results from an international study, including 477 cross-industry projects, indicated that 52% of projects could be categorized as hybrid approaches. A regression analysis using multiple outcome measures indicated substantial explanatory power ( $0.21 < R^2 < 0.41$ ). Analysis suggested that hybrid and agile approaches significantly increase stakeholder success over traditional approaches while achieving the same budget, time, scope, and quality outcomes. Hybrid approaches were found to be similar in effectiveness to fully agile approaches. Results validate decisions by practitioners to combine agile and traditional practices and suggest that hybrid is a leading project management approach.



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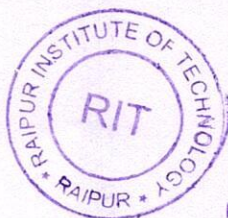
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**CHHATAUNA, MANDIRHASAUD, RAIPUR (C.G.)**



# Chhattisgarh Swami Vivekanand Technical University, Bhilai

Branch: Computer Science & Engineering Semester: V  
Subject: Data Base Management System Code: 322556 (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 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 RDBMS 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.
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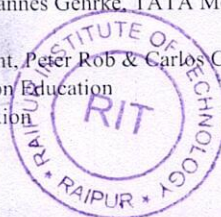
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CHHATAUNA, MANDIRHASAUD, RAIPUR (C.G.)

Name of the Programme: Bachelor of Engineering ::::: Duration of the Programme: Four years



# **“ CITY COMPLAINT PORTAL ”**

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

Govind Kumar Sharma

Himanshu Sharma

Ravi Shankar dubey

Under the Guidance of

**Mr. Yogesh rathore**

Asst. Profesor, Department of CSE

RITEE, Raipur(C.G.)



DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

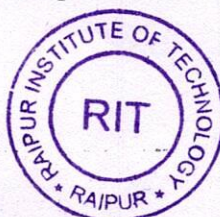
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Chhataunna, Mandir Hassaud, Raipur, Chhattisgarh

Phone:0771-3208842,3250790 Fax: 0771-2537634

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Department of Computer Science and Engineering



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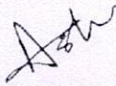


**Raipur Institute of Technology**  
**Chhatauna, Mandir Hasaud, Raipur (C.G.)**

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**CERTIFICATE BY THE EXAMINERS**

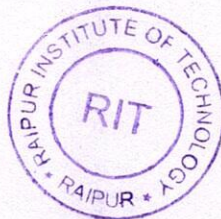
The project entitled "City complaint portal" Submitted by GOVIND KUMAR SHARMA, Enrollment No.: AN0928, HIMANSHU SHARMA, Enrollment no.: AN0931, RAVI SHANKAR DUBEY, Enrollment no.: AN1000, has been examined by the undersigned as a part of the examination and is hereby recommended for the award of the degree of Bachelor of technology in Computer Science & Engineering of Chhattisgarh Swami Vivekananda Technincal University Bhilai,(C.G.)



-----  
Internal Examiner



-----  
External Examiner



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CHHATAUNA, MANDIRHASAUD, RAIPUR (C.G.)



### ABSTRACT

entralised Public Grievance Redress and Monitoring System (CPGRAMS) is an online platform available to the citizens 24x7 to lodge their grievances to the public authorities on any subject related to service delivery. It is a single portal connected to all the Ministries/Departments of Government of India and States. Every Ministry and States have role-based access to this system. CPGRAMS is also accessible to the citizens through standalone mobile application downloadable through Google Play store and mobile application integrated with UMANG.

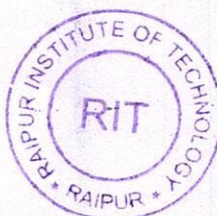


  
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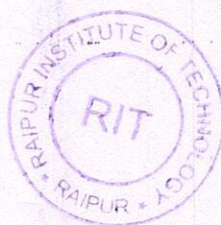


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# Chhattisgarh Swami Vivekanand Technical University, Bhilai

Branch: **Computer Science & Engineering** Semester: **V**  
Subject: **Data Base Management System** Code: **322556 (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 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 RDBMS 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.

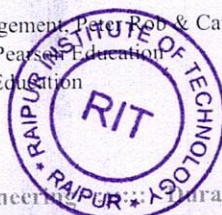
- UNIT I** Data base System Applications, data base System VS file System – View of Data – Data Abstraction – Instances and Schemas – data Models – the ER Model – Relational Model – Other Models – Database Languages – DDL – DML – database Access for applications Programs – data base Users and Administrator – 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, 5<sup>th</sup> 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



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CHHATAUNA, MANDIRHASAUD, RAIPUR (C.G.)

Name of the Programme: Bachelor of Engineering Duration of the Programme: Four years



# **“ CHATTISHGARH INFO”**

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

ANKIT EKKA

NANDANI SINHA

ARUN YADAV

TRIPTI NIGAM

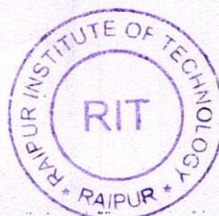
NILESH SAHU

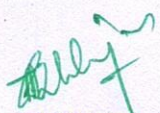
Under the Guidance of  
Mr. Prabhakar Sharma

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



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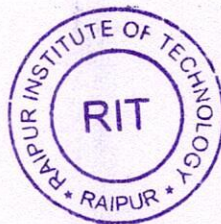
Chhatauna, MandirHasaud, Raipur (C.G.)

### CERTIFICATE BY THE EXAMINERS

The project entitled "Chattishgarh Info" Submitted by ANKIT KUMAR EKKAE Enrollment No.: AL7440, NANDANI SINHA, Enrollment no.: AL7634, Arun Yadav Enrollment no.: AN0917, TRIPTI NIGAM Enrollment No: AL1009, NILESH SAHU Enrollment No: AL0932 has been examined by the undersigned as a part of the examination and is hereby recommended for the award of the degree of Bachelor of technology in Computer Science & Engineering of Chhattisgarh Swami Vivekananda Technincal University Bhilai, (C.G.).

Internal Examiner

External Examiner



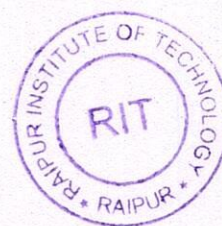
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## ABSTRACT

Chhattisgarh state is situated in the central part of India and is also known as the 'Bowl of rice'. Paddy is the principal crop of this state, and rice is the staple diet of the people. The state largely maintains its ethnic food culture as most of its population continues to live within rural and tribal areas. The state has nearly 44% of forest cover which serves as a decent source of food. People here prefer a vegetarian diet, and over 70 varieties of leaves, 25 varieties of tubers and roots are used here as vegetables. The present article is an attempt to explore the ethnic food culture of Chhattisgarh and to provide information about rice and non-rice-based traditional recipes, sweet dishes, leafy vegetables, tubers and roots which are consumed here.



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

**Semester: VII**

**Subject: Digital Image Processing**

**Total Theory Periods: 50**

**Total Marks in End Semester Exam: 80**

**Branch: Computer Science & Engg.**

**Code: 322740(22)**

**Total Tutorial Periods: NIL**

**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, Dilation & 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

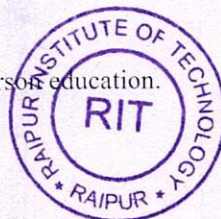
- Describe, analyze and reason about how digital images are represented, manipulated, encoded and processed, with emphasis on algorithm design, implementation and performance evaluation.
- Apply principles and techniques of digital image processing in applications related to digital imaging system design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

**Name of Text Books:-**

1. Gonzalez 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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# **“IMAGE STAGNOGRAPHY”**

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

ARTI KASHYAP

DEEPSIKHA GUPTA

Under the Guidance of  
**Mr. PRABHAKAR SHARMA**

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



DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

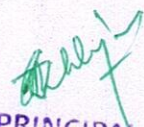
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Phone:0771-3208842,3250790 Fax: 0771-2537634

Email:Contactus@rit.edu.in, Website-www.rit.edu.in



  
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Department of Computer Science and Engineering

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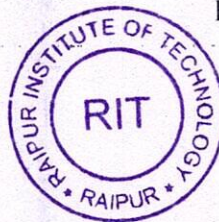
Chhatauna, MandirHasaud, Raipur (C.G.)

### CERTIFICATE BY THE EXAMINERS

The project entitled "IMAGE STAGNOGRAPHY" Submitted by ArtiKashyap, Enrollment No.: AN0915, Deepshil Gupta, Enrollment no.: AN1030, has been examined by the undersigned as a part of the examination and is recommended for the award of the degree of Bachelor of technology in Computer Science & Engineering of Chhattisgarh Vivekananda Technincal University Bhilai, (C.G.).

Internal Examiner

External Examiner

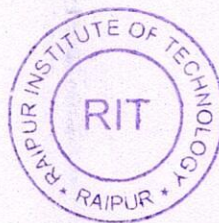


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## ABSTRACT

Steganography is a form of security technique through obscurity, the science and art of hiding the existence of a message between sender and intended recipient. Steganography has been used to hide secret messages in various types of files, including digital images, audio and video.



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# **“COMPUTER ASSISTANT SYSTEM PROVIDING EFFICIENT RESOURCES”**

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

MOHIT BARAI

NIVISH TIWARI

TILAK DEWANGAN

**Under the Guidance of  
Mr. Abhishekkumar Saw**

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



DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

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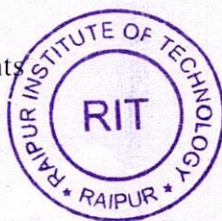
*Abhishek Kumar Saw*  
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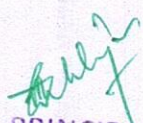
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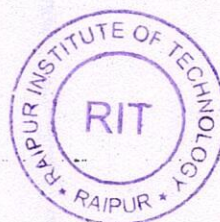
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**PRINCIPAL**

**RAIPUR INSTITUTE OF TECHNOLOGY**  
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**CHHATTISGARH SWAMI VIVEKANAD TECHNICAL UNIVERSITY  
BHILAI (C.G.)**

**Semester: VIII**

**Subject: Parallel processor and computing**

**Total Theory Periods: 40**

**Total Marks in End Semester Exam: 80**

**Branch: Computer Science & Engg.**

**Code: 322732(22)**

**Total Tutorial Periods: 12**

**Minimum number of CTs to be conducted: 02**

**Course Objective**

- To develop structural intuition of how the hardware and the software work, starting from simple systems to complex shared resource architectures.
- Get a broad understanding of parallel computer architecture and different models for parallel computing
- To understand concepts related to memory consistency models, cache coherence, interconnection networks, and latency tolerating techniques.
- To know about current practical implementations of parallel architectures.
- To learn how to design parallel programs and how to evaluate their execution

**UNIT-I: Introduction & Technique of Parallelism:** Trends towards parallel computing, parallelism in Uni-processor systems, Architectural classification schemes, Amdahl's law, Moore's law, Principles of Scalable Performance, Parallel Processing in Memory, Parallel Algorithms, Parallel Algorithm Complexity, Models of Parallel Processing, Cache coherence, Cache coherence Protocols.

**UNIT-II: Pipeline & Vector Processing:** Conditions of Parallelism: Data & Resource dependencies, Program flow mechanisms: Control-flow .vs. Data flow computers Principle of pipelining and vector processing: principles of linear pipelining, classification of pipeline processors. General pipelines and reservation tables. Instruction and arithmetic pipelines, vector processing, architecture of Cray -1, Pipeline hazards, VLIW computers, Array Processing.

**UNIT-III : Parallel Models & Mesh-Based Architectures:** PRAM and Basic Algorithms, Data Broadcasting, Parallel Prefix Computation, Shared- Memory Algorithms, Parallel Selection Algorithm, Sorting and Selection Networks, Selection Networks, Circuit-Level Examples, Tree-Structured Dictionary Machine, Parallel Prefix Networks, Sorting on a 2D Mesh or Torus, Routing on a 2D Mesh or Torus, Types of Data Routing Operations, Greedy Routing Algorithms, Wormhole Routing, Numeric al 2 D Mesh Algorithms, Other Mesh-Related Architectures, Meshes of Trees, Low-Diameter Architectures, Hyper-cubes and Their Algorithms, Sorting and Routing on Hypercubes, Bitonic Sorting on a Hypercube, Dimension-Order Routing, Broadcasting on a Hypercube, Other Hypercubic architectures, Butterfly and Permutation Networks, Plus-or-Minus-2'Network, The Cube-Connected Cycles Network , Shuffle and Shuffle-Exchange Networks, A Sampler of Other Networks, Star and Pancake Networks, Ring-Based Networks.

**UNIT-IV: Multiprocessor architecture and Programming:** Emulation and Scheduling, Emulations among Architectures, Distributed Shared Memory, Data Storage, Input, and Output, Multithreading and Latency Hiding, Parallel I/O Technology, Defect-Level Methods, Fault-Level Methods, Error-Level Methods, Parallel Programming Parallel Operating Systems, Parallel File Systems.

**UNIT-V: Parallel System Implementations:** Shared-Memory MIMD Machines, Variations in Shared Memory, MIN-Based BBN Butterfly, Vector-Parallel Cray Y-MP, CC-NUMA Stanford DASH, Message-Passing MIMD Machines, Data-Parallel SIMD Machines, Processor and Memory Technologies.

**Outcomes:** On completion of this subject the student is expected to:

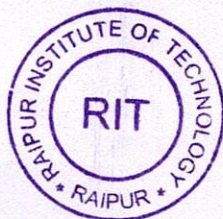
- Have an understanding of parallel algorithms, analysis and architectures.
- Be able to reason about ways to parallelize a problem
- Design and analyze the algorithms that execute efficiently on parallel computers


**Name of Text Books:-**

1. Computer Architecture & Parallel processing - Kai Hwang 7 Briggs.(MGH).
2. Parallel Computers: Arch.& Prog., Rajaraman & Siva Ram Murthy, PHI.

**Name of Reference Books :-**

1. Parallel Computer 2 –Arch.& Algo., Adam Hilger, R.W. Hockney, C.R. Jesshope.,
2. Advanced Computer Architecture with Parallel Programming", K. Hwang, MGH.
3. Parallel computing- Theory and practice - Michael J Quinn- Mc Graw Hill



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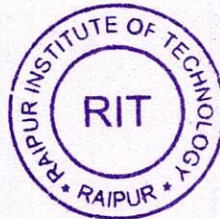
Department of Computer Science and Engineering  
Raipur Institute of Technology  
Chhatauna, Mandir Hasaud, Raipur (C.G.)

### CERTIFICATE BY THE EXAMINERS

The project entitled "Computer Assistant system providing efficient resources" Submitted by mohitbarai Enrollment No.: AN0958, .nvishtiwari Enrollment no.: AN0976, tilakdewangan Enrollment no.: AN1024 has been examined by the undersigned as a part of the examination and is hereby recommended for the award of the degree of Bachelor of technology in Computer Science & Engineering of Chhattisgarh Swami Vivekananda Technincal University Bhilai, (C.G.)

Internal Examiner

External Examiner



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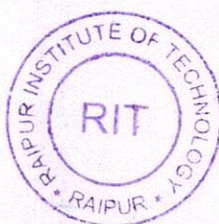


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|   |              |
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## ABSTRACT

In recent future all the electronic devices will be worked by utilizing the remote helper which is definitely not hard to get to yet it needs weakness. This structure affirmed the clients to get to the framework by the voice orders. User can request to the assistant that anything can be done by the framework, for example Music, Open Specified Application, Open Tabs, Open Websites and so forth. Voice associates are programming specialists that can decipher human discourse and react through orchestrated voices. Clients can pose their associate's inquiries, control home gadgets and media playback by means of voice, and oversee other essential errands, for example, email, daily agendas, and schedules with verbal orders.



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# 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- DS Chauhan, 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, Kataria, Delhi



Name of the Programme: Bachelor of Engineering :::: Duration of the programme: Four Years

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 CHHATAUNA, MANDIRHASAUD, RAIPUR (C.G.)



A Major Project Report on  
"Automatic Solar Tracker Water Irrigation System"

Submitted to



"CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY  
BHILAI"

Bachelor of Engineering in  
MECHANICAL ENGINEERING

Guided by

Mr. Manuraj Sahu

Submitted by

|                      |            |
|----------------------|------------|
| 1. Fanendra K. Sahu  | 3123713028 |
| 2. Rajesh Ranjan     | 3123713059 |
| 3. Domeswar Kothalia | 3123713026 |
| 4. Gupesh K. Sahu    | 3123713030 |
| 5. Devesh Singh      | 3123713022 |
| 6. Dilip Sahu        | 3123713024 |



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# Chhattisgarh Swami Vivekanand Technical University, Bhilai

Name of program: **Bachelor of Engineering**

Branch: **Mechanical Engineering**

Subject: **Robotics**

Total Theory Periods: **40**

Class Tests: **Two (Minimum)**

ESE Duration: **Three Hours**

Semester: **VIII**

Code: **337831(37)**

Total Tutorial Periods: **10**

Assignments: **Two (Minimum)**

**Maximum Marks: 80 Minimum Marks: 28**

## Course Objectives:

- To acquire the knowledge of basics of robotics and their importance.
- Understand fundamental theory of robot design.
- To acquire the knowledge on advanced algebraic tools for the description of motion.
- To develop the ability to analyze and design the motion for articulated systems.
- To acquire the knowledge of sensors, actuators and vision system used in robotics.

## UNIT – I : Introduction

Fixed & flexible automation, evolution of robots and robotics, laws of robotics, progressive, advancement in robots, manipulator anatomy, arm configuration & work space, human arm characteristics, design and control issues, manipulation and control, actuators, sensors and vision, programming of robots, applications – material handling, processing applications, assembly applications, inspection applications etc, the future prospects, notations.

## UNIT – II : Coordinate Frames, Mapping and Transforms

Coordinate frames, description of objects in space, transformation of vectors, inverting a homogeneous transform, fundamental rotation matrices, mechanical structure and notations, description of links and joints, kinematic modeling of the manipulator, Denavit – Hartenberg notation, kinematic relationship between adjacent links, manipulator transformation matrix.

## UNIT – III : Kinematic Modeling of Robots

Position analysis - direct and inverse kinematic models of robotic manipulators, various examples. velocity analysis – Jacobian matrix, introduction to inverse kinematic model.

## UNIT – IV : Robotic Sensors and Vision

Introduction regarding sensing technologies, sensors in robotics, classification, characteristics, internal sensors – position, velocity, acceleration sensors, force sensors, external sensors – proximity, touch and slip sensors. robotic vision, process of imaging, architecture of robotic vision systems, image acquisition, components of vision system, image representation, image processing.

## UNIT – V : Motion Planning and Control of Robot Manipulators

Trajectory planning of robotic manipulator: joint space and Cartesian space techniques. open and close loop control, linear control schemes, examples of control models.

### Robot applications

Industrial applications, material handling, processing applications, assembly applications, inspection application, principles for robot application and application planning, justification of robots, robot safety, non-industrial applications, robotic application for sustainable development.

### Text Books:

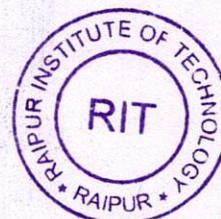
1. Robotics & Control – R.K. Mittal & I.J. Nagrath – TMH Publications.
2. Introduction to Robotics Analysis, Systems Applications - Saced B. Niku, Pearson

### Reference Books:

1. Principle of Robot Motion- Choset – PHI, Delhi
2. Kinematics and Synthesis of linkages – Hartenberg and Denavit – McGraw Hill.
3. Robotics Control Sensing - Vision and Intelligence – K.S. Fu, McGraw Hill.
4. Robotic Engineering – An Integrated Approach - R.D. Klapfer – PHI, Delhi.
5. Introduction to Robotics - S.K. Saha – Mc Graw Hill.
6. Introduction to Robotics – Mechanics and Control - John J. Craig

### Course Outcomes:

- Apply knowledge of robotics for understanding, formulating and solving engineering problems.
- Acquire knowledge and hands-on competence in applying the concepts in the design and development robots.
- Demonstrate creativeness in designing and development of robotics.
- Identify, analyze and design of robots useful to the society.
- Work effectively with multidisciplinary robots.



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A

**Major Project Report**

on

**"STUDY OF SOLAR POWERED GRASS CUTTING ROBOT"**

Submitted to

**"CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY  
BHILAI"**

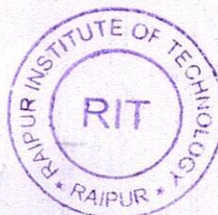
Bachelor of Engineering in

**MECHANICAL ENGINEERING**

Guided by:-

**Mr. Manuraj Sahu (Asst. Prof.)**

Submitted by

**SURESH RATHORE(3123713081)****YASH PATEL(3123713090)****YUGAL KISHOR PRADHAN(3123713091)****ANIL KUMAR(3123713103)****BHUPENDRA CHANDRAKAR(3123713117)**  
PRINCIPALRAIPUR INSTITUTE OF TECHNOLOGY  
CHHATAUNA, MANDIRHASAUD, RAIPUR (C.G.)



# 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.

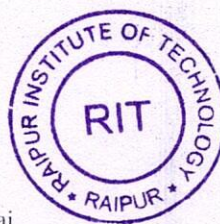
- UNIT I Spring:** Spring materials and their mechanical properties, equation for stress and deflection, helical coil springs of circular section for tension, compression and torsion, dynamic loading, fatigue loading, Wahl line, leaf spring and laminated spring.
- UNIT II GEARS: Spur Gears -** Gear Drives, 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, Delhi/Noida

## 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 & Shanmugam – Anuradha, Chennai



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Name of the Programme: Bachelor of Engineering :::: Duration of the programme: Four Years  
CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY, RAIPUR (C.G.)



A

**Major Project Report**

on

**“DESIGN OF CAM PROFILE USING BASIS SPLINE (B-SPLINE) CURVE”**

Submitted to



**“CHHATTISGARH SWAMI VIVEKANAND TECHNICAL  
UNIVERSITY BHILAI”**

**Bachelor of Engineering in**

**MECHANICAL ENGINEERING**

Guided by

**Mr. Hukum Chand Dewangan**  
(Assistant Professor)

Submitted by

**Darshan Dwiz (3123713002)**

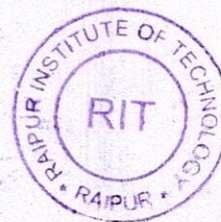
**Mohar Say (3123713044)**

**Mukesh Singh (3123713047)**

**Pratik Gadgil (3123713054)**

**Rajat kumar Panigrahi (3123713058)**

**Palash Agrawal (3123713125)**



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# Chhattisgarh Swami Vivekanand Technical University, Bhilai

|                                     |   |                                     |             |
|-------------------------------------|---|-------------------------------------|-------------|
| Branch:                             | Mechanical Engineering/Mechatronics Engineering | Semester:                           | V           |
| Subject:                            | Dynamics of Machines                            | Code:                               | 337553 (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 study types of mechanical governors and to analyze its performance parameters
- To Apply the theory of balancing to rotating and reciprocating masses.
- To analyze gyro-effect on moving bodies
- To understand the concepts of mechanical vibration
- To perform inertia force analysis of machine elements
- To draw turning moment diagram of reciprocating engines
- To analyze performance parameters flywheel

## Course Outcome

- Apply knowledge of Dynamics of machine for understanding, formulating and solving engineering problems.
- Acquire knowledge and hands-on competence in applying the concepts Dynamics 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, analyze and solve mechanical engineering problems useful to the society.
- Work effectively with engineering and science teams as well as with multidisciplinary designs.

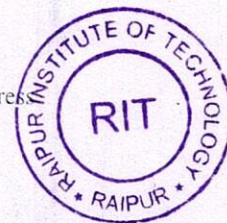
- UNIT I Governors:** Characteristics of centrifugal governors, Gravity controlled governors, Porter and proell. Spring controlled centrifugal governor: Hartung, & Hartnell governor. Performance parameter: Sensitivity, stability, Isochronisms, Governor Effort and power.
- UNIT II Balancing:** Balancing of rotating masses, Static and dynamic balancing, Determination of balancing masses in two plane balancing, Balancing of internal combustion engines, Balancing of in-line engines, Firing order, Balancing of V-twin and radial engines, Forward and reverse crank method, Balancing of rotors.
- UNIT III Gyroscope:** Gyroscopic forces and couple, gyroscopic effect in Airplanes, Ship motion and Vehicles moving on curved path.
- UNIT IV Mechanical Vibrations:** One-dimensional, longitudinal, Transverse, and torsional vibrations, Natural frequency, Effect of damping on vibrations, Different types of damping, Forced vibration, Forces and displacement, Transmissibility, Vibration Isolation, Vibration sensors: seismometer and Accelerometers, Whirling of shafts with single rotor.
- UNIT V**  
**(a) Inertia force analysis:** Effective force and inertia force on link, Inertia force on reciprocating engine. Inertia force in four bar chain mechanism.  
**(b) Turning moment diagram and flywheel:** Turning moment diagram for single and multi cylinder internal combustion engine, Coefficient of fluctuation of speed, Coefficient of fluctuation of energy, Flywheel.

## TEXT BOOKS

1. Theory of Machine- S.S.Rattan - Tata McGraw Hill, New Delhi
2. Theory of Machines - Thomas Bevan, - CBS/ Cengage Publishers

## REFERENCE BOOKS

1. Theory of Machines and Mechanism- Uicker, Pennock, & Shigley – Oxford Univ. Press
2. Theory of Mechanisms and Machines- A. Ghosh, A. K. Mallik – EWP Press.
3. Mechanism and Machine theory- Ambekar-PHI, Delhi
4. Theory of Machine – P.L. Ballaney – Khanna Publishers, New Delhi
5. Theory of Machine - Jagdish Lal - Metro Politan Books, New Delhi



**PRINCIPAL**

Name of the Programme: Bachelor of Engineering :::: Duration of the Programme: 3 Years  
**RAIPUR INSTITUTE OF TECHNOLOGY**  
 CHHATAUNA, MANDIRHASAUD, RAIPUR (C.G.)



A  
Major Project Report

on

**“HAND GESTURE CONTROLLED  
WHEEL CHAIR(Base) WITH OBSTACLE DETECTION”**

Submitted to



**“CHHATTISGARH SWAMI VIVEKANAND TECHNICAL  
UNIVERSITY, BHILAI”**

**Bachelor of Engineering in  
MECHANICAL ENGINEERING**

Guided by

**Mr. Jeenendra Shiv**

**(Asst. Prof.)**

Submitted by

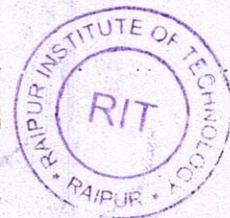
**Vishal Roy (3123713100)**

**Malay Pradhan (3123713108)**

**Naveen Singh (3123713109)**

**Rishabh Ganzeer (3123713110)**

**Vivek Kumar (3123713115)**



*[Signature]*  
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**RAIPUR INSTITUTE OF TECHNOLOGY  
CHHATAUNA, MANDIRHASAUD, RAIPUR (C.G.)**



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

Name of program: **Bachelor of Engineering**

Branch: **Mechanical Engineering**

Subject: **Machine Tool Technology**

Total Theory Periods: **40**

Class Tests: **Two (Minimum)**

ESE Duration: **Three Hours**

Semester: **VII**

Code: **337734(37)**

Total Tutorial Periods: **10**

Assignments: **Two (Minimum)**

Maximum Marks: **80**

Minimum Marks: **28**

## Course objectives:

- To impart knowledge about cutting tool geometry, tool material, mechanics of metal cutting, machinability and importance of cutting fluid.
- To understand the kinematics drive of machine tool.
- To design speed gear box and feed gear box
- To understand the procedure of acceptance test of machine tool

## UNIT - I

**Cutting Tool** – Types, requirements, specification & application

**Geometry of Single Point Cutting Tool** - tool angle, Tool angle specification system, ASA, ORS and NRS and inter-relationship.

**Mechanics of Metal Cutting**

Theories of metal cutting, chip formation, types of chips, chip breakers. Orthogonal and Oblique cutting, stress and strain in the chip, velocity relations, power and energy requirement in metal cutting.

## UNIT - II

**Machinability** :Concept and evaluation of Machinability, Mechanism of Tool failure, Tool wear mechanism, Tool life, Tool life equation, Machinability index, factors affecting machinability.

**Thermal Aspects in Machining and Cutting Fluid**

Source of heat in metal cutting and its distributions, temp measurement in metal cutting, function of cutting fluid, types of cutting fluid.

## UNIT - III

**Design of Machine Tool Elements** :Design of Lathe bed - Material and construction feature, various bed section, analysis of force under headstock, tail stock and saddle, torque analysis of lathe bed, bending of lathe bed, designing for torsional rigidity, use of reinforcing stiffener in lathe bed.

Design of Guide ways, Material and construction features, over turning diagram, Antifriction guide ways.

## UNIT - IV

**Design of Speed Gear Box** :Drives in Machine Tool, classification, selecting maximum and minimum cutting speeds, speed loss, kinematic advantage of Geometric progression, kinematic diagrams, design of Gear Box of 6,9,12 and 18 speed.

## UNIT - V

**Design of Feed Gear Box** :Elements of feed gear box, classification-Norton drive, draw key drive, Meander's drive, Design of feed gear box for longitudinal and cross feed and for thread cutting.

**Acceptance Test of Machine tool** :Testing, Geometrical checks, measuring equipment for testing, acceptance test for Lathe and Radial drilling machines.

## TEXT BOOKS

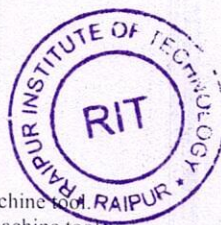
1. Machine Tool Engineering – G.R. Nagpal – Khanna Publishers, New Delhi
2. Fundamentals of Metal Cutting & Machine Tool – B.L. Juneja, G.S. Sekhan, Nitin Sethi – New Age Publishers – New Delhi

## REFERENCE BOOKS

1. Production Engineering – P. C. Sharma – S. Chand & Company – New Delhi
2. Production Technology – R.K. Jain – Khanna Publisher – New Delhi
3. Principle of Metal Cutting -Sen, Bhattacharya – New Central Book Agency, Calcutta
4. Machine Tool Practices – Kibbe Richard R – PHI, New Delhi
5. Manufacturing Technology Vol.-II – P. N. Rao - TMH Delhi
6. Manufacturing Engineering & Technology – Serope Kalpakjian- Pearson, Delhi

## Course Outcomes:

1. Graduates will gain a strong foundation in machine tool engineering
2. Acquire knowledge and hands-on competence in design and development of machine tool.
3. Develop an ability to identify, analyze and solve technical problems related to machine tools.



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



A  
Major Project Report  
on  
"ROCKER BOGIE SUSPENSION SYSTEM"

Submitted to



"CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY  
BHILAI"

Bachelor of Engineering in  
**MECHANICAL ENGINEERING**

Guided by

Mr. Jeenendra Shiv  
(Asst. Prof.)

Submitted by

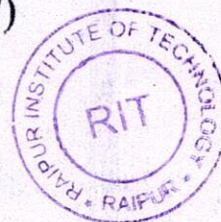
Shubham Sharma (3123713097)

Veerendra Sahu (3123713113)

Soman Lal Sahu (3123713073)

Abhishek Addanki (3123713123)

Sunil Chandravanshi (3123713098)



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



# 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 modern 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 design 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 – Addison 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

Name of the Programme: Bachelor of Engineering

:::

Duration of the Programme: Four Years

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



A  
Major Project Report

on

**"AUTO TYRE INFLATION SYSTEM"**

Submitted to



**"CHHATTISGARH SWAMI VIVEKANAND TECHNICAL  
UNIVERSITY BHILAI"**

Bachelor of Engineering in  
**MECHANICAL ENGINEERING**

Guided by

**BHOJ KUMAR PATEL**

(Asst. Prof.)

Submitted by

Aditya Ku. Pathak (3123713005)

Aayam Mishra (3123713006)

Abhishek Ku. Dwivedi (3123713007)

Bhavesh Kumar Sahu (3123713018)

Bhola Ram Sahu (3123713019)

Jai Prakash Chandra (3123713036)



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**PRINCIPAL**

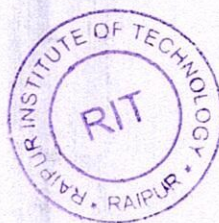
**RAIPUR INSTITUTE OF TECHNOLOGY  
CHHATAUNA, MANDIRHASAUD, RAIPUR (C.G.)**



## ABSTRACT:

The main aim of our project is to develop a "Automatic tyre inflation and deflation system". This can be placed in all automobiles while long drives and that can be utilized while climbing uphill or down hills. It is very necessary for the every automobile to be cautious while driving through long distances. So we have fabricated this machine to fill the air automatically by using control units. In this project, main function is when suddenly the air is decreased to the automobile vehicles, the sensor signal alerted to the person when the use of air tank to fill the air in the tyre. Then the air pressure is increased to the tyre in the vehicle. It is same as the process of indicating the sensor signal through the person when the use of solenoid valve to reduce the excess air in the tyre.

It is well understood that fuel economy directly influences the CO<sub>2</sub> emissions in vehicles. Thus, a straight forward approach to reduce the tailpipe CO<sub>2</sub> emissions is to reduce the overall fuel consumption of the vehicle. In this thesis work, the role of tyre inflation pressure on the fuel economy is investigated. Apart from the benefits of reduced fuel consumption, tyre pressure also plays an important role in deciding vehicle handling and passenger comfort



A handwritten signature in green ink, appearing to be "Rajiv", written over the printed name of the Principal.

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No. 05-06/Estt./Training /003

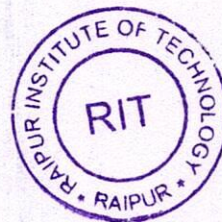
Raipur, dt. 23/11/2017

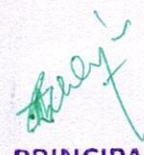
### CERTIFICATE

This is to certify that **Shri Girish Yadav S/o Shri Pancham Yadav** a student of MBA (3<sup>rd</sup> 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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CHHATAUNA, MANDIRHASAUD, RAIPUR (C.G.)