

Annexure -B**Mandatory Disclosure (as per AICTE Approval Process Handbook 2022-23)**

The following information shall be given in the information Brochure besides being hosted on the Institution's official Website.

The onus of the authenticity of the information lies with the Institution ONLY and not on AICTE.

1. Name & Address of the Institution :

GOVERNMENT POLYTECHNIC LISANA (REWARI)
VILLAGE LISANA POST OFFICE BIKANER THE & DIST. REWARI PIN 123401 EMAIL:-
gplisana@hry.nic.in, Mobile No. 9466397797

2. Name and address of the Trust/ Society/ Company and the Trustees –

It is Govt. Institute

3. Name and Address of the Principal:

(Address including Telephone, Mobile, E-Mail)

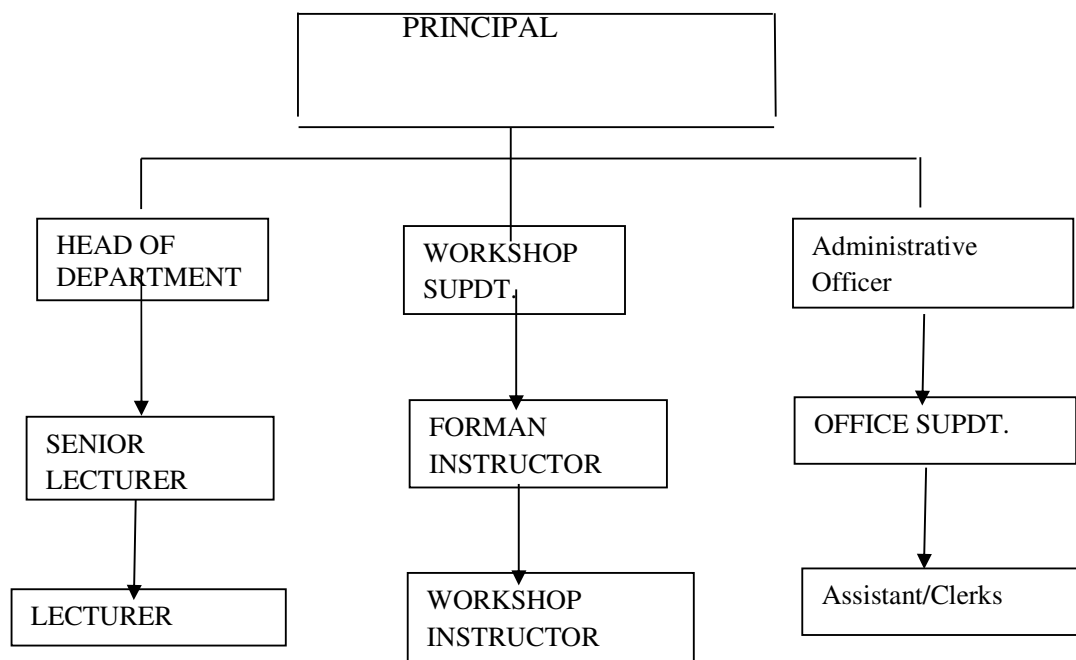
SUKHVIR YADAV, MOBILE: +91-9466397797, EMAIL: sukhvir_0075@yahoo.in

4. Name of the affiliating University/Board :

HARYANA STATE BOARD OF TECHNICAL EDUCATION, PANCHKULA

5. Governance :

- Members of the Board and their brief background: Governing Body
- Members of Academic Advisory Body
- Frequency of the Board Meeting and Academic Advisory Body : Two to three meetings annually.
- Organizational chart and processes

Organizational Chart of Govt. Polytechnics

Signature of the Principal/ Head of the Institution

<p>Nature and Extent of involvement of faculty and students in academic affairs/ improvements</p>	<p>The faculties are involved in various activities including teaching, continuous assessment of students. Students are free to interact with their Teachers/ Courses Co-coordinators any time. During teaching days or through e-mails, regular SFC meeting, implementing student feedback mechanism. The different academic activities are carried out by the faculty members through various committees in close coordination with the students. Some of the key committees are:</p> <p>Placement Team Corporate Relations Cell Alumni Cell</p>
<p>Mechanism/ Norms & Procedure for democratic/ good Governance</p>	<p>Regular feedback from students. Proper counseling of students by the Tutor and Head of the Department from time to time. Explanation by faculty members for the marks scored by students & guidance to students for further improvement. Encourage by Faculty to participate in competitions/ event management. Teacher's evaluation by students.</p>
<p>Students Feedback on Institutional Governance/ faculty performance</p>	<p>Feedback about faculty is being taken by the Students from time to time & faculty members are informed about the shortcoming. Regular meeting with the Principal on fortnightly basis are done to discuss academic matters.</p>
<p>Grievance redressal mechanism for faculty, staff and students</p>	<p>Grievances if any are invited through a written application or through Online Grievance Redressal System from the aggrieved party/ person & staff welfare committee & students welfare committee headed by senior staff members have been constituted to listen the aggrieved party/ person & suggest corrective action.</p>

- Establishment of Anti Ragging Committee: Anti-ragging Committee constituted vide office Order No. 177, Dated 16/03/2022.

Signature of the Principal/ Head of the Institution

- Establishment of Online Grievance Redressal Mechanism: A web based Online Grievance Redressal System has been purchased and also a Link for the same has been created on the institutional website.
- Establishment of Grievance Redressal Committee in the Institution and Appointment of OMBUDSMAN by the University:
Grievance and Ombudsman Committee constituted vide Office Order No. 177, Dated 16/03/2022.
- Establishment of Internal Complaint Committee (ICC):
Internal Complaint Committee constituted vide Office Order No. 177, Dated 16/03/2022.
Establishment of Committee for SC/ ST: A Committee constituted vide Order No. 177, Dated 16/03/2022.
- Internal Quality Assurance Cell: A Cell constituted vide office order no. GPL/19/183, Dated 27.02.2019.

6. Programmes

Name of Programmes approved by AICTE:

Sr.No	Name of the Program	Name of the Course	Approved Intake
1	Engineering & Technology	Civil Engineerig	60
2.		Computer Engineering	60
3.		Electrical Engg.	60
4.		Electronics & Communication Engg.	60
5.		Mechanical Engineering	60
6.		Medical Lab Technology	60

Name of Programmes Accredited by AICTE: No Course

Sr.No	Name of the Program	Name of the Course	Approved Intake
1	Engineering & Technology		
2.			
3.			
4.			
5.			
6.			

Status of Accreditation of the Courses: Not Applicable

Total number of Courses: Six

No. of Courses for which applied for Accreditation: **Under Process for Two No. of Courses.**

Status of Accreditation – **NIL**

For each Programme/ Course the following details are to be given:

1.

Name of the Course: **Civil Engg.**

Number of seats: **60**

Duration: **3 Years**

Signature of the Principal/ Head of the Institution

Cut off marks/rank of admission during the last three years:

Fee: **4350 at the time of admission(including First Semester Fees) and further 2850/- per semester**

Placement Facilities: **Placement Cell has been Established**

Campus placement in last three years with minimum salary, maximum salary and average salary:

Year	Total Placement Students	minimum salary	maximum salary
2020	0	NIL	NIL
2021	2	1.4 Lac	1.9 Lac
2022	5	1.5 Lac	2.2 Lac

2.

Name of the Course: **Computer Engineering**

Number of seats: **60**

Duration: **3 Years**

Cut off marks/rank of admission during the last three years:

Fee: **4350 at the time of admission(including First Semester Fees) and further 2850/- per semester**

Placement Facilities: **Placement Cell Established**

Campus placement in last three years with minimum salary, maximum salary and average salary:

Year	Total Placement Students	minimum salary	maximum salary
2020	0	N.A.	N.A.
2021	2	1.4 Lac	1.6 Lac
2022	11	1.4 Lac	1.6 Lac

3.

Name of the Course: **Electrical Engineering**

Number of seats: **60**

Duration: **3 Years**

Cut off marks/rank of admission during the last three years:

Fee: **4350 at the time of admission(including First Semester Fees) and further 2850/- per semester**

Placement Facilities: Placement Cell Established

Campus placement in last three years with minimum salary, maximum salary and average salary:

Year	Total Placement Students	minimum salary	maximum salary
2020	27	1.2 Lac	1.8 Lac
2021	10	1.4 Lac	1.9 Lac
2022	28	1.4 Lac	1.9 Lac

4.

Name of the Course: **Electronics & Communication Engineering**

Number of seats: **60**

Duration: **3 Years**

Cut off marks/rank of admission during the last three years:

Fee: **4350 at the time of admission(including First Semester Fees) and further 2850/- per semester**

Placement Facilities: **Placement Cell Established**

Campus placement in last three years with minimum salary, maximum salary and average salary:

Year	Total Placement Students	minimum salary	maximum salary
2020	2	1.2 Lac	1.8 Lac
2021	11	1.4 Lac	1.9 Lac
2022	21	1.4 Lac	1.9 Lac

5.

Name of the Course: **Mechanical Engineering**

Number of seats: **60**

Duration: **3 Years**

Cut off marks/rank of admission during the last three years:

Fee: **4350 at the time of admission(including First Semester Fees) and further 2850/- per semester**

Placement Facilities: **Placement Cell Established**

Campus placement in last three years with minimum salary, maximum salary and average salary:

Year	Total Placement Students	minimum salary	maximum salary
2020	18	1.2 Lac	1.8 Lac
2021	15	1.4 Lac	1.9 Lac
2022	30	1.4 Lac	3.2 Lac

6.

Name of the Course: **Medical Lab Technology**

Number of seats: **60**

Duration: **3 Years**

Cut off marks/rank of admission during the last three years:

Fee: **4350 at the time of admission(including First Semester Fees) and further 2850/- per semester**

Placement Facilities: **Placement Cell Established**

Campus placement in last three years with minimum salary, maximum salary and average salary:

Year	Total Placement Students	minimum salary	maximum salary
2020	12	1.2 Lac	1.8 Lac
2021	07	1.3 Lac	1.8 Lac
2022	NIL	N.A.	N.A.

7. Branch wise list Faculty members:**Permanent Faculty**

Sr.No.	Name of the Faculty	Designation	Name of Branch
1.	Sh. Sukhvir Yadav	Sr. Lecturer	Mechanical Engg.
2.	Dr. Dharam Pal	Lecturer	Mechanical Engg.
3.	Sh. Bhupesh	Lecturer	Mechanical Engg.
4.	Sh. Ravikant	Lecturer	Mechanical Engg.
5.	Sh. Amit Kumar	Lecturer	Mechanical Engg.
6.	Ms. Sunita Dhariwal	Sr. Lecturer	ECE
7.	Sh. M.B. Zaman	Lecturer	ECE
8.	Sh. Sunny Taneja	Lecturer	ECE
9.	Sh. Sunil Kumar	Lecturer	ECE
10.	Sh. Praveen Kumar	Sr. Lecturer	Computer Engineering
11.	Sh. Pankaj Yadav	Lecturer	Computer Engineering
12.	Sh. Charna Singh	Lecturer	Computer Engineering
13.	Ms. Pooja Arora	Lecturer	Computer Engineering
14.	Ms. Reena Rani	Sr. Lecturer	Applied Science
15.	Ms. Preeti	Lecturer	Applied Science
16.	Dr. Jyoti Singh	Lecturer	Applied Science
17.	Ms. Reena	Lecturer	Applied Science
18.	Ms. Madhu Yadav	Lecturer	Applied Science
19.	Sh. Smit	Lecturer	Applied Science
20.	Sh. Rajapl Churria	Workshop Supdt.	Workshop
21.	Sh. Narinder Kumar	Workshop Instructor	Workshop
22.	Sh. Mukesh Kaushik	Workshop Instructor	Workshop
23.	Sh. Jitender	Workshop Instructor	Workshop

Adjunct Faculty: NIL


Permanent Faculty: Student Ratio 1: 46.95

Number of Faculty employed during last three years: 02


Number of Faculty left during the last three years: NIL

8. Profile of Vice Chancellor/ Director/ Principal/ Faculty


(For each Faculty give a page covering with Passport size photograph)

Sr. No.	01
Faculty Name & Designation	 Sh. Sukhvir Yadav, Principal
Date of Birth	01.01.1983
Unique id	1-506680299
Education Qualifications	: M.Tech
Work Experience	Teaching: 15 Years Research: Pursuing Ph. D. Industry: No others: No
Area of Specialization	: Mechanical Engineering
Courses taught at Diploma/ Post Diploma/ Under Graduate/ Post Graduate/ Post Graduate Diploma Level:	Mechanical Engineering
Research guidance	: Not Applicable No. of papers published in National/ International Journals/ Conferences: 04 international papers published Master Ph.D.
Projects Carried out-	NIL
Patents-	NIL
Technology Transfer-	NIL
Research Publications-	04 international papers published
No. of Books published with details-	NIL

Signature of the Principal/ Head of the Institution

Faculty Name:	 Sh. Praveen Kumar
Date of Birth:	20.06.1980
Unique id:	1-506748631
Education Qualifications:	B.Tech.
Work Experience	Teaching: 15 Years Research: No Industry: No others: No
Area of Specialization:	Computer Engineering
Courses taught at Diploma/ Post Diploma/ Under Graduate/ Post Graduate/ Post Graduate Diploma Level:	Computer Engineering
Research guidance:	Not Applicable No. of papers published in National/ International Journals/ Conferences Master Ph.D.
Projects Carried out-	NIL
Patents-	NIL
Technology Transfer-	NIL
Research Publications	NIL
No. of Books published with details	NIL


Signature of the Principal/ Head of the Institution

Faculty & Name	 Sh. Pankaj Yadav
Date of Birth	01.12.1977
Unique id	1-4641776052
Education Qualifications	B.Tech.
Work Experience	Teaching: 15 Years Research: No Industry: No others: No
Area of Specialization	Computer Engineering
Courses taught at Diploma/ Post Diploma/ Under Graduate/ Post Graduate/ Post Graduate Diploma Level	Computer Engineering
Research guidance	Not Applicable No. of papers published in National/ International Journals/ Conferences Master Ph.D.
Projects Carried out	NIL
Patents	NIL
Technology Transfer	NIL
Research Publications	NIL
No. of Books published with details	NIL


Faculty & Name	Sh. Charan Singh
Date of Birth	22.11.1978
Unique id	1-11097530961
Education Qualifications	M.C.A.
Work Experience	Teaching: 14 Years Research: No Industry: No Others: No
Area of Specialization	Computer Engineering
Courses taught at Diploma/ Post Diploma/ Under Graduate/ Post Graduate/ Post Graduate Diploma Level	Computer Engineering
Research guidance	Not Applicable No. of papers published in National/ International Journals/ Conferences Master Ph.D.
Projects Carried out	NIL
Patents	NIL
Technology Transfer	NIL
Research Publications	NIL
No. of Books published with details	NIL

Faculty & Name	Ms. Pooja Arora
Date of Birth	25.09.1983
Unique id	1-4363072094
Education Qualifications	M.C.A.
Work Experience	Teaching: 14 Years Research: No Industry: No others: No
Area of Specialization	Computer Engineering
Courses taught at Diploma/ Post Diploma/ Under Graduate/ Post Graduate/ Post Graduate Diploma Level	Computer Engineering
Research guidance	Not Applicable No. of papers published in National/ International Journals/ Conferences Master Ph.D.
Projects Carried out	NIL
Patents	NIL
Technology Transfer	NIL
Research Publications	NIL
No. of Books published with details	NIL


Signature of the Principal/ Head of the Institution


Faculty & Name	 Ms. Sunita Dhariwal
Date of Birth	07.11.1984
Unique id	1-506729545
Education Qualifications	M.Tech
Work Experience	Teaching: 13 Years Research: No Industry: No others: No
Area of Specialization	Electronics & Communication Engineering
Courses taught at Diploma/ Post Diploma/ Under Graduate/ Post Graduate/ Post Graduate Diploma Level	Electronics & Communication Engineering
Research guidance	Not Applicable No. of papers published in National/ International Journals/ Conferences Master Ph.D.
Projects Carried out	NIL
Patents	NIL
Technology Transfer	NIL
Research Publications	NIL
No. of Books published with details	NIL

Signature of the Principal/ Head of the Institution


Faculty & Name	 Sh. M.B. Zaman
Date of Birth	19.10.1972
Unique id	1-506729541
Education Qualifications	B.Tech.
Work Experience	Teaching: 13 Years Research: No Industry: No others: No
Area of Specialization	Electronics & Communication Engineering
Courses taught at Diploma/ Post Diploma/ Under Graduate/ Post Graduate/ Post Graduate Diploma Level	Electronics & Communication Engineering
Research guidance	Not Applicable No. of papers published in National/ International Journals/ Conferences Master Ph.D.
Projects Carried out	NIL
Patents	NIL
Technology Transfer	NIL
Research Publications	NIL
No. of Books published with details	NIL

Signature of the Principal/ Head of the Institution


Faculty & Name	 Sh. Sunny Taneja
Date of Birth	20.09.1985
Unique id	1-506680303
Education Qualifications	B.Tech
Work Experience	Teaching: 12 Years Research: No Industry: No others: No
Area of Specialization	Electronics & Communication Engineering
Courses taught at Diploma/ Post Diploma/ Under Graduate/ Post Graduate/ Post Graduate Diploma Level	Electronics & Communication Engineering
Research guidance	Not Applicable No. of papers published in National/ International Journals/ Conferences Master Ph.D.
Projects Carried out	NIL
Patents	NIL
Technology Transfer	NIL
Research Publications	NIL
No. of Books published with details	NIL


Faculty & Name	 Sh. Sunil Kumar
Date of Birth	13.07.1984
Unique id	1-506748623
Education Qualifications	B.Tech
Work Experience	Teaching: 12 Years Research: No Industry: No others: No
Area of Specialization	Electronics & Communication Engineering
Courses taught at Diploma/ Post Diploma/ Under Graduate/ Post Graduate/ Post Graduate Diploma Level	Electronics & Communication Engineering
Research guidance	Not Applicable No. of papers published in National/ International Journals/ Conferences Master Ph.D.
Projects Carried out	NIL
Patents	NIL
Technology Transfer	NIL
Research Publications	NIL
No. of Books published with details	NIL

Signature of the Principal/ Head of the Institution


Faculty & Name	 Sh. Sukhvir Yadav
Date of Birth	01.01.1983
Unique id	1-506680299
Education Qualifications	M.Tech.
Work Experience	Teaching: 13.4 Years Research: No Industry: No others: No
Area of Specialization	Mechanical Engineering
Courses taught at Diploma/ Post Diploma/ Under Graduate/ Post Graduate/ Post Graduate Diploma Level	Mechanical Engineering
Research guidance	Not Applicable No. of papers published in National/ International Journals/ Conferences Master Ph.D.
Projects Carried out	NIL
Patents	NIL
Technology Transfer	NIL
Research Publications	04 No of International Research Papers Published
No. of Books published with details	NIL

Signature of the Principal/ Head of the Institution


Faculty & Name	 Dr. Dharam Pal
Date of Birth	02.09.1975
Unique id	1-506748627
Education Qualifications	M.Tech, Ph.D.
Work Experience	Teaching: 14 Years Research: No Industry: No others: No
Area of Specialization	Mechanical Engineering
Courses taught at Diploma/ Post Diploma/ Under Graduate/ Post Graduate/ Post Graduate Diploma Level	Mechanical Engineering
Research guidance	Not Applicable No. of papers published in National/ International Journals/ Conferences Master Ph.D.
Projects Carried out	NIL
Patents	NIL
Technology Transfer	NIL
Research Publications	NIL
No. of Books published with details	NIL

Faculty & Name	 Sh. Bhupesh Kumar
Date of Birth	13.09.1978
Unique id	1-506748635
Education Qualifications	B.Tech.
Work Experience	Teaching: 13 Years Research: No Industry: No others: No
Area of Specialization	Mechanical Engineering
Courses taught at Diploma/ Post Diploma/ Under Graduate/ Post Graduate/ Post Graduate Diploma Level	Mechanical Engineering
Research guidance	Not Applicable No. of papers published in National/ International Journals/ Conferences Master Ph.D.
Projects Carried out	NIL
Patents	NIL
Technology Transfer	NIL
Research Publications	NIL
No. of Books published with details	NIL


Signature of the Principal/ Head of the Institution

Faculty & Name	 Sh. Ravikant
Date of Birth	15.03.1989
Unique id	1-1566901115
Education Qualifications	M.Tech
Work Experience	Teaching: 09 Years Research: No Industry: No others: No
Area of Specialization	Mechanical Engineering
Courses taught at Diploma/ Post Diploma/ Under Graduate/ Post Graduate/ Post Graduate Diploma Level	Mechanical Engineering
Research guidance	Not Applicable No. of papers published in National/ International Journals/ Conferences Master Ph.D.
Projects Carried out	NIL
Patents	NIL
Technology Transfer	NIL
Research Publications	NIL
No. of Books published with details	NIL


Signature of the Principal/ Head of the Institution

Faculty & Name	 Sh. Amit Kumar
Date of Birth	20.03.1989
Unique id	1-3300626482
Education Qualifications	M.Tech.
Work Experience	Teaching: 05 Years Research: No Industry: No others: No
Area of Specialization	Mechanical Engineering
Courses taught at Diploma/ Post Diploma/ Under Graduate/ Post Graduate/ Post Graduate Diploma Level	Mechanical Engineering
Research guidance	Not Applicable No. of papers published in National/ International Journals/ Conferences Master Ph.D.
Projects Carried out	NIL
Patents	NIL
Technology Transfer	NIL
Research Publications	NIL
No. of Books published with details	NIL


Signature of the Principal/ Head of the Institution

Faculty & Name	 Ms. Reena Rani
Date of Birth	03.11.1981
Unique id	1-506680283
Education Qualifications	PhD.
Work Experience	Teaching: 13 Years Research: No Industry: No others: No
Area of Specialization	English
Courses taught at Diploma/ Post Diploma/ Under Graduate/ Post Graduate/ Post Graduate Diploma Level	English
Research guidance	Not Applicable No. of papers published in National/ International Journals/ Conferences Master Ph.D.
Projects Carried out	NIL
Patents	NIL
Technology Transfer	NIL
Research Publications	NIL
No. of Books published with details	NIL


Signature of the Principal/ Head of the Institution

Faculty & Name	 Ms. Preeti
Date of Birth	28.02.1986
Unique id	1-506680287
Education Qualifications	PhD.
Work Experience	Teaching: 13 Years Research: No Industry: No others: No
Area of Specialization	Mathematics
Courses taught at Diploma/ Post Diploma/ Under Graduate/ Post Graduate/ Post Graduate Diploma Level	Mathematics
Research guidance	Not Applicable No. of papers published in National/ International Journals/ Conferences Master Ph.D.
Projects Carried out	NIL
Patents	NIL
Technology Transfer	NIL
Research Publications	NIL
No. of Books published with details	NIL


Signature of the Principal/ Head of the Institution

Faculty & Name	 Dr. Jyoti Singh
Date of Birth	11.03.1977
Unique id	1-1566901217
Education Qualifications	PhD.
Work Experience	Teaching: 09 Years Research: No Industry: No others: No
Area of Specialization	Chemistry
Courses taught at Diploma/ Post Diploma/ Under Graduate/ Post Graduate/ Post Graduate Diploma Level	Chemistry
Research guidance	Not Applicable No. of papers published in National/ International Journals/ Conferences Master Ph.D.
Projects Carried out	NIL
Patents	NIL
Technology Transfer	NIL
Research Publications	NIL
No. of Books published with details	NIL


Signature of the Principal/ Head of the Institution


Faculty & Name	 Ms. Reena Kumari
Date of Birth	15.04.1986
Unique id	1-1566901087
Education Qualifications	M.Phil.
Work Experience	Teaching: 09 Years Research: No Industry: No others: No
Area of Specialization	Physics
Courses taught at Diploma/ Post Diploma/ Under Graduate/ Post Graduate/ Post Graduate Diploma Level	Physics
Research guidance	Not Applicable No. of papers published in National/ International Journals/ Conferences Master Ph.D.
Projects Carried out	NIL
Patents	NIL
Technology Transfer	NIL
Research Publications	NIL
No. of Books published with details	NIL

Signature of the Principal/ Head of the Institution

Faculty & Name	 Ms. Madhu Yadav
Date of Birth	20.01.1981
Unique id	1-3300772748
Education Qualifications	M.Phil.
Work Experience	Teaching: 05 Years Research: No Industry: No others: No
Area of Specialization	English
Courses taught at Diploma/ Post Diploma/ Under Graduate/ Post Graduate/ Post Graduate Diploma Level	English
Research guidance	Not Applicable No. of papers published in National/ International Journals/ Conferences Master Ph.D.
Projects Carried out	NIL
Patents	NIL
Technology Transfer	NIL
Research Publications	NIL
No. of Books published with details	NIL

Signature of the Principal/ Head of the Institution

Faculty & Name	 Sh. Smit Yadav
Date of Birth	24.03.1992
Unique id	1-3300626857
Education Qualifications	M.Phil.
Work Experience	Teaching: 05 Years Research: No Industry: No others: No
Area of Specialization	Mathematics
Courses taught at Diploma/ Post Diploma/ Under Graduate/ Post Graduate/ Post Graduate Diploma Level	Mathematics
Research guidance	Not Applicable No. of papers published in National/ International Journals/ Conferences Master Ph.D.
Projects Carried out	NIL
Patents	NIL
Technology Transfer	NIL
Research Publications	NIL
No. of Books published with details	NIL

Faculty & Name	 Sh. Rajpal Churria
Date of Birth	29.01.1973
Unique id	1-504663665
Education Qualifications	B.Tech.
Work Experience	Teaching: 12 Years Research: No Industry: No others: No
Area of Specialization	Workshop
Courses taught at Diploma/ Post Diploma/ Under Graduate/ Post Graduate/ Post Graduate Diploma Level	Workshop
Research guidance	Not Applicable No. of papers published in National/ International Journals/ Conferences Master Ph.D.
Projects Carried out	NIL
Patents	NIL
Technology Transfer	NIL
Research Publications	NIL
No. of Books published with details	NIL

Faculty & Name	Sh. Narinder Kumar
Date of Birth	17.06.1978
Unique id	1-504663673
Education Qualifications	CTI
Work Experience	Teaching: 12 Years Research: No Industry: No others: No
Area of Specialization	Workshop
Courses taught at Diploma/ Post Diploma/ Under Graduate/ Post Graduate/ Post Graduate Diploma Level	Workshop
Research guidance	Not Applicable No. of papers published in National/ International Journals/ Conferences Master Ph.D.
Projects Carried out	NIL
Patents	NIL
Technology Transfer	NIL
Research Publications	NIL
No. of Books published with details	NIL

Signature of the Principal/ Head of the Institution

Faculty & Name	Sh. Mukesh Kaushik
Date of Birth	30.07.1980
Unique id	1-504663669
Education Qualifications	CTI
Work Experience	Teaching: 12 Years Research: No Industry: No others: No
Area of Specialization	Workshop
Courses taught at Diploma/ Post Diploma/ Under Graduate/ Post Graduate/ Post Graduate Diploma Level	Workshop
Research guidance	Not Applicable No. of papers published in National/ International Journals/ Conferences Master Ph.D.
Projects Carried out	NIL
Patents	NIL
Technology Transfer	NIL
Research Publications	NIL
No. of Books published with details	NIL

Signature of the Principal/ Head of the Institution

Faculty & Name	Sh. Jitender Singh
Date of Birth	01.04.1973
Unique id	1-504663677
Education Qualifications	CTI.
Work Experience	Teaching: 12 Years Research: No Industry: No others: No
Area of Specialization	Workshop
Courses taught at Diploma/ Post Diploma/ Under Graduate/ Post Graduate/ Post Graduate Diploma Level	Workshop
Research guidance	Not Applicable No. of papers published in National/ International Journals/ Conferences Master Ph.D.
Projects Carried out	NIL
Patents	NIL
Technology Transfer	NIL
Research Publications	NIL
No. of Books published with details	NIL

Signature of the Principal/ Head of the Institution

9. Fee

- Details of fee, as approved by State Fee Committee, for the Institution

Admission Fees Structure Per Semester as given below:-

Category	Other than TFW & Girls	TFW	Girls
Development Fund	Rs. 750/-	Rs. 750/-	Rs. 750/-
Student Fund	Rs. 600/-	Rs. 600/-	Rs. 600/-
Tuition Fees	Rs. 1500/-	—	—
Security (Refundable)- one time at the time of Admission only	Rs. 1500/-	Rs. 1500/-	Rs. 1500/-
Building Fund	Rs. —	Rs. —	Rs. —
Total Fees	Rs. 4350/-	Rs. 2850/-	Rs. 2850/-

Time schedule for payment of fee for the entire programme

No. of Fee waivers granted with amount and name of students

Number of scholarship offered by the Institution, duration and amount

Criteria for fee waivers/scholarship

Estimated cost of Boarding and Lodging in Hostels: No Hostel Facility Available

10. Admission**Number of seats sanctioned with the year of approval**

Sr.No	Name of the Program	Name of the Course	Approved Intake	Year of Approval
1	Engineering & Technology	Civil Engineering	60	2010
2		Computer Engineering	60	2017
3		Electrical Engineering	60	2017
4		Electronics & Communication Engineering	60	2011
5		Mechanical Engineering	60	2010
6		Medical Lab Technology	60	2017

Number of Students admitted under various categories each year in the last three years**2018-19**

Sr. No.	Branch	Total Admission	SC	TFW	BCA	BCB	AIC	HOGC
1	Civil Engg.	60	11	02	06	04	25	12
2	Computer	58	05	00	04	17	12	20

Signature of the Principal/ Head of the Institution

	Engg.							
3	Electrical Engg.	61	14	02	12	16	06	11
4	Electronics & Communication Engg.	51	04	00	03	12	19	13
5	Mechanical Engg.	61	11	03	10	23	04	10
6	Medical Lab Technology	60	14	00	05	11	17	13

2019-20

Sr. No.	Branch	Total Admission	SC	TFW	BCA	BCB	AIC	HOGC
1	Civil Engg.	59	05	00	03	13	27	11
2	Computer Engg.	56	04	00	03	07	25	17
3	Electrical Engg.	60	13	02	06	18	11	10
4	Electronics & Communication Engg.	44	02	00	03	07	17	15
5	Mechanical Engg.	63	11	02	07	23	12	08
6	Medical Lab Technology	57	11	00	06	13	16	11

2020-21

Sr. No.	Branch	Total Admission	SC	TFW	BCA	BCB	AIC	HOGC
1	Civil Engg.	60	7	0	5	18	18	12
2	Computer Engg.	62	13	2	9	21	6	11
3	Electrical Engg.	64	12	2	9	20	6	13
4	Electronics & Communication Engg.	60	9	0	10	10	11	19
5	Mechanical Engg.	63	11	1	12	15	8	14
6	Medical Lab Technology	62	20	2	11	15	6	8

Number of applications received during last two years for admission under Management Quota and number admitted: **Not Applicable**

11. Admission Procedure

Mention the admission test being followed, name and address of the Test Agency and its URL (website): <http://www.hstes.org.in/>

Number of seats allotted to different Test Qualified candidate separately (AIEEE/ CET (State conducted test/ University tests/ CMAT/ GPAT)/ Association conducted test): **Not Applicable**

Signature of the Principal/ Head of the Institution

Calendar for admission against Management/vacant seats: **Not Applicable**

Last date of request for applications

Last date of submission of applications

Dates for announcing final results

Release of admission list (main list and waiting list shall be announced on the same day)

Date for acceptance by the candidate (time given shall in no case be less than 15 days)

Last date for closing of admission

Starting of the Academic session

The waiting list shall be activated only on the expiry of date of main list

The policy of refund of the fee, in case of withdrawal, shall be clearly notified

12. Criteria and Weightages for Admission

Describe each criterion with its respective weightages i.e. Admission Test, marks in qualifying examination etc.

Criterion for Admission:

It is for information that from the session 2017-18 admission in three year diploma courses in Polytechnics are totally on merit basis of qualifying exams (i.e.10th class).

Eligibility and Basis of Admission in Diploma Courses for the Session 2022-23

S. No.	Name of Course
1.	Diploma Engg.* (including HGST, KM and TFW Categories)

Eligibility 10th with 35% marks (33% in case of candidates belonging to Scheduled Castes and Scheduled Tribes category or Kashmiri Migrants Category).

Compulsory pass in Maths & Science subjects.

Basis of Admission: Inter-se-merit of Secondary School Examination (Matriculation) or equivalent qualifying examination.

2. Diploma (Engg.) Lateral Entry (including TFW Category)

Eligibility : 10+2/ ITI (02 years)

Basis of Admission: Rank of Lateral Entry Diploma Entrance Test (DET-L) to be conducted by HSTES.

*Up to session 2015-16, admissions in Diploma (Engg.) Course were made on the basis of Rank of Diploma Entrance Test (DET). From the session 2016-17 onwards, admissions in Diploma (Engg.) Course shall be made on the basis of Merit of Qualifying Examination.

1. Information Brochure: The information brochures of all Diploma Courses i.e. Diploma Prospectus – 2022 will be available online at HSTES website www.hstes.org.in in 2nd or 3rd week of May.

2. Application Form: Applications for admissions in all the courses shall be invited online at www.onlinetesthry.gov.in.

Diploma (Engg.) Lateral entry TFW (Tuition Fees Waiver) scheme.

Admissions in TFW Category shall be made on the basis of Rank of DET (L)-2022, so candidates applying for this category must apply/ appear in DET (L)-2022. Further, the candidates must deposit the Printout of Online Filled Application Form for TFW Category along with relevant documents/ proof of deposit of the Entrance Test Fee at HSTES, Panchkula as per latest schedule (please visit www.hstes.org.in) .♣

The candidate must upload the following documents along with the online application

Signature of the Principal/ Head of the Institution

form:

- **Colored Photograph of the candidate.**
- **Specimen Signature of the candidate.**

For any enquiry/ help regarding applying online, Entrance Test, counseling etc. candidates may contact nearby Govt./ Govt. Aided Polytechnics or HARYANA STATE TECHNICAL EDUCATION SOCIETY (Under Department of Technical Education, Govt. of Haryana) Bay Nos.: 7-12, Sector-4, Panchkula, Haryana (Toll Free: 18001373735)

E-mail: Onlineadmissionhelp@gmail.com, Website: www.hstes.org.in)

For the admission in diploma courses the tentative schedule by HSTES given on their

Website:- **www.hstes.org.in**

Mention the minimum level of acceptance, if any

Mention the cut-off levels of percentage and percentile score of the candidates in the admission test for the last three years: No Admission test because admission is based on the percentage of marks in Matriculation Exam for 1st year and on the basis of Admission test for Lateral Entry to direct 2nd Year.

Display marks scored in Test etc. and in aggregate for all candidates who were admitted

List of Applicants

List of candidate whose applications have been received along with percentile/percentage score for each of the qualifying examination in separate categories for open seats. List of candidate who have applied along with percentage and percentile score for Management quota seats --- *Not Applicable*

Results of Admission Under Management seats/Vacant seats – NOT APPLICABLE

Composition of selection team for admission under Management Quota with the brief profile of members (This information be made available in the public domain after the admission process is over)

- Score of the individual candidate admitted arranged in order or merit
- List of candidate who have been offered admission
- Waiting list of the candidate in order of merit to be operative from the last date of joining of the first list candidate
- List of the candidate who joined within the date, vacancy position in each category before operation of waiting list

13. Information of Infrastructure and Other Resources Available**a. Number of Class Rooms and size of each**

Sr. No.	Room Type	Room No.	Average Carpet Area (Sqm)
1	Class Room	R-07	48
2		R-101	47
3		R-104	73
4		R-106	97
5		R-108	98
6		R-109	77
7		R-110	66

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8		R-111	60
9		R-114	94
10		R-116	73

b. Number of Tutorial rooms and size of each

Sr. No.	Room Type	Room No.	Average Carpet Area (Sqm)
1	Tutorial Room	R-122D	100

c. Number of Laboratories and size of each

Sr. No.	Room Type	Room No.	Average Carpet Area (Sqm)
1	Laboratories	R-02	120
2		R-08	124
3		R-09	77
4		R-10	73
5		R-102A	169
6		R-105	120
7		R-11	73
8		R-115	71
9		R-117	97
10		R-118	73
11		R-119	97
12		R-12	97
13		R-120	73
14		R-121	97
15		R-123	100
16		R-124	100
17		R-13A	200
18		R-14	39
19		R-16A	80
20		R-16B	80
21		R-16C	85
22		R-18	48

c. Number of Drawing Halls with capacity of each

Sr. No.	Room Type	Room No.	Average Carpet Area (Sqm)
1	Drawing Halls	R-122 B	69
2		R-122 C	71

d. Number of Computer Centres with capacity of each: 01 with capacity 30

e. Central Examination Facility, Number of rooms and capacity of each

Signature of the Principal/ Head of the Institution

Sr. No.	Room Type	Room No.	Capacity
1	Examination Hall	E H	200
2	Class Room	R-07	30
3		R-101	30
4		R-104	40
5		R-106	50
6		R-108	50
7		R-109	40
8		R-110	40
9		R-111	40
10		R-114	50
11		R-116	50

f. Barrier Free Built Environment for disabled and elderly persons: **YES**

g. Occupancy Certificate: **YES**

h. Fire and Safety Certificate: **YES**

i. Hostel Facilities: **YES**

j. Library

- i. Number of Library books: **20081**
- ii. Titles: 1952
- iii. Journals available: **18**
- iv. List of online National/ International Journals subscribed: **YES**
- v. E- Library facilities: **Yes Available**

k. Laboratory and Workshop

- vi. List of Major Equipment/Facilities in each Laboratory/ Workshop

Sr. No.	Name of Dept.	Name of Lab	Major Equipments
1	Civil Engg.	CONCRETE LAB	CTM, MIXER MACHINE, REBOUND HAMMER, SLUMP TEST APPARATUS, ELECTRIC OVEN, COMPRESSION TESTING MACHINE
2		HIGHWAY ENGG. LAB	BITUMEN DUCTILITY TESTING MACHINE, ABRASION TESTING MACHINE, CBR TEST APPARATUS
3		SOIL AND FOUNDATION ENGINEERING	UNCONFINED COMPRESSION TEST APPARATUS, PENETRATION TEST APPARATUS, POST HOLE AUGER
4		STRUCTURAL MECHANICS LAB	DIRECT SHEAR TEST APPARATUS, DEFLECTION BEAM APPARATUS, SINGLE ROOF TRUSS APPARATUS

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5		SURVEYING	AUTO-LEVEL, VERNIER-THEODOLITE, PRISMATIC COMPASS
6		WS & WW LAB	PH METER, FLOCCULATOR, TURBIDITY METER, AIR TESTING KIT, CONDUCTIVITY METER, WATER SUPPLY FITTING MODEL
7	Computer Engg.	COMPUTER LAB1	COMPUTER SYSTEM, ONLINE UPS PROJECTOR, VISUALIZER, MFD, DIGITAL TEACHING SYSTEM, PRINTER, EQUIPED WITH NETWORKING
8		COMPUTER LAB2	COMPUTER SYSTEM, ONLINE UPS, PRINTER, PROJECTOR, EQUIPED WITH NETWORKING
9		COMPUTER LAB3	COMPUTER, ONLINE UPS, PRINTER, COMPUTER ACCESSORIES
10	Electrical Engg.	DEM LAB	8085 KIT, TTL IC LOGIC KIT, HALF ADDER & FULL ADDER, CRO, FUNCTION GENERATOR
11		ELECTRICAL MACHINE	THREE PHASE INDUCTION MOTOR KIT, SYNCHRONOUS MOTOR, ALTERNATOR, DC MOTOR KIT, SINGLE PHASE I.M. KIT
12		ELECTRICAL WORKSHOP	MCB, 1 & 3 PHASE MOTOR, PVC WIRING, DISTRIBUTION BOARD, FAULT FINDING, INTER LOCKING CIRCUIT ETC.
13		ELECTRONICS ENGG. LAB	DIODE JUNCTION, TRANSISTOR, CB/CE & CC KIT, FET, UJT, ZENER DIODE KIT, H/W & F/W KIT, RC COUPLING
14		EMMI LAB	ENERGY METER, TRANSFORMER KIT, POWER MEASUREMENT, POWER FACTOR MEASUREMENT KIT, AUTO TRANSFORMER KIT
15		IECD LAB	TRIAC CHARACTERISTIC KIT, SCR, DIAC KIT, SCR HW CONTROL RECTIFIER, CRO, UJT KIT, DC MOTOR SPEED CTRL
16		INSTRUMENTATION LAB	LOAD CELL, PT, CT, LVDT, AUTO TRANSFORMER, LCR Q METER, CRO, STRAIN GUAGE
17		MACHINE LAB	DC MOTOR KIT, PARALLEL OPERATION KIT, TRANSFORMER KIT, INDUCTION MOTOR KIT
18		PLC & MICROCONTROLLER LAB	MICRO CONTROLLER KIT (8051), PLC MODEL, DESKTOP PC WITH SOFTWARE, PLC MODELS FOR APPLICATION ETC
19	Electronics &	COMMUNICATION	AM, FM, MODULATOR,

	Communication Engg.	SYSTEM LAB	DEMODULATOR, CRO, FUNCTION GENERATOR
20		CONSUMER ELECTRONICS LAB	COLOUR TV TRAINER, BLACK & WHITE TV TRAINER, MICROPHONE, LOUDSPEAKER
21		DIGITAL ELECTRONICS	LOGIC GATES, COUNTERS, ALU, SHIFT RESISTERS
22		INSTRUMENTATION	LVDT, THERMOCOUPLE, THERMISTER
23		MEDICAL ELECTRONICS LAB	ECG, GLUCOMETER, PULSE RATE METER, BP APPARATUS, RESPIRATION RATE METER
24		MICROPROCESSOR & MICROCONTROLLER LAB	8085 MICROPROCESSOR, 8051 MICROCONTROLLER
25		MWR LAB	MICROWAVE OVEN, MICROWAVE BENCHES
26		NFTL LAB	SYMMETRICAL & ASYMMETRICAL T & PIE NETWORK, FILTERS, ATTENUATOR
27		OPTICAL FIBER COMMUNICATION LAB	OPTICAL FIBER BENCHES
28		POWER ELECTRONICS LAB	SCR, TRIAC, UJT, DIAC, CRO
29		PROJECT LAB	SOLDERING & DESOLDERING STATION
30		TSEE LAB	UPS TRAINER CORDLESS PHONE TRAINER, DVD TRAINER, CRO TRAINER
31		WIRELESS & MOBILE COMMUNICATION LAB	MOBILE TRAINER, GSM TRAINER, CORDLESS TRAINER
32		Mechanical Engg.	APPLIED MECHANICS
33	AUTOMOBILE ENGG. LAB		STEERING SYSTEM, IGNITION SYSTEM, COOLING SYSTEM, LUBRICATION SYSTEM, TRANSMISSION SYSTEM ETC.
34	BEEE LAB		BATTERY TEST SETUP, OHM'S LAW KIT, RESISTANCE VERIFICATION KIT, VI CHARACTERISTICS, PN JUNCTION KIT
35	CAD LAB		DESKTOP PC, PROJECTOR,

			VISUALIZER, INTERACTIVE DISPLAY BOARD, ONLINE UPS 1.5 KVA
36		CHEMISTRY LAB	ELECTROPLATING KIT REDWOOD VISCOMETER VARIOUS KITS INCLUDING CHEMICALS & SALTS ETC.
37		ELECTRICAL & ELECTRONICS	DRILL MACHINE, POWER SUPPLY CHANNEL, CRI 20 MHG., BREAD BOARD, CAPACITORS, MULTIMETERS, ETC.
38		FITTING SHOP	BENCH VICE, DRILL MACHINE, HAMMERS, INSTRUMENTS, SWAGE BLOCK, ANVILS, WORKING TABLES, TOOLS KITS ETC.
39		HYDRAULICS LAB	BERNAULI'S THEOREM APPARATUS, VENTURI METER, PIPE FRICTION APPARATUS, PUMP TEST RIG ETC.
40		LANGUAGE LAB	COMPUTER SYSTEMS, HEADPHONES, LANGUAG E SOFTWARE, DTS SYSTEM
41		MATERIAL & METALLURGY	METALLURGYICAL MICROSCOPE SURFACE PLATE HCS SPECIMEN LCS SPECIMEN DIGITAL FURNACE ETC.
42		MM LAB	MICROSCOPE, CAMERA FOR METALLURGY TEST, POLISHING MACHINE, FURNACE FOR HEAT TREATMENT ETC.
43		PAINT SHOP	AIR COMPRESSOR UNIT, POWDER COATING SYSTEM, OVEN, SINGLE CYCLONE RECOVERY BOOTH CHAMBER ETC.
44		PHYSICS LAB	COMPOUND MICROSCOPE CANTILEVER GALVANOMETER VOLTMETER OHM'S LAW KIT BAROMETER, VARIOUS KITS
45		REFRIGERATION & AIR CONDITIONING	ICE PLANT, COLD STORAGE PLANT, TOOL KITS, CUT SECTION OF COMPRESSOR ETC.
46		SOM LAB	Bending Test M/c, Hardness Tester etc
47		THERMODYNAMICS LAB	THERMOCOUPLE, THERMOMETERS, MODEL & MOUNTING ACCESSORIES OF BOILER, HEAL TRANSFER APPRATUS ETC.

48		WELDING SHOP	MIG WELDING MACHINE WELDING TRANSFORMER, BENCH VICE, SWAGE BLOCK, ANVILS, SCREENS, RODS, HAMMERS etc
49	Medical Lab Technology	ANATOMY & PHYSIOLOGY LAB	PROJECTOR, BP APPARATUS, STETHOSCOPE, BRAIN & SPINAL CORD MODEL, EYE & EAR MODEL, HEART MODEL ETC
50		BIOCHEMISTRY LAB	CENTRIFUGE, COLORIMETER, FLAME PHOTOMETER, BALANCE, WATER BATH, MICROSCOPE
51		HAEMATOLOGY LAB	BALANCE, HB METER, COUNTING CHAMBER, MICROSCOPE, STOPWATCH, CENTRIFUGE, BP APPARATUS, NEAUBAR CHAMBE
52		HEMATOLOGY LAB	CENTRIFUGE, COLORIMETER, AUTOCLAVE, DISTILLATION PLANT ETC.
53		HISTOPATHOLOGY LAB	MICROSCOPES, MICROTOME, WATER BATH, NEEDLE CUTTER, VDRL ROTATOR, RAZOR SHARPNER ETC.
54		MICROBILOGY	AUTOCLAVE, INCUBATOR, BALANCE, CENTRIFUGE, MICROSCOPE, WATERBATH , VDRL SHAKER, MICROSCOPE
55		MICROBIOLOGY LAB	MICROSCOPES, CENTRIFUGE, WATER BATH, NEEDLE CUTTER, AUTOCLAVE, HOT AIR OVEN INCUBATOR ETC.

vii. List of Experimental Setup in each Laboratory/ Workshop

English:-

1. Listening Exercises
2. Self and Peer Introduction
3. Debate
4. Situational Conversations: Offering - Responding to offers; Requesting – Responding to requests; Congratulating; Expressing sympathy and condolence; Apologizing and Forgiving; Complaining; Warning; Asking and giving information; Getting and giving permission; Asking for and giving opinions; Talking about likes and dislikes
5. Just a minute sessions – Extempore
6. Group Discussion 7. Newspaper reading 8. Mock Interviews: Telephonic and Personal

Physics:-

1. To find diameter of solid cylinder using a vernier calliper
2. To find internal diameter and depth of a beaker using a vernier calliper and hence find its volume.
3. To find the diameter of wire using screw gauge
4. To find thickness of paper using screw gauge.
5. To determine the thickness of glass strip using a spherometer

6. To determine radius of curvature of a given spherical surface by a spherometer.
7. To verify parallelogram law of forces
8. To determine the atmospheric pressure at a place using Fortin's Barometer
9. To determine force constant of spring using Hooke's law
10. Measuring room temperature with the help of thermometer and its conversion in different scale.
11. To find the time period of a simple pendulum
12. To determine and verify the time period of Cantilever
13. To verify ohm's laws by plotting a graph between voltage and current.
14. To verify laws of resistances in series combination.
15. To verify laws of resistance in parallel combination.
16. To find resistance of galvanometer by half deflection method
17. To verify laws of reflection of light using mirror.
18. To verify laws of refraction using glass slab.
19. To find the focal length of a concave lens, using a convex lens
20. To study colour coding scheme of resistance.

Chemistry:-

1. Volumetric analysis and apparatus used their in.
2. To prepare standard solution of oxalic acid (N/20).
3. To determine the strength of given sodium hydroxide solution by titrating against standard oxalic acid (N/10) solution using phenolphthalein as indicator.
4. Gravimetric analysis and apparatus used their in.
5. To determine the percentage of moisture in given sample of coal.
6. To determine the percentage of ash in given sample of coal.
7. To determine the percentage of volatile and non volatile substance in given mixture.
8. To determine the viscosity of lubricant by using Redwood viscometer.
9. To determine total acid number (TAN) or Total acid value of given lubricant (liquid).
10. Detection of iron metal in the given solution of rust.

APPLIED MECHANICS:-

1. Verification of the polygon law of forces using Gravesand's apparatus.
2. To verify the forces in different members of jib crane.
3. To verify the reaction at the supports of a simply supported beam.
4. To find the mechanical advantage, velocity ratio and efficiency in case of an inclined plane.
5. To find the mechanical advantage, velocity ratio and efficiency of a screw jack.
6. To find the mechanical advantage, velocity ratio and efficiency of worm and worm wheel.
7. To find mechanical advantage, velocity ratio and efficiency of single purchase crab.
8. To find out center of gravity of regular lamina.
9. To find out center of gravity of irregular lamina.
10. To determine coefficient of friction between three pairs of given surface.

ENVIRONMENTAL STUDIES:-

1. Determination of pH of drinking water
2. Determination of TDS in drinking water
3. Determination of TSS in drinking water
4. Determination of hardness in drinking water
5. Determination of oil & grease in drinking water
6. Determination of alkalinity in drinking water

7. Determination of acidity in drinking water
8. Determination of organic/inorganic solid in drinking water
9. Determination of pH of soil
10. Determination of N&P (Nitrogen & Phosphorus) of soil
11. To measure the noise level in classroom and industry.
12. To segregate the various types of solid waste in a locality.
13. To study the waste management plan of different solid waste
14. To study the effect of melting of floating ice in water due to global warming

INFORMATION TECHNOLOGY:-

1. Given a PC, name its various components and peripherals. List their functions .
2. Installing various components of computer system and installing system software and application software
3. Installation of I/O devices, printers and installation of operating system viz. Windows/BOSS/ LINUX
4. Features of Windows as an operating system
 - Start
 - Shut down and restore
 - Creating and operating on the icons
 - Opening, closing and sizing the windows and working with windows interfacing elements (option buttons, checkbox, scroll etc.)
 - Using elementary job commands like – creating, saving, modifying, renaming, finding and deleting a file and folders
 - Changing settings like, date, time, colour (back ground and fore ground etc.)
 - Using short cuts
 - Using on line help
5. Word Processing (MS Office/Open Office)
 - a) File Management:
 - a) Opening, creating and saving a document, locating files, copying contents in some different file(s), protecting files, giving password protection for a file
 - b) Page set up:
 - Setting margins, tab setting, ruler, indenting
 -
 - c) Editing a document:
 - Entering text, cut, copy, paste using tool- bars
 - d) Formatting a document:
 - Using different fonts, changing font size and colour, changing the appearance through bold/italic/underlined, highlighting a text, changing case, using subscript and superscript, using different underline methods
 - Aligning of text in a document, justification of document, inserting bullets and numbering
 - Formatting paragraph, inserting page breaks and column breaks, line spacing
 - Use of headers, footers: Inserting footnote, end note, use of comments, autotext
 - Inserting date, time, special symbols, importing graphic images, drawing tools
 - e) Tables and Borders:
 - Creating a table, formatting cells, use of different border styles, shading in tables, merging of cells, partition of cells, inserting and deleting a row in a table
 - Print preview, zoom, page set up, printing options
 - Using find, replace options
 - f) Using Tools like:

- Spell checker, help, use of macros, mail merge, thesaurus word content and statistics, printing envelopes and labels
 - Using shapes and drawing toolbar,
 - Working with more than one window
6. Spread Sheet Processing (MS Office/Open Office)
- a) Starting excel, open worksheet, enter, edit, data, formulae to calculate values, format data, save worksheet, switching between different spread sheets
 - b) Menu commands: Create, format charts, organise, manage data, solving problem by analyzing data. Programming with Excel Work Sheet, getting information while working
 - c) Work books: Managing workbooks (create, open, close, save), working in work books, selecting the cells, choosing commands, data entry techniques, formula creation and links, controlling calculations Editing a worksheet, copying, moving cells, pasting, inserting, deletion cells, rows, columns, find and replace text, numbers of cells, formatting worksheet, conditional formatting
 - d) Creating a chart:

Working with chart types, changing data in chart, formatting a chart, use chart to analyze data

Using a list to organize data, sorting and filtering data in list

e) Retrieve data with query: Create a pivot table, customizing a pivot table. Statistical analysis of data

f) Exchange data with other application: Embedding objects, linking to other applications, import, export document.

7. PowerPoint Presentation (MS Office/Open Office)

a) Introduction to PowerPoint

- How to start PowerPoint
- Working environment: concept of toolbars, slide layout & templates.
- Opening a new/existing presentation
- Different views for viewing slides in a presentation: normal, slide sorter.

b) Addition, deletion and saving of slides

c) Insertion of multimedia elements

- Adding text boxes
- Adding/importing pictures
- Adding movies and sound
- Adding tables and charts etc.
- Adding organizational chart
- Editing objects
- Working with Clip Art

d) Formatting slides

- Using slide master
- Text formatting
- Changing slide layout
- Changing slide colour scheme
- Changing background

- Applying design template
- e) How to view the slide show?
 - Viewing the presentation using slide navigator
 - Slide transition
 - Animation effects, timing, order etc.
- f) Use of Pack and Go Options.

8. Internet and its Applications

- a) Establishing an internet connection.
 - b) Browsing and down loading of information from internet.
 - c) Sending and receiving e-mail
 - Creating a message
 - Creating an address book
 - Attaching a file with e-mail message
 - Receiving a message
 - Deleting a message
 - d) Assigning IP Addresses to computers and use of domain names.
- ## 9. Functioning of Antivirus

- a) Installation and updation of an antivirus.
- b) How to scan and remove the virus

FLUID MECHANICS:-

1. To verify Bernoulli's Theorem
2. To find out venturimeter coefficient
3. To determine coefficient of velocity (C_v), Coefficient of discharge (C_d) Coefficient of contraction (C_c) of an orifice and verify the relation between them
4. To perform Reynold's experiment
5. To verify loss of head in pipe flow due to
 - a. Sudden enlargement
 - b. Sudden contraction
 - c. Sudden bend
6. Demonstration of use of current meter and pitot tube
7. To determine coefficient of discharge of a rectangular notch and triangular notch.

APPLIED MECHANICS:-

1. Verification of the polygon law of forces using Gravesand's apparatus.
2. To verify the forces in different members of jib crane.
3. To verify the reaction at the supports of a simply supported beam.
4. To find the mechanical advantage, velocity ratio and efficiency in case of an inclined plane.
5. To find the mechanical advantage, velocity ratio and efficiency of a screw jack.
6. To find the mechanical advantage, velocity ratio and efficiency of worm and

worm wheel.

7. To find mechanical advantage, velocity ratio and efficiency of single purchase crab.
8. To find out center of gravity of regular lamina.
9. To find out center of gravity of irregular lamina.
10. To determine coefficient of friction between three pairs of given surface.

SURVEYING – I:-

I. Chain surveying:

- i)
 - a) Ranging a line
 - b) Chaining a line and recording in the field book
 - c) Taking offsets - perpendicular and oblique (with a tape only)
 - d) Setting out right angle with a tape
- ii) Chaining of a line involving reciprocal ranging
- iii) Chaining a line involving obstacles to ranging
- iv) Chain Survey of a small area.

II. Compass Surveying:

- i)
 - a) Study of prismatic compass
 - b) Setting the compass and taking observations
 - c) Measuring angles between the lines meeting at a point

III. Levelling:

- i)
 - a) Study of dumpy level and levelling staff
 - b) Temporary adjustments of various levels
- c) Taking staff readings on different stations from the single setting and finding differences of level between them
 - ii)
 - a) To find out difference of level between two distant points by shifting the instrument
 - iii) Longitudinal and cross sectioning of a road/railway/canal
 - iv) Setting a gradient by dumpy and auto-level

IV. Plane Table Surveying:

- i)
 - a) Study of the plane table survey equipment
 - b) Setting the plane table
 - c) Marking the North direction
 - d) Plotting a few points by radiation method
- ii)
 - a) Orientation by
 - Trough compass
 - Back sighting
 - b) Plotting few points by intersection, radiation and resection method
- iii) Traversing an area with a plane table (at least five lines)

- V. Layout of Buildings (from given drawing of two room residential building) by use of surveying instruments.

CONSTRUCTION MATERIALS:-

- i) To identify the stones used in building works by visual examination
- ii) To determine the crushing strength of bricks
- iii) To determine the water absorption of bricks and efflorescence of bricks
- iv) To identify various types of timbers such as: Teak, Sal, Chir, Shisham, Deodar, Kail & Hollock by visual examination only
- v) The students should submit a report work on the construction materials, covering water proofing material, cements, steel, paints and timber products available in the local market. They will also show the competitive study based upon the cost, brand name, sizes available in the local market.

BUILDING CONSTRUCTION:-

1. Demonstration of tools and plants used in building construction
2. To prepare Layout of a building: two rooms building with front verandah
3. To construct brick bonds (English bond only) in one, one and half and two brick thick: (a) Walls for L, T and cross junction (b) Columns
4. Demonstration of following items of work at construction site by:
 - a) Timbering of excavated trenching
 - b) Laying damp proof courses
 - c) Construction of masonry walls
 - d) Laying of tile flooring on an already prepared lime concrete base
 - e) Plastering and pointing exercise
 - f) Constructing RCC work
- g) Pre-construction and post construction termite treatment of building and woodwork
- h) Interlocking tiles

CONCRETE TECHNOLOGY:-

1. To determine the physical properties of cement such as fineness, consistency, setting time, soundness and compressive strength of cement as per IS Codes
2. To determine flakiness at elongation Index of coarse aggregate
3. To determine silt content in fine aggregate
4. Determination of specific gravity and water absorption of aggregates
5. Determination of bulk density and voids of aggregates
6. Determination of particle size distribution of fine, coarse and all-in-aggregate by sieve analysis (grading of aggregate)
7. To determine bulking of fine aggregates
8. To determine workability by slump test and to verify the effect of water, fine aggregate/coarse aggregate ratio and aggregate/Cement ratio on slump
9. Compaction factor test for workability
10. Non destructive test on concrete by:
 - a) Rebound Hammer Test
 - b) Ultrasonic Pulse Velocity Test
11. To determine compressive strength of concrete cubes for different grades of concrete
12. To determine flexural strength of concrete beam

PUBLIC HEALTH ENGINEERING:-

- 1) To determine turbidity of water sample
- 2) To determine dissolved oxygen of given sample
- 3) To determine pH value of water
- 4) To perform jar test for coagulation
- 5) To determine BOD of given sample
- 6) To determine residual chlorine in water
- 7) To determine conductivity of water and total dissolved solids
- 8) To study the installation of following:
 - a) Water meter
 - b) Connection of water supply of building with main
 - c) Pipe valves and bends
 - d) Water supply and sanitary fittings
- 9) To study and demonstrate the joining/Periodseading of GI Pipes, CI Pipes, SWG pipes, PVC pipes and copper pipes.
- 10) To demonstrate the laying of SWG pipes for sewers
- 11) Study of water purifying process by visiting a field lab.
- 12) Demonstration of plumbing tools.

SURVEYING – II:-

I. Contouring:

- i) Preparing a contour plan by radial line method by the use of a Tangent Clinometer/Tachometer
- ii) Preparing a contour plan by method of squares
- iii) Preparing a contour plan of a Road/Railway track/Canal by taking cross sections.

II. Theodolite:

- i) Taking out the Theodolite, mounting on the tripod and placing it back in the box
- ii) Study of a transit vernier theodolite; temporary adjustments of theodolite
- iii) Reading the vernier and working out the least count, measurement of horizontal angles by repetition and reiteration methods
 - iv) Measurement of vertical angles and use of tachometric tables
 - v) Measurement of magnetic bearing of a line
- vi) Running a closed traverse with a theodolite (at least five sides) and its plotting
- vii) Height of objects with and without accessible bases

III. Curves

- i) Setting out of a simple circular curve with given data by the following methods
 - a) Offsets from the chords produced
 - b) One theodolite method

IV. Minor instruments:

- i) Demonstration and use of minor instruments like Ceylon Ghat Tracer, Tangent Clinometer, Pantagraph, Abney level etc.
- ii) Use of planimeter for computing areas

V. Demonstration of digital instruments Periodic field visits to Survey of India and other government agencies.

VI. To plot an area with the help of Total Station

STRUCTURAL MECHANICS:-

- i) Determination of yield stress, ultimate stress, percentage elongation and plot the stress strain diagram and compute the value of young's modulus on mild steel
- ii) Testing of HYSD Steel
- iii) Determination of Young's modulus of elasticity for steel wire with searl's apparatus
 - iv) Determination of modulus of rupture of a concrete beam
- v) Determination of maximum deflection and young's modulus of elasticity in simply supported beam with load at middle third point
- vi) Verification of forces in a framed structure

HIGHWAY ENGINEERING:-

1. Determination of penetration value of bitumen
2. Determination of softening point of bitumen
3. Determination of ductility of bitumen
4. Determination of impact value of the road aggregate
5. Determination of abrasion value (Los Angeles') of road aggregate
6. Determination of crushing strength of aggregate
7. Determination of flakiness and elongation index of aggregate
8. Determination of the California bearing ratio (CBR) for the sub-grade soil
9. Demonstration of working of hot mix plant through a field visit
10. Visit to highway construction site for demonstration of operation of:
Tipper, tractors (wheel and crawler), scraper, bulldozer, dumpers, shovels, grader, roller, dragline, road pavers, JCB
11. Demonstration of working of mixing and spraying equipment through a field visit

COMPUTER APPLICATIONS IN CIVIL ENGINEERING:-

1. Introduction and use of AutoCAD for making 2D Drawings and develop plan, section and elevation of a residential building
2. Demonstration of various Civil Engineering softwares like STAAD-Pro, Revit or Primavera Project Planner, Auto CIVIL & Mx Road, Build Superfast, BIM, ArcGIS or any other equivalent software

SOIL MECHANICS AND FOUNDATION ENGINEERING:-

1. To determine the moisture content of a given sample of soil
2. Auger Boring and Standard Penetration Test
 - a) Identifying the equipment and accessories
 - b) Conducting boring and SPT at a given location
 - c) Collecting soil samples and their identification
 - d) Preparation of boring log and SPT graphs
 - e) Interpretation of test results
3. Extraction of Disturbed and Undisturbed Samples
 - a) Extracting a block sample
 - b) Extracting a tube sample
 - c) Extracting a disturbed samples for mechanical analysis.

- d) Field identification of samples
4. Field Density Measurement (Sand Replacement and Core Cutter Method)
 - a) Calibration of sand
 - b) Conducting field density test at a given location
 - c) Determination of water content
 - d) Computation and interpretation of results
5. Liquid Limit and Plastic Limit Determination:
 - a) Identifying various grooving tools
 - b) Preparation of sample
 - c) Conducting the test
 - d) Observing soil behaviour during tests
 - e) Computation, plotting and interpretation of results
6. Mechanical Analysis
 - a) Preparation of sample
 - b) Conducting sieve analysis
 - c) Computation of results
 - d) Plotting the grain size distribution curve
 - e) Interpretation of the curve
7. Laboratory Compaction Tests (Standard Proctor test)
 - a) Preparation of sample
 - b) Conducting the test
 - c) Observing soil behaviour during test
 - d) Computation of results and plotting
 - e) Determination of optimum moisture and maximum dry density
8. Direct Shear Test
9. Permeability Test
10. Demonstration of Unconfined Compression Test
 - a) Specimen preparation
 - b) Conducting the test
 - c) Plotting the graph
 - d) Interpretation of results and finding/bearing capacity
11. Demonstration of Vane shear Test

PLUMBING SERVICES:-

1. Carry out simple job requiring cutting mild steel plate, filing, drilling and tapping holes etc.
2. Practice cutting, threading and bending of metal pipes; cutting and shaping of PVC pipes
3. Carry out simple pipe connections requiring use of bends, tees, elbows etc.
4. Erect simple water supply system
5. Test drainage lines by using different testing methods
6. Practice fixing of different valves
7. Install sanitary fittings like washbasin, Sink, Floor traps, Urinal, Bathtub and heating appliance like geyser

PROGRAMMING IN C:-

1. Programming exercises on executing and editing a C program.
2. Programming exercises on defining variables and assigning values to variables.

3. Programming exercises on arithmetic and relational operators.
4. Programming exercises on arithmetic expressions and their evaluation.
5. Programming exercises on formatting input/output using printf and scanf and their return type values.
6. Programming exercises using if statement.
7. Programming exercises using if – Else.
8. Programming exercises on switch statement.
9. Programming exercises on do – while, statement.
10. Programming exercises on for – statement.
11. Simple programs using pointers.
12. Programs on one-dimensional array.
13. Programs on two-dimensional array.
14. (i) Programs for putting two strings together.
(ii) Programs for comparing two strings.
15. Simple programs using functions
16. Simple programs using structures.
17. Simple programs using union.

OPERATING SYSTEMS:-

1. Demonstration of all the controls provided in windows control panel.
2. Exercise on Basics of windows.
3. Installation of Linux Operating System
4. Usage of directory management commands of Linux: ls, cd, pwd, mkdir, rmdir
5. Usage of File Management commands of Linux: cat, chmod, cp, mv, rm, pg, more, find
6. Use the general purpose commands of Linux: wc, od, lp, cal, date, who, whoami
7. Using the simple filters: pr, head, tail, cut, paste, nl, sort
8. Communication Commands: news, write, talk, mseg, mail, wall
9. Write a shell program that finds the factorial of a number.
10. Write a shell program that finds whether a given number is prime or not.
11. Write a shell program to find the average of three numbers.
12. Write a shell program that will convert all the text of the file from lowercase to uppercase.

DIGITAL ELECTRONICS:-

1. Verification and interpretation of truth tables for AND, OR, NOT NAND, NOR and Exclusive OR (EXOR) and Exclusive NOR (EXNOR) gates
2. Realisation of logic functions with the help of NAND or NOR gates
3. - To design a half adder using XOR and NAND gates and verification of its operation
- Construction of a full adder circuit using XOR and NAND gates and verify its operation
4. Verification of truth table for positive edge triggered, negative edge triggered, level triggered IC flip-flops (At least one IC each of D latch, D flip-flop, JK flip-flops).
5. Verification of truth table for encoder and decoder ICs, Mux and DeMux
6. To design a 4 bit SISO, SIPO, PISO, PIPO shift registers using JK/D flip flops and verification of their operation.

7. To design a 4 bit ring counter and verify its operation.
8. Use of Asynchronous Counter ICs (7490 or 7493)

MULTIMEDIA APPLICATIONS:-

1. Installation of various multimedia software like Photoshop, Flash, Director or any open source software
2. Installing and use of various multimedia devices
 - Scanner
 - Digital camera, web camera
 - Mike and speakers
 - Touch screen
 - Plotter and printers
 - DVD
 - Audio CD and Video CD
3. Reading and writing of different format on CD/DVD
4. Transporting audio and video files
5. Using various features of Flash
6. Using various features of Photo-shop/GIMP
7. Making multimedia presentations combining, Flash, Photo-shop, such as department profile, lesson presentation, games and project presentations.
8. Generation and recognition of bar code & QR code using pre built application/mobile applications.

DATA STRUCTURES USING C:-

Write programmes in C to implement

1. Sorting an array
2. The addition of two matrices using functions
3. The multiplication of two matrices
4. Push and pop operation in stack
5. Inserting and deleting elements in queue
6. Inserting and deleting elements in circular queue
7. Insertion and deletion of elements in linked list
8. Insertion and deletion of elements in doubly linked list
9. The Factorial of a given number with recursion and without recursion
10. Fibonacci series with recursion and without recursion
11. Program for binary search tree operation
12. The selection sort technique
13. The bubble sort technique
14. The quick sort technique
15. The merge sort technique
16. The binary search procedures to search an element in a given list
17. The linear search procedures to search an element in a given list

MICROPROCESSORS AND PERIPHERAL DEVICES:-

1. Familiarization of different keys of 8085 microprocessor kit and its memory map
2. Steps to enter, modify data/program and to execute a programme on 8085 kit
3. Writing and execution of ALP for addition and subtraction of two 8 bit numbers
4. Writing and execution of ALP for multiplication and division of two 8 bit numbers

5. Writing and execution of ALP for arranging 10 numbers in ascending/descending order
6. Writing and execution of ALP for 0 to 9 BCD counters (up/down counter according to choice stored in memory)
7. Interfacing exercise on 8255 like LED display control
8. Interfacing exercise on 8253 programmable interval timer
9. Interfacing exercise on 8279 programmable KB/display interface like to display the hex code of key pressed on display
10. Use of 8085 emulator for hardware testing

DATABASE MANAGEMENT SYSTEM :-

1. Exercises on creation and modification of structure of tables.
2. Exercises on inserting and deleting values from tables.
3. Exercises on querying the table (using select command).
4. Exercises on using various types of joins.
5. Exercises on using functions provided by database package.
6. Exercises on commands like Grant, Revoke, Commit and Rollback etc.
7. Design of database for any application.

COMPUTER NETWORKS :-

1. Recognize the physical topology and cabling (coaxial, OFC, UTP, STP) of a network.
2. Recognition and use of various types of connectors RJ-45, RJ-11, BNC and SCST
3. Making of cross cable and straight cable
4. Install and configure a network interface card in a workstation.
5. Identify the IP address of a workstation and the class of the address and configure the IP Address on a workstation
6. Managing user accounts in windows and LINUX
7. Sharing of Hardware resources in the network.
8. Use of Netstat and its options.
9. Connectivity troubleshooting using PING, IPCONFIG, IFCONFIG
10. Installation of Network Operating System(NOS)
11. Visit to nearby industry for latest networking techniques
12. Create a network of at least 6 computers.

COMPUTER PROGRAMMING USING PYTHON:-

1. Getting started with Python and IDLE in interactive and batch modes
2. What do the following string methods do?
 - lower
 - count
 - replace
3. Write instructions to perform each of the steps below
 - (a) Create a string containing at least five words and store it in a variable.
 - (b) Print out the string.
 - (c) Convert the string to a list of words using the string split method.
- (d) Sort the list into reverse alphabetical order using some of the list methods (you might need to use dir(list) or help(list) to find appropriate methods).

- (e) Print out the sorted, reversed list of words.
- 4. Write a program that determines whether the number is prime.
What is your favorite number? 24
24 is not prime
What is your favorite number? 31
31 is prime
- 5. Find all numbers which are multiple of 17, but not the multiple of 5, between 2000 and 2500?
- 6. Swap two integer numbers using a temporary variable. Repeat the exercise using the code format: a, b = b, a. Verify your results in both the cases.
- 7. Find the largest of n numbers, using a user defined function largest().
- 8. Write a function myReverse() which receives a string as an input and returns the reverse of the string.
- 11. Check if a given string is palindrome or not.
- 12. WAP to convert Celsius to Fahrenheit
- 13. Find the ASCII value of charades
- 14. WAP for simple calculator

CLOUD COMPUTING:-

- 1. Introduction to Cloud Vendors: Amazon, Microsoft, IBM.
- 2. Setting up Virtualization using Virtualbox/VMWare Hypervisor
- 3. Introduction to OwnCloud
- 4. Installation and configuration of OwnCloud software for SaaS
- 5. Accessing Microsoft AZURE cloud-services
- 6. Cloud Simulation Software Introduction: CloudSim

BIG DATA:-

- 1. Installation of Hadoop.
- 2. Setting up a Hadoop cluster.
- 3. Practice of various Hadoop commands
- 4. MapReduce WordCount problem.
- 5. MapReduce TeraSort problem
- 6. Basics of R Programming/ Rstudio

WEB DEVELOPMENT USING PHP:-

- 1. Design PHP based web pages using correct PHP, CSS, and XHTML syntax, structure.
- 2. Create Web forms and pages that properly use HTTP GET and POST protocol as appropriate.
- 3. Design SQL language within MySQL and PHP to access and manipulate databases.
- 4. Install and configure both PHP and MySQL.
- 5. Create PHP code that utilizes the commonly used API library functions built in to PHP.
- 6. Design and create a complete web site that demonstrates good PHP/MySQL client/server design.
- 7. To store a cookie using PHP on client side.
- 8. To save the user session on server side.
- 9. Design website using wordpress or Joomla.

NETWORK SECURITY:-

1. Installation and comparison of various anti virus software
2. Installation and study of various parameters of firewall.
3. Writing program in C to Encrypt/Decrypt using XOR key.
4. Study of VPN.
5. Study of various hacking tools.
6. Practical applications of digital signature.

MOBILE APPLICATION DEVELOPMENT:-

1. Write a program to demonstrate activity (Application Life Cycle)
2. Write a program to demonstrate different types of layouts
3. Write a program to implement simple calculator using text view, edit view, option button and button
4. Write a program to demonstrate list view
5. Write a program to demonstrate photo gallery
6. Write a program to demonstrate Date picker and time picker
7. Develop an simple application with context menu and option menu
8. Develop an application to send SMS
9. Write a program to view, edit contact
10. Write a program to send e-mail
11. Write a program to demonstrate a service
12. Write a program to demonstrate web view to display web site
13. Write a program to display map of given location/position using map view
14. Write a program to demonstrate the application of intent class
15. Write a program to create a text file in a external memory
16. Write a program to store and fetch data from SQL life database.

APPLICATION DEVELOPMENT USING WEB FRAMEWORK:-

1. Practice on HTML, CSS, Java Script, Ajax.PHP & MySql
2. Install WordPress & Create Blogs
3. Manage blogs features e.g. Images, Text Around Images, Comments, Post Formats, Linking, Pages, Categories, Smilies, Feeds, Gravatars, Password Protection
4. Practice various designing features: Colour Scheme, Headers, CSS Horizontal Menus, Dynamic Menu, Highlighting, Navigation Links, Print
5. Read More, Formatting Date and Time, Finding CSS Styles, Creating Individual Pages, Uploading Files, Using WordPress Themes, Templates, Template Tags, Template Hierarchy, Validating a Website, Know Your Sources, WordPress Site Maintenance
6. Integrate PHP & MySql with WordPress
7. Install Moodle & various plugins,
8. Create a Moodle site and Database Schema
9. Design Site appearance, Front page, Front page settings, My Moodle, User profiles, Navigation, Course list, Themes, Theme settings, Header and footer, Language settings, Using web services, Publishing a course, Blogs, RSS feeds
10. Manage Moodle site, Managing authentication, Manual accounts, No login, Email-based self-registration, Account
11. Create Roles and permissions, Assign roles,
12. Implement Password salting.

13. Perform Site backup, Course backup, Course restore, Automated course backup

FUNDAMENTALS OF ELECTRICAL ENGINEERING:-

1. Determination of voltage-current relationship in a dc circuit under specific physical conditions and to draw conclusions (to verify ohm's law)
2. Filament lamp
 - a) Measure the resistance of a cold lamp filament with the help of calculations.
 - b) Measure the current drawn by the lamp at different voltages from zero to 220 volts and the resistance of lamp at different voltages, plot a graph between current and voltage
3. (a) To verify that $R_t = R_1 + R_2 + \dots + R_n$ where R_1, R_2, R_n etc. are resistances connected in series
 (b) To verify

$$\frac{1}{R_t} = \frac{1}{R_1} + \frac{1}{R_2} + \dots + \frac{1}{R_n}$$
 Where R_1, R_2 etc. are resistances connected in parallel
4. Verification of Kirchhoff's current and voltage laws applied to DC circuits
 - a) to construct a circuit arrangement consisting of resistances in series, parallel combination
 - b) identification of node points in the circuit
 - c) to see that algebraic sum of currents at node point is zero
 - d) to see that algebraic sum of emfs and voltage drops in a closed loop is zero
5. To find ratio of inductance values of a coil having air /iron core respectively and to see the effect of introduction of a magnetic core on coil inductance
6. To construct an RL and RC circuit and to measure
 - a) their impedance
 - b) phase angle between voltage and current
 - c) construct impedance triangle
7. Measurement of power and power factor of a single phase RLC circuit. To calculate kVA and kVAR
8. Testing a battery for its charged condition and to charge it

COMPUTER APPLICATIONS IN ELECTRICAL INSTALLATIONS:-

1. MATLAB and SCILAB
 - Introduction to MATLAB, MATLAB Programming – input/output, types of graphs, functions, loops, structures, MATLAB Simulink.
2. LABVIEW
 Graphical Programming using LabVIEW including creation of VIs, subVIs, structures, arrays, clusters, charts and graphs, strings, File I/Os. Practice on NI ELVIS and other DAQ hardware
3. EPAN
 - Utility of EPLAN software

ELECTRONICS – II:-

1. To study the effect of coupling capacitor on lower cut off frequency and upper cut off frequency by plotting frequency response curve of a two stage RC coupled amplifier

2. To measure (a) optimum load (b) output power (c) signal handling capacity of a push-pull amplifier
3. To measure (a) voltage gain (b) input and output impedance for an emitter follower circuit
 - To measure frequency generation in (a) Hartley (b) R-C Phase Shift oscillator
4. To observe the differentiated and integrated square wave on a CRO for different values of R-C time constant
5. Clipping of both portion of sine-wave using:
 - a) diode and dc source
 - b) /*zener diodes
 Clamping a sine-wave to:
 - a) Negative dc voltage
 - b) Positive dc voltage
6. To generate square-wave using an astable multivibrator and to observe the wave form on a CRO and verify the result using p-spice software
7. To observe triggering and working of a bistable multivibrator circuit and observe its output wave form on a CRO
8. To use the op-Amp (IC 741) as inverting one and non-inverting amplifiers, adder, comparator, integrator and differentiator and verify the result using p-spice software
9. To study the pin configuration and working of IC 555 and its use as monostable and astable multivibrator

ESTIMATING AND COSTING IN ELECTRICAL ENGINEERING:-

1. Framing of Tender and reply to tender to get job/project
2. Identification of wiring for different applications
3. Prepare an estimate for a Two room residential building as per given plan
4. Prepare an estimate for service connection for residential building having connected load ---- kW.
5. Visit a nearby substation and list the components with diagram

ELECTRICAL MACHINES – I:-

1. To measure the angular displacement of rotor of the three phase synchronous machine with respect to the stator on application of DC to the field winding and simultaneously to each phase-winding in sequence

OR

Measurement of the angular displacement of the rotor of a slip-ring induction motor on application of DC to stator of motor winding in sequence and simultaneously to each phase of rotor winding

2. Speed control of DC shunt motor (i) Armature control method (ii) Field control method
3. Study of DC series motor with starter (to operate the motor on no load for a moment)
4. Determine efficiency of DC motor by Swinburne's Test at (i) rated capacity (ii) half full load

5. To perform open circuit and short circuit test for determining: (i) equivalent circuit (ii) the regulation and (iii) efficiency of a transformer from the data obtained from open circuit and short circuit test at full load
6. To find the efficiency and regulation of single phase transformer by actually loading it.
7. Checking the polarity of the windings of a three phase transformer and connecting the windings in various configurations
8. Finding the voltage and current relationships of primary and secondary of a three phase transformer under balanced load in various configurations conditions such as
 - (a) Star-star
 - (b) Star-delta
 - (c) Delta-star
 - (d) Delta - Delta configuring conditions.

ELECTRICAL MEASURING INSTRUMENTS AND INSTRUMENTATION:-

1. Use of analog and digital multimeter for measurement of voltage, current (A.C/D.C) and resistance
2. Measurement of pressure by using LVDT
3. To measure the value of earth resistance using earth tester.
4. To measure power, power factor in a single-phase circuit, using wattmeter and power factor meter and to verify results with calculations.
5. Measurement of power and power factor of a three-phase balanced load by two wattmeter method.
6. Measurement of voltage and frequency of a sinusoidal signal using CRO and draw wave shape of signal.
7. Measurement of power in a 3 phase circuit using CT, PT and 3-phase wattmeter.
8. Use of LCR meter for measuring inductance, capacitance and resistance.
9. To record all electrical quantities from the meters installed in the institution premises.
10. To measure Energy at different Loads using Single Phase Digital Energy meter
11. Measurement of temperature by using thermister/Thermal Imager
12. Calibration of single phase and three-phase energy meter

DIGITAL ELECTRONICS:-

1. Verification and interpretation of truth table for AND, OR, NOT, NAND, NOR, X-OR gates
2. Construction of Half Adder using gates
3. Construction of Full Adder using gates
4. To verify the truth table for JK flipflop
5. Construction and testing of any counter
6. Verification of operation of a 8-bit D/A Converter

ELECTRICAL MACHINES – II:-

1. Determination of efficiency by (a) no load test and blocked rotor test on an induction motor (b) direct loading of an induction motor (refer BIS code)
2. Determination of effect of rotor resistance on torque speed curve of an induction motor

3. Observe the performance of a ceiling fan (I- ϕ) induction motor) without capacitor Determine the effect of change in capacitor on the performance of 1-phase induction motor and reverse the direction of motor.
4. To plot relationship between no load terminal voltage and excitation current in a synchronous generator at constant speed
5. Determination of the relationship between the voltage and load current of an alternator, keeping excitation and speed constant
6. Determination of the regulation and efficiency of alternator from the open circuit and short circuit test
7. Determination of the effect of variation of excitation on performance of a synchronous motor

PROGRAMMABLE LOGIC CONTROLLERS AND MICRO CONTROLLERS:-

1. Demonstration of various components/sub-components of a PLC, Learning functions of different modules of a PLC system
2. Practical steps in programming a PLC (a) using a Hand held programmer (b) using computer interface
3. Demonstration to step 5 programming language, ladder diagram concepts, instruction list syntax
4. Basic logic operations, AND, OR, NOT functions
5. Logic control systems with time response as applied to clamping operation
6. Sequence control system e.g. in lifting a device for packaging and counting
7. Use of PLC for an application(teacher may decide)

Micro Controllers:-

1. Demonstration and study of Micro Controllers (8051) kit
2. Testing of general input/output on Micro controller board
3. Controlling of LEDs using microcontroller program

INSTRUMENTATION:-

1. To measure the level of a liquid using a transducer
2. To measure temperature using a thermo-couple
3. Study and use of digital temperature controller
4. Use of thermistor in ON/OFF transducer
5. Study of variable capacitive transducer
6. Draw the characteristics of a potentiometer
7. To measure linear displacement using LVDT
8. To study the use of electrical strain gauge
9. To study weighing machine using load cell
10. To study pH meter.

AUTO ELECTRICAL:-

1. Testing of battery - specific gravity test using hydrometer, voltage test, high rate discharge test; Charging of battery using battery charger.
2. Testing of field winding of alternator and armature of starter motor for open circuit, short circuit and earthing.

3. Study and sketching of various lighting circuits on a working model circuit board.
4. Basic electrical checks:- Battery connections, electrical bulbs and units, circuit protection devices, wiring harness connections, colour coding.
5. Replacement of head lamps, tail lamps, indicator lamps, fog lamps and lamp holders.
6. Head light beam alignment and setting
7. Testing and setting of horn and relay.
8. Servicing of windscreen wiping system; replacement of wiper blade assembly.

SOLAR PANEL INSTALLATION AND MAINTENANCE:-

1. Panel Installation
2. Using Tools and Machines
3. Handling Safety Equipment

ELECTRICAL POWER-II :-

1. Testing of the dielectric strength of transformer oil and air
2. Study of different types of circuit breakers and isolators by visiting power station
3. Plot the time current characteristics of over current relay
4. Power measurement by using CTs and PTs
5. Earthing of different equipment/Main Distribution Board and Energy Meter Box
6. Perform the overload and short circuit test of MCB as per IS specifications
7. Plot the time-current characteristics of Kit-Kat fuse wire
8. Measurement of current on any LT line with clip meter

INDUSTRIAL ELECTRONICS AND CONTROL OF DRIVES:-

1. To draw V-I characteristics of an SCR
2. To draw V-I characteristics of a TRIAC
3. To draw V-I characteristics of a DIAC
4. To draw uni-junction transistor characteristics
5. Observe the output wave of an UJT relaxation oscillator
6. Observe the wave shape across SCR and load of an illumination control circuit
7. Fan speed regulator using TRIAC Quadriac (fabrication of this circuit)
8. Speed-control of a DC shunt motor or universal motor
9. To observe the output wave shape on CRO of (a) Single phase half controlled full wave rectifier(b)Single phase controlled rectifier

ELECTRONIC INSTRUMENTS AND MEASUREMENT:-

1. Measurement of voltage, resistance, frequency using digital multimeter
2. Measurement of voltage, frequency, time period and phase using CRO
3. Measurement of voltage, frequency, time and phase using DSO
4. Measurement of Q of a coil
5. Measurement of resistance and inductance of coil using RLC Bridge
6. Measurement of impedance using Maxwell Induction Bridge
7. To find the value of unknown resistance using Wheat Stone Bridge
8. Measurement of distortion using Distortion Factor Meter
9. Use of logic pulser and logic probe

PRINCIPLES OF COMMUNICATION ENGINEERING:-

1. a) To observe an AM wave on CRO produced by a standard signal generator using internal and external modulation
- b) To measure the modulation index of the wave obtained in above practical
2. a) To obtain an AM wave from a square law modulator circuit and observe waveforms
- b) To measure the modulation index of the obtained wave form.
3. To obtain an FM wave and measure the frequency deviation for different modulating signals.
4. To obtain modulating signal from an AM detector circuit and observe the pattern for different RC time constants and obtain its optimum value for least distortion.
5. To obtain modulating signal from FM detector.
6. To observe the sampled signal and compare it with the analog input signal. Note the effect of varying the sampling pulse width and frequency on the sampled output.
7. To observe and note the pulse amplitude modulated signal (PAM) and compare them with the corresponding analog input signal
8. To observe PPM and PWM signal and compare it with the analog input signal

DIGITAL ELECTRONICS:-

1. Verification and interpretation of truth tables for AND, OR, NOT NAND, NOR and Exclusive OR (EXOR) and Exclusive NOR(EXNOR) gates
2. Realisation of logic functions with the help of NAND or NOR gates
3. - To design a half adder using XOR and NAND gates and verification of its operation
- Construction of a full adder circuit using XOR and NAND gates and verify its operation
4. Verification of truth table for positive edge triggered, negative edge triggered, level triggered IC flip-flops (At least one IC each of D latch , D flip-flop, JK flip-flops).
5. Verification of truth table for encoder and decoder ICs, Mux and DeMux
6. To design a 4 bit SISO, SIPO, PISO, PIPO shift registers using JK/D flip flops and verification of their operation.
7. To design a 4 bit ring counter and verify its operation.
8. Use of Asynchronous Counter ICs (7490 or 7493)

ELECTRONIC DEVICES AND CIRCUITS:-

- (1) Plot the frequency response of two stage RC coupled amplifier and calculate the bandwidth and compare it with single stage amplifier
- (2) To measure the gain of push-pull amplifier at 1KHz
- (3) To measure the voltage gain of emitter follower circuit and plot its frequency response
- (4) Plot the frequency response curve of Hartley and Colpitt's Oscillator
- (5) Plot the frequency response curve of phase shift and Wein bridge Oscillator
- (6) Use of IC 555 as monostable multivibrator and observe the output for different values of RC
- (7) Use of IC 555 as astable multivibrator and observe the output at different duty cycles
- (8) To use IC 741 (op-amplifier) as
 - i) Inverter,
 - ii) Adder,
 - iii) Subtractor
 - iv) Integrator

(9) To realize positive and negative fixed voltage DC power supply using three terminal voltage regulator IC (7805, 7812, 7905)

ELECTRICAL MACHINES:-

1. To measure power and power factors in 3 Phase load by two wattmeter method
2. To determine the efficiency of a single phase transformer from the data obtained through open circuit and short circuit test
3. To measure power and power factor of a single phase induction motor.
4. To run a synchronous motor with a.c supply and to measure speed to verify the relation $N=120 f/P$
5. To make connections of starting and running winding of a single phase capacitor motor and to run it with the help a DOL starter and to measure its speed
6. Study construction of a stepper and servomotor and to write their complete specifications.

COMPUTER PROGRAMMING USING C:-

1. Programming exercises on executing and editing a C program.
2. Programming exercises on defining variables and assigning values to variables.
3. Programming exercises on arithmetic and relational operators.
4. Programming exercises on arithmetic expressions and their evaluation.
5. Programming exercises on formatting input/output using printf and scanf and their return type values.
6. Programming exercises using if statement.
7. Programming exercises using if – Else.
8. Programming exercises on switch statement.
9. Programming exercises on do – while, statement.
10. Programming exercises on for – statement.
11. Programs on one-dimensional array.
12. Programs on two-dimensional array.
13. (i) Programs for putting two strings together.
(ii) Programs for comparing two strings.
14. Simple programs using structures.
15. Simple programs using pointers.
16. Simple programs using union.

NETWORK FILTERS AND TRANSMISSION LINES:-

1. To measure the characteristic impedance of symmetrical T and π networks
2. To measure the image impedance of a given asymmetrical T and π networks
3. For a prototype low pass filter:
 - a) Determine the characteristic impedance experimentally
 - b) Plot the attenuation characteristic
4. To design and measure the attenuation of a symmetrical T/ π type attenuator
5. For a prototype high pass filter:
 - Determine the characteristic impedance experimentally
 - To plot the attenuation characteristic
6. a) To plot the Impedance characteristic of a prototype band-pass filter

- b) To plot the attenuation characteristic of a prototype band pass filter
- 7. a) To plot the impedance characteristic of m-derived low pass filter
b) To plot the attenuation characteristics of m-derived high pass filter
- 8. To observe the information of standing waves on a transmission line and measurement of SWR and characteristic impedance of the line
- 9. Draw the attenuation characteristics of a crystal filter

COMMUNICATION SYSTEMS:-

- 1. To observe the waveforms at different stages of a AM transmitter
- 2. To observe the waveforms at different stages of a Radio Receiver
- 3. To align AM broadcast radio receiver
- 4. To identify and study the various types of antennas used in different frequency ranges.
- 5. To plot the radiation pattern of a directional and omni directional antenna
- 6. To plot the variation of field strength of a radiated wave, with distance from a transmitting antenna..
- 7 To study and rectify different faults in a broadcast radio receiver.

POWER ELECTRONICS:-

- 1) To plot VI characteristic of an SCR.
- 2) To plot VI characteristics of TRIAC.
- 3) To plot VI characteristics of UJT.
- 4) To plot VI characteristics of DIAC.
- 5) To study UJT relaxation oscillator and observe different wave forms
- 6) To observe wave shapes at relevant points of single-phase half wave controlled rectifier and effect of change of firing angle.
- 7) To observe wave shapes and measurement of voltage at relevant points in TRIAC based AC phase control circuit for .
- 8) To observe output wave shape in a circuit for single phase full wave controlled rectifier.
- 9) To study installation of UPS system and routine maintenance of batteries.

MICROPROCESSORS AND PERIPHERAL DEVICES:-

- 01. Familiarization of different keys of 8085 microprocessor kit and its memory map
- 02. Steps to enter, modify data/program and to execute a programme on 8085 kit
- 03. Writing and execution of ALP for addition and sub station of two 8 bit numbers
- 04. Writing and execution of ALP for multiplication and division of two 8 bit numbers
- 05. Writing and execution of ALP for arranging 10 numbers in ascending/descending order
- 06. Writing and execution of ALP for 0 to 9 BCD counters (up/down counter according to choice stored in memory)
- 07. Interfacing exercise on 8255 like LED display control
- 08. Interfacing exercise on 8253 programmable interval timer
- 09. Interfacing exercise on 8279 programmable KB/display interface like to display the hex code of key pressed on display
- 10. Use of 8085 emulator for hardware testing

ELECTRONICS DESIGN AND SIMULATION TECHNIQUES:-

1. Electronic Design
 - Selection and use of commonly used active and passive components
 - Testing of active and passive components
 - Develop skills in assembly of components, soldering, and soldering techniques
 - Procedure for Cabinet Making
2. Fabrication Techniques
 - Printed Circuit Boards (PCBs):
 - PCB board materials, their characteristics and plating, corrosion and its prevention.
 - Photo processing, screen printing, etching, high speed drilling, buffing, surface treatment and protection from harsh environments, plated through holes, double sided and multilayer PCBs.
 - Assembly of circuits on PCB, soldering techniques, Role of tinning, flow and wave soldering, solderability, composition of solder, Edge connector.
3. Lab View/Multisim/Proteus/ORCAD/'Winspice based circuit simulation
Simulation of different circuits of following types:
 - a) Analog Circuits
 - b) Digital Circuits
 - c) Power Electronic Circuits.
4. PCB Layout Design
Practice in designing PCB layout using software like EDA/Diptrace/Eagle/ORCAD

MEDICAL ELECTRONICS:-

1. To operate and familiarization with:
 - a) B.P. Apparatus
 - b) ECG Machine
2. To operate and familiarization with:
 - a) Ventilator
 - b) Incubator
3. To measure the concentration of blood sugar with Glucometer (fasting, P.P., Random)
4. To measure
 - a) Respiration rate and interface to PC
 - b) Pulse rate
5. To Measure The EMG Signals and interface with PC
6. Body Temperature measurement and recording in excel form in pc.
7. To study the Body positions and interfacing of body position sensor and data recording
8. Installation of small medical equipment in laboratories of Hospital precautions to be taken.
9. Study of large medical equipment in Hospital / Nursing home.
10. Operation and use of Electro-physiotherapy
11. Maintenance schedule for different equipment and their records in a hospital
12. Getting body parameters from Bluetooth to android App and PC
13. Creating body Area network using Zigbee devices
14. Logging of various body parameters in SD card as excel format.

AUDIO VIDEO SYSTEMS:-

1. To plot the directional response of a Microphone
2. To plot the directional response of a Loud Speaker
3. To study public address system and its components.
4. To test color TV using pattern generator.
5. To perform fault identification in Colour TV.
6. Installation of Dish Antenna for best reception.
7. Installation of CCTV system.

INSTRUMENTATION:-

1. To measure temperature using a thermo-couple/PTO/temperature sensor.
2. Study and use of digital temperature controller
3. Use of thermistor in ON/OFF transducer
4. Study of variable capacitive transducer/proximity Switches
5. Draw the characteristics of a potentiometer
6. To measure linear displacement using LVDT, Ultrasonic
7. To study the use of electrical strain gauge
8. To study weighing machine using load cell
9. To measure pH/ TPS/DO₂ value of given solution.

OPTICAL FIBER COMMUNICATION:-

To set up fiber analog link

To set up optic digital link

To measure bending losses in optical fibers

To observe and measure the splice or connector loss

To measure and calculate numerical aperture of optical fiber

To observe characteristics of optical source

To observe characteristics of optical detector

To splice the available optical fiber

To connect a fiber with connector at both ends

To identify and use various components and tools used in optical fiber communication

DIGITAL COMMUNICATION:-

1. Observe wave forms at input and output of pulse code modulator with CRO.
2. Transmission of data using MODEM.
3. Observe wave forms at input and output of QPSK modulators
4. Observe wave forms at input and output of PSK modulators
5. Observe the working of space and time switching circuit.

MICROCONTROLLERS:-

1. Familiarization with Micro-controller Kit and its different sections

2. Familiarization with Assembly Language Programming (PC Based)
3. Programming to interface switches and LEDs
4. Programming and interface of Seven Segment and LCD.
5. Programming and interfacing of Graphical LCD .
6. Programming to interface Hex 4x4 matrix Keypad
7. Programming for A/D converter, result on LCD.
8. Programming for D/A converter, result on LCD.
9. Programming for serial data transmission from PC to Kit or Vice versa.
10. Programming and interfacing of RELAY and Buzzer

TROUBLE SHOOTING OF ELECTRONIC EQUIPMENT:-

1. Demonstration and practice of fault finding and repair of:
 - (a) C.R.O
 - (b) Function Generator
 - (c) Power supplies
 - (d) Digital multimeter
 2. Demonstration, practice of fault finding and repair of any one equipment from group-I i.e. Communication
 3. Demonstration, practice of fault finding and repair of any one equipment from group-II i.e. Consumer
 4. Demonstration, practice of fault finding and repair of any one equipment from group-III i.e. Audio/Video systems
 5. Demonstration, practice of fault finding and repair of any one equipment from group IV i.e. Computer
- Choice of one equipment from each group is compulsory.

Group-I Communication	Group-II Consumer	Group-III Audio-video	Group-IV Computer
Telephone Handsets.	Inverters/UPS Emergency Lights	TV, CRT, LCD/HD	Monitor
Cordless Phones	Stabilizers	VCD, DVD Players	Printer (Laser)
Fax Machine	EPABX	CCTV	Printer (Inkjet)
Modem	Hub/Switches	Audio Systems	Scanner
Walkie / Talkie	Electronic Toys		Keyboard, Mouse
			Video Games

6. Testing of Integrated Circuits (ICs)
7. Use of digital tools for troubleshooting digital equipments

MICROWAVE AND RADAR ENGINEERING:-

- To measure electronics and mechanical tuning range of a reflex klystron
- To measure VSWR of a given load.
- To measure the Klystron frequency by slotted section method
- To measure the directivity and coupling of a directional coupler.
- To plot radiation pattern of a horn antenna in horizontal and vertical planes.
- To verify the properties of magic tee.

WIRELESS AND MOBILE COMMUNICATION:-

1. Study the features, specification and working of cellular mobile

2. Measurement of signal strength at various points from a transmitting antenna
3. Demonstration of Base Trans Receiver(BTS) with nearby cellular tower
4. Observing call processing of GSM trainer kit.
5. Visit to Mobile Switching Centre
6. Repair of a GSM mobile phone

EMBEDDED SYSTEMS:-

- Design PIC based Security System
- Design AVR based Temperature indicator cum controller.

MATERIALS AND METALLURGY :-

1. Classification of about 25 specimens of materials/machine parts into
 - (i) Metals and non metals
 - (ii) Metals and alloys
 - (iii) Ferrous and non ferrous metals
 - (iv) Ferrous and non ferrous alloys
2. Given a set of specimen of metals and alloys (copper, brass, aluminium, cast iron, HSS, Gun metal); identify and indicate the various properties possessed by them.
3.
 - a) Study of heat treatment furnace.
 - b) Study of a thermocouple/pyrometer.
4. Study of a metallurgical microscope and a specimen polishing machine.
5. To prepare specimens of following materials for microscopic examination and to Examine the microstructure of the specimens of following materials⊗At least any two)
 - i) Brass ii) Copper iii) Cast Iron , iv) Mild Steel v) HSS, vi) Aluminium
6. To anneal a given specimen and find out difference in hardness as a result of annealing.
7. To normalize a given specimen and to find out the difference in hardness as a result of normalizing.
8. To harden and temper a specimen and to find out the difference in hardness due to tempering.

APPLIED MECHANICS:-

1. Verification of the polygon law of forces using Gravesand's apparatus.
2. To verify the forces in different members of jib crane.
3. To verify the reaction at the supports of a simply supported beam.
4. To find the mechanical advantage, velocity ratio and efficiency in case of an inclined plane.
5. To find the mechanical advantage, velocity ratio and efficiency of a screw jack.
6. To find the mechanical advantage, velocity ratio and efficiency of worm and worm wheel.
7. To find mechanical advantage, velocity ratio and efficiency of single purchase crab.
8. To find out center of gravity of regular lamina.
9. To find out center of gravity of irregular lamina.
10. To determine coefficient of friction between three pairs of given surface.

BASICS OF ELECTRICAL AND ELECTRONICS ENGINEERING:-

1. Connection of a three-phase motor and starter with fuses and reversing of direction of rotation
2. Connection of a single-phase induction motor with supply and reversing of its direction of rotation
3. Troubleshooting in domestic wiring system, including distribution board
4. Connection and reading of an electric energy meter
5. Use of ammeter, voltmeter, wattmeter, and multi-meter
6. Measurement of power and power factor in a given single phase ac circuit
7. Study of different types of fuses, MCBs and ELCBs
8. Study of zener diode as a constant voltage source and to draw its V-I characteristics
9. Study of earthing practices
10. To draw V-I characteristics of a (i) NPN transistor (ii) thyristor (SCR)
11. Study of construction and working of a (i) stepper motor and (ii) servo motor

STRENGTH OF MATERIALS:-

1. Tensile test on bars of Mild steel and Aluminium.
2. Bending tests on a steel bar or a wooden beam.
3. Impact test on metals
 - a) Izod test
 - b) Charpy test
4. Torsion test of solid specimen of circular section of different metals for determining modulus of rigidity.
5. To plot a graph between load and extension and to determine the stiffness of a helical spring.
6. Hardness test on different metals.

HYDRAULICS AND PNEUMATICS :-

1. Measurement of pressure head by employing.
 - i) Piezometer tube
 - ii) Simple U-tube manometer
 - iii) Bourdon's tube pressure gauge
2. Verification of Bernoulli's theorem.
3. Measurement of flow by using venturimeter.
4. To find out the value of coefficient of discharge for a venturimeter.
5. To find coefficient of friction for a pipe (Darcy's equation).
6. To study a single stage centrifugal pump and reciprocating pump for constructional details with the help of cut section models.

THERMODYNAMICS – I:-

1. Determination of temperature by
 - 1.1 Thermocouple
 - 1.2 Pyrometer
 - 1.3 Infrared thermometer

2. Demonstration of mountings and accessories on a boiler.
3. Study the working of Lancashire boiler and Nestler boiler.
4. Study of working of high pressure boiler.
5. Study of boilers (Through industrial visit)
6. Determination of Dryness fraction of steam using calorimeter.
7. Demonstrate the working of air compressor.

THEORY OF MACHINES:-

1. To study inversion of Four Bar Mechanism, Single Slider Crank Chain Mechanism and Double Slider Crank Chain Mechanism with the help of working models.
2. To study various kinds of belts drives and gear trains with the help of working models.
3. To find the moment of inertia of a flywheel.
4. To Study the different types of centrifugal governors & to plot graph between R.P.M & Displacement.
5. To construct cam profile for uniform velocity, SHM and uniform acceleration and retardation on drawing sheet.
6. To perform the experiment of Balancing of rotating parts and find the unbalanced couple and forces.

REFRIGERATION AND AIR CONDITIONING:-

1. Identify various tools of refrigeration kit.
2. Practice in cutting, bending, flaring, swaging and brazing of tubes.
3. Study of thermostatic switch, LP/HP cut out overload protector filters, strainers and filter driers.
4. Identify various parts of a refrigerator and window air conditioner.
5. To find COP of Refrigeration system
6. To measure air flow using anemometer.
7. Charging of a refrigerator/ air conditioner.
8. To detect faults in a refrigerator/ air conditioner
9. Visit to an ice plant or cold storage plant. or central air conditioning plant

THERMODYNAMICS-II:-

1. Dismantle an IC engine and note down the condition of various parts, removal and fitting of piston, rings, measuring of bore size, crank shaft ovality and assemble it.
2. Dismantle a carburetor
3. Servicing of petrol injection system
4. Valve servicing, grinding, lapping and fitting mechanism and tappet adjustment.
5. Inspection of ignition system of a multi-cylinder engine stressing ignition timings, setting, fixing order and contact breaker; gap adjustment, spark plug cleaning.
6. Service of cooling & lubrication system of IC engine and note down the functioning/testing of various components.
7. Determination of BHP by dynamometer.

8. Morse test on multi-cylinder petrol engine.
9. Draw layout of modern automobile workshop and note down the special tools and equipments in each shop.
10. Local visit to roadways or private automobile workshop.

CNC MACHINES AND AUTOMATION:-

1. Study the constructional details of CNC lathe.
2. Study the constructional details of CNC milling machine.
3. Study the constructional details and working of:
 - Automatic tool changer and tool setter
 - Multiple pallets
 - Swarf removal
 - Safety devices
4. Develop a part programme for following lathe operations and make the job on CNC lathe and CNC turning center.(for finish pass only) – (At least two)

Calculating coordinate points for a cylindrical job by considering sign convention for lathe

 - Plain turning and facing operations
 - Taper turning operations
 - Operation along contour using circular interpolation.
5. Develop a part programme for the following milling operations and make the job on CNC milling (for finish pass only)- At least two
 - Plain milling
 - Slot milling
 - Contouring
 - Pocket milling

Calculate coordinate points for a zig zag job by considering sign convention for milling
6. Develop a part program by using canned cycle on CNC lathe for turning , facing
7. Preparation of work instruction for machine operator
8. Preparation of preventive maintenance schedule for CNC machine.
9. Demonstration through industrial visit for awareness of actual working of FMS in production.
10. Use of software for turning operations on CNC turning center.
11. Use of software for milling operations on machine centres.

AUTOMOBILE ENGINEERING:-

1. Fault and their remedies in Battery Ignition system
2. Adjustment of Head Light Beam (ii) Wiper and Indicators.
3. Dismantling and inspection of (i) AC Pump (ii) SU Pump
4. Dismantle (i) rear axle (ii) differential and find out the gear ratio of crown wheel & driven sun gear and planet pinion..
5. Fault finding practices on an automobile - four wheelers (petrol/ diesel vehicles).
6. Servicing/Tuning of a 2 wheeler/4 wheeler.
7. Servicing of hydraulic brakes :

- a) *adjustment of brakes*
 - b) *bleeding of brakes*
 - c) *fitting of leather pads*
- 8 Tuning of an automobile engine.
 - 9 Testing and Charging of an automobile battery and measuring cell voltage and specific gravity of electrolyte.
 - 10 Changing of wheels and inflation of tyres, balancing of wheels.
 - 11 Measuring spark gap, valve clearance and ring clearance; carrying out cleaning operations for adjustment.

INSPECTION AND QUALITY CONTROL:-

Use of dial indicator for measuring taper.

Use of combination set, bevel protector and sine bar for measuring taper.

Measurement of thread characteristic using vernier and gauges.

Use of slip gauge in measurement of center distance between two pins.

Use of tool maker's microscope and comparator.

Plot frequency distribution for 50 turned components.

With the help of given data, plot X and R, P and C charts

MECHATRONICS:-

1. Make and Simulate Hydraulic and Pneumatic circuits(at least two each).
2. Make and simulate some simple PLC programs (at least three).
3. Designing a mechatronic system exploring possible design solutions.
4. Case studies of mechatronic system.

ANATOMY AND PHYSIOLOGY:

1. Study of various parts of body through demonstration
2. Study of tissues of body through demonstration
3. Study of various parts of skin (demonstration from models)
4. Study of various bones and joints through demonstration
5. Study of parts of digestive & respiratory system through demonstration
6. Study of various parts of nervous system (brain and spinal cord) (demonstration from model)
7. Study of structure of eye and ear (demonstration from models)
8. Study of structural differences between skeletal, smooth and cardiac muscles (permanent mounts) through demonstration.
9. Study of various parts of circulatory system through demonstration.
10. Examination of stained blood film for blood cells
11. Estimation of blood pressure
12. Study of various parts of excretory and reproductive system (male and female demonstration from models and charts)

BASIC CHEMISTRY:-

1. Preparation of standard solutions.
2. To prepare N/10 Sodium carbonate

3. To prepare M/10 oxalic acid solution
4. To prepare 5N HCl from given 12 N HCl, N/10 HCL
5. Iodometric titrations
6. Oxidation reduction titrations
7. Acid-base titrations
8. Estimation of carbohydrates by benedicts methods
9. Estimation of proteins by acitic acid & Salphosalicylic acid test
10. Estimation of lipids by direct method

CHEMICAL MICROBIOLOGY:-

1. Demonstration of safety rules (universal precautions) in a microbiology laboratory
2. Preparation of cleaning agents and techniques of cleaning of glass and plastic ware.
3. Sterilization by autoclave and hot air oven
4. Handling and use of compound microscope
5. Staining techniques: Gram, Albert's, Ziehl – Neelson's
6. Demonstration of motility (Hanging drop method)
7. Preparation and sterilization of various culture media (Nutrient agar, Nutrient broth, Blood agar, Chocolate agar, Mac-Conkey agar, Lowenstein-Jensen Media
8. Antimicrobial susceptibility testing by Stokes disc diffusion method
- a) Biochemical testing (Carbohydrate utilization tests, Catalase, Oxidase, Coagulase,
9. Collection, transportation of clinical samples, processing including culture of following clinical samples for identification of pathogens – Urine, Stool, Sputum, Throat swabs, Pus and Pus swabs, Blood, Skin, Eye and Ear swabs and CSF
10. Identification of known bacterial cultures of common pathogens.

HAEMATOLOGY:-

- Collection and routine stool examination for detection of intestinal parasites
 - Saline preparation
 - Lugol's Iodine preparation
 - Concentration methods
 - a) Floatation method (saturated salt solution/zinc sulphate)
 - b) Sedimentation method (formal ether)
- Identification of following adult worms/cyst from preserved specimen/slides
 - Tapeworm
 - Roundworm
 - Hookworm
 - Giardia
 - Entamoeba . histolytica, E. coli
- Preparation of smear and identification of blood parasites
 - Preparation of stains (Leishman, Giemsa, Field)
 - Preparation of thin and thick smears
 - Staining of smears by Leishman, Giemsa, Field
 - Examination of smears for malarial parasite (P. vivax and P. falciparum)
 - Demonstration of various stages of malarial parasite from stained slides

CLINICAL MICROBIOLOGY- III:-

- Collection and routine stool examination for detection of intestinal parasites
 - Saline preparation
 - Lugol's Iodine preparation
 - Concentration methods

- a) Floatation method (saturated salt solution/zinc sulphate)
- b) Sedimentation method (formal ether)
- Identification of following adult worms/cyst from preserved specimen/slides
 - Tapeworm
 - Roundworm
 - Hookworm
 - Giardia
 - Entamoeba . histolytica, E. coli
- Preparation of smear and identification of blood parasites
 - Preparation of stains (Leishman, Giemsa, Field)
 - Preparation of thin and thick smears
 - Staining of smears by Leishman, Giemsa, Field
 - Examination of smears for malarial parasite (P. vivax and P. falciparum)
 - Demonstration of various stages of malarial parasite from stained slides

HAEMATOLOGY – III:-

1. ESR estimations (wintrobe and westergren) in blood sample
2. Determination of PCV (wintrobe and capillary) in blood by Macro and Micro Methods
3. Counting of Reticulocyte in blood
4. To perform red cell fragility test on blood
5. To perform Sickling test on blood
6. Estimation of foetal haemoglobin by alkali denaturation test
7. Estimation of plasma haemoglobin
8. Estimation of and G₆PD by Methylene Blue Reduction Test)

CLINICAL BIOCHEMISTRY- III:-

1. Serum bilirubin estimation
2. Phosphorus estimation
3. Calcium estimation
4. Renal clearance tests
5. SGOT estimation
6. SGPT estimation
7. ALP estimation
8. ACP estimation
9. Total cholesterol estimation
10. Triglyceride estimation
11. Estimation of HDL and calculation of VLDL and LDL
12. Urinary protein and creatinine estimation (24 hr)
13. Estimation of serum amylase

HISTOPATHOLOGY AND CYTOLOGY- I:-

1. Reception of specimen, labeling and preserving the specimen
2. Preparation of various smears by unfixed methods
- b. Imprint smears
- c. Teased smears
- d. Squashed smears
- Preparation of different fixatives with special emphasis on preparation of formaline based fixatives

- Preparation of paraffin blocks from various tissue pieces and labeling with emphasis on orientation
- Handling of microtome
- Sharpening of microtome knives
- Preparation of blocks for fine cutting
 1. Rough cutting
 2. Trimming
- Practice of fine section cutting
- Practice of lifting of sections on the slides
- Performing H&E staining on sections and mounting of tissue sections
- Demonstration of cell using buccal smear/urine sample
- Processing of urine samples for malignant cells
- Processing of sputum sample for malignant cytology
- To perform PAP stain on given smear
- To perform MGG stain on given smear
- To perform H&E on given smear
- To demonstrate various automation by use of brochures, charts etc.

BASICS OF INFORMATION TECHNOLOGY:-

1. Identify and list functions of various components and peripherals of given computer.
 2. Installation of operating system viz. * Windows XP, *Windows 2007 etc.
 3. Installing a computer system by giving connection and loading the system software and application software and various sources to install software. Exercises on entering text and data (Typing Practice)
 4. Features of Windows as an operating system:
 5. Start, shutdown and restore
 6. Creating and operating on the icons
 7. Opening, closing and resizing the windows
 8. Using elementary job commands like – creating, saving, modifying, renaming, finding and deleting a file , creating and operating on a folder
 9. Introduction to all properties such as changing settings like, date, time, calculator, colour (back ground and fore ground)
 10. Using short cuts
- Word Processing (MS Office/Open Office)
11. File Management:
Opening, creating and saving a document, locating files, copying contents in some different file(s)
 12. Editing a document:
 1. Entering text, cut, copy, paste using toolbars
 2. Use of spell check
 3. PDF file and its conversion in different file formats (MS Word/Excel etc.)
 4. Scanning, editing and printing of a document
 13. Formatting a document:
 1. Using different fonts, changing font size and colour, changing the appearance through bold/ italic/ underlined, highlighting a text, changing case, using subscript and superscript, using different underline methods
 2. Aligning of text in a document, justification of document ,Inserting bullets and numbering
 3. Formatting paragraph, inserting page breaks and column breaks, line spacing

4. Use of headers, footers, inserting footnote, end note, use of comments
5. Inserting date, time, special symbols, importing graphic images, drawing tools
14. Tables and Borders:
 1. Creating a table, formatting cells, use of different border styles, shading in tables, merging of cells, partition of cells, inserting and deleting a row in a table
 2. How to change docx file to doc file
 3. Print preview, zoom, page set up, printing options
 4. Using Find, Replace options
15. Spread Sheet Processing (MS Office/Open Office)
16. Starting Excel
open worksheet, enter, edit data, formulae to calculate values, format data, create chart, printing chart, save worksheet, switching between different spread sheets
17. Menu commands:
Create, format charts, organize, manage data, solving problem by analyzing data, creating graphs
18. Work books:
 1. Managing workbooks (create, open, close, save, rename), working in work books
 2. Editing a worksheet: copying, moving cells, pasting, inserting, deleting cells, rows, columns, find and replace text, numbers of cells, formatting worksheet
19. Creating a chart:
 1. Working with chart types, changing data in chart, formatting a chart, use chart to analyze data
 2. Using a list to organize data, sorting and filtering data in list
20. Formulas:
Addition, subtraction, division, multiplication, percentage and auto sum
8. Power Point Presentation (MS Office/Open Office)
 - a) Introduction to PowerPoint
 - How to start PowerPoint
 - Working environment: concept of toolbars, slide layout, templates etc.
 - Opening a new/existing presentation
 - Different views for viewing slides in a presentation: normal, slide sorter etc.
 - b) Addition, deletion and saving of slides
 - c) Insertion of multimedia elements
 - Adding text boxes, importing pictures, tables and charts etc.
 - d) Formatting slides
 - Text formatting, changing slide layout, changing slide colour scheme
 - Changing background, Applying design template
 - e) How to view the slide show?
 - Viewing the presentation using slide navigator, Slide transition
 - Animation effects etc.
9. Antivirus
 - a) What is virus and its types
 - b) Problems due to virus
 - c) Installation and updation of antivirus (anyone out of Kaspersky, McAfee, Norton, Quickheal etc).
 - d) How to scan and remove the virus
10. Internet and its Applications

- a) Log-in to internet, introduction to search engine Browsing and down loading of information from internet
- b) Creating e-Mail Account
 - Log in to e-mail account and Log out from e-mail account
- c) Managing e-Mail
 - Creating a message
 - Sending, receiving and forwarding a message
 - Attaching a file
 - Deleting a message

TRANSFUSION MEDICINE:-

1. Performing ABO blood grouping by following method:
 - Direct
 - Tube Test
 - Indirect (reverse)
 - Subgroup
2. Performing-Rh grouping by following techniques:
 - Slide
 - Tube technique
3. Performance of Coombs Test
 - Direct
 - Indirect
4. Cross Matching (compatibility testing)
 - Major
 - Minor
5. Preparation of anticoagulants
 - ACD (Acid Citrate Dextrose)
 - CPD (Citrate Phosphate Dextrose)
 - CPDA (Citrate Phosphate Dextrose Adenine)
- 6 Malarial Parasite test by Thick and Thin smear preparation
- 7 VDRL Test
- 8 HIV Test
- 9 HbsAg Test
- 10 HCV Test
- 11 Preparation of platelet rich plasma and platelet poor plasma

CLINICAL MICROBIOLOGY- IV:-

1. Preparation of different culture media used in mycology - Sabouraud's dextrose agar with and without antibiotics, Corn meal agar, BHI (Brain, Heart Infusion)
2. To perform wet mount techniques – KOH and LCB
3. To study characteristics of common laboratory fungal contaminants
4. Collection and processing of samples for diagnosis of fungal infections in skin, hair, nail scrapings
5. To perform serological tests
 - Widal test (Both slide and tube method)
 - ASO titre
 - CRP
 - Rheumatoid factor
 - VDRL Test

- HIV Screening
- HBsAg Screening

HAEMATOLOGY – IV:-

1. Determination of bleeding time by Ivy's and Dukes method².
 2. Determination of clotting time by Lee and White method³.
 3. Determination of prothrombin time, index and INR (International Normalised Ratio)⁴.
 4. Determination of Activated Partial thromboplastin time (APTT)
 5. Demonstration of Hess test
 6. Performance of Clot retraction test
 7. Demonstration of LE Cell
- Cell counts of biological fluids
Semen analysis

CLINICAL BIOCHEMISTRY- IV:-

1. Analysis of urine for sugar and proteins (qualitative and quantitative)
2. Detection of ketone bodies in urine
3. Detection of haematuria
4. Detection of bile pigments, bile salts and urobilinogen
5. Occult blood test for stool specimen
6. Estimation of glucose in CSF
7. Estimation of total proteins and globulins in CSF
8. Estimation of chloride in CSF
9. Titration for acidity determination and qualitative analysis of gastric juice
10. Demonstration of electrophoresis (Paper electrophoresis)
11. Demonstration of chromatography (Paper chromatography)

HISTOPATHOLOGY AND CYTOLOGY – II:-

1. Demonstration of various parts of light microscope (Mechanical & Optical)
2. Demonstration of cryostat (brochures and charts can be used)
3. Processing of tissue for frozen section
4. Staining and mounting of frozen section using H&E stain (rapid method), Oil Red "O".
5. Preparation of various mounting reagents for museum specimens
6. Demonstration and care of autopsy instruments
7. Demonstration of malignant cell
8. Preparation of dry smear and wet smear
9. To perform Pap stain
10. Fixation of smears and staining with MGG

PRACTICAL PROFESSIONAL TRAINING – I & II:-

During 5th Semester

1. Preparation of various anticoagulants/containers
2. Collection of various clinical samples
3. Haemoglobin estimation
4. TLC, DLC, ESR, PCV, BT & CT
5. Absolute Eosinophil Count
6. APTT/PTTK
7. Prothrombin Time & calculation of INR
8. Blood Sugar – Random/Fasting/PP
9. GTT/ST

4. Urine – Complete examination
5. Stool – Complete examination
6. RA/RF factor
7. ABO and Rh blood grouping
8. Widal test
9. VDRL test
10. Cleaning of glassware
11. Disposal of Medical wastes (use of bags)
12. Staining of blood film
13. H&E staining
14. Spotting

During 6th Semester

- Reticulocyte count
- Platelet count
- Peripheral blood film examination
- Sputum examination for AFB
- Serum calcium
- CSF examination
- Lipid profile
- Liver function test
- Renal function test
- Stool for occult blood
- Urine for culture and sensitivity
- Blood for culture and sensitivity
- Semen culture
- Pus culture and sensitivity
- Staining of smears by various staining procedures
- Biochemical testing
- HIV Test
- Hbs Ag test
- ASO
- CRP
- Pregnancy test
- Spotting

b. Computing Facilities

- i. Internet Bandwidth: 48 Mbps
 - ii. Number and configuration of System: 230 Computer Systems with i5 Processor and 8 GB RAM, 1 TB Hard Disk
 - iii. Total number of system connected by LAN: 230
 - iv. Total number of system connected by WAN: NIL
 - v. Major software packages available: Microsoft Window 10, Adobe reader, Microsoft Office, Office Suite,
 - vi. Special purpose facilities available:
- c. Innovation Cell: **Innovation Cell has been setup Vide office order no. GPL/19/184 dated: 27.02.2019.**
 - d. Social Media Cell: **Media Cell has been setup Vide office order no. GPL/19/182 dated: 27.02.2019.**

- e. Compliance of the National Academic Depository (NAD), applicable to PGCM/ PGDM Institutions and University Departments: NOT APPLICABLE
- f. List of facilities available
- i. Games and Sports Facilities: **Football Ground, Volleyball Ground, Basketball Ground, Badminton Ground, Cricket Ground, Indoor games facility.**
- ii. Extra-Curricular Activities: **Singing, Poen recitation, Debate, Declamation, Rangoli, Poster making, Slogan Writing, Quiz, NCC Wing.**
- iii. Soft Skill Development Facilities: **Language Lab Available with different listening & speaking skills software.**
- g. **Teaching Learning Process**
- i. Curricula and syllabus for each of the programmes as approved by the University:- **List Attached (Annexure-I)**
- ii. Academic Calendar of the University:- **File Attached (Annexure-II)**
- iii. Academic Time Table with the name of the Faculty members handling the Course:- **List Attached (Annexure-III)**
- iv. Teaching Load of each Faculty:

Sr.No.	Name of the Faculty	Teaching Load	Department
1.	Sh. Sukhvir Yadav	18	Mechanical Engg.
2.	Sh. Dharampal	22	Mechanical Engg.
3.	Sh. Ravikant	22	Mechanical Engg.
4.	Sh. Amit Kumar	22	Mechanical Engg.
5.	Sh. Bhupesh Gupta	18	Mechanical Engg.
6.	Ms.Sunita Dhariwal	18	ECE
7.	Sh. M.B. Zaman	22	ECE
8.	Sh. Sunny Taneja	22	ECE
9.	Sh. Sunil Kumar	23	ECE
10.	Ms. Reena Rani	16	Applied Science
11.	Ms. Preeti	21	Applied Science
12.	Dr. Jyoti Singh	21	Applied Science
13.	Ms. Reena	21	Applied Science
14.	Ms. Madhu Yadav	24	Applied Science
15.	Sh. Samit Yadav	16	Applied Science
16.	Sh. Praveen Kumar	19	Computer Engineering
17.	Sh. Pankaj Yadav	24	Computer Engineering
18.	Sh. Charan Singh	24	Computer Engineering
19.	Ms. Pooja Arora	24	Computer Engineering

- v. Internal Continuous Evaluation System and place: **Evaluation is done through Internal Sessional test, Assignment**
- vi. Student's assessment of Faculty, System in place: **Feedback from students is taken through feedback form.**
- h. For each Post Graduate Courses give the following: NOT APPLICABLE
- i. Title of the Course
Curricula and Syllabi
Laboratory facilities exclusive to the Post Graduate Course
- i. Special Purpose: NOT APPLICABLE
Software, all design tools in case
Academic Calendar and frame work
15. **Enrollment of students in the last 3 years**
- **2018-19:- 351**

- **2019-20:- 339**
- **2020-21:- 371**

16. List of Research Projects/ Consultancy Works

- a. Number of Projects carried out, funding agency, Grant received
- b. Publications (if any) out of research in last three years out of masters projects
- c. Industry Linkage:-
 - M/s Amass Skill Ventures Pvt. Ltd Hiring for Rane NSK Steering System Ltd
 - BMG Group Rewari
 - M/s Talbros ltd. manesar
 - SRG Buildtech India Pvt. Ltd. Rewari
 - M/s Subros Ltd. Manesar
 - M/s India Nippon Electricals Ltd. Masani rewari
 - M/s Supreme Group, Bawal
 - M/s Shree Cement Ltd. New Delhi
 - M/s IQOR ltd. Manesar
 - M/s SGS Tekniks manufacturing Pvt. Ltd.
 - M/s Gupta Metal Sheets Ltd. Rewari
 - M/s Thermo Cabs, Rewari
- d. **MoUs with Industries (minimum 3):**
 - M/s India Nippon Electricals Limited, Masani Village
 - M/s Asian Colour Coated Ispat Ltd. Bawal
 - M/s BMG Group Pvt. Ltd. Rewari
 - M/s Thermo Cabs Behind, Uttam Nagar, Rewari
 - M/s Paran Auto Industries, Sector-37 Gurgaon
 - M/s Micromatic Machine Tools Pvt. Ltd. Gurgaon
 - M/s Dynamic Engineering, Bawal
 - M/s SGS Tekniks manufacturing Pvt. Ltd. IMT Manesar, Gurgaon
 - M/s Gupta Metal Sheets Ltd. Rewari
 - M/s Authentic Engineers, Plot No. 341, Sec.-07, II, IMT Manesar, Gurgaon
 - Pride India Engineering Solutions Pvt. Ltd., Plot no. 72,59 & 63 Sector-7, IMT Manesar, Gurgaon
 - India Japan Lighting Pvt. Ltd, Plot no. 22-36 Sector-6, HSIIDC Bawal, Rewari

17. LoA and subsequent EoA till the current Academic Year

- **Annexure-IV**

18. Accounted audited statement for the last three years

- **Annexure-V**

19. Best Practices adopted, if any