

**ANDHRA PRADESH PUBLIC SERVICE COMMISSION::VIJAYAWADA**

**NOTIFICATION NO.13/2023, DATED: 21/12/2023**

**LECTURERS IN GOVERNMENT POLYTECHNIC COLLEGES (ENGINEERING AND NON ENGINEERING) IN A.P. TECHNICAL EDUCATION SERVICE (LIMITED RECRUITMENT)**

**PARA – 1:**

- 1.1. Applications are invited through online from eligible candidates for the post of Lecturers in Government Polytechnic Colleges (Engineering and Non-Engineering) in A.P Technical Education Service for a total of 99 CF vacancies in the scale of pay of Rs. 56,100/- - 98,400/- (AICTE 2016 Pay Scales) within the age group of 18 - 42 years as on 01.07.2023.
- 1.2. The candidate shall apply online through Commission's Website <https://psc.ap.gov.in> The application can be submitted from **29/01/2024 to 18/02/2024** up to 11:59 midnight.
- 1.3. The applicant who desires to apply for the above post shall login the Commission's Website, with his/her registered OTPR number. In case, the candidate is applying for the first time to the posts notified by A.P.P.S.C. he/she shall register his/her bio-data particulars through One Time Profile Registration (OTPR) on the Commission's Website viz., <https://psc.ap.gov.in> Once applicant registers his/her particulars, a user ID is generated and sent to his/her registered mobile number and email ID.
 

**Note:** i. OTPR (One Time Profile Registration) is not considered as an application for any post under any circumstances.

ii. The applicants are advised to retain their mobile number and Email ID registered in OTPR for receiving OTPR/SMS for further communication.
- 1.4. The selection to the post shall be on the basis of Written Examination in Computer Based Recruitment Test mode to be conducted by the Commission. **The Written Examination will be held in the Month of April/May, 2024.**
- 1.5. The candidates are required to visit the Commission's website regularly to keep themselves updated about dates of written examinations are to be held. The examination would be in objective type and questions are to be answered on computer system. Instructions regarding computer based recruitment test are attached as Annexure - III.
- 1.6. A general Mock Test facility is available to the applicants on the Commission's website to acquaint themselves with the computer based recruitment test. Applicant can visit the website and practice the answering pattern under MOCK TEST option available on main page of website <https://psc.ap.gov.in>
- 1.7. The applicant is required to visit the Commission's website regularly to keep himself /herself updated until completion of the recruitment process. The Commission's website information is final for all correspondence. No individual correspondence by any means will be entertained under any circumstances.
- 1.8. HALL TICKETS for the written Examination will be hosted on Commission's website for downloading. Instructions would be given through the website regarding downloading of Hall Tickets.
- 1.9. All desirous and eligible candidates shall apply online after satisfying themselves as per the terms and conditions of this recruitment notification. Any application sent through any mode other than the prescribed online mode will not be entertained under any circumstances. Submission of application form by the candidate is construed as he / she read the notification and shall abide by the terms and conditions laid down there under.
- 1.10. The details of vacancies are as follows:-

CARRIED FORWARD (CF) VACANCIES

Post Code No.	Name of the Post	Zone wise vacancies				Total
		I	II	III	IV	
01	Lecturer in Architectural Engineering	-	01	-	-	01
02	Lecturer in Auto Mobile Engineering	-	03	04	01	08
03	Lecturer in Bio-Medical Engineering	-	-	-	02	02
04	Lecturer in Commercial & Computer Practice	01	02	07	02	12
05	Lecturer in Ceramic Technology	-	-	01	-	01
06	Lecturer in Chemistry	01	-	05	02	08
07	Lecturer in Civil Engineering	01	01	05	08	15
08	Lecturer in Computer Engineering	01	01	01	05	08
09	Lecturer in Electronics & Communication Engineering	-	02	-	08	10
10	Lecturer in Electrical & Electronics Engineering	-	-	-	02	02
11	Lecturer in Electronics & Instrumentation Engineering	-	-	01	-	01
12	Lecturer in English	01	-	-	03	04
13	Lecturer in Garment Technology	-	-	01	-	01
14	Lecturer in Geology	-	-	01	-	01
15	Lecturer in Mathematics	01	-	01	02	04
16	Lecturer in Mechanical Engineering	02	-	01	03	06
17	Lecturer in Metallurgical Engineering	-	01	-	-	01
18	Lecturer in Mining Engineering	02	-	02	-	04
19	Lecturer in Pharmacy	01	01	-	01	03
20	Lecturer in Physics	-	-	02	02	04
21	Lecturer in Textile Technology	-	-	01	02	03
<b>Total</b>		<b>11</b>	<b>12</b>	<b>33</b>	<b>43</b>	<b>99</b>

Note: The breakup of vacancies may be seen at **Annexure-I**.

**PARA-2: ELIGIBILITY:**

- i. He / She is of sound health, active habits and free from any bodily defect or infirmity rendering him unfit for such service;
- ii. His / Her character and antecedents are such as to qualify him/her for such service;
- iii. He /She possesses the academic and other qualifications prescribed for the post; and
- iv. He/ She is a citizen of India:  
Provided that no candidate other than a citizen of India may be appointed except with the previous sanction of the State Government and except in accordance with such conditions and restrictions as they may be laid down. Such sanction shall not be accorded unless the State Government are satisfied that sufficient number of citizens of India, who are qualified and suitable are not available.

**PARA-3: EDUCATIONAL QUALIFICATIONS:**

The candidate should possess the prescribed academic qualification as on the date of this notification. **The date of this notification** shall be the crucial date for calculating the experience including the practical experience. **In respect of other than prescribed Educational Qualifications, claiming equivalence, the decision of the concerned department (Unit Officer) shall be final.**

**Note:** If the applicant possesses an equivalence of qualification other than prescribed qualification in the Commission's notification, applicant should produce a copy of the Government Orders to the Commission in advance within 10 days of last date for submitting applications, failing which their application will be rejected.

Post Code No.	Name of the Post	Educational Qualification
01	Lecturer in Architectural Engineering	1 <sup>st</sup> Class Bachelor's Degree in appropriate branch of Engineering / Technology.
02	Lecturer in Auto Mobile Engineering	
03	Lecturer in Bio-Medical Engineering	
05	Lecturer in Ceramic Technology	
07	Lecturer in Civil Engineering	
08	Lecturer in Computer Engineering	
09	Lecturer in Electronics & Communication Engineering	
10	Lecturer in Electrical & Electronics Engineering	
11	Lecturer in Electronics & Instrumentation Engineering	
16	Lecturer in Mechanical Engineering	
17	Lecturer in Metallurgical Engineering	
18	Lecturer in Mining Engineering	
21	Lecturer in Textile Technology	
13	Lecturer in Garment Technology	Must possess 1 <sup>st</sup> Class Bachelor's Degree in Textile Technology. OR 1 <sup>st</sup> Class Master's Degree in Home Science with clothing & textile as subjects from any University in India recognized by U.G.C/AICTE.
06	Lecturer in Chemistry	1 <sup>st</sup> Class Post Graduate Degree in appropriate subject.
12	Lecturer in English	
14	Lecturer in Geology	
15	Lecturer in Mathematics	
20	Lecturer in Physics	
04	Lecturer in Commercial & Computer Practice (to teach Commerce, Typewriting and Shorthand subjects)	i) Must possess 1 <sup>st</sup> Class Master Degree in Commerce. ii) Type writing Higher Grade in English and Shorthand Higher Grade in English conducted by State Board of Technical Education and Training.
19	Lecturer in Pharmacy	1 <sup>st</sup> Class Bachelor's Degree in Pharmacy

**Note:**

- i) In case of recruitment of candidates belonging to SC/ST for the posts of Lecturers in Engineering & Non-Engineering, a relaxation of 5% marks shall be accorded and candidate having 55% marks and above in appropriate Branch of study shall be eligible for appointment to the post of Lecturer in Engineering & Non-Engineering as per G.O.Ms.No.178, Higher Education (TE.I-2) department, Dt. 09/12/2005.
- ii) **Based on merit in Main written examination the candidates will be short listed for Computer Proficiency Test. No candidate shall be eligible for appointment to the post of Lecturers in Government Polytechnic Colleges (Engineering and Non-Engineering) in A.P Technical Education Service unless he/she qualifies the Computer Proficiency Test in terms of G.O.Ms.No.26, G.A. (Ser-B) Dept., Dt: 24.02.2023.**
- iii) Please see **Annexure-V** for subject equivalency particulars.

**PARA- 4 RESERVATIONS:**

- 4.1. There will be Vertical Reservations in direct recruitment in respect of Scheduled Tribes, Scheduled Castes, Backward Classes and Economically Weaker Sections and Horizontal Reservations in respect of Persons with Benchmark Disabilities, Women and Meritorious Sports Persons as per Rule 22, 22(A) and 22(B) of A.P. State and Subordinate Service Rules, 1996 as amended vide G.O.Ms.No.77, G.A. (Ser-D) Dept., Dt: 02.08.2023.
- NOTE: The candidates belonging to SC, ST, BC, EWS & PBD and who avails upper age relaxation will also be considered for OC vacancies”.**
- 4.2. There shall be Reservation to Women horizontally to an extent of 33 1/3% in terms of Rule 22, 22 (A) and 22 (B) of A.P. State and Subordinate Service Rules, 1996 as amended vide G.O. Ms. No. 77, GA(Ser-D) Dept., Dt:02.08.2023.
- 4.3. There will be reservations in direct recruitment in respect of Person with Benchmark Disability (PBD) as per Rule 22, 22 (A) and 22 (B) of State and Subordinate Service Rules and read with Departmental Special Rules.
- 4.4. The Person with Benchmark Disability (PBD) means a person suffering from not less than forty percent of any disability as certified by a medical authority except hearing Impairment. Hearing Impairment means a) “**deaf**” means persons having 70 DB hearing loss in speech frequencies in both ears; b) “**hard of hearing**” means persons having 60 DB to 70 DB hearing loss in speech frequencies in both ears; as per provision under “Person with Disabilities Act, 1995”, The Rights of Persons with Disabilities Act, 2016 and The Rights of Persons with Disabilities Rules, 2017, dt: 15.06.2017 as per G.O.Ms.No.36, Dept., for Women, Children, Differently Abled & Senior Citizens (Prog.II), Dt: 23.08.2023.
- 4.5. The following are the categories of Persons with Benchmark Disabilities (PBD) as per G.O.Ms.No.77, G.A. (Ser-D) Dept., Dated: 02.08.2023:
- Blindness and low vision
  - Deaf and hard hearing
  - Loco motor disability including cerebral palsy, leprosy cured, dwarfism, acid attack victims and muscular dystrophy.
  - Autism, Intellectual disability, Specific learning disability, Mental illness.
  - Multiple disabilities from amongst persons under clauses (a) to (d) including deaf-blindness in the posts identified for each disabilities.
- 4.6. If eligible disabled candidates of a particular category are not available, to fill up the carry forward vacancy, the same shall be filled-up by the method of interchanging as per G.O. Ms. No.23, department for Women, Children, Disabled and Senior Citizen (DW) Dept., Dated: 26.05.2011 and G.O.Ms.No.99, General Admn (Services -D) Dept., dated: 04.03.2013 read with G.O. Ms. No.77, G.A. (Services-D) Dept., dt:02/08/2023.
- 4.7. Evaluation of various physical disabilities and procedure for certification will be as per orders contained in **G.O.Ms.No.36, Dept., for Women, Children, Differently Abled & Senior Citizens (Prog.II) Dt: 23.08.2023.**
- 4.8. Reservation to BC-E group will be subject to the adjudication of the litigation before the Hon'ble Courts including final orders in Civil Appeal No: 2628-2637 of 2010 in SLP ( C). No. 7388-7397 of 2010, dated: 25/03/2010 and orders from the Government.
- 4.9. The candidates claiming status of non-creamy layer of Backward Class have to obtain a Certificate in terms of G.O. Ms. No. 3, Backward Classes Welfare (C-2) Department, Dated 04.04.2006 read with G.O. Ms. No. 26 Backward Classes Welfare(C) Department, Dated 09.12.2013 regarding their exclusion from the Creamy Layer from the competent authority (Tahasildar) and produce the same at appropriate time of verification. In case of failure to produce the same on the day of verification, the Candidature will be considered against open competition, if he / she is otherwise eligible in all aspects.
- 4.10. Economically Weaker Sections means the persons who are not covered under existing scheme of reservations for the SCs, the STs and Socially and Educationally Backward Classes and whose gross annual family income is below Rs.8.00 lakh. Only such persons are identified as Economically Weaker Sections for the benefit of reservations. The persons seeking the benefit of reservation under EWS category shall obtain the necessary EWS Certificate issued by the Tahsildar concerned and produce at an appropriate time to the Commission as per G.O.Ms.No:73, GA(SER-D)Dept,Dt:04-08-2021.

- 4.11. In the case of candidates who claim the benefit of reservation or relaxation from upper age limit on the basis of Caste/Tribe or Community/Category the basic document of proof of Community/Category will be the Certificate issued by the Revenue Authorities not below the rank of Tahsildar in the case of SC/ST/EWS and Non Creamy Layer Certificate issued by the Revenue Authorities in the case of Backward Classes. The list of Caste/Tribe/Community is as incorporated in Schedule-I of above Rules. The list is also appended at Annexure –IV. The candidates have to produce proof of the community claimed in their application at all stages of selection along with the certificates relating to Educational Qualifications and local status certificates etc. Subsequent claim of change of community will not be entertained.
- 4.12. Caste & Community: Community Certificate issued by the competent authority in terms of G.O. Ms No. 58, SW (J) Dept., dt.12/5/97 should be submitted at appropriate time. As per A.P. State and Subordinate Service Rules, Rule -2(28) Explanation: In so far as claiming for SC reservation is concerned, No person who professes a religion different from Hinduism shall be deemed a member of Schedule Caste. However, scheduled caste converts to Buddhism deemed to be scheduled caste. BCs, SCs, STs & EWS belonging to other States are not entitled for reservation.
- 4.13. Horizontal Reservation cuts across vertical reservation (in what is called inter-locking reservation) and persons selected against the quota for Persons with Benchmark Disabilities / Meritorious Sports Persons have to be placed in the appropriate category viz. SC / ST / BC / EWS / Unreserved depending upon the category to which they belong in the roster meant for reservation of SCs/STs/BCs/EWSs as per G.O. Ms. No.77, G.A. (Ser-D) Dept., Dt: 02.08.2023.
- 4.14. **The reservations and relaxations to different categories/communities are applicable only in case of availability of vacancies to the respective category / community as announced through this notification.**

**PARA - 5: RESERVATION TO LOCAL CANDIDATES:**

- 5.1. The specification of a post is determined by the concerned Department with reference to both vertical and horizontal reservations as well as local reservation. The reservations are specified through the indent by the concerned department and the general criteria with regard to reservations are given below.
- 5.2. Reservation to the Local candidates is applicable as provided in Article 371-D as per G.O.Ms.No.674, G.A (SPF- A) Department, dated.20.10.1975 and rules as amended from time to time and as in force on the date of notification. The candidates claiming reservation as Local candidates should obtain the required Study Certificate(s) (from IV Class to X Class or SSC) OR Residence Certificate in the proforma prescribed for those candidates who have not studied in any Educational Institutions as the case may be. The relevant certificates with authorized signature shall be produced as and when required.
- 5.3. As per G.A (SPF & MC) Department letter No. 5352/SPF & MC/2018, Dated:01-02-2018 clarified the A.P. local status of the candidate for direct recruitment with reference to the provisions of paragraph 7 of the Presidential Order,1975 that the 2 year period of study (9<sup>th</sup> & 10<sup>th</sup> class) under National Integration Scheme at outside the State of A.P. and he/she studies from 4<sup>th</sup> class to 8<sup>th</sup> class in Jawahar Navodaya Vidyalaya in A.P. District and there after migrated to Navodaya Schools in outside the state of A.P. under National Integration Scheme may be treated as the study in Navodaya Schools in A.P. in which he/she been admitted originally for the purpose of determining the local candidature of the candidate.

**PARA -6 DEFINITION OF LOCAL CANDIDATE:**

- 6.1. A local candidate has been defined in G.O.Ms.No.674, General Administration (SPF-A) Department, dated:20.10.1975 "LOCAL CANDIDATE" as follows:
- "Local Candidate:- (1) A candidate for direct recruitment to any post shall be regarded as a local candidate in relation to a local area.
- (a) in cases where a minimum educational qualification has been prescribed for recruitment to the post.
- (i) "if he/she has studied in an educational institution or educational institutions in such local area for a period of not less than four consecutive academic years ending with the academic year in which he appeared or, as the case may be, first appeared for the relevant qualifying examination; or

(ii) where during the whole or any part of the four consecutive academic years ending with the academic year in which he appeared or as the case may be, first appeared for the relevant qualifying examination he has not studied in any educational institution, if he has resided in that local area for a period of not less than four years immediately preceding the date of commencement of the qualifying examination in which he appeared or as the case may be, first appeared.

(b) In cases where no minimum educational qualification has been prescribed for recruitment to the post, if he has resided in that local area for a period of not less than four years immediately preceding the date on which the post is notified for recruitment.  
 Explanations:- For the purpose of the paragraph.

(i) educational institution means a University or any educational institution recognized by the State Government, a University or other competent authority;

(ii) relevant qualifying examination in relation to a post means;

(a) the examination, a pass in which is the minimum educational qualification prescribed for the post;

(b) the Matriculation examination or an examination declared by the State Government to be equivalent to the Matriculation examination; whichever is lower; and

(iii) In reckoning the consecutive academic years during which a candidate has studied, any period of interruption of his study by reason of his failure to pass any examination shall be disregarded.

(iv) the question whether any candidate for direct recruitment to any post has resided in any local area shall be determined with reference to the places where the candidate actually resided and not with reference to the residence of his parents or other guardian (Vide G.O.Ms.No.168, G.A. (SPF.A) Department, dated.10-3-77).

(2) A candidate for direct recruitment to any post who is not regarded as a local candidate under sub paragraph (1) in relation to any local area shall.

(a) in cases where a minimum educational qualification has been prescribed for recruitment to the post.

(i) if he has studied in educational institutions in the State for a period of not less than seven consecutive academic years ending with academic year in which he appeared or as the case may be, first appeared for the relevant qualifying examination, be regarded as a local candidate in relation to

(1) Such local area where he has studied for the maximum period out of the said period of seven years; or

(2) where the periods of his study in two or more local areas are equal, such local areas where he has studied last in such equal periods;

(ii) if during the whole or any part of the seven consecutive academic years ending with the academic years in which he appeared or as the case may be first appeared for the relevant qualifying examination, he has not studied in the educational institutions in any local area, but has resided in the State during the whole of the said period of seven years, be regarded as a local candidate in relation to

(1) such local area where he has resided for a maximum period out of the said period of seven years: or

(2) where the periods of his residence in two or more local areas are equal, such local areas where he has resided last in such equal periods;

(b) In cases where no minimum educational qualification has been prescribed for recruitment to the post, if he has resided in the State for a period of not less than seven years immediately preceding the date on which the post is notified for recruitment, be regarded as a local candidate in relation to

(i) such local area where he has resided for the maximum period out of the said period of seven years; or

(ii) where the periods of his residence is two or more local areas are equal such local area where he has resided last in such equal periods " (G.O.Ms.No.168, dated 10-3-1977).  
 The candidates belonging to other States are not entitled for local Reservations.

6.2. Single certificate, whether of study or residence as stipulated in G.O.Ms.No.674, General Administration (SPF-A) Dept., dated: 20.10.1975 would suffice for enabling the candidate to apply as a "LOCAL CANDIDATE".

- 6.3. Residence certificate will not be accepted, if a candidate has studied in any Educational Institution upto S.S.C. or equivalent examination. Such candidates have to produce study certificates invariably. The candidates, who acquired degree from open Universities directly without studying in any Educational Institution, only may submit residence certificate. Here Educational Institutions mean a recognized Institution by the Government / University/Competent authority.
- 6.4. Candidates are advised to refer provisions of the PRESIDENTIAL ORDER 1975 in this regard.
- 6.5. Candidates who migrated from Telangana to Andhra Pradesh between 2<sup>nd</sup> June, 2014 and 1<sup>st</sup> June, 2024 as per G.O. Ms. No. 161, General Administration (SPF&MC) Department, dated.27.12.2022 and as per terms laid down in Circular Memo No.4136/SPF & MC/2015-5, Dated.20.11.2017 and Circular Memo No.4136/SPF & MC/2015-17, Dated.27.12.2022 of Government of Andhra Pradesh shall obtain the Local Status Certificate from competent authority and produce at the time of verification.
- 6.6. The composition of Districts in each zone is as hereunder:
- Zone-I: Srikakulam, Vizianagaram and Visakhapatnam. (SKM, VZM, VSP)  
 Zone-II: East Godavari, West Godavari and Krishna. (EG, WG, KST)  
 Zone-III: Guntur, Prakasam and Nellore. (GNT, PKM, NLR)  
 Zone-IV: Chittoor, Kadapa, Anantapur and Kurnool. (CTR, CDP, ATP, KNL)

**PARA- 7 AGE:**

- 7.1. Minimum 18 years and Maximum 42 years as on 01/07/2023, as per G.O.Ms.No.109, GA (Ser-A) Dept., Dt.10.10.2023.  
 N.B.: No person shall be eligible if less than 18 years and more than 42 years.
- 7.2. Age Relaxation is applicable to the categories as detailed below:

S. No.	Category of candidates	Relaxation of age permissible
1.	BC and EWS	5 Years
2.	SC, ST & PBD	10 Years
3.	Ex-Service men	Shall be allowed to deduct from his age a period of 3 years in addition to the length of service rendered by him in the armed forces / NCC.
4.	N.C.C. (who have worked as Instructor in N.C.C.)	
5.	Regular A.P. State Government Employees (Employees of Corporations, Municipalities etc. are not eligible).	Allowed to deduct from his age the length of regular Service under State Government up to a maximum of five years for the purposes of the maximum age limit.
6.	Retrenched temporary employees in the State Census Department with a minimum service of 6 months.	3 Years

**EXPLANATION:**

Provided that the persons referred to at Sl.Nos.3 & 4 above shall, after making the deductions referred to in sub Rule 12 (c) (i) & (ii) of A.P. State and Subordinate Service Rules not exceed the Maximum age limit prescribed for the post.

The age relaxation for Ex-Servicemen is applicable for those who have been released from Armed Forces other than by way of dismissal or discharge on account of misconduct or inefficiency.

**PARA - 8 HOW TO APPLY:**

**STEP-I:** The applicant desires to apply for the post shall login the Commission's Website with his/her registered OTPR number. Candidate applying for the first time for any notification has to first fill the OTPR application carefully to obtain OTPR ID. While filling the OTPR, the candidate has to ensure that the particulars are filled correctly. The Commission bears no responsibility for the mistakes, if any, made by the candidates. If candidates choose to modify they may do so by clicking the modify OTPR make the modification, save them and proceed to STEP-II.

**STEP-II:** The Applicant has to Login in the Commission's website with the User Name (OTPR ID) and the Password set by Candidate. After Login, the Applicant has to click on the "Online Application Submission" present in the bottom right corner of the Commission's website. The applicant now has to click on the Fill Application button against the notification number that he / she wants to apply.

**STEP-III:** After checking all the data and ensuring that the data is correct the applicant has to fill application specific data such as Local/Non Local status, White card details etc., which are also used to calculate the Fee. Hence if any details are to be changed, applicant should use the modify OTPR link, modify the details, save it and again click on online application submission.

Once all the data such as Qualification details, Post preferences, examination centre, etc filled carefully and submit the Application form with Save or Save & Submit option. If candidate click on save button the application details are only save due to power/service issues. The applicant has to click on the Save & Submit button payment link will be generated.

**NOTE:** 1. By click on "Save" button the application details given by you will be partially saved at our end. However, your application will not be submitted until you click on "Save & Submit" button.

2. By click on "Save & Submit" button you will be directed to the payment gateway and on successful payment of fee, your application will be finally submitted.

3. Applicant shall note that the data displayed from OTPR at the time of submitting the application will be considered for the purpose of this notification only. Any changes made by the applicant in OTPR data at later date shall not be considered for the notification on hand.

**PAYMENT PROCESS:** The applicant has to check the basic details for calculation of the fee and age relaxation will be pre-populated from the OTPR data. The applicant has to verify all the details that are displayed. Once the payment form is submitted, the respective details (used for Calculation of fee and age relaxation) will not be altered in any stage of application processing. On successful submission, the payment reference ID is generated and SMS alter sent to the registered Mobile Number of the candidate. The candidate can download the filled application pdf for ready reference / correspondence.

**STEP-IV:** In any case if the payment process is not submitted successfully, then the applicant should start the fresh payment process as mentioned in STEP-II.

**STEP-V:** Once the application is submitted successfully, corrections in the application will be enabled after the last date of the submission of application and will be allowed up to 7 days only from the last date of applications. The corrections can be made in the application form itself. Fields which affect the Name, fee and age relaxations are not enabled for corrections.

**NOTE:**

A. The Commission is not responsible, for any omissions made by the applicant in bio-data particulars while submitting the application form online. The applicants are therefore, advised to strictly follow the instructions given in the user guide before submitting the application.

B. All the candidates are requested to submit their application with correct data. It is noticed that some of the candidates are requesting for change in the data, after submission of the application. It is informed that such requests shall be allowed on payment of Rs.100/- (Rupees Hundred Only) for each correction. However changes are not allowed for Name, Fee and age relaxation. No manual application for corrections shall be entertained.

C. The particulars furnished by the applicant in the application form will be taken as final. Candidates should, therefore, be very careful in uploading / submitting the application form online.

D. Incomplete / incorrect application form will be summarily rejected. The information if any furnished by the candidate subsequently will not be entertained by the Commission under any circumstances. Applicants should be careful in filling-up the application form and submission. If any lapse is detected during the scrutiny, the candidature will be rejected even though he / she comes to the final stage of recruitment process or even at a later stage and also liable for punishment as per Para 16.1 of this notification.



E. Before uploading / Submission Application Form, the Candidates should carefully ensure his / her eligibility for this recruitment. No relevant column of the application form should be left blank; otherwise application form will not be accepted.

**PARA - 9: (a) FEE:**

- 9.1. Applicant must pay Rs. 250/- (Rupees two hundred and fifty only) towards application processing fee and Rs 120/- (Rupees one hundred twenty only) towards examination fee.
- 9.2. However, the following categories of candidates are exempted from payment of examination fee Rs.120/- only.
- i) SC, ST, BC, PBD & Ex-Servicemen.
  - ii) Families having Household Supply White Card issued by Civil Supplies Department, A.P. Government. (Residents of Andhra Pradesh)
  - iii) Un-employed youth as per G.O.Ms.No.439, G.A (Ser- A) Dept., dated: 18/10/1996 should submit declaration at an appropriate time to the Commission.
  - iv) Applicants belonging to the categories mentioned above (except Ex-Service Men) hailing from other States are not entitled for exemption from payment of fee and not entitled for claiming any kind of reservation.
  - v) Candidates belonging to other States shall pay the prescribed examination fee of Rs.120/-(Rupees one hundred and twenty only), along with processing fee of Rs. 250/- (Rupees two hundred and fifty only) through different channels as indicated at Para-8. Otherwise such applications will not be considered and no correspondence on this will be entertained.
- 9.3. **If candidate is eligible for more than one post he/she shall submit separate application for each eligible post.**
- 9.4. **b) MODE OF PAYMENT OF FEE:**
- i) The Fee mentioned in the above paragraph is to be paid online using Payment Gateway using Net Banking/ Credit card / Debit Card. The list of Banks providing service for the purpose of online remittance of Fee will be available on the Website.
  - ii) The fee once remitted shall not be refunded or adjusted under any circumstances. Failure to pay the examination fee and application fee (in non-exempt case) will entail total rejection of application.
  - iii) IPOs / Demand Drafts are not accepted.
  - iv) In case of corrections Rs.100/- per correction will be charged. However changes are not allowed for name, fee and age relaxation.

**PARA-10: SCHEME OF EXAMINATION:**

- 10.1 Scheme of written examination is prescribed vide G.O.Ms.No.141, Finance (HR-I Plg. & Policy) Department, Dt: 01.08.2016 read with G.O Ms. No.100, GA (SER-A) Dept., dated: 30.09.2022 and Scheme & Syllabus is prescribed for Computer Proficiency Test (CPT) vide G.O.Ms.No.26, G.A. (Ser-B) Dept., Dt: 24.02.2023.
- 10.2 As per G.O. Ms. No.235, Finance (HR-I, Plg & Policy) Dept., Dt. 06/12/2016, for each wrong answer will be penalized with 1/3<sup>rd</sup> of the marks prescribed for the question.
- 10.3 The Scheme & Syllabus for written examination and CPT is shown in **Annexure-II**.

**PARA - 11: CENTRES FOR THE EXAMINATIONS:**

The centres of examination will be announced separately. The applicant may choose the Test centre with three preferences. However the Commission reserves the right to allot the applicant to any centre of examination depending on the availability of the resources like centers / systems.

**PARA -12 RESOLUTION OF DISPUTES RELATED TO QUESTION PAPER, ANSWER KEY AND OTHER MATTERS:**

- 12.1. The Commission would publish initial answer key(s) for the question paper(s) on its website after conduct of the examination. If the candidates have any objections with regard to the initial key / questions they shall have to file the objections within three days after publication of the initial key in the prescribed proforma available in the website. Any objection filed after expiry of specified time would not be entertained.
- 12.2. The objections received if any on initial key, would be examined by referring it to three subject experts and finalize the key as per the decision of the Commission. And the key so finalized shall be final and no further objections shall be taken in to account.
- 12.3. The candidate shall pay Rs.100/- per objection raised by him/her against question / initial answer key within the stipulated time and procedure as above. In case of genuine objections, which are sustained in the final analysis, the amount will be reimbursed to the candidate.
- 12.4. **The question paper for General Studies & Mental Ability is set in English and translated in to Telugu language. English version will be considered as the authentic version for valuation purpose. The Subject question papers will be in English medium only.**
- 12.5. With regard to situation where there is deletion of questions, if any, from any paper, scaling (proportionate increase) would be done for that particular part of the paper to the maximum marks prescribed for the paper and the marks would be rounded off to 2 decimals to determine the merit of the candidate.
- 12.6. ANSWER KEY: Answer key would be published on the website.

**PARA -13 NOTE ON IMPORTANT LEGAL PROVISIONS GOVERNING THE RECRUITMENT PROCESS:**

- 13.1. Vacancies: The recruitment will be made to the vacancies notified only. There shall be no waiting list as per G.O. Ms. No. 81, General Administration (Ser. A) Department, Dated 22/02/1997, G.O.Ms.No.544, General Administration (Ser. A) Department, Dated: 04.12.1998 and Rule 6 of APPSC Rules of Procedure. In any case, no cognizance will be taken by Commission of any vacancies arising or reported after the completion of the selection and recruitment process or the last date as decided by the Commission as far as this Notification is concerned, and these will be further dealt with as per G.O. & Rule cited above. As per G.O.Ms.No:139 Finance HR (I) Planning Policy Dept., dt: 28/07/2016, Rule 7 of APPSC Rules of procedure regarding relinquished vacancies has been deleted.
- 13.2. The recruitment will be processed as per this notification and as per the Rules and Instructions issued by the Government and also as decided by the Commission from time to time. Further, in terms of G.O.Ms.No.178 Higher Education (TE-I) department, Dt. 09/12/2005, G.O.Ms.No.29 Skills Development & Training (TE.A2) Department, Dt.07/11/2022 and Special Rules / Adhoc Rules Governing the recruitment and other related GOs, Rules etc., are applicable.
- 13.3. Rules: The various conditions and criteria prescribed herein are governed by the A.P. State and Subordinate Service Rules, 1996 read with the relevant Special Rules applicable to any particular service in the departments. Any guidelines or clarification is based on the said Rules, and, in case of any necessity, any matter will be processed as per the relevant General and Special Rules as in force.
- 13.4. The Commission is empowered under the provisions of Article 315 to 320 of the Constitution of India read with relevant laws, rules, regulations and executive instructions and all other enabling legal provisions in this regard to conduct examination for appointment to the posts notified herein, duly following the principle of order of merit as per Rule 3(vi) of the APPSC Rules of Procedure read with relevant statutory provisions and ensuring that the whole recruitment and selection process is carried out with utmost regard to secrecy and confidentiality so as to ensure that the principle of merit is scrupulously followed.
- 13.5. Zonal/Local: In terms of Para 4 of the G.O., A.P. Public Employment (Organization of Local Cadres and Regulation of Direct Recruitment) Order, 1975 (G.O.Ms.No.674, G.A. (SPF-A) Dept., dated: 20/10/1975) read with G.O.Ms.No.124, General Administration (SPF-A) Department, dated: 07/03/2002, "The provisional list shall be divided into two parts. The

first part shall comprise 30% of the posts consisting of combined merit lists of locals as well as non-locals and the remaining second part shall comprise the balance 70% of the posts consisting of locals only and the posts shall be filled duly following the rule of reservation".

- 13.6. The persons already in Government Service / Autonomous bodies / Government aided institutions etc., whether in permanent or temporary capacity or as work charged employees are however required to inform, in writing, to their Head of Office/ Department that they have applied for this recruitment.
- 13.7. A candidate shall be disqualified for appointment, if he himself or through relations or friends or any others has canvassed or endeavored to enlist for his candidature, extraneous support, whether from official or non-official sources for appointment to this service.
- 13.8. The Candidates who have obtained Degrees through Open Universities / Distance Education mode are required to have recognition by the Distance Education Council, Government of India. Unless such Degrees have been recognised by the D.E.C. they will not be accepted for purpose of Educational Qualification. The onus, in case of doubt, of Proof of recognition by the D.E.C. that their Degrees / Universities have been recognised, rests with the candidate. Candidates may also refer G.O.R.T.No.143, Higher Education (EC) Dept., Dated: 11.07.2018 and the Supreme Court judgment dated: 03.11.2017 in this connection.

**PARA-14 The candidate shall go through the Annexures appended to the notification before filling the application form:**

- Annexure-I : Break up of vacancies.
- Annexure-II : Scheme & Syllabus.
- Annexure-III : Instructions to candidates.
- Annexure-IV : List of SC / ST /BC's.
- Annexure-V : Subject equivalency particulars.

**PARA-15: PROCEDURE OF SELECTION:**

- 15.1 Appearance in all the papers of examination is compulsory. Absence in any of the papers will automatically render the disqualification of the candidature.
- 15.2. The selection to this recruitment shall be based on the Merit in the written Exam to be held as per the Scheme and Syllabus shown at Annexure-II.
- 15.3. The standard for the examination and the cut off marks for various categories for selection shall be fixed by the Commission. However the candidates have to secure minimum qualifying marks to be short listed for selection against respective vacancies. The minimum qualifying marks on aggregate for the vacancies notified under different categories are as follows as per G.O.Ms.No.103, G.A. (Ser.A) Dept., dt.03.02.1967 and amendments from time to time.
- |  |     |
|--|-----|
| 1. Open Competition (OC), Sports Persons, Ex-Servicemen & EWS: | 40% |
| 2. Backward Class:   | 35% |
| 3. SCs, STs & PBDs:  | 30% |
- N.B.: Mere securing of minimum qualifying marks does not confer any right to the candidate for being considered to the selection.
- 15.4. The claims of members of the Scheduled Castes, Scheduled Tribes, Backward Classes, Economically Weaker Section and Women as the case may be, shall also be considered for the vacancies earmarked for open competition, which shall be filled on the basis of open competition. In respect of social reservations viz., Scheduled Castes, Scheduled Tribes, Backward Classes, the vertical reservation will be applicable and the number of appointments reserved for that category shall in no way be affected during the period the reservation for that category is in force.
- 15.5. In the event of Schedule Caste & Schedule Tribe candidates not coming up for selection with the existing minimum prescribed for selection in the competitive examination conducted by the APPSC their selection shall be considered on the basis of rank with reference to their performance in the written competitive examination irrespective of the marks secured, as per G.O.Ms.No.631, G.A. (Ser.A) Dept., dt.05.09.1977.
- 15.6. Where the candidates get equal number of marks in the Written Examination if two or more candidates get equal total number of marks, those candidates shall be bracketed. Candidates within the same bracket shall then be ranked 1, 2, 3 etc., according to age i.e., oldest being considered for admission. In case there is tie in age, the person who possesses educational qualification at earlier date would be considered.

- 15.7. Zonal preferences will be taken at the time of submission of online application as well as at the time of verification of Certificates. However, the submission of option for Zonal preferences at the time of verification of Certificates is mandatory and will be considered as final for selection. Candidates are required to visit Commission's website regularly for this purpose.
- 15.8. It is hereby clarified that the said preferences are only indicative for being considered to the extent possible but not binding or limiting the Commission's powers under Article 315 to 320 of the Constitution of India. Therefore, the Commission has the power to assign a candidate to any of the notified posts for which he is considered to be qualified and eligible, subject to fulfilling the selection criterion. Mere claim of preference for any Zone for allotment against vacancy does not confer a right to selection for that Zone in particular or any Zone in general.
- 15.9. The appointment of selected candidates will be subject to their being found medically fit in the appropriate medical classification, and if he/she is of sound health, active habits and free from any bodily defect or infirmity.
- 15.10. Memorandum of Marks: After publication of final selection list, the marks list (total marks) of the successful candidates will be displayed on the Commission's website. However, Memorandum of their own Marks can be obtained individually after one month from the date of declaration of selection list in APPSC website on payment of Rs.200/- (Rupees Two hundred only) through IPO/DD in favour of Secretary, A.P. Public Service Commission, Vijayawada, for a period of Three Months only. Rejected, Invalid, Disqualified, ineligible candidates will not be issued any Memorandum of Marks and fees paid by such candidates, if any, will be forfeited to Government account, without any correspondence in this regard. Requests for Memorandum of Marks will not be entertained until the recruitment process is finalized.

**PARA-16: DEBARMENT:**

- 16.1. Candidates should make sure of their eligibility to the post applied for and that the declaration made by them in the format of application regarding their eligibility is correct in all respects. Any candidate **furnishing in-correct information or making false declaration regarding his/her eligibility at any stage or suppressing any information** is liable TO BE DEBARRED UPTO FIVE YEARS FROM APPEARING FOR ANY OF THE EXAMINATIONS CONDUCTED BY THE COMMISSION, and summary rejection of their candidature for this recruitment.
- 16.2. The Penal Provisions of Act 25/97 published in the A.P. Gazette No. 35, Part-IV.B Extraordinary dated: 21/08/1997 shall be invoked **if malpractice and unfair means are noticed at any stage** of the recruitment. Further candidates shall be liable for penalty as per G.O.Ms.No.385, G.A. (Ser. A) Dept., Dt.18/10/2016. The Chief Superintendent of the examination centre is authorized to take decision in case of malpractice or usage of unfair means or creation of disturbance or use of physical force by any candidate and report the matter to the competent authority as well as register a police case.
- 16.3. The Commission is vested with the Constitutional duty of conducting recruitment and selection as per rules duly maintaining utmost secrecy and confidentiality in this process and any attempt by anyone causing or likely to cause breach of this constitutional duty in such manner or by such action as to violate or likely to violate the fair practices followed and ensured by the Commission will be sufficient cause for rendering such questionable means as ground for debarment and penal consequences as per law and rules as per decision of the Commission.
- 16.4. Any candidate found **impersonating or procuring impersonation by any person** or resorting to any other irregular or improper means in connection with his / her candidature for selection or obtaining support of candidature by any means, such a candidate may in addition to rendering himself/ herself liable to criminal prosecution, be liable to be debarred permanently from any exam or selection held by the Service Commissions in the country.
- 16.5. ELECTRONIC GADGETS BANNED:
- (a) The use of any mobile (even in switched off mode), calculator or any electronic equipment or programmable device or storage media like pen drive, smart watches etc., or camera or blue tooth devices or any other equipment or related accessories either in working or switched off mode capable of being used as a communication device during the examination is strictly prohibited. Any infringement of these instructions shall entail disciplinary action including ban from future examinations.

(b) Candidates are advised, in their own interest, not to bring any of the banned items including mobile phones to the venue of the examination, as arrangement for safe – keeping cannot be assured.

**PARA-17: COMMISSION'S DECISION TO BE FINAL:**

The decision of the Commission in all aspects and all respects pertaining to the application and its acceptance or rejection as the case may be, conduct of examination and at all consequent stages culminating in the selection or otherwise of any candidate shall be final in all respects and binding on all concerned, under the powers vested with it under Article 315 to 320 of the Constitution of India. Commission also reserves its right to alter and modify the terms and conditions including vacancies laid down in the notification for conducting the various stages up to selection, duly intimating details thereof to all concerned, as warranted by any unforeseen circumstances arising during the course of this process, or as deemed necessary by the Commission at any stage.

**PLACE: VIJAYAWADA,  
DATE: 21/12/2023.**

**Sd/- J. PRADEEP KUMAR, I.R.S.M.E.,  
SECRETARY.**

**ANNEXURE-I****NOTIFICATION NO.13/2023****BREAKUP OF VACANCIES FOR THE POST OF LECTURERS IN GOVERNMENT POLYTECHNICS  
(ENGINEERING & NON ENGINEERING) IN A.P. TECHNICAL EDUCATION SERVICE****CARRIED FORWARD (CF) VACANCIES****P.C.No:01: SUBJECT: ARCHITECTURE ENGINEERING**

CATEGORY	ZONE-2				TOTAL
	OPEN ZONE		LOCAL		
	G	W	G	W	
BC-A	-	-	-	1*	1

**Note:** As per G.O.Ms.No.436 General Administration (Ser-D) Dated.15/10/1996 and in terms of Rule 22 (h) (ii) of A.P. State Subordinate Service Rules 1996. If no Candidate is available for the said 01\* CF Vacancies, interchanging procedure would be followed. Hence all BC women candidates belonging to Zone-2 can also apply.

**P.C.No:02: SUBJECT: AUTOMOBILE ENGINEERING**

CATEGORY	ZONE-2				ZONE-3				ZONE- 4				TOTAL				GRAND TOTAL
	OPEN ZONE		LOCAL		OPEN ZONE		LOCAL		OPEN ZONE		LOCAL		OPEN ZONE		LOCAL		
	G	W	G	W	G	W	G	W	G	W	G	W	G	W	G	W	
OC	-	-	-	2	-	1	-	-	-	-	-	-	-	1	-	2	3
BC-A	-	-	-	-	-	-	-	1*	-	-	-	-	-	-	-	1	1
BC-B	-	-	-	1*	-	-	-	-	-	-	-	-	-	-	-	1	1
BC-C	-	-	-	-	-	-	-	-	-	1	-	-	-	-	1	-	1
SC	-	-	-	-	-	1*	-	-	-	-	-	-	-	1	-	-	1
ST	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	1	1
<b>TOTAL</b>	-	-	-	<b>3</b>	-	<b>2</b>	-	<b>2</b>	-	-	<b>1</b>	-	-	<b>2</b>	<b>1</b>	<b>5</b>	<b>8</b>

**Note:** As per G.O.Ms.No.436 General Administration (Ser-D) Dated.15/10/1996 and in terms of Rule 22 (h) (ii) of A.P. State Subordinate Service Rules 1996. If no Candidate is available for the said 03\* CF Vacancies, interchanging procedure would be followed. Hence all BC women candidates belonging to zones - 2 & 3 can also apply. In respect of SC (W) vacancy all SC & ST women candidates of **all zones** can also apply.

**P.C.No:03: SUBJECT: BIO-MEDICAL ENGINEERING**

CATEGORY	ZONE-4				TOTAL
	OPEN ZONE		LOCAL		
	G	W	G	W	
BC-C	1*	-	-	-	1
BC-D	-	-	-	1	1
<b>TOTAL</b>	<b>1</b>	<b>-</b>	<b>-</b>	<b>1</b>	<b>2</b>

**Note:** As per G.O.Ms.No.436 General Administration (Ser-D) Dated.15/10/1996 and in terms of Rule 22 (h) (ii) of A.P. State Subordinate Service Rules 1996. If no Candidate is available for the said 01\* CF Vacancy, interchanging procedure would be followed. Hence all BC candidates of all zones can also apply.

**P.C.No:04: SUBJECT: COMMERCIAL & COMPUTER PRACTICE**

CATEGORY	ZONE-1				ZONE-2				ZONE-3				ZONE- 4				TOTAL				GRAND TOTAL	
	OPEN ZONE		LOCAL		OPENZ ONE		LOCAL		OPEN ZONE		LOCAL		OPEN ZONE		LOCAL		OPEN ZONE		LOCAL			
	G	W	G	W	G	W	G	W	G	W	G	W	G	W	G	W	G	W	G	W		G
OC	-	-	-	-	-	-	1	-	-	-	2	-	-	-	-	-	-	-	3	-	3	
BC-A	-	-	-	-	-	-	-	1	-	-	-	1*	-	-	-	1*	-	-	-	3		3
BC-B	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	1		1
SC	1	-	-	-	-	-	-	-	1	-	-	1*	-	1*	-	-	2	1	-	1		4
ST	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	1		1
<b>TOTAL</b>	<b>1</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>-</b>	<b>2</b>	<b>4</b>	<b>-</b>	<b>1</b>	<b>-</b>	<b>1</b>	<b>2</b>	<b>1</b>	<b>3</b>	<b>6</b>	<b>12</b>	

**Note:** As per G.O.Ms.No.436 General Administration (Ser-D) Dated.15/10/1996 and in terms of Rule 22 (h) (ii) of A.P. State Subordinate Service Rules 1996. If no Candidate is available for the said 04\* CF Vacancies, interchanging procedure would be followed. Hence all BC women candidates belonging to zone - 3&4 can also apply. In respect of SC (W) vacancies, all SC & ST women candidates of **all zones** can also apply.

**P.C.No:05: SUBJECT: CERAMIC TECHNOLOGY**

CATEGORY	ZONE-3				TOTAL
	OPEN ZONE		LOCAL		
	G	W	G	W	
SC	-	-	-	1*	1

**Note :** As per G.O.Ms.No.436 General Administration (Ser-D) Dated.15/10/1996 and in terms of Rule 22 (h) (ii) of A.P. State Subordinate Service Rules 1996. If no Candidate is available for the said 01\* CF Vacancy, interchanging procedure would be followed. Hence, all SC & ST women candidates of zone-3 can also apply.

**P.C.No:06: SUBJECT: CHEMISTRY**

CATEGORY	ZONE-1				ZONE-3				ZONE- 4				TOTAL				GRAND TOTAL	
	OPEN ZONE		LOCAL		OPEN ZONE		LOCAL		OPEN ZONE		LOCAL		OPEN ZONE		LOCAL			
	G	W	G	W	G	W	G	W	G	W	G	W	G	W	G	W		
OC	-	-	1	-	-	1	-	1	-	-	1	-	-	1	2	1	4	
BC-A	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	1	1
BC-D	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	1	1
BC-E	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	1	1
SC	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	1	-	1
<b>TOTAL</b>	<b>-</b>	<b>-</b>	<b>1</b>	<b>-</b>	<b>-</b>	<b>1</b>	<b>1</b>	<b>3</b>	<b>-</b>	<b>-</b>	<b>1</b>	<b>1</b>	<b>-</b>	<b>1</b>	<b>3</b>	<b>4</b>	<b>8</b>	

**P.C.No:07: SUBJECT: CIVIL ENGINEERING**

CATEGORY	ZONE-1				ZONE-2				ZONE-3				ZONE- 4				TOTAL				GRAND TOTAL
	OPEN ZONE		LOCAL		OPENZ ONE		LOCAL		OPEN ZONE		LOCAL		OPEN ZONE		LOCAL		OPEN ZONE		LOCAL		
	G	W	G	W	G	W	G	W	G	W	G	W	G	W	G	W	G	W	G	W	
OC	-	-	-	1	-	-	-	1	-	1	-	1	1	-	1	1	1	1	1	4	7
BC-A	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	1	-	-	-	1
BC-D	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	1	-	1
BC-E	-	-	-	-	-	-	-	-	-	-	-	1*	-	-	-	-	-	-	-	1	1
SC	-	-	-	-	-	-	-	-	-	-	1	-	1	-	-	-	1	-	1	-	2
ST	-	-	-	-	-	-	-	-	-	-	-	1	1*	-	1	-	1	-	1	1	3
TOTAL	-	-	-	1	-	-	-	1	-	1	1	3	4	-	3	1	4	1	4	6	15

**Note :** As per G.O.Ms.No.436 General Administration (Ser-D) Dated.15/10/1996 and in terms of Rule 22 (h) (ii) of A.P. State Subordinate Service Rules 1996. If no Candidate is available for the said 02\* CF Vacancies, interchanging procedure would be followed. Hence all BC women candidates belonging to zone - 3 can also apply. In respect of ST (G) vacancy, all SC & ST candidates of **all zones** can also apply.

**P.C.No:08: SUBJECT: COMPUTER ENGINEERING**

CATEGORY	ZONE-1				ZONE-2				ZONE-3				ZONE- 4				TOTAL				GRAND TOTAL
	OPEN ZONE		LOCAL		OPEN ZONE		LOCAL		OPEN ZONE		LOCAL		OPEN ZONE		LOCAL		OPEN ZONE		LOCAL		
	G	W	G	W	G	W	G	W	G	W	G	W	G	W	G	W	G	W	G	W	
OC	-	-	-	-	-	-	-	-	-	-	1	-	-	-	2	1	-	-	3	1	4
BC-D	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	1	1
BC-E	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	1	-	-	1
ST	-	-	1	-	-	-	-	-	-	-	-	-	-	1	-	-	-	1	1	-	2
TOTAL	-	-	1	-	-	1	-	-	-	-	1	-	-	1	2	2	-	2	4	2	8

**P.C.No:09: SUBJECT: ELECTRONICS & COMMUNICATION ENGINEERING**

CATEGORY	ZONE-2				ZONE- 4				TOTAL				GRAND TOTAL
	OPEN ZONE		LOCAL		OPEN ZONE		LOCAL		OPEN ZONE		LOCAL		
	G	W	G	W	G	W	G	W	G	W	G	W	
OC	1	-	-	-	1	1	1	1	2	1	1	1	5
BC-B	-	-	-	-	-	-	1	-	-	-	1	-	1
BC-D	-	-	1	-	-	-	-	-	-	-	1	-	1
BC-E	-	-	-	-	-	1	-	-	-	1	-	-	1
ST	-	-	-	-	-	1*	1	-	-	1	1	-	2
TOTAL	1	-	1	-	1	3	3	1	2	3	4	1	10

**Note :** As per G.O.Ms.No.436 General Administration (Ser-D) Dated.15/10/1996 and in terms of Rule 22 (h) (ii) of A.P. State Subordinate Service Rules 1996. If no Candidate is available for the said 01\* CF Vacancy, interchanging procedure would be followed. Hence, all ST & SC women candidates of **all zones** can also apply.



**P.C.No:10: SUBJECT: : ELECTRICAL& ELECTRONICS ENGINEERING**

CATEGORY	ZONE-4				TOTAL
	OPEN ZONE		LOCAL		
	G	W	G	W	
SC	-	-	1	-	1
ST	1	-	-	-	1
<b>TOTAL</b>	1	-	1	-	2

**P.C.No:11: SUBJECT: : ELECTRONICS & INSTRUMENTATION ENGINEERING**

CATEGORY	ZONE-3				TOTAL
	OPEN ZONE		LOCAL		
	G	W	G	W	
BC-A	-	-	-	1*	1

**Note :** As per G.O.Ms.No.436 General Administration (Ser-D) Dated.15/10/1996 and in terms of Rule 22 (h) (ii) of A.P. State Subordinate Service Rules 1996. If no Candidate is available for the said 01\* CF Vacancy, interchanging procedure would be followed. Hence, all BC women candidates of zone - 3 can also apply.

**P.C.No:12: SUBJECT:: ENGLISH**

CATEGORY	ZONE-1				ZONE- 4				TOTAL				GRAND TOTAL
	OPEN ZONE		LOCAL		OPEN ZONE		LOCAL		OPEN ZONE		LOCAL		
	G	W	G	W	G	W	G	W	G	W	G	W	
OC	-	-	1	-	-	-	2	-	-	-	3	-	3
BC-D	-	-	-	-	-	-	1	-	-	-	1	-	1
<b>TOTAL</b>	-	-	1	-	-	-	3	-	-	-	4	-	4

**P.C.No:13: SUBJECT:: GARMENT TECHNOLOGY**

CATEGORY	ZONE-3				TOTAL
	OPEN ZONE		LOCAL		
	G	W	G	W	
BC-A	-	-	-	1*	1

**Note :** As per G.O.Ms.No.436 General Administration (Ser-D) Dated.15/10/1996 and in terms of Rule 22 (h) (ii) of A.P. State Subordinate Service Rules 1996. If no Candidate is available for the said 01\* CF Vacancy, interchanging procedure would be followed. Hence, all BC women candidates of zone - 3 can also apply.

**P.C.No:14: SUBJECT: : GEOLOGY**

CATEGORY	ZONE-3				TOTAL
	OPEN ZONE		LOCAL		
	G	W	G	W	
OC	-	-	-	1	1

**P.C.No:15: SUBJECT:: MATHEMATICS**

CATEGORY	ZONE-1				ZONE-3				ZONE- 4				TOTAL				GRAND TOTAL
	OPEN ZONE		LOCAL		OPEN ZONE		LOCAL		OPEN ZONE		LOCAL		OPEN ZONE		LOCAL		
	G	W	G	W	G	W	G	W	G	W	G	W	G	W	G	W	
OC	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	1	1
BC-C	-	-	1	-	-	-	-	-	-	-	-	-	-	-	1	-	1
BC-E	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	1	1
ST	-	-	-	-	-	-	-	-	1	-	-	-	1	-	-	-	1
<b>TOTAL</b>	-	-	1	-	-	-	-	1	1	-	-	1	1	-	1	2	4

**P.C.No:16: SUBJECT:: MECHANICAL ENGINEERING**

CATEGORY	ZONE-1				ZONE-3				ZONE- 4				TOTAL				GRAND TOTAL
	OPEN ZONE		LOCAL		OPEN ZONE		LOCAL		OPEN ZONE		LOCAL		OPEN ZONE		LOCAL		
	G	W	G	W	G	W	G	W	G	W	G	W	G	W	G	W	
OC	-	-	2	-	-	-	1	-	-	1	-	1	-	1	3	1	5
BC-B	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	1	1
<b>TOTAL</b>	-	-	2	-	-	-	1	-	-	1	-	2	-	1	3	2	6

**P.C.No:17: SUBJECT:: METALLURGICAL ENGINEERING**

CATEGORY	ZONE-2				TOTAL
	OPEN ZONE		LOCAL		
	G	W	G	W	
BC-A	-	-	-	1	1

**P.C.No:18: SUBJECT:: MINING ENGINEERING**

CATEGORY	ZONE-1				ZONE- 3				TOTAL				GRAND TOTAL
	OPEN ZONE		LOCAL		OPEN ZONE		LOCAL		OPEN ZONE		LOCAL		
	G	W	G	W	G	W	G	W	G	W	G	W	
OC	-	-	-	-	-	-	-	1	-	-	-	1	1
BC-A	-	1*	-	-	-	-	-	-	-	1	-	-	1
SC	-	-	-	-	-	-	-	1	-	-	-	1	1
ST	-	-	-	1*	-	-	-	-	-	-	-	1	1
<b>TOTAL</b>	-	1	-	1	-	-	-	2	-	1	-	3	4

**Note :** As per G.O.Ms.No.436 General Administration (Ser-D) Dated.15/10/1996 and in terms of Rule 22 (h) (ii) of A.P. State Subordinate Service Rules 1996. If no Candidate is available for the said 02\* CF Vacancies, interchanging procedure would be followed. Hence, all BC women candidates of all zones can also apply. In respect of ST (W) Local vacancy all SC & ST women candidates of zone-1 can also apply.

**P.C.No:19: SUBJECT: PHARMACY**

CATEGORY	ZONE-1				ZONE-2				ZONE- 4				TOTAL				GRAND TOTAL	
	OPEN ZONE		LOCAL		OPEN ZONE		LOCAL		OPEN ZONE		LOCAL		OPEN ZONE		LOCAL			
	G	W	G	W	G	W	G	W	G	W	G	W	G	W	G	W		
BC-A	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	1	1
BC-C	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	1	-	1
BC-D	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	1	-	1
<b>TOTAL</b>	-	-	1	-	-	-	1	-	-	-	1	-	-	1	2	-	3	

**P.C.No:20: SUBJECT: PHYSICS**

CATEGORY	ZONE-3				ZONE- 4				TOTAL				GRAND TOTAL
	OPEN ZONE		LOCAL		OPEN ZONE		LOCAL		OPEN ZONE		LOCAL		
	G	W	G	W	G	W	G	W	G	W	G	W	
OC	-	-	-	1	-	-	-	-	-	-	-	1	1
BC-A	-	-	-	-	-	-	-	1	-	-	-	1	1
SC	-	-	1	-	-	-	1	-	-	-	2	-	2
<b>TOTAL</b>	-	-	1	1	-	-	1	1	-	-	2	2	4

**P.C.No:21: SUBJECT: TEXTILE TECHNOLOGY**

CATEGORY	ZONE-3				ZONE- 4				TOTAL				GRAND TOTAL
	OPEN ZONE		LOCAL		OPEN ZONE		LOCAL		OPEN ZONE		LOCAL		
	G	W	G	W	G	W	G	W	G	W	G	W	
BC-A	-	1*	-	-	-	-	-	1*	-	1	-	1	2
SC	-	-	-	-	-	-	-	1*	-	-	-	1	1
<b>TOTAL</b>	-	1	-	-	-	-	-	2	-	1	-	2	3

**Note:** As per G.O.Ms.No.436 General Administration (Ser-D) Dated.15/10/1996 and in terms of Rule 22 (h) (ii) of A.P. State Subordinate Service Rules 1996. If no Candidate is available for the said 03\* CF Vacancies, interchanging procedure would be followed. Hence, all BC women candidates of all zones can also apply. In respect of SC (W) Local vacancy all SC & ST women candidates of zone-4 can also apply.

**ANNEXURE-II****SCHEME AND SYLLABUS FOR THE POST OF LECTURERS IN GOVERNMENT POLYTECHNICS  
(ENGINEERING & NON ENGINEERING) IN A.P. TECHNICAL EDUCATION SERVICE**

(As per the Annexure – III to the G.O Ms. No. 141, Finance (HR-I Plg &amp; Policy) Dept., Dt. 01/08/2016)

<b>Written Examination: (Objective Type)</b>				
<b>Paper</b>	<b>Subject</b>	<b>No. of Questions</b>	<b>Duration Minutes</b>	<b>Maximum Marks</b>
<b>Paper-1</b>	General Studies & Mental Ability (Degree Standard)	150	150	150
<b>Paper-2</b>	Concerned Subject	150	150	300
<b>Total</b>				<b>450</b>
<b>N.B:</b> As per G.O.Ms. No.235 Finance (HR-1, Plg & Policy) Dept, Dt: 06/12/2016, for each wrong answer will be penalized with 1/3rd of the marks prescribed for the question in all Objective type papers.				

- N.B:** 1. The paper in concerned subject for Engineering streams is of Engineering Bachelor's degree standard.  
2. The paper in the concerned subject for Non-Engineering streams is of P.G. Degree standard

1	Architectural Engineering
2	Automobile Engineering
3	Bio Medical Engineering
4	Commercial & Computer Practice
5	Ceramic Technology
6	Chemistry
7	Civil Engineering
8	Computer Engineering
9	Electronics & Communication Engineering
10	Electrical & Electronics Engineering
11	Electronics and Instrumentation Engineering
12	English
13	Garment Technology
14	Geology
15	Mathematics
16	Mechanical Engineering
17	Metallurgical Engineering
18	Mining Engineering
19	Pharmacy
20	Physics
21	Textile Technology

### **PAPER-I: GENERAL STUDIES AND MENTAL ABILITY**

1. Major Current Events and Issues pertaining to International, National and State of Andhra Pradesh.
2. General Science and its applications to the day to day life Contemporary developments in Science & Technology and Information Technology.
3. History of India – emphasis will be on broad general understanding of the subject in its social, economic, cultural and political aspects with a focus on AP and Indian National Movement.
4. Geography of India with focus on Andhra Pradesh.
5. Indian polity and Governance: constitutional issues, public policy, reforms and e-Governance initiatives.
6. Indian Economy and planning
7. Sustainable Development and Environmental Protection
8. Disaster management: vulnerability profile, prevention and mitigation strategies, Application of Remote Sensing and GIS in the assessment of Disaster
9. Logical reasoning, analytical ability and logical interpretation.
10. Data Analysis: Tabulation of data Visual representation of data Basic data analysis (Summary Statistics such as mean, median, mode and variance) and Interpretation.

### **PAPER-II**

#### **1. ARCHITECTURAL ENGINEERING**

01. **Engineering Mechanics:** Free body diagrams, Equilibrium equations, Analysis of determinate trusses, Simple stress and strain, Types of stresses, Principal stress and Mohr circle of stress, Elastic limit, Modulus of elasticity, Bending moment and shear forces, Moment of inertia, Deflection, Buckling & Crushing failures, Slenderness ratio, Torsion, Design of RCC & Steel Structures.
02. **Basic Design:** Design definition and description, Importance of Design, Fundamental elements of Design, Principles of design, elements of composition, Anthropometrics Study, Ergonomics, Study of Different spaces, Optimum areas for various functions, Space standards, Lighting and Ventilation, Design Process and thinking and Introduction to the study of aesthetics.
03. **Building materials :** Clay Bricks, Stones, Sand, Mortars, Cement, Cement mortar, Concrete, Reinforced cement concrete, Timber, Veneers, Paints and Varnishes, Glass, Rubber, Adhesives, Asphalt and Bitumen, Plastics, roofing and flooring materials, metals, alloy steels, non-ferrous metals, stones- classification, properties, aggregates — coarse and fine aggregates, Admixtures.
04. **Building Construction:** Foundations. Footings, Walls, Lintels, Openings (doors & windows), Composite Masonry, Partition Walls, Staircases, Cladding, Sloping and flat roofs, Floorings, Structural steel work and Types of steel trusses.
05. **Architectural Drawing and Graphics:** Importance of Scale, Different forms, Architectural representation of different objects, Solid geometry, Building Geometry — isometric. Rendering, visualization skills and importance of free hand drawing.
06. **Introduction of art and architecture:** Importance of art, Development and exploration of art, Relationship between art and architecture, Role of an architect in society, relationship with other consultants, Technical knowledge and expertise, Evolution of Shelter forms.
07. **History of Architecture:** Architectural development in Egypt, Greek, Roman, Early Christian, Romanesque, Gothic & Byzantine. Indian Architecture. characteristic styles of modern architecture, Arts and Crafts movement, Art Nouveau, Monumentalism,

- Expressionism.
08. Surveying and Site Studies: Principles of Surveying, Computation of areas and levelling, Theodolite surveying, Total station and GPS.
  09. **Water supply and Sanitary Engineering:** Sources of water supply, Quality of water, Treatment of water, Distribution system of water, Collection and Treatment of refuse, Sewage, BOD, COD, Principles of drainage.
  10. **Climatology:** Building Climatology, Tropical Climates, Thermal Comfort, Heat flow, Natural ventilation, passive cooling, Sun & Design Process.
  11. **Landscape design and site planning:** Importance and role of landscape designing, Historical perspective, Elements in Landscape design, Plants and design, Landscape construction.
  12. **Building Services:** Electrical services, Lighting, Air Conditioning, Elevators and Escalators, Telephones and EPABX, Security systems, Firefighting systems, Swimming pools, And Energy sources of building: wind energy, photo voltaic, bio mass, Waste disposal: Industries and hospitals, Hotel services and elevated flooring.
  13. **Sociology of human settlements:** sociological aspects, Elements of society, Urbanization, Historic evolution, Transportation and communication, Principle of ekistics.
  14. **Economics, Estimating and costing:** Introduction on economics, Micro and Macroeconomics, economic issues, Financing of a project, Quantity surveying and estimating (approximate and detailed) and rate analysis.
  15. **Town Planning.** Town forms In urban planning and development processes, various levels of planning national, regional, urban, rural, local etc.. Objectives of town planning, O-D surveys, FSI planning of industrial and recreational areas, urban renewals. TCPO and Town planning organization in India.
  16. **Building Acoustics:** Need to study acoustics, history of acoustics, generation, and propagation. transmission of sound, characteristics of sound, sensibility of human ear, resonance, reverberation time, Sabine's formula, echoes, principles of acoustical design process and sound isolation.
  17. **Advances construction:** Decay and Damage, Building Failures, Maintenance and Renovation, guniting, Strutting. Underpinning, Grouting, Propping, Effect of ageing, Weathering.
  18. **Professional Practice:** Types of offices for practice, COA registration and rules, IIA Code professional conduct, architects duties, principles of Indian contract act, Tenders, Contracts, Easements, Arbitration, Valuation, Role of Consultants, Building Bye-laws, National Building ode, Consumer protection act. Transfer of property.
  19. **Computer applications:** hardware and Software requirements, Operating systems, Features of presentation package, drafting packages and benefits of internet technology.

## **2. AUTOMOBILE ENGINEERING**

1. Thermodynamics: systems – Zeroth Law of thermodynamics – First law of thermodynamics – Second Law of thermodynamics – Entropy – Statistical thermodynamics – Air Compressors I.C. Engines cycles and Process – Combustion in I.C. Engines – Engine performance – Scavenging and supercharging of Engines – Modern development in I.C. Engines – I.C. Engine plant layout.
2. Heat Transfer: Conduction Convection – Thermal Radiation – Heat Exchangers.
3. Fluid Mechanics and Machinery: Fluid properties – Dimensional analysis – Fluid static's Flow past immersed bodies – Centrifugal pumps – Axial flow pumps – Rotary pumps – Reciprocating pumps – Oil Hydraulic systems.
4. Instrumentation: Transducers – Flow measuring transducers – Temperature measurement – Strain gauges – Mechanical measuring devices – Slip gauges – Plug gauge – Micrometers in bars optical flat etc.
5. Automobile chasis & Systems: Chasis layout – Shock absorbers in dependent suspension – torsion bars – gear suspension – wheel balancing – tyres and tubes – constructional details of the engine – Ignition system – Fuel system – Lubrication system – Cooling system – Transmission system – Brakes steering mechanism – Electrical circuits

and equipment's – Engine troubles – Air conditioning system – Modern trends in automobiles & Engines.

6. Material Science: Crystallography of metals – Binary alloys – Constitution and equilibrium diagram – methods of studying metal structure – Heat treatment – of steels – Casehardening and surface treatment of steels – Non Ferrous metals and alloys – Creep – Fatigue.
7. Kinematics of Machines: Kinematics – Velocity and Acceleration – Properties of instantaneous centre – Gears – Gears trains – Oams – Governors – Brakes and dynamometers – Clutches – Power transmission – Chain drives.
8. Dynamics of Machines: Static force Analysis – Dynamic Force Analysis – Dynamics of Reciprocating Engines – Balancing – Vibration Analysis of Single degree freedom systems – Torsional Vibrations – Vibration isolation.
9. Design of Automobile Machine Parts: Design of welded joints Design of bolts & nuts Shafts and Axles – Curved beams – Springs – Bearings – clutches – Brakes – Design of connecting rod – Crank shaft fly wheel.
10. Production Technology: Machine tools – Lathes – Shaper, planner and slotting machines Drilling and boring machine – Milling – Lapping – Tool room – Electro machining – Welding – Brazing – Foundry.
11. Industrial Engineering: Industrial management – personnel function – Production facilities – Production Planning and control – Wages and incentives Cost Control – Marketing and Sales Promotion.

### **3. BIOMEDICAL ENGINEERING**

#### **1. Physiology**

Cell biology and biopotentials, neuromuscular physiology, respiratory system, Cardiovascular physiology, Renal physiology, Gastrointestinal and endocrine physiology) Auditory system and Vision

#### **2. Clinical Immersion**

1. Cell biology: Nernst equation - derivation and its significance. Refractory period. Characteristics of stimulus. Strength-duration relationship. Electrical equivalent circuit of an axon.
2. Membrane time and space constants. Hodgkin-Huxley formulation. Membrane conductance. Nerve conduction membrane properties from current voltage relations, models of squid axon. Propagation of impulses in unmyelinated and myelinated nerve fibre. Electrical properties of receptors. Generator potential of Receptors. Intensity frequency relationship. Electrical properties of synaptic junctions – EPSP and IPSP.
3. Electrical Activity of the heart. Conduction system of the heart. Characteristics of Action potentials at SA node, Atria, AV Node, Purkinje fibres and ventricles, ECG complexes. The international standard 12 leads of ECG. Standard leads of Einthoven, precordial leads and augmented limb leads. Relationship between unipolar extremity leads and standard bipolar leads. Volume conductor fields: Bioelectric sources, Volume-conductor formulation. Solid angle computation. Infinite cylindrical axon, core conductor model non-homogenous media, integral equations.
4. Electrical activity of skeletal muscles-motor unit potentials. EMG wave form. Surface and needle electrodes for EMG. Velocity and their changes in normal and abnormal states. Fatigue and conduction - chemical significance.
5. Introduction to bioelectric Phenomena of hearing – Mechanical equivalent schematic diagram of the ear. Mechanical transformer of the middle ear. Frequency analysis of sound by the basilar membrane. Cochlear microphonics.

6. Interaction between Engineering and life sciences. Definition of Biomedical Engineering, its scope. The role of Biomedical Engineer in Health care delivery systems. Medical Electronics Industry Research, Development and education.
7. Application of Engineering concepts and methods for understanding Physiological systems. Basic electrical and Mechanical properties skeletal systems, muscular system, heart and brain. Nervous system as an internal communication system of the human body, Sense Organs.
8. Electrophysiology: Functional structure of a cell. Basis of biopotentials. Resting
9. potential of a nerve cell and its ionic mechanisms. Properties of excitable membranes. Action potential generation, its ionic mechanism and its characteristics.
10. Physiological signals, Characteristics, Basis of ECG, EMG, EEG and qualitative treatment of instrumentation for measuring these signals.
11. Biopotential, Electrodes, Electrode - Electrolyte Interface. Internal electrodes like needle electrodes and microelectrodes.

### **3. Bio-Medical Instrumentation.**

General Characteristics . of medical instrumentation like linearity, range, frequency response, signal-to-noise ratio and stability. Equivalent circuit Properties.

Broad classification of Biomedical Instrumentation for Clinical practice that is:

1. Instrumentation for Diagnosis, ECG, EEG, EMG, PCG etc.,
2. Therapeutic Devices - Stimulators, diathermy equipments etc.,
3. Prosthetic Devices - Pacemakers, Artificial Organs.
4. Visualising Devices - X-ray, Ultrasound etc., fibre optic endoscope.
5. Electrosurgical Devices - HF Surgery, Laser Surgery.
6. Data Storage & Analysis - Computers in medicine.
7. Analytical Instruments - Photocolorimetry, Spectrophoto Meter, Electrophoresis, Centrifuges, Waterbath etc., Hospital illumination, Theatre illumination, Requirements and typical arrangements. Miscellaneous equipments. Development of instrumentation for Clinical practice and Medical Research, Introduction. Comparative study of industrial and Medical Instrumentation.

### **4. Electrical Safety and Standards:**

1. Electrical hazards during Bioelectric monitoring: safety, Codes, Standards. Micro and Macroshock and their physiological effects. Leakage currents and protection by use of isolation transformers. Equipotential grounding and earth free monitoring.
2. Electrical factors in Hospital Design: Electrical power supply systems in a hospital building, Proper installation and grounding for providing safe patient - electrical environment.

### **5. Sensors and transducers for Biomedical applications:**

Transducers for physiological application. Stratic-types like variable R.L. & C, LVDT, Therna couples, Thermistors Photo electric and Dynamic types like piezoelectric and moving coil type and their applications. Special requirements.



## 6. Amplifiers for Biomedical applications:

1. Operational amplifiers, Differential, Instrumentation amplifier, Carrier amplifiers, Phase sensitive detector for LVDT. Principles of wave generation and shaping.
2. Recorders and play devices for Bio-Medical applications. General features of ink-jet, thermo sensitive and optical recorders. General features of display devices for bio-signals. Data acquisition and display using micro computers. ECG recording system. Block schematic diagram of ECG machine; amplifiers : circuits for ECG. Special types of ECG recorders. Noise problems and their elimination.
3. Electro-encephalography: Block schematic diagram of EEG recording system. General features of different blocks : specification of EEG amplifiers : qualitative requirements, 10-20 electrode system, Resting Rhythms and sleep stages.
4. Electro Myography: Block schematic diagram of EMG recording system. EMG amplifiers. Design considerations of EMG amplifiers. Data display for EMG.
5. Blood Pressure and blood flows. Electronic techniques for indirect and direct measurement of blood pressure: measurement of blood flow by electromagnetic, doppler and plethysmographic methods.
6. Respiratory Measurements and Aid; Principles and techniques of impedance pneumography and pneumotachograph. Spirometry principles
7. Ventilators : Parameters, system Concepts, Flow Gauges, Valves Humidifiers. Birds, Emerson, Bear Ventilators.
8. Biosensors: Electrochemical biosensors, impedometric, voltammetry, amperometry, mechanical transducers, MEMS-based
9. Anaesthesia Equipment, Boyle's Apparatus, Gas Distribution Systems.
10. Audiometry: Common Tests and procedures, Airconduction, Bone Conduction, Masking, Schematic Functional Diagram of an Audiometer.
11. Hearing Aids: Different Types, Comparison of Microphones, Receivers and Amplifiers, cochlear implants
12. Biophotonics, Introduction to the principles of optics, lasers and biology, the interaction of light with cells and tissues, and various optical imaging, sensing and activation techniques and their applications in biomedicine.
13. Lasers: Basic Principles of Laser, Different types of Laser Equipment used in Ablations, Surgery. Laser Safety principles and classifications.
14. Fibre Optics: Principles and Applications : Endoscopes, Neonatural instrumentation, Incubators, Apnea Monitor, Ophthalmic Instrumentation : Intra - ocular Pressure Measurement, Contacting and Non-contacting Types, Refractometers.
15. Optical microscopy, phase contrast microscope, Differential interference contrast microscope, Confocal and multiphoton microscopy, Fluorescence microscopy.
16. Diffuse Optical tomography and Optical coherence tomography
17. Optical sensors, Fiber optics sensors, Surface plasmon resonancebased biosensing
18. Methods of Chemical analysis: Absorption photometry: Emission photometry; Fluorometry, Introduction to autoanalyzer. Chromatography for blood gas analysis, Colorimeters., Spectrophotometers, Electrophoresis.

## 7. Biomedical Imaging

**1. Introduction to Radiography:** Physical properties of; X-rays. Principles of generation of x-rays. Radiation energy distribution. Collimators and grids, Fluoroscopy. Image intensifiers.

**2. Sonography:** basic principles, ultrasound-based imaging, Ultrasound Applications for Surgery: Lithotripsy, Principles and Applications. Ultrasonics: Basic principles of Medical Ultrasonics, Echo Techniques, Functional Block Diagram of Basic Pulse-Echo System for Diagnostic Purposes. Different Display Modes A-Mode, B-Mode, M-Mode, Types of Scan-B Scan, Principles of Echocardiography and Echoencephalography with Schematic Block Diagrams. Sector Scanners, and phased array scanners. Introduction to Doppler Ultrasound: Blood flow through heart valves, peripheral vessels Doppler flow meter. Display Devices for Ultrasonic Echo Imaging. Biological Effects of Ultrasound and Safety Precautions. Phonocardiography: Origin of heart sounds. Phonocardiographic instrumentation consisting of microphone, filters and signal conditioners.

**3. Computed Tomography:** Basic Principles, System Components and Functions of Scanning System, Processing Unit, Reconstruction Techniques - Viewing systems, storage and documentation. Medical applications and safety precautions.

**4. Magnetic Resonance Imaging:** Basic Physics of Magnetic Resonance Imaging. Signal Excitation and Detection. Schematic Functional Diagram of MRI Scanner with its subsystems. Magnet, Gradient system. R.F. Transmitter Receiver system, Computer and Image Display, Medical Applications and safety precautions.

**5. Radio Nuclide Imaging:** Principle, Schematic functional diagram and Components of Gamma Camera. Medical Applications, safety and precautions.

**6. Position emission tomography (PET) and Single Photon Emission Computed Tomography (SPECT):** Basic Principles, Nuclear Reactions and production of precursors. Detector Materials reconstruction techniques.

**7. Medical Thermography:** Basic Principle, Functional Block Diagram of thermographic equipment, scanning and display arrangements for Infra-Red Imaging, Medical applications.

## 8. Biomedical Devices

Defibrillators : D.C. Defibrillators of capacitive discharge and delay line capacitive discharge with basic circuit diagrams. Types of electrodes and their features. Testing and safety.

Cardioverters : Working Principles, Scheme of synchronizing D.C. Defibrillators with the R-wave of ECG. Testing and safety. Cardiac pacemakers : Types –

- i. Asynchronous and Synchronous (demand) mode of operation.
- ii. External and implantable, Asynchronous Pacemakers.

Working principles, block diagram and circuit diagram of blocking oscillator asynchronous pacemaker.

Synchronous / Demand Pacemaker: Working principles,, modes of triggering-ventricular triggered (QRS triggered) and atrioventricular synchronized pacemaker (P wave triggered).

Implantable pacemaker: Technical and qualitative requirements of power supplies, lead wires and electrodes. Transcutaneous R.F. powered Cardiac pacemaker system. Susceptibility of implanted pacemaker to electrical interference and remedial

measure. Assist Devices for the Heart : Principles of external counter - pulsation techniques. Infraaortic Balloon pump. Auxilliary ventricle and schematic for temporary by-pass of left ventricle.

Prosthetic Heart Valves: Qualitative requirements. Categories Mechanical and tissue valves. Types of mechanical Valves – ball and cage, tilting disc and bileaflet valves. Types of tissue valves - Homografts or allograft (human cadaver) and Heterografts or Xenografts (Porcine or Bovine). In vitro performance testing of prosthetic heart valves using a pulse duplicator.

Heart- Lung Machine: Governing principles, qualitative requirements, functional details of bubble, thin film and membrane - Type of blood oxygenators.

Haemodialyser: Qualitative requirements. General Scheme of operation. Types of Exchangers, block diagram, electronic control and monitoring systems.

Intensive Coronary Care Concepts: Systems organisation, Critical Physiological parameters to be monitored. Layout and safety precautions.

Physical Therapy Equipment, Short wave, Microwave and Ultrasonic diathermy.

#### **4. COMMERCIAL AND COMPUTER PRACTICE**

1. **Financial Management:** Meaning, nature, objectives and scope of financial management. Capital budgeting, process, techniques. Sources of finance. Cost of capital - cost of various sources of finances. Leverages - operating and financial leverages. Capital structure theories. Working capital management - cash, receivables and inventory management.
2. **Financial and management accounting:** Techniques of analysis of financial statements - comparative and common size statements, trend analysis and ratio analysis. Funds flow and cash flow analyses.
3. **Managerial Economics:** Meaning, nature and scope of managerial economics. Demand analysis. Production and cost analysis. Market structure - perfect and imperfect markets.
4. **Business environment:** Meaning and components of business environment. Industrial policies, and 1991. Liberalization, privatization and globalization. WTO.
5. **Marketing management:** Meaning, concepts, nature and scope of marketing management - marketing environment. Consumer behavior and market segmentation. Product, price, promotion and Channel management.
6. **Quantitative techniques:** Sampling and sampling methods. Probability and probability distributions - hypothesis testing. Parametric tests (Z, t-tests and ANOVA) and non-parametric tests (Chi-square tests).
7. **Business Mathematics:** Simple and Compound Interest, Calculating value of annuities, Functions and graphs, Limits and differentiation, Basic Matrix operations, Basics of Linear Programming.
8. **Computer tools for office applications:** Basic knowledge of computers and its peripheral equipment, Use of word processing (such as MS Word) and spreadsheet management (such as MS Excel) software. Use of internet and email for office correspondence. Use of accounting packages (such as Tally).

## 5. CERAMIC TECHNOLOGY

### FUELS, FURNACES & PYROMETRY:

#### A. FUELS:

**1. Solid Fuels:** COAL: Coal formation theories, Mineral matter, Classification, handling and storage, washing, general properties, Calorific value, grind ability etc.

**2. Gaseous Fuels:** Various gaseous fuels like Producer gas, Water gas, Coke Oven gas, other gaseous fuels like blast furnace gas, LPG, CNG, Natural gas – Properties like composition, calorific value.

**3. Liquid Fuels:** Petroleum products – Origin, composition, refining process, distillation of petroleum products – brief outlines. Synthetic fuels, storage and handling – general industrial practices.

**4. Properties:** Analysis of coal, gaseous fuels, liquid fuels.

#### B. FURNACES:

**1. Combustion:** Combustion calculations, liberated heat, available heat, waste gas – Solid, Liquid and Gaseous fuels – Pulverisation of fuel, atomization of fuel, propagation of gaseous mixture, diffusion of flame, control of combustion.

**2. Heat Transfer:** Heat transfer to charge by conduction, convection and radiation, flow of heat through furnace walls, heat losses, heat balancing, heat recovery – recuperators and regenerators.

**3. Types of furnaces:** Various types of furnaces and kilns used in ceramic industries

#### C. PYROMETRY:

Measurement of temperature – temperature scales – thermometers – pyrometric cones thermoelectric current – thermo couples – resistance pyrometers – radiation pyrometers – optical pyrometer.

### CERAMIC SCIENCE

**CRYSTAL CHEMISTRY:** Ionic bond with examples – Potential energy curve-bond strength Lattice energy – Covalent Bond – Atomic and molecular orbitals, hybridization – Metallic bond Vanderwall's bond – Hydrogen bond, Mixed bond. Relation to bond vis-à-vis melting point, hardness, electrical and thermal properties – Crystalline defects; Point defects, line defects.

**1. PHASE EQUALIBRIA AND PHASE DIAGRAMS:** Gibb's rule and its interpretation; condensed system – One component system – Binary diagrams – Lever rule – Familiarity with  $\text{SiO}_2 - \text{Na}_2\text{O}$ ,  $\text{CaO} - \text{Al}_2\text{O}_3$ ,  $\text{SiO}_2 - \text{Al}_2\text{O}_3$  – Ternary phase diagrams -  $\text{Na}_2\text{O}$ ,  $\text{CaO} - \text{SiO}_2$ ,  $\text{CaO} - \text{Al}_2\text{O}_3 - \text{SiO}_2$ ,  $\text{MgO} - \text{CaO} - \text{SiO}_2$ .

**2. MECHANICAL PROPERTIES:** Elastic properties – Stress & Strain – tensile, compressive and shear stress strain, elastic moduli – Poisson's ratio – PLASTIC DEFORMATION – Simple oxides – dislocation and slip, creep, effect of temperature, Polyphase materials – influence of microstructure – BOTTLE FRACTURE – Fracture energy – Flaws and their origin and role. Hardness & Abrasion – Relationship with other properties, elastic modulus, creep – Abrasives

**3. THERMAL PROPERTIES:** Specific heat – Latent heat of fusion – Fusion point – Melting point. Thermal expansion – Simple ionic crystals – Class – Polycrystalline materials. Thermal conductivity – Theory – Simple oxides – Polycrystalline materials – Thermal stress – Permanent and temporary stress – Spalling of ceramics – Stress at interfaces.

**4. OPTICAL PROPERTIES:** Reflection and refraction – Scattering and opacity, absorption and radiation – Ionic colour in vitreous systems – Colloidal colours – Carbon – Sulphur

**5. CHEMICAL PROPERTIES:** Surface chemistry of vitreous materials – attack of water, alkalis and acids, electrode glasses, durability of glazes and enamels.

**6. ELECTRICAL AND MAGNETIC PROPERTIES:** Ionic conduction – Electronic conduction – Dielectric constant – Dielectric loss, dielectric strength, ferroelectric phenomena. Paramagnetism and ferromagnetism in ceramics.

## **GLASSTECHNOLOGY**

**INTRODUCTION:** Glass industry in India – common uses – import and export of glass, present and future status.

**PREPARATION OF GLASS BATCH:** Glass composition – melting and fabrication, characteristics, properties and cost; composition range.

**MAJOR INGREDIENTS:** Sand, Limestone, Dolomite, Soda ash, Feldspar, Nephelene syenate etc.

**MINOR INGREDIENTS:** Melting accelerators, Refining agents, decolourisers.

**CULLET:** Cullet and its use- BATCH calculations

**GLASS MELTING PROCESS:** Particle size, melting, volatilization, refining – sources of gas bubbles – fused batch interface and re-boil, identification of gases, refining agents, chemistry of refining actions – Homogenisation – rate of homogenization – viscosity glass at various stages, standard viscosity points, working characteristics, viscosity – temperature relationships of common glasses.

**FABRICATION PROCESSES:** Conditions of glass; feeding; blowing and pressing – effect of variations in composition on the working characteristics

**ANNEALING & TEMPERING:** Release of stress, annealing constant, determination of annealing schedules for slabs, continuous plate containers, tempering.

**TESTING & QUALITY CONTROL:** Raw materials; Sieve analysis; purity, batch analysis, density, composition and homogeneity, SQS chart, softening point and thermal expansion. Defects in Glass; seeds and blisters, cords, striae, strain and stones, methods of testing, sources of trouble and their elimination. Fabrication defects; various defects of fabrication. Testing of container; weight and capacity, flat glass.

**LAY OUT OF A MODERN GLASS PLANT:** Flow diagram – Site selection – storage of raw materials – batch house – melting furnace – infrastructure facilities.

**BATCH PREPARATION:** Handling, mixing and charging of raw materials.

**GLASS MELTING TANK FURNACES:** Types of tank furnaces – general features – combustion – temperature distribution – heat transfer and convection currents – heat recovery and insulation, heat balance, thermal performance. DESIGN, CONSTRUCTION & OPERATION of glass tank furnace – Electric melting.

**POT MELTING PRACTICE:** Types of glasses suitable for pot melting, pots and pot furnaces.

**FORMING PROCESSES:** Hand operations, fore hearth and feeder, machine for blown ware, press machines, moulds, parison and blow moulds. Paste moulds. Rolling of glass – drawing of sheet glass – annealing Lehr – special processes surface coating – other operations – table working.

**SPECIAL GLASSES:** Heat resistant glasses – Fiber glass – Glass ceramic – Optical glasses – Glasses for electrical and electronic industries.

## **ENAMELS**

**Introduction:** Enamels & ceramic coatings – metal bases – pre-treatment of metal and non-metal surfaces – de-enamelling – aluminum alloys – Enamel glass composition – batch calculations – typical examples of compositions for various steels – frit making – smelting – quenching – drying – smelting furnaces – milling and mill additions. Application and Firing; Control of slips – drying & brushing, firing – enamelling furnaces – special firing methods, properties and tests. Defects and remedies of enamelling.

## **WHITE WARE AND HEAVY CLAYWARE**

**RAW MATERIAL PREPARATION:** Particle size reduction – methods – comparison – analysis Mixing methods – blunger – pug mill – u mixer, Muller mixer etc – Forming methods – Slip casting - rheology of slip – plastic forming – power pressing – special forming methods.

**DRYING:** External parameters – critical moisture content – drying rates – driers – types – shrinkage - defects

**CHANGES DURING FIRING:** Thermal decomposition – changes in ceramic body – sintering – microstructure

**EQUIPMENT & MACHINERY:** Crushers – grinders – mixers, separators, shaper, presses (mechanical, hydraulic, isostatic) – die materials and design – driers - glazing machines – ancillary equipment.

**FURNACES/KILNS:** Down draft kiln – updraft kiln – coal or oil fired – flues – chimney & stack calculations, complete operations.

Tunnel kilns – oil, gas or electric fired – construction – operation – heat balancing Roller Kilns – design – function – cycles – maintenance Others: burners – blowers etc.

**FIRING PRACTICE:** Furnace loading – lighting – firing schedule – temperature control – seger cones – firing defects – warpage – Microstructure – changes in microstructure in relation to sintering, typical ceramic microstructures and their control

**PLANT DESIGN:** Location – assessment – economics – factory layout – flow sheet – project report.

## **REFRACTORIES**

**CLASSIFICATION:** Classification of Refractories – Acid - Basic – Neutral – Special Refractories

**APPLICATIONS:** Industries of Iron & Steel – Gas plants – Powerhouses – Non-Ferrous metals Ceramic – Cement & Fertilisers.

**REFRACTORY INDUSTRY:** Status and scope of Indian Refractory industry – Layout of modern Refractory plant.

**ALUMINO-SILICATES:** Raw materials – Manufacturing process – Microstructure & properties Uses.

**SILICA REFRACTORIES:** Manufacturing process – raw materials & composition – microstructure – properties and uses.

**BASIC REFRACTORIES:** Magnesite – Dolomite – Chrome – combination Refractories – manufacturing process – Microstructure – Properties and uses.

**SPECIAL REFRACTORIES:** Alumina – Raw materials – Manufacture – Properties & uses. Fusion cast Refractories – others like zircon, carbon, silicon carbide – Spinel and refractory cements – castables – ramming masses.

## **CEMENT TECHNOLOGY**

**CEMENT INDUSTRY:** Indian and A.P. scenario – Large – medium – small scale units.

**TYPES:** Varieties of cements – occurrence – uses – manufacturing procedures.

**PORTLAND CEMENT:** Manufacturing methods – Wet process – advantages and disadvantages; Dry process – advantages and disadvantages. Rotary Kiln – construction – operation – Refractories used – various chemical phases present in cement. Properties of cement – testing methods.

**SPECIAL CEMENTS:** Rapid setting cement, Pozzolona, Slag cement etc.

## **SPECIAL CERAMIC MATERIALS**

**HIGH TEMPERATURE CERAMIC-OXIDES:** Beryllia – Magnesia – Alumina – Zirconia – NON-OXIDES – Silicon Nitride – Boron nitride – Silicon carbide – Boron Carbide – Methods of production – Properties – Thermal – Electrical – Thermo mechanical behaviour.

**ELECTRICAL & ELECTRONIC CERAMICS:** Dielectric Ceramics – High Voltage – low frequency applications – porcelain insulators manufacture – Low voltage High frequency applications – insulators – steatite, Magnesium titanate, Cordierite, Fosterite. FERRO ELECTRIC CERAMICS – Barium Titanate – Lead Zirconium Titanates etc., - MAGNETIC CERAMICS – Soft Ferrites – hard ferrites – Magnetite – Nickel Zinc ferrites, Yttrium Iron garnet, Hexaferrites of Barium, Lead and Strontium - CERAMIC

**SEMI CONDUCTORS:** Germanium – Silicon – Gallium – Antimonide – Silicon carbide etc.

**CERAMIC COMPOSITES:** Types – Fibres and Whiskers – Fibre reinforced composites – cermets – Metal castings – Transformation toughened ceramics – Cutting Tools – Wear resistant ceramics – Grinding media, Ceramic engine parts.

**NUCLEAR CERAMICS:** Methods of production and properties – Uranium Oxide; Uranium carbide, Thorium Oxide; Beryllium Oxide etc.

## **6. CHEMISTRY**

### **Inorganic Chemistry:**

1. Chemical periodicity: Periodic properties
2. Atomic structure, nuclear properties, molecular symmetry, bonding in polyatomic molecules, concepts of acids and bases
3. Main group elements and their compounds: Synthesis, bonding and structure.
4. Transition metal Chemistry and coordination compounds: Structure and bonding, Molecular Orbital (MO) theory of complexes, Crystal field theory (CFT), Jahn-Teller effect, magnetic properties, orbital splitting, spin-orbit coupling, calculation of CFSE, spectra of octahedral and tetrahedral complexes of d1 to d9 systems, and reaction mechanisms
5. Organometallic compounds, their synthesis, bonding and structure, and reactivity. Organometallic compounds in homogenous catalysis.
6. Cage like structures and metal clusters
7. Analytical Chemistry: separation techniques, spectroscopic electro- and thermo-analytical methods.
8. Bioinorganic Chemistry — photosystems, porphyrins, metallo-enzymes, oxygen reactions, electron transfer, nitrogen fixation.

9. Characterization of inorganic compounds by infrared-, Raman- NMR-, electron spin resonance (EPR)-, UV-Visible, and Mass spectroscopic techniques
10. Nuclear chemistry — nuclear reactions, fission and fusion and their applications, radio-analytical techniques and activation analysis.

**Physical Chemistry:**

11. Quantum mechanics: Fundamental concepts and applications, hydrogen atom, and angular momentum
12. Atomic structure and hydrogen atom spectra, chemical bonding
13. Group theory: Basic principles and applications
14. Kinetic theory of gases: Equations of state and collision theory
15. Chemical Kinetics: order and molecularity of reactions, Arrhenius equation, Activated complex theory of bimolecular gaseous reactions and Lindemann theory of unimolecular gaseous reactions, experimental methods for studying reaction rates.
17. Chemical Thermodynamics: First Law, Joule-Thomson effect, Thermochemistry, Second law, Entropy, Maxwell relations, Van't Hoff equation
18. Electrochemistry: Electrochemical cells and cell reactions, Standard electrode potentials, Nernst equation, specific, equivalent and molar conductivities, Kohlrausch's law; Concentration cells, Debye-Huckel theory and Debye-Huckel-Onsager equation, transport number and ionic mobility, potentiometric and conductometric titrations, electrical double layer.
19. Photochemistry: Laws of photochemistry, Grothus-Draper Law, Stark- Einstein law, kinetics of photochemical reactions
20. Statistical Thermodynamics: Types of statistics, partition functions, thermodynamic properties of monoatomic ideal gases, Einstein theory of heat capacities
20. Surface Chemistry: Adsorption isotherms. And BET theory of multilayer adsorption
21. Catalysis: Acid-base catalysis, enzyme catalysis, Michaelis-Menten equation, heterogeneous catalysis.
22. Molecular spectroscopy: Principles and applications of rotational and vibrational spectroscopy, NMR and EPR.
23. Chemical equilibrium: basic concepts, Solubility product, common ion effect, pH and buffer solutions, acids and bases, hydrolysis of salts, phase equilibrium.
24. Solid state: crystal systems, classification of binary and ternary compounds, diffraction techniques, bonding.

**Organic Chemistry:**

25. Heterocyclic compounds- classification based on the nature of hetero-atom, size of the ring and electron deficient nature of the ring.
26. General and comparative study of furan-, pyrrole- and thiophene- ring transformations. Comparison with benzenoid compounds: pyridine, quinoline, isoquinoline and acridine.
27. Aromaticity of cyclic compounds: synthesis, reactivity and properties.
28. Organic reaction mechanisms: Structure and reactivity of organic molecules-inductive effect, mesomeric (resonance) effect and hyper-conjugation, dipole moments, acidic



and basic strengths of organic compounds.

29. Concepts of organic reaction mechanisms: Aromatic substitutions: Electrophilic and Nucleophilic substitutions (SN1, SN2, SNi, SN2'), Elimination (E1 and E2), Cope- and Hofmann- eliminations.
30. Study of reaction intermediates: classical and non-classical carbocations-, carbanions-, carbon free radical- and carbene- in organic reactions.
31. Rearrangements: Dienone-Phenol-, Baeyer-Villiger-, Favorskii-, Beckmann-, Perkin-, Fries-, Pinacol-pinacolone- rearrangements.
32. Name reactions: Wurtz-, Friedel-Crafts-, Gattermann-, Diels-Alder-, Reformatsky-, Rosenmund- reactions.
33. Organometallic reagents and their application to organic reactions: RMgX, RLi, RZnX, R<sub>2</sub>CuLi
34. Transition metal catalysis: Heck-, Stille-, Sonogashira-, Suzuki-, Buchwald- Hartwig-coupling reactions.
35. Carbohydrates: General reactions of monosaccharides — configurational studies on glucose, fructose, sucrose, and recent advances in the Chemistry of cellulose and starch.
36. Proteins: Introduction to proteins, their classification, nomenclature and distribution in nature, simple amino acids — their isolation and their synthesis.
37. Alicyclic compounds: Mono-terpenes
38. Stereochemistry: Optical and geometric isomerism, configuration of saturated molecules, dextro and laevo, and R- and S- configurations of optically active compounds, racemic mixtures, racemization and resolution.
39. Characterization of organic compounds by infrared (IR)-, NMR-, UV-Visible-, and Mass-spectroscopy techniques.

## **7. Civil Engineering**

### **1. ANALYSIS OF STRUCTURES:**

Stresses in beams; combined bending and direct stresses; axially and eccentrically loaded columns Closed-coiled and open-coiled; helical springs under axial load and axial twist; carriage springs Analysis of thin and thick cylinders; compound cylinders  
Analysis of statically determinate plane trusses; method of joints and method of sections  
Deflection and slope of beams by Double integration Macaulay's, Moment area and Conjugate beam methods  
Analysis of statically indeterminate beams by flexibility and stiffness methods; propped cantilevers, fixed beams and continuous beams  
Strain energy method, slope-deflection method, moment distribution method and Kaini's method of analysis of indeterminate structures.  
Struts subjected to axial loads, buckling, Euler's formula for strut with different support conditions

### **2. STRUCTURAL DESIGN:**

Reinforced concrete, concrete technology, R.C.C. Design, working stress method and limit state method, Design of beams, design of axially loaded columns, Design of one-way and two-way slabs, design of continuous beams and slabs; Design of wall footings and isolated footings, combined footings, raft foundations, and retaining walls by limit state method, water tanks, Deck-slab and T-beam bridges by working stress method. Structural Steel — design of riveted and welded joints, design of tension members; Design of compression members; simple and compound beams. Design of plate girders, crane girders and roof-trusses. Elements of pre-stressed concrete.

### **3. FLUID MECHANICS AND HYDRAULIC MACHINES:**

Fluid properties; fluid statics; fluid-flow concepts; Laminar and turbulent flow; steady and unsteady-flow, uniform and non-uniform flow; continuity equation; Euler's equation of motion; Bernoulli's equation, Hydrostatic force on plane and curved surface

Momentum equation and applications; Moment of Momentum equation, Dimensional analysis and similitude; Flow through Pipes: Viscous flow-laminar flow through circular pipes; velocity distribution in laminar flow. Turbulent flow in pipes, velocity distribution in turbulent flow

Flow Measuring Devices- Measurement of discharge, venturimeter, orifice meter, notches and weirs, Measurement of velocity, Pitot tube

Hydraulic machines; Turbines and pumps; basic equations; performance selection, specific speed

### **4. WATER RESOURCES ENGINEERING:**

Steady flow through open channels. Uniform flow in channels; Chezy's and Manning's formulae. Specific energy and critical depth. Hydraulic jump — Momentum equation for a hydraulic jump. Surface Water hydrology; Hydrologic cycle, hydrologic data-measurement of precipitation, evaporation, transpiration, and infiltration. Runoff, determination of run-off. Stream gauging; Hydrograph and unit hydrograph, flood routing. Ground water resources, Darcy's law, Dupuits equation, yield of wells, recuperation test.

### **5. SURVEYING:**

Chain surveying; compass surveying, plane table surveying; leveling and contouring, Minor instruments; Areas and Volumes; Theodolite surveying and traversing; Tachometry; Curve ranging; setting out works.

Principles and uses of triangulation, hydrographic surveying, Aerial photogrammetry and photo interpretation, remote sensing and electromagnetic distance measurement.

### **6. GEOTECHNICAL ENGINEERING:**

Physical properties of soils; identification and classification of soils; soil compaction; permeability and seepage; stress distribution in soil; consolidation; shear strength of soil; stability of earth slopes; site investigation and sub soil exploration; lateral earth pressure and retaining walls; bearing capacity and shallow foundations; pile foundations; well foundations; Machine foundations.

### **7. TRANSPORTATION ENGINEERING:**

Highway Engineering; classification of roads; highway alignment and surveys; geometric design of highways; elements of traffic engineering; highway materials and testing; elements of pavement design; construction and maintenance of earth gravel, W.B.M., bituminous and concrete roads; highway drainage

Railway Engineering; engineering surveys for a new railway route, gauge and gauge problem; track components; ballast; sleepers; rail fastenings; Station and station yards; requirements and requirement for station yards; signaling and inter locking. Elements of cross drainage works; causeways; culverts; bridges

### **8. ENVIRONMENTAL ENGINEERING:**

Water supply engineering; source of water supply, conveyance of water, distribution system; quality of water; treatment of water; filtration; disinfection; method of water treatment

Air pollutants – monitoring, quantification and standards

Characteristics of sewage: composition; B.O.D., C.O.D., aerobic and anaerobic decomposition; chemistry of sanitary sewage; sewage disposal; primary and secondary treatment of sewage; design of sewers

## **8. COMPUTER ENGINEERING**

1. Hardware: Logic families, gates, flip-flops, Multiplexers, decoders, registers, counters, adder circuits, Boolean algebra, Combinational circuit design, minimization, sequential circuit design, number systems, inter conversion, number representation, computer organization, instruction formats, addressing modes, micro-programming, ALU organization, multiplication and division algorithms, memory hierarchy, cache and associate memories, virtual memory, memory IC's, I/O organization schemes, interrupts, arbitration, DMA, microprocessors, interfacing, pipeline, SIMD and MIMD organizations
2. Discrete Mathematics: Proposition and predicate logics, methods of deduction, set theory, relations, functions, algebraic structures, lattices, recursion, combinatorics, Graph theory: representation, Shortest paths, Warshall's algorithm, cyclic and bipartite graphs, Hamiltonian graph, chromatic number, trees, binary tree traversals, representation of expressions, breadth-first and depth-first algorithms, spanning trees, Prim's and Kruskal's algorithms.
3. Theory of Computation: Finite automata, pushdown automata, grammars: type 0, 1, 2, and 3, Turing machines.
4. Compilers: Lexical Analysis, LL and LR grammars, parsing, Flex, Bison
5. Programming: Flow-charts, programming methodologies, 'C', C++, Java.
6. Data Structures and Algorithms: Linked Lists, Stacks, Queues, Binary Search Trees, height balanced trees, AVL trees, Algorithms, searching and sorting methods, Algorithm Design paradigms: divide and conquer, dynamic programming, greedy.
7. DBMS: Database models, query languages, normalization and indexing
8. Operating systems: Process vs thread, CPU scheduling, memory allocation, paging and segmentation, synchronization, deadlocks and prevention, concurrent processing and file management.
9. Computer networks: OSI model vs TCP/IP model, Application layer protocols: HTTP, SMTP, FTP, Skype, Operation of TCP and UDP, IP routing, sunetting, IPv4/IPv6, network routing algorithms, error control, TDMA/CDMA/FDMA/CSMA, ARQ mechanisms, Ethernet and Wi-Fi.
10. Computer graphics: DDA algorithms, graphic primitives, 2-D transformations, graphic input devices
11. AI techniques: Natural language processing, machine learning, knowledge representation, expert systems, LISP, PROLOG.
12. Software Engineering: Software engineering development life-cycle, system analysis, modular design, testing and validation, CASE tools

## **09. ELECTRONICS AND COMMUNICATION ENGINEERING**

### **Section 1: Networks, Signals and Systems**

Network solution methods: nodal and mesh analysis; Network theorems: superposition, Thevenin and Norton's, maximum power transfer; Wye-Delta transformation; Steady state sinusoidal analysis using phasors; Time domain analysis of simple linear circuits; Solution of network equations using Laplace transform; Frequency domain analysis of RLC circuits; Linear 2-port network parameters: driving point and transfer functions; State equations for networks.

Continuous-time signals: Fourier series and Fourier transform representations, sampling theorem and applications; Discrete-time signals: discrete-time Fourier transform (DTFT), DFT, FFT, Ztransform, interpolation of discrete-time signals; LTI systems: definition and properties, causality, stability, impulse response, convolution, poles and zeros, parallel

and cascade structure, frequency response, group delay, phase delay, digital filter design techniques.

### **Section 2: Electronic Devices**

Energy bands in intrinsic and extrinsic silicon; Carrier transport: diffusion current, drift current, mobility and resistivity; Generation and recombination of carriers; Poisson and continuity equations; P-N junction, Zener diode, BJT, MOS capacitor, MOSFET, LED, photo diode and solar cell; Integrated circuit fabrication process: oxidation, diffusion, ion implantation, photolithography and twin-tub CMOS process.

### **Section 3: Analog Circuits**

Small signal equivalent circuits of diodes, BJTs and MOSFETs; Simple diode circuits: clipping, clamping and rectifiers; Single-stage BJT and MOSFET amplifiers: biasing, bias stability, midfrequency small signal analysis and frequency response; BJT and MOSFET amplifiers: multi - stage, differential, feedback, power and operational; Simple op-amp circuits; Active filters; Sinusoidal oscillators: criterion for oscillation, single-transistor and op-amp configurations; Function generators, wave-shaping circuits and 555 timers; Voltage reference circuits; Power supplies: ripple removal and regulation.

### **Section 4: Digital Circuits**

Number systems; Combinatorial circuits: Boolean algebra, minimization of functions using Boolean identities and Karnaugh map, logic gates and their static CMOS implementations, arithmetic circuits, code converters, multiplexers, decoders and PLAs; Sequential circuits: latches and flip-flops, counters, shift-registers and finite state machines; Data converters: sample and hold circuits, ADCs and DACs; Semiconductor memories: ROM, SRAM, DRAM; 8-bit microprocessor (8085): architecture, programming, memory and I/O interfacing.

### **Section 5: Control Systems**

Basic control system components; Feedback principle; Transfer function; Block diagram representation; Signal flow graph; Transient and steady-state analysis of LTI systems; Frequency response; Routh-Hurwitz and Nyquist stability criteria; Bode and root-locus plots; Lag, lead and lag-lead compensation; State variable model and solution of state equation of LTI systems.

### **Section 6: Communications**

Random processes: autocorrelation and power spectral density, properties of white noise, filtering of random signals through LTI systems; Analog communications: amplitude modulation and demodulation, angle modulation and demodulation, spectra of AM and FM, superheterodyne receivers, circuits for analog communications; Information theory: entropy, mutual information and channel capacity theorem; Digital communications: PCM, DPCM, digital modulation schemes, amplitude, phase and frequency shift keying (ASK, PSK, FSK), QAM, MAP and ML decoding, matched filter receiver, calculation of bandwidth, SNR and BER for digital modulation; Fundamentals of error correction, Hamming codes; Timing and frequency synchronization, inter-symbol interference and its mitigation; Basics of TDMA, FDMA and CDMA.

### **Section 7: Electromagnetics**

Electrostatics; Maxwell's equations: differential and integral forms and their interpretation, boundary conditions, wave equation, Poynting vector; Plane waves and properties: reflection and refraction, polarization, phase and group velocity, propagation through various media, skin depth; Transmission lines: equations, characteristic impedance, impedance matching, impedance transformation, S-parameters, Smith chart; Waveguides: modes, boundary conditions, cut-off frequencies, dispersion relations; Antennas: antenna types, radiation pattern, gain and directivity, return loss, antenna arrays; Basics of radar; Light propagation in optical fibers.

## **10. ELECTRICAL AND ELECTRONICS ENGINEERING**

### **Section 1: Electric Circuits**

Network graph, KCL, KVL, Node and Mesh analysis, Transient response of dc and ac networks, Sinusoidal steady-state analysis, Resonance, Passive filters, Ideal current and voltage sources, Thevenin's theorem, Norton's theorem, Superposition theorem, Maximum power transfer theorem, Two-port networks, Three phase circuits, Power and power factor in ac circuits.

### **Section 2: Electromagnetic Fields**

Coulomb's Law, Electric Field Intensity, Electric Flux Density, Gauss's Law, Divergence, Electric field and potential due to point, line, plane and spherical charge distributions, Effect of dielectric medium, Capacitance of simple configurations, Biot-Savart's law, Ampere's law, Curl, Faraday's law, Lorentz force, Inductance, Magnetomotive force, Reluctance, Magnetic circuits, Self and Mutual inductance of simple configurations.

### **Section 3: Signals and Systems**

Representation of continuous and discrete-time signals, Shifting and scaling operations, Linear Time Invariant and Causal systems, Fourier series representation of continuous periodic signals, Sampling theorem, Applications of Fourier Transform, Laplace Transform and z-Transform.

### **Section 4: Electrical Machines**

Single phase transformer: equivalent circuit, phasor diagram, open circuit and short circuit tests, regulation and efficiency; Three phase transformers: connections, parallel operation; Auto-transformer, Electromechanical energy conversion principles, DC machines: separately excited, series and shunt, motoring and generating mode of operation and their characteristics, starting and speed control of dc motors; Three phase induction motors: principle of operation, types, performance, torque-speed characteristics, no-load and blocked rotor tests, equivalent circuit, starting and speed control; Operating principle of single phase induction motors; Synchronous machines: cylindrical and salient pole machines, performance, regulation and parallel operation of generators, starting of synchronous motor, characteristics; Types of losses and efficiency calculations of electric machines.

### **Section 5: Power Systems**

Power generation concepts, ac and dc transmission concepts, Models and performance of transmission lines and cables, Series and shunt compensation, Electric field distribution and insulators, Distribution systems, Per-unit quantities, Bus admittance matrix, Gauss-Seidel and Newton-Raphson load flow methods, Voltage and Frequency control, Power factor correction, Symmetrical components, Symmetrical and unsymmetrical fault analysis, Principles of over-current, differential and distance protection; Circuit breakers, System stability concepts, Equal area criterion.

### **Section 6: Control Systems**

Mathematical modeling and representation of systems, Feedback principle, transfer function, Block diagrams and Signal flow graphs, Transient and Steady-state analysis of linear time invariant systems, Routh-Hurwitz and Nyquist criteria, Bode plots, Root loci, Stability analysis, Lag, Lead and Lead-Lag compensators; P, PI and PID controllers; State space model, State transition matrix.

### **Section 7: Electrical and Electronic Measurements**

Bridges and Potentiometers, Measurement of voltage, current, power, energy and power factor; Instrument transformers, Digital voltmeters and multimeters, Phase, Time and Frequency measurement; Oscilloscopes, Error analysis.

**Section 8: Analog and Digital Electronics**

Characteristics of diodes, BJT, MOSFET; Simple diode circuits: clipping, clamping, rectifiers; Amplifiers: Biasing, Equivalent circuit and Frequency response; Oscillators and Feedback amplifiers; Operational amplifiers: Characteristics and applications; Simple active filters, VCOs and Timers, Combinational and Sequential logic circuits, Multiplexer, Demultiplexer, Schmitt trigger, Sample and hold circuits, A/D and D/A converters, 8085 Microprocessor: Architecture, Programming and Interfacing.

**Section 9: Power Electronics**

Characteristics of semiconductor power devices: Diode, Thyristor, Triac, GTO, MOSFET, IGBT; DC to DC conversion: Buck, Boost and Buck-Boost converters; Single and three phase configuration of uncontrolled rectifiers, Line commutated thyristor based converters, Bidirectional ac to dc voltage source converters, Issues of line current harmonics, Power factor, Distortion factor of ac to dc converters, Single phase and three phase inverters, Sinusoidal pulse width modulation.

**11. ELECTRONICS & INSTRUMENTATION ENGINEERING****1: Electrical Circuits:**

Voltage and current sources: independent, dependent, ideal and practical; v-i relationships of resistor, inductor, mutual inductor and capacitor; transient analysis of RLC circuits with dc excitation.

Kirchoff's laws, mesh and nodal analysis, superposition, Thevenin, Norton, maximum power transfer and reciprocity theorems.

Peak-, average- and rms values of ac quantities; apparent-, active- and reactive powers; phasor analysis, impedance and admittance; series and parallel resonance, locus diagrams, realization of basic filters with R, L and C elements.

One-port and two-port networks, driving point impedance and admittance, open-, and short circuit parameters.

**Section 2: Signals and Systems:**

Periodic, aperiodic and impulse signals; Laplace, Fourier and z -transforms; transfer function, frequency response of first and second order linear time invariant systems, impulse response of systems; convolution, correlation. Discrete time system: impulse response, frequency response, pulse transfer function; DFT and FFT; basics of IIR and FIR filters.

**Section 3: Control Systems:**

Feedback principles, signal flow graphs, transient response, steady-state-errors, Bode plot, phase and gain margins, Routh and Nyquist criteria, root loci, design of lead, lag and lead-lag compensators, state-space representation of systems; time-delay systems; mechanical, hydraulic and pneumatic system components, synchro pair, servo and stepper motors, servo valves; on-off, P, P-I, P-I-D, cascade, feedforward, and ratio controllers.

**Section 4: Analog Electronics:**

Characteristics and applications of diode, Zener diode, BJT and MOSFET; small signal analysis of transistor circuits, feedback amplifiers. Characteristics of operational amplifiers; applications of opamps: difference amplifier, adder, subtractor, integrator, differentiator, instrumentation amplifier, precision rectifier, active filters and other circuits. Oscillators, signal generators, voltage controlled oscillators and phase locked loop.

**Section 5: Digital Electronics:**

Combinational logic circuits, minimization of Boolean functions. IC families: TTL and CMOS. Arithmetic circuits, comparators, Schmitt trigger, multi-vibrators, sequential circuits, flip-flops, shift registers, timers and counters; sample-and-hold circuit,

multiplexer, analog-to-digital (successive approximation, integrating, flash and sigma-delta) and digital-to-analog converters (weighted R, R-2R ladder and current steering logic). Characteristics of ADC and DAC (resolution, quantization, significant bits, conversion/settling time); basics of number systems, 8-bit microprocessor and microcontroller: applications, memory and input-output interfacing; basics of data acquisition systems.

#### **Section 6: Measurements:**

SI units, systematic and random errors in measurement, expression of uncertainty accuracy and precision index, propagation of errors. PMMC, MI and dynamometer type instruments; dc potentiometer; bridges for measurement of R, L and C, Q-meter. Measurement of voltage, current and power in single and three phase circuits; ac and dc current probes; true rms meters, voltage and current scaling, instrument transformers, timer/counter, time, phase and frequency measurements, digital voltmeter, digital multimeter; oscilloscope, shielding and grounding.

#### **Section 7: Sensors and Industrial Instrumentation:**

Resistive-, capacitive-, inductive-, piezoelectric-, Hall effect sensors and associated signal conditioning circuits; transducers for industrial instrumentation: displacement (linear and angular), velocity, acceleration, force, torque, vibration, shock, pressure (including low pressure), flow (differential pressure, variable area, electromagnetic, ultrasonic, turbine and open channel flow meters) temperature (thermocouple, bolometer, RTD (3/4 wire), thermistor, pyrometer and semiconductor); liquid level, pH, conductivity and viscosity measurement.

#### **Section 8: Communication and Optical Instrumentation:**

Amplitude- and frequency modulation and demodulation; Shannon's sampling theorem, pulse code modulation; frequency and time division multiplexing, amplitude-, phase-, frequency-, pulse shift keying for digital modulation; optical sources and detectors: LED, laser, photo-diode, light dependent resistor and their characteristics; interferometer: applications in metrology; basics of fiber optic sensing.

## **12. ENGLISH**

### **I. Movements and Concepts**

Renaissance, Metaphysical poetry, Neo-classicism, Romanticism, Rise of the novel, Modernism, Postmodernism, Colonialism, Postcolonialism, Diaspora, Psychoanalytical criticism, Myth and archetype, Feminism, Structuralism, Poststructuralism, Deconstruction.

### **II. Writers and Texts**

- |                            |  |
|----------------------------|--|
| 1) William Shakespeare     | <i>Hamlet, Tempest</i>   |
| 2) John Milton             | <i>Paradise Lost-Book 1 and 9</i>                                  |
| 3) William Wordsworth      | "Immortality Ode", <i>Tintern Abbey</i>                            |
| 4) John Keats              | "Ode to a Nightingale", "To Autumn"                                |
| 5) Robert Browning         | "My Last Duchess", "The Last Ride Together"                        |
| 6) <b>Charles Dickens</b>  | <b><i>David Copperfield</i></b>                                    |
| 7) <b>TS Eliot</b>         | <b>"The Waste Land", <i>Murder in the Cathedral</i></b>            |
| 8) <b>GB Shaw</b>          | <b><i>Saint Joan</i></b>   |
| 9) <b>Virginia Woolf</b>   | <b>"A Room of One's Own"</b>                                       |
| 10) <b>Samuel Beckett</b>  | <b><i>Waiting for Godot</i></b>                                    |
| 11) <b>William Golding</b> | <b><i>Lord of the Flies</i></b>                                    |
| 12) <b>Robert Frost</b>    | <b>"Home Burial", "The Road Not Taken"</b>                         |
| 13) <b>Eugene O'Neill</b>  | <b><i>The Hairy Ape</i></b>  |
| 14) <b>Toni Morrison</b>   | <b><i>Beloved</i></b>  |
| 15) <b>Mulk Raj Anand</b>  | <b><i>Untouchable</i></b>  |
| 16) <b>AK Ramanujan</b>    | "Love Poem for a Wife", "Small-Scale Reflections on a Great House" |
| 17) <b>Girish Karnad</b>   | <b><i>Hayavadana</i></b>   |
| 18) <b>Salman Rushdie</b>  | <b><i>Midnight's Children</i></b>                                  |
| 19) <b>Chinua Achebe</b>   | <b><i>Things Fall Apart</i></b>                                    |

- 20) **Margaret Atwood**  
 21) **AD Hope**  
 22) **Bessie Head**

**Edible Woman**  
**"Australia", "Crossing the Frontier"**  
*A Question of Power*

### **III. English Language Teaching**

- 1) ELT in India: (History and status of English in India; English as Second Language, English as Foreign Language, and English as Global Language).
- 2) Methods and Approaches: (Grammar Translation method, Direct method, Audio-Lingual method; Structural approach, Communicative language teaching)
- 3) Teaching of Language Skills: (Teaching of Listening, Speaking, Reading, and Writing Skills; Teaching of Grammar and Functional English; Teaching of Vocabulary; Classroom techniques; Use of authentic materials)
- 4) Testing and Evaluation: (Principles, Types, Objectives of testing and evaluation)
- 5) Phonetics and Phonology; Syntax and Structure.

## **13. GARMENT TECHNOLOGY**

### **Indian Embroidery, Indian Jewellery, Traditional Indian textiles**

Embroidery of Kashmir, Sindh, Gujarat, Punjab, Haryana, Himachal Pradesh, Bengal, Bihar, Uttar Pradesh, Karnataka, Rajasthan, Orissa, Tamilnadu, Gold and Silver embroidery etc Indian Jewellery – techniques in jewellery work, traditional ornaments- nose ornaments, foot ornaments, head ornaments, girdles, belts, armlets, neck ornaments, bangles etc Traditional Indian textiles-Kalamkari, Pochampally, Paithani, Patola, Baluchari, anaras brocades, Pabuji Par etc

### **DYEING AND PRINTING**

Bleaching of Cotton, Wool, Silk, man-made fibers Scouring, Singeing, desizing  
 Chemical constitution and colour Classification and types of dyes Machinery used in dyeing Methods and styles of printing

Dyeing and printing of cotton, wool, silk, polyester, acrylic, and other synthetic fibers  
 Chemistry of dyestuff intermediates.

Pollution control- air pollution, water pollution, treatment of effluent water, disposal of solid waste.

### **TEXTILE SCIENCE**

Manufacture and properties of – cotton silk, wool polyester, nylon, acrylic, modacrylic, viscose rayon, cuprammonium rayon, cellulose acetate rayon, polypropylene, glass Yarns – types, count, systems, measurement Ecology and textiles – eco standards, textile process chemicals, toxicological considerations.

Textile testing- identification of fibers stain tests solubility tests, fiber analysis, testing of fibers- fiber length, fiber fineness, twist, yarn strength, lea strength, etc., fabric testing – strength, abrasion resistance, air and water permeability, skewness, etc

Weaving – Yarn calculations, weaving calculations Preparations for weaving, types of looms different types of weaves etc.,

Knitting, Braiding, Lace, felt, etc., methods of making fabric Wet spinning, melt spinning, and dry spinning Texturizing Finishes – ammoniating mercerizing shrinking, stiffening, weighting, calendaring, glazing, schreinerizing, embossing, moireing, creasing, beetling, raising, napping, wrinkle, resistant finishes, soil repellent finishes, flame retardant finishes, mildew proof finishes etc.,

Detergents – fats and oils, surfactants and surface activity, soap manufacture, synthetic detergents, analysis of detergents Textile terminology.

### **CLOTHING**

Basic stitches – entering stitch, hemming, back stitch, quick overcasting, overcasting, deeper over casting, over handling, stoating stitch etc.,



Seams and seam finishes – plain, welt, flat fell, strap, slot, French, upholsterer's, corded, lapped, imitation French, laced seams, top stitch seam, etc.,

Working of embroidery stitches

Methods of handling finishes – Casing, gathers, shirring, smocking, tucks, pleats, godets, darts, etc.,

Neck line finishes – combination facings, applying shaped facings to neckline with zipper, applying shaped facing to neckline and garment opening, applying bias facing, applying cording to faced neck line, application of single and double layer binding, decorative facings etc  
 Drafting and stitching of sleeves – cap sleeve, basic Bishop sleeve, exaggerated Bishop sleeve, Bell sleeve, puff sleeve, petal sleeve, lantern sleeve, cowl sleeve, wedding sleeve, Kimono sleeve, Dolmon sleeve, Raglan sleeve etc.,

Drafting and stitching of collars – shirt collar, shawl collar, mandarin collar, turtle neck collar, sailor collar, puritan collar, etc

Drafting and stitching of pockets – patch, bound, in seam pockets etc  
 Drafting and stitching of yokes  
 Drafting and stitching of skirts  
 Underlying fabrics – linings, inter linings, interfacings, underlying (selection, types, applications etc)

preparation of material for cutting – preparation of woven and knitted fabrics for cutting  
 Handling of fabrics – velvet, velveteen, bonded, stretch, knit, lace, wash and wear, silk, laminated, napped, leather, jersey sheer fabrics etc

(selection of pattern, shrinking, cutting, marking, selection of inter facing, basting, selection of thread and needle, stitch length, seam finishes, button holes, hems, linings, pressing etc)  
 Pattern alterations – alterations to trousers, skirts, blouse, alterations based on figure irregularities etc

Care of fabrics – darning and patching, washing of different fabrics, dry cleaning – types of equipment used in dry cleaning, methods of dry cleaning, pressing of garments, pressing equipments etc.  
 Dart manipulation.

### **APPAREL MANUFACTURING, MARKETING AND MERCHANDISING**

Cutting, production analysis – types of spreads, spreading equipment and tools, spreading methods analysis, cutting equipment, cutting methods analysis, types of marker and spreading materials, cost and quality principles governing markers, training cutting production personnel etc

Fabric grading – grey state fabric grading, conventional system of grading, point system of grading, finished fabric grading

Defects – spinning defects, sizing defects, warp defects, filling defects, other weaving defects, bleaching and finishing defects, dyeing defects, printing defects, stains etc

Machinery used in apparel industry

Time and motion study  
 Quality control  
 Production systems  
 Pricing strategies  
 Marketing ethics  
 Product services  
 Marketing environment

### **FASHION DESIGNING**

Principles of designing  
 Elements of design  
 Colour theory  
 Selection of apparel  
 Selection of accessories  
 Classification of fashion  
 Fashion terminology  
 Selection of fabric design  
 Illusion in designing.

Works of Indian and international designer's Western fashions.

Fashion trends in different periods  
 Display of garments.

## **14. GEOLOGY**

### **1. Geomorphology and Remote Sensing**

Basic principles, weathering and soils, mass wasting, influence of climate on processes. Concept of erosion cycles. Geomorphology of fluvial tracts, arid zones, coastal regions, karst landscapes and glaciated ranges. Applications of Geomorphology in mineral prospecting, civil engineering, hydrology and environmental studies, topographical maps and geomorphology of India.

Concepts and principles of aerial photography and photogrammetry Satellite Remote Sensing. Fundamentals of Digital Image Processing. Use of Remote Sensing in landforms, landuse, and structural mapping, Hydrogeological studies and mineral exploration. Geographic Information System (GIS) – principles and applications.

### **2. Structural geology and Geotectonics**

Principles of geological mapping and map reading, projection diagrams, stress-strain relationship of elastic, plastic and viscous materials. Behavior of minerals and rocks under deformation conditions. Structural analysis of folds, cleavages, lineation's, joints, and faults. Superposed deformation. Mechanism of folding and faulting. Unconformities and basement cover relations. Structural behavior of igneous rocks, diapirs and salt domes. Fundamentals of petrofabric analysis.

Earth and solar system. Planetary evolution of earth and its internal structure. Heterogeneity of the earth's crust. Major tectonic features of the oceanic and continental crust. Continental drift geological, geophysical and other evidences, mechanics, objections and present status. Gravity and magnetic anomalies at mid oceanic ridges, deep sea trenches, continental shield areas and mountain chains. Paleomagnetism, seafloor spreading and plate tectonics, Island arcs, oceanic islands and volcanic arcs, isostasy, orogeny, epeirogeny, geosynclines, and seismic belts of the earth. Seismicity and plate movements. Geodynamics of the Indian plate.

### **3. Stratigraphy**

Nomenclature and the modern stratigraphic code. Radio isotopes and measuring geological time. Geological time scale, stratigraphic procedures of correlation of unfossiliferous rocks. Precambrian stratigraphy of India. Stratigraphy of the Paleozoic and Mesozoic and Cenozoic formations of India. Gondwana system and gondwana land, and origin of Himalaya and evolution of Siwalik basin, Deccan volcanic. Quaternary stratigraphy, rock record, paleoclimates and paleogeography.

### **4. Paleontology**

Fossil records, morphology and time ranges fossil groups. Evolutionary changes in Mollusks and mammals in geological time. Principles of evolution. Use of species and genera of foraminifera and echinodermata in biostratigraphic correlation. Siwalik vertebrate fauna and flora, different microfossil groups and their distribution in India.

### **5. Crystallography and Mineralogy**

Physical, chemical and crystallographic characteristic of common rock forming mineral group. Silicate structures. Common minerals of igneous and metamorphic rocks. Minerals of the carbonate, phosphate, sulphide, halide and oxide groups.

Optical properties of common rock forming silicate minerals, uniaxial and biaxial minerals. Extinction, pleochroism, birefringence of mineral and their relation with mineral composition. Twinned crystals and dispersion of optic axis and crystallographic axis.

## **6. Igneous and Metamorphic petrology**

Forms, textures, and structures of igneous rocks, silicate melt equilibria, binary and ternary phase diagrams, Petrology and geotectonic evolution of granites, basalts, andesites and alkaline rocks. Petrology of gabbros, kimberlites, anorthosites and carbonatites. Origin and evolution of magmas.

Textures and structures of metamorphic rocks. Regional and contact metamorphism of pelitic and impure calcareous rocks. Mineral assemblages and P/T condition.

Characteristics of different grades and facies of metamorphism, Metasomatism and granitization, magmatites. Plate tectonics and metamorphic zones. Paired metamorphic belts.

## **7. Sedimentology**

Provenance and diagenesis of sediments, Sedimentary textures. Framework matrix and cement of terrigenous sediments. Definition, measurement and interpretation of grain size. Elements of hydraulics, primary structure, paleocurrent analysis. Biogenic and chemical sedimentary structures. Sedimentary environment and facies. Facies modeling for marine, non marine and mixed sediments. Tectonics and sedimentation. Classification and definition of sedimentary basins, sedimentary basins of India. Cycle sediments. Seismic and sequence stratigraphy. Purpose and scope of basin analysis. Structure contours and isopach maps.

## **8. Geochemistry**

Earth in relation to the solar system and universe, cosmic abundance of elements. Composition of the planets and meteorites. Structure and composition of earth and distribution of elements. Trace elements. Elementary crystal chemistry and thermodynamics. Introduction to isotope geochemistry. Geochemistry of hydrosphere, biosphere and atmosphere. Geochemical cycle and principles of geochemical prospecting. Origin of elements.

## **9. Environmental geology**

Concepts and principles. Natural hazards, preventive/precautionary measures-floods, landslides, earthquakes, rivers and coastal erosion. Impact assessment of anthropogenic activities such as urbanization, open-cast mining and quarrying, river-valley projects, disposal of industrial radioactive waste. Excess withdrawal of groundwater, use of fertilizers, dumping of ores, mine waste and flyash. Organic and inorganic contamination of groundwater and their remedial measures. Soil degradation and remedial methods. Environmental protection-legislative measures in India. Factors for groundwater subsidence.

## **10. Indian mineral deposits and mineral economics**

Occurrence and distribution of metalliferous deposits-base metals, iron, manganese, aluminium, platinum, chromium, nickel, gold, silver, molybdenum. Indian deposits of non metals-mica, asbestos, barite, gypsum, apatite and beryl. Phosphrite, placer and rare earth mineral deposits. Gemstones, raw materials used for refractories, abrasives, glass, fertilizers, paints, ceramics and cement industries.

Strategic, critical and essential minerals. India's status in mineral production. Change in pattern of mineral consumption, National Mineral Policy. Mineral concession rules, Marine mineral resources and law of sea. Conservation and substitution of minerals.

### **11. Ore genesis**

Ore deposits and ore minerals. Magmatic processes of mineralization, porphyry, skarn, and hydrothermal mineralization. Fluid inclusion studies and paragenesis. Mineralization associated with – i. ultramafic, mafic and acid rocks, ii. Greenstone belts, iii. Komatites, anorthosites and kimberlites, iv, Submarine volcanism-volcanogenic deposits. Magma-related mineralization through geological time. Stratiform and stratabound ores. Syngenetic deposits, residual and mechanical concentration processes, supergene sulphide and oxide enrichments.

### **12. Mineral exploration**

Methods of surface and subsurface exploration, prospecting for economic minerals and fuels drilling, sampling, and assaying. Geophysical techniques – gravity, electrical, magnetic, air borne, and seismic. Instrumental techniques of detection and measurement of radio activity. Radio active methods for prospecting and assaying of mineral deposits. Geomorphological and remote sensing techniques. Geobotanical and geochemical methods. Bore hole logging and survey for deviation.

### **13. Fuels**

Definition, origin of coal, stratigraphy of coal measures. Fundamentals of coal petrology, peat, lignite, bituminous and anthracite. Industrial application of coal. Indian coal deposits.

Origin, accumulation, migration and entrapment of natural hydrocarbons. Characters of reservoir rocks. Structural, stratigraphic and mixed traps. Geographical and geological distribution of petroliferous basins of India. Gas hydrates and Coal Bed Methane occurrences.

Mineralogy and geochemistry of radioactive minerals. Distribution of radio active minerals in India. Radio active methods in petroleum exploration-well logging techniques. Nuclear waste disposal-geological constraints.

### **14. Engineering geology**

Mechanical properties of rocks and soils. Geological investigations for river-valley projects-dams and reservoirs; tunnels-type, methods and problems. Bridges-types and foundation problems. Shoreline engineering, landslides, classification, causes, prevention and rehabilitation. Earthquake resistant structures. Problems of groundwater in engineering projects. Geotechnical case studies of major projects in India.

### **15. Hydrogeology**

Origin of water-meteoric, juvenile, and connate. Hydrological cycle-evaporation, precipitation, runoff. Hydrographs, water table contour maps. Rock properties affecting groundwater. Types of aquifers. Porosity, permeability, specific yield and retention, hydraulic conductivity, transmissivity, storage and storage coefficient.

Well hydraulics, general flow equations, study of unidirectional flow, radial flow to a well, unsteady radial flow in a confined and unconfined aquifer. Water level fluctuation and causative factors. Methods of pumping tests and analyses, evaluation of aquifer parameters. Artificial recharge of groundwater. Groundwater legislation. Sustainability criteria and managing renewable and non-renewable groundwater resources.

Groundwater quality-sources of salinity, estimation of major elements, interpretation of chemical analyses. Groundwater pollution, arsenic and fluoride problems.

Groundwater quality maps of India. Quality criteria for groundwater use. Salt water intrusion in coastal aquifers and remedial methods.

Surface geophysical methods-seismic, gravity, geoelectrical and magnetic. Subsurface geophysical methods-well logging for delineation of aquifers and estimation of water quality.

## 15. Mathematics

### 1. Real Analysis

- Countable and uncountable sets — Real number system—l<sup>ub</sup> and g<sup>lb</sup> of a subset of real line.
- Cauchy, monotone and convergent sequences — subsequences — Bolzano Weierstrass theorem.
- Tests of convergence of infinite series.
- Continuous and uniform continuous functions — Intermediate value theorems.
- Differentiable functions — Mean value theorems.
- Riemann integrable functions.
- Sequence and series of functions.
- Metric spaces — completeness, compactness and connectedness. —Heine Borel theorem.

### 2. Complex Analysis

- Algebra of complex numbers — complex plane
- Analytic functions — Cauchy-Riemann equations
- Fractional linear transformation — Mobius transformation.
- Harmonic functions — Mean value property — Maximum principle.
- Complex integration — Cauchy theorem
- Cauchy integral formula — Liouville's and Morera's theorem
- Power series — radius of convergence — manipulation.
- Taylor and Laurent series.
- Calculus of residues

### 3. Linear Algebra

- Vector spaces — subspaces — Quotient space
- Linear dependence and independence — basis — dimension.
- Inner product space — orthogonal basis Gram Schmidt process.
- Linear transformation — rank nullity theorem — matrix of a linear transformation with respect to a basis — change of basis.
- Singular and non singular matrix — inverse of a matrix.
- Eigen value and eigen vectors — characteristic polynomial — Cayley-Hamilton theorem
- Diagonalization

### 4. Algebra

- Groups, subgroups, normal subgroups — Lagrange's theorem
- Quotient groups — homomorphism and isomorphism theorems.
- Permutation groups, cyclic groups
- Cayley's theorem, Sylow's theorem and applications.
- Rings, subrings, — quotient rings — homomorphism and isomorphisms integral domains, fields
- Ideals, prime ideals, maximal ideals
- Polynomial rings — irreducible polynomials
- Euclidean domain, principal ideal domains

### 5. Differential equation

- First order linear ordinary differential equations (ODE) — solutions — Exact differential equations and integrating factors.
- First order non-linear equations — solutions — singular solutions.
- Second order linear equations — solutions — Wronskian — variation of parameters.
- Linear higher order equations with constant coefficients and specific variable coefficients
- Formation of partial differential equation (PDE) — geometry of solution — types of solution
- Cauchy problem for first order PDE — characteristic curves
- Compatible systems, Lagrange and Charpit method of solving first order PDE.
- Classification of second order PDEs. Examples of three types.

## **16. MECHANICAL ENGINEERING**

### ***Fluid Mechanics***

Fluid properties— density, viscosity, surface tension; Fluid Statics— Hydrostatics, Fluid forces on planes and curved surfaces, submerged and floating bodies, Buoyancy and stability, Fluid Concepts —Streamlines, streaklines, pathlines, viscous vs inviscid flows, laminar vs turbulent flows, compressible v/s incompressible flows; Bernoulli equation; Control Volume analysis: Basic laws — Mass conservation law, thermodynamic laws, Newton's laws, Angular-Momentum principle; Flows in a pipes and channels - friction factor, flow measurement devices — Venturi meter, Orifice meter. Governing equations of fluid flows— continuity, Euler equations, Navier-Stokes equations, internal flows; external flows, Flow separation;

### ***Thermodynamics***

Thermodynamic system and control volume, properties and state of a substance, process and cycles, energy, pressure and temperature, Zeroth law, Properties of pure substance, work and heat, First law of thermodynamics, first law analysis for a control volume, Second law of thermodynamics, Entropy, Second law analysis for a control volume, irreversibility and availability, power and refrigeration cycles —Carnot cycle, Brayton cycle, Diesel cycle, Otto cycle, Stirling cycle, Rankine cycle, vapour compression refrigeration cycle and their variants

### ***Material Science***

Crystal geometry and structure determination, structure of solids, crystal imperfections, Phase diagram, diffusion in solids, phase transformations, elastic anelastic and visco-elastic behaviour, phase deformation and creep in crystalline materials, fracture, conductors, resistors, semi - conductors, magnetic materials, dielectric materials

### ***Engineering Mechanics and Strength of Materials***

Definition for rigid body, statics, dynamics (kinematics and kinetics); Idealization in mechanics; Vector operations; Resultant of system of coplanar forces (parallelogram and triangular construction); Free body. diagram; Resolution of forces in 3D; Equilibrium equation; Shear Force and Bending Moment Diagram; Analysis of trusses — Method of joints and Method of sections; stability of trusses; space trusses; Mass and Geometric properties of members — Centre of gravity and moment of inertia for simple geometries; Parallel and Perpendicular — axes theorem; Kinematics and dynamics of rigid bodies; Virtual work done; Energy method for particles. Tension, compression and shear stresses, axially loaded members, torsion, beam bending, transverse shear, combined loading, and impact loading, deflections of beams, energy methods, analysis of stress and strain, stress transformation, applications of plane stress, pressure vessel, column buckling, and statically indeterminate structures.

### ***Manufacturing Processes***

Methods of manufacturing with metals — Basic Principles, Processes, equipment, process variables: Casting - Fundamentals, various types of casting processes; Forming — Rolling, Forging, Extrusion and Drawing, Sheet Metal Forming; Joining — Welding, Brazing, Soldering, Bonding and Mechanical Fastening; Non-Traditional Manufacturing - Thermo-mechanical Processes, Thermo-electrical Processes, Chemical Processes, Thermo-chemical Processes, Hybrid Processes

### ***Applied Thermodynamics***

IC Engines - Classification, Basic Working Principles, Components and Engine Operating Events of an IC Engine; Engine Operating Parameters: Geometry, Torque, Power and Work; Fuel Consumption and Efficiencies; SI and CI Engine Cycle Models: Basic Thermodynamic and Thermo-chemistry Analysis

Turbo-machine: Basic Principles, Two-dimensional cascades, Thermodynamic analysis of axial flow turbines, axial flow compressors, centrifugal pumps, compressors and hydraulic turbines

Boilers and Condensers: Fire-tube boiler, Water tube boiler, high pressure boilers, boiler draught and performance; types of condensers, jet condenser, surface condenser, condenser efficiency, cooling tower and pond

Reciprocating Air Compressor: Compressed air systems, reciprocating air compressor, thermodynamic analysis, efficiency, free air delivery

### ***Heat Transfer and Refrigeration***

Modes of heat transfer, heat conduction — 1D steady state, 1D transient, fins; convective heat transfer — natural and forced convection, convective heat transfer correlations, condensation and boiling, heat exchangers — LMTD and NTU methods. Vapour compression refrigeration systems, types of refrigerants, components in a refrigeration systems — pumps, condensers, expansion devices, evaporators; gas cycle refrigeration, vapour absorption system.

### ***Machine Design***

Design consideration-limits, fits, tolerances and standardization, modes of failure, failure theories. Design of shafts under static and fatigue loadings. Design of springs - helical, compression, tension, torsional and leaf springs. Design of joints — threaded fasteners, preloaded bolt joints, welded and glued joints. Design and analysis of sliding and rolling contact bearings. Analysis and applications of power screws and couplings. Analysis of clutches and brakes. Design of belt and chain drives. Design of spur, helical, bevel and worm gears.

### ***Machine Drawing and Solid Modelling***

Principle of drawing. Introduction to machine drawing, production drawing, assembly drawing. Different sectional views. Fits, limits, tolerances and surface finish. Solid modelling of different machine elements. Example, threads, bolts, and nuts, welded and riveted joints, shafts, keys, cotter, and pin joints; couplings and clutches, springs, belts, and pulleys; bearings, gears. Assembly of different components of IC engine

### ***Theory of Machines***

Introduction to mechanisms, Links, Kinematic pairs, Kinematic chains, Mechanism and Inversions, Kennedy's theorem, Velocity and acceleration in mechanism, Relative velocity methods, Instantaneous center of rotation, Acceleration diagram, Acceleration center. Cams: Synthesis of translating flat-face, translating roller and oscillating roller follower cams. Gears: terminology, fundamental law of gearing, involute profile, Interference and undercutting, minimum number of teeth, contact ratio, bevel helical, spiral and worm gears, Gear Trains —simple, compound and epicyclic gear trains; sliding gear boxes and synchronous gear boxes.

### ***Production Engineering***

Principles of Metal cutting: orthogonal and oblique cutting; mechanics of machining; Machine Tools turning, milling, shaping, drilling: Construction and working; Process variables; Cutting tools —nomenclature, material and tool life; Machinability ; Abrasive machining processes- grinding, honing, lapping, burnishing and super finishing; Equipment, process variables and surface features; Surface integrity concepts. Introduction to NC and CNC: Concepts and programming — Constructional features of various machine tools; Introduction to computer integrated manufacturing.

Metrology : Fundamentals of measurements: Errors, Length Standards, Gauging, Comparators, limits & Fits and Tolerances; Role of metrology in quality assurance; Measurement of geometric forms , Flatness, Straightness, form errors; Slip gauges; Surface finish measurements; Coordinate measuring machines; Vision applications in Metrology; Optical metrology and laser interferometry; Nano measurements

### ***Industrial Engineering***

Management functions, Evolution of Management Theory, Management approach to Planning, Analysis and Control functions involved in a Production System; Production cycles, planning functions; Types of industry : Job, Batch, Continuous, Mass and Flow Productions; Organisation and policies in respect of production planning and control; Product design and development; Forecasting techniques; Scheduling, Sequencing and plant loading for optimal utilization; Queueing models and line balancing; Materials Planning and Control, Inventory Management; Value Analysis; Productivity Analysis, Mechanics of production control.

## **17. METALLURGICAL ENGINEERING**

### **Section 1: Thermodynamics and Rate Processes**

Laws of thermodynamics, activity, equilibrium constant, applications to metallurgical systems, solutions, phase equilibria, Ellingham and phase stability diagrams, thermodynamics of surfaces, interfaces and defects, adsorption and segregation; basic kinetic laws, order of reactions, rate constants and rate limiting steps; principles of electro chemistry- single electrode potential, electrochemical cells and polarizations, aqueous corrosion and protection of metals, galvanic corrosion, crevice corrosion, pitting corrosion, intergranular corrosion, selective leaching, oxidation and high temperature corrosion - characterization and control; heat transfer - conduction, convection and heat transfer coefficient relations, radiation, mass transfer – diffusion and Fick's laws, mass transfer coefficients; momentum transfer - concepts of viscosity, shell balances, Bernoulli's equation, friction factors.

### **Section 2: Extractive Metallurgy**

Minerals of economic importance, comminution techniques, size classification, flotation, gravity and other methods of mineral processing; agglomeration, pyro-, hydro-, and electro-metallurgical processes; material and energy balances; principles and processes for the extraction of non-ferrous metals - aluminium, copper, zinc, lead, magnesium, nickel, titanium and other rare metals; iron and steel making - principles, role structure and properties of slags, metallurgical coke, blast furnace, direct reduction processes, primary and secondary steel making, ladle metallurgy operations including deoxidation, desulphurization, sulphide shape control, inert gas rinsing and vacuum reactors; secondary refining processes including AOD, VAD, VOD, VAR and ESR; ingot and continuous casting; stainless steel making, furnaces and refractories.

### **Section 3: Physical Metallurgy**

Crystal structure and bonding characteristics of metals, alloys, ceramics and polymers, structure of surfaces and interfaces, nano-crystalline and amorphous structures; solid solutions; solidification; phase transformation and binary phase diagrams; principles of heat treatment of steels, cast iron and aluminium alloys; surface treatments; recovery, recrystallization and grain growth; structure and properties of industrially important ferrous and non-ferrous alloys; elements of X-ray and electron diffraction; principles of optical, scanning and transmission electron microscopy; industrial ceramics, polymers and composites; introduction to electronic basis of thermal, optical, electrical and magnetic properties of materials; introduction to electronic and opto-electronic materials.



#### **Section 4: Mechanical Metallurgy**

Elasticity, yield criteria and plasticity; defects in crystals; elements of dislocation theory - types of dislocations, slip and twinning, source and multiplication of dislocations, stress fields around dislocations, partial dislocations, dislocation interactions and reactions; strengthening mechanisms; tensile, fatigue and creep behaviour; superplasticity; fracture - Griffith theory, basic concepts of linear elastic and elastoplastic fracture mechanics, ductile to brittle transition, fracture toughness; failure analysis; mechanical testing - tension, compression, torsion, hardness, impact, creep, fatigue, fracture toughness and formability.

#### **Section 5: Manufacturing Processes**

Metal casting - patterns and moulds including mould design involving feeding, gating and risering, melting, casting practices in sand casting, permanent mould casting, investment casting and shell moulding, casting defects and repair; Hot, warm and cold working of metals; Metal forming - fundamentals of metal forming processes of rolling, forging, extrusion, wire drawing and sheet metal forming, defects in forming; Metal joining - soldering, brazing and welding, common welding processes of shielded metal arc welding, gas metal arc welding, gas tungsten arc welding and submerged arc welding; Welding metallurgy, problems associated with welding of steels and aluminium alloys, defects in welded joints; Powder metallurgy - production of powders, compaction and sintering; NDT using dye-penetrant, ultrasonic, radiography, eddy current, acoustic emission and magnetic particle methods.

### **18. MINING ENGINEERING**

#### **Section 1: Mine Development and Surveying**

**Mine Development:** Methods of access to deposits; Underground drivages; Drilling methods and machines; Explosives, blasting devices and practices.

**Mine Surveying:** Levels and leveling, theodolite, tacheometry, triangulation; Contouring; Errors and adjustments; Correlation; Underground surveying; Curves; Photogrammetry; Field astronomy; EDM and Total Station; Introductory GPS .

#### **Section 2: Geomechanics and Ground Control**

**Engineering Mechanics:** Equivalent force systems; Equations of equilibrium; Two dimensional frames and trusses; Free body diagrams; Friction forces; Particle kinematics and dynamics; Beam analysis.

**Geomechanics:** Geo-technical properties of rocks; Rock mass classification; Instrumentation and stress measurement techniques; Theories of rock failure; Ground vibrations; Stress distribution around mine openings; Subsidence; Rock bursts and coal bumps; Slope stability.

**Ground Control:** Design of pillars; Roof supporting systems; Mine filling.

#### **Section 3: Mining Methods and Machinery**

**Mining Methods:** Surface mining: layout, development, loading, transportation and mechanization, continuous surface mining systems; Underground coal mining: bord and pillar systems, room and pillar mining, longwall mining, thick seam mining methods; highwall mining; Underground metal mining: open, supported and caved stoping methods, stope mechanization, ore handling systems.

**Mining Machinery:** Generation and transmission of mechanical , hydraulic and pneumatic power; Materials handling: haulages, conveyors, face and development machinery, hoisting systems, pumps, crushers.

#### **Section 4: Surface Environment, Mine Ventilation, and Underground Hazards**

**Surface Environment:** Air, water and soil pollution : Standards of quality, causes and dispersion of contamination, and control; Noise; Land reclamation.

**Mine Ventilation:** Underground atmosphere; Heat load sources and thermal environment, air cooling; Mechanics of air flow, distribution, natural and mechanical ventilation; Mine fans and their usage; Auxiliary ventilation; Ventilation planning; Ventilation networks.

**Subsurface Hazards:** Mine Gases. Underground hazards from fires, explosions, dust and inundation; Rescue apparatus and practices; Safety in mines; Accident data analysis; Mine lighting; Mine legislation; Occupational safety.

#### **Section 5: Mine Economics, Mine Planning, Systems Engineering**

**Mine Economics:** Mineral resource classification; Discounted cash flow analysis; Mine valuation; Mine investment analysis; Mineral taxation.

**Mine Planning:** Sampling methods, practices and interpretation; Reserve estimation techniques; Basics of geostatistics and quality control; Optimization of facility location; Work-study.

**Systems Engineering:** Concepts of reliability; Reliability of simple systems; Maintainability and availability; Linear programming, transportation and assignment problems; Network analysis; Inventory models; Queuing theory; Basics of simulation.

### **19. PHARMACY**

#### **PHARMACEUTICS**

- History of Pharmacy: Development of Pharmacy education
- Pharmacy literature : History and Development of IP., BP., USP, BPC, NF OF INDIA and extra Pharmacopoeia.
- History of Ayurveda.
- Principles of dispensing- Prescription handling, pricing and refilling of Prescription, containers,
- labelling and packing.
- Posology : Definition, factors influencing doses, calculation of doses.
- Unit Operations: Size Reduction, Size Separation, Mixing, Evaporation, Distillation, Extraction, Drying, Sterilization, Filtration, crystallization, centrifugation, Dehumidification and humidity control
- Principles Involved and procedures adopted in the preparation and dispensing of the following classes of pharmaceutical preparations solid, liquid, semisolid, parenteral dosage forms and Aerosols.
- Incompatibility: Physical, chemical and therapeutic incompatibilities, methods of overcoming and handling of incompatible prescriptions.
- Cosmetic preparations : General aspects of face , hands ,body , hair , dental , shaving preparations
- Novel Drug Delivery Systems : Oral, Transdermal, Mucoadhesive and Targeted drug delivery systems.
- General principles of immunology, serology and their applications.

#### **PHARMACEUTICAL CHEMISTRY**

- Sources of impurities in pharmaceutical substances, Limit tests for chloride, sulphate arsenic, lead, iron. Qualitative tests for anions and cations .

- Systematic study of the following pharmaceutical inorganic and organic compounds with reference to their preparations, properties, test for identity, purity, pharmaceutical uses and assay methods.

### **INORGANIC**

- Electrolytes: sodium and potassium replenishers, calcium replenishers; acid base regulators, dialysis fluids. Mineral nutrients and supplements
- Gastro intestinal agents —acidifiers and antacids, adsorbents, laxatives. Haematinics, Pharmaceutical aids, Expectorants - ammonium chloride, potassium iodide, Antidote -- sodium thiosulphate, sodium nitrite, Topical agents — astringents, protectants, silicone polymers-activated dimethicone, anti infectives, dental products-oral antiseptics and astringents.

### **ORGANIC**

- Study of hydrocarbons, carbonyl compounds, carboxyl acids and derivatives, nitrogen, halogens hydroxy compounds and ethers; Study of hetero cyclic systems, five membered and six membered ring systems with 1-3 hetero atoms; mechanism and application in drug synthesis of named reactions such as Beckmann's and Fries rearrangement, Phillips's condensation reaction, Mannich, Michael addition reaction.

### **MEDICINAL CHEMISTRY**

- Nomenclature, classification, structures, mechanism of action, SAR, uses and synthesis of: - Antibiotics - Penicillins, Cephalosporin, Tetracyclines, Aminoglycosides Steroids — Cholesterol, Diosgenin, Stigmasterol, Ergosterol.
- Vitamins, Hormones, Alkaloids, Terpenoids.
- Drug Discovery, Drug Design
- Instrumentation and Pharmaceutical applications of UV, Visible IR, Spectrophotometry, Fluorimetry, Refractometry, Polarimetry, Conductometry, Electrophoresis, Flame Photometry.

### **PHARMACOGNOSY**

- Determination of leaf constants, identification of crude drugs, identification of fibres by chemical tests, determination of ash values, extractive values, swelling factor and foreign organic matter.
- Study of mineral drugs, tannins.
- Study of biological sources, cultivation, collection, chemical constituents, substitutes, adulterants, uses, microscopic features of Liquorice, Digitalis, Senna, Chirata, Lobelia, Belladonna, Cinchona, Rauwolfia, Ephedra, Vasaka
- General techniques of biosynthetic studies and basic metabolic pathways.
- Brief introduction to biogenesis of secondary metabolites of pharmaceutical importance.

### **BIOCHEMISTRY**

- Carbohydrate, Protein and Amino acid, Lipid metabolism, nucleic acid metabolism, biological oxidation.
- Enzymes, Mechanism, kinetics, enzyme inhibition, factors affecting enzyme action, isoenzymes, co-enzymes, metalloenzymes, allosteric-enzymes, clinical and therapeutic uses of enzymes.
- Role of minerals and water in biochemical processes.
- Qualitative and Quantitative measurement of Glucose, Urea, Cholesterol, Bile salts, Bile pigments, Creatinine, Calcium phosphates, SGPT, and SGOPT in Blood and abnormal constituents in urine.

## **INTRODUCTION TO ANATOMY & PHYSIOLOGY & PHARMACOLOGY**

- Comprehensive knowledge of the anatomical consideration in relation to Nervous system (central and autonomic nervous system), Urinary system , Reproductive system, Digestive system, Respiratory system , Endocrine system , Blood and Blood forming organs , Lymphatic system, Cardiovascular system and Special Senses.
- Concept of Health and Diseases, Disease causing agents, prevention , communicable diseases —causative agents , modes of transmission and prevention of Chicken Pox , Measles , Influenza , Diphtheria , Whooping Cough , Tuberculosis , Poliomyelitis , Hepatitis , Cholera , Typhoid, Helminthiasis , Malaria , Filariasis , Rabies, Trachoma, Tetanus, Leprosy, Syphilis, Gonorrhoea and AIDS ,family planning methods and devices.
- Types and preparation of media , theory of staining , Isolation and preservation of cultures , study of bacterial growth. Microbiology of air ,water and milk .
- Pharmacokinetics, Pharmacodynamics, Molecular mechanisms.
- Pharmacology of drugs acting on Autonomic nervous system, Central nervous system,
- Cardiovascular system , gastrointestinal tract , Excretory system ,Blood and respiratory systems.

## **PHYSICAL PHARMACY**

- Theory and application of interfacial phenomenon , Colloids , Rheology, Micromeritics , Chemical kinetics , Complexation and Protein binding , Thermodynamics.

## **DRUG STORE MANAGEMENT AND PHARMACY ADMINISTRATION**

- Goals of Production Management and Organization , Distribution , Drug store planning and layout , Sales Promotion , Inventory control, Elements of industrial Accountancy.

## **HOSPITAL & CLINICAL PHARMACY**

- Objectives, functions, organization, planning, location layout of Hospital Pharmacy. Drug distribution to out patients and inpatients. Hospital drug policy: General considerations.
- Pharmacy and therapeutic committee - organization, formulary content, preparation and distribution, Hospital committees, Hospital manufacturing, patient data analysis .
- Basic and general principles of drug therapy: monitoring of drug therapy, adverse drug reactions, drug interactions, toxicology- types of poisons , general principles of treatment , types of antidote.
- Statistical inferences : Common parametric and non-parametric tests employed in testing of significance in Biological / Pharmaceutical experiments and elements of ANOVA(one way and two ways)

## **Forensic / Pharmaceutical jurisprudence**

- Development of Pharmaceutical and drug legislation in India.
- The Pharmacy act, 1948, Drugs and cosmetics act 1940 and Drugs and cosmetics rules 1945.
- Drugs and magic remedies act, The Medicinal and Toilet preparation act, Drugs Price Control order, Legislations to control the operations regulating the dangerous drugs,, poisons and opium , The narcotic drugs and psychotropic substances act, 1985.
- Industries act, 1951, the Indian patents and design act, 1970 with reference to the drugs and Pharmaceuticals, prevention of food adulteration act.(acquaint with amendments to above acts)
- Pharmacy ethics: Introduction to code of ethics of Pharmacy, Pharmaceutical ethics , ethical guidelines for retail pharmacist, community ,manufacturing pharmacist and Pharmaceutical researcher.

## 20. PHYSICS

### **I. Mathematical Methods of Physics:**

Dimensional analysis, Vector algebra and vector calculus, Linear algebra, matrices, Cayley-Hamilton theorem, Eigenvalue and eigenvectors, Linear ordinary differential equations of first and second order, Special functions (Hermite, Bessel, Laguerre and Legendre). Fourier series, Fourier and Laplace transform. Elements of complex analysis, analytic functions: Taylor and Laurent series; poles, residues and evaluation of integrals. Elementary probability theory, random variables, binomial, Poisson and normal distributions. Central limit theorem. Data interpretation and analysis, Precision and accuracy. Error analysis, propagation of errors. Least square fitting, linear and nonlinear curve fitting and Chi-square test. Introductory group theory;  $SU(2)$ ,  $O(3)$ .

### **II. Classical Mechanics:**

Newton's laws, Phase space dynamics, stability analysis, Central force motion. Two body collisions, scattering in laboratory and center-of-mass frames, Rigid body dynamics, moment of inertia tensor, Non-inertial frames and pseudoforces. Variational principle, Generalized coordinates, Lagrangian and Hamiltonian formalism and equations of motion. Poisson brackets and canonical transformations, Symmetry, invariance and Conservation laws, cyclic coordinates. Periodic motion, small oscillations, normal modes. Special theory of relativity, Lorentz transformations, relativistic kinematics and mass-energy equivalence.

### **III. Electromagnetic Theory:**

Electrostatics: Gauss's law and its applications, Laplace and Poisson equations, boundary value problems; Magnetostatics: Biot -Savart law, Ampere's theorem, electromagnetic induction. Maxwell's equations in free space and linear isotropic media; boundary conditions on the fields at interfaces; Scalar and Vector Potentials, Gauge invariance. Electromagnetic waves in free space. Dielectrics and conductors. Reflection, Refraction and Polarization, Fresnel's law, interference, coherence and diffraction. Lorentz invariance of Maxwell's equations, Dynamics of charged particles in static and uniform electromagnetic fields. Radiation from moving charges, dipoles and retarded potentials.

### **IV. Quantum Mechanics:**

Wave particle duality, Schrodinger equation: time dependent and time independent. Wave functions in coordinate and momentum representations, Eigenvalue problems: particle in a box, harmonic oscillator etc.; Tunneling through a barrier. Wave function in coordinate and momentum representations. Commutators and Heisenberg uncertainty principle. Matrix representation, Dirac notation and state vectors. Motion in central potential: orbital angular momentum, angular momentum algebra, Spin, addition of angular momenta; Hydrogen atom. Stern-Gerlach experiment. Time independent perturbation theory and applications. Variational method. Time dependent perturbation theory and Fermi's golden rule, selection rules, semi -classical theory of radiation; Elementary theory of scattering, phase shift, partial waves, Born approximation, Identical particles, Pauli exclusion principle, Spin-statistics connection. Relativistic quantum mechanics: Klein Gordon and Dirac Equations.

### **V. Thermodynamics and Statistical Physics:**

Laws of thermodynamics and their consequences. Thermodynamic potential, Maxwell relations, Chemical potential, phase equilibria. Phase space, micro and macro states, Micro-canonical, Canonical and Grand canonical ensembles and Partition functions. Free energy and its connection with thermodynamic quantities. First and second order phase transitions, Classical and quantum statistics. Ideal Bose and Fermi Gases.

Principle of detailed balance. Blackbody radiation and Planck's distribution law; Bose-Einstein condensation.

#### **VI. Electronics:**

Semiconductor devices (diodes, junctions, transistors, field effect devices, homo- and hetero-junction devices), device structure, device characteristics, frequency dependence and applications. Opto-electronic devices (solar cells, photo-detectors, LEDs ). Operational amplifiers and their applications. Digital techniques and applications (logic circuits, registers, counters and comparators). A/D and D/A converters, Microprocessor microcontroller basics. Fundamentals of communication electronics, modulation techniques.

#### **VII. Atomic & Molecular Physics:**

Quantum state of an electron in an atom. Electron spin, Spectrum of Hydrogen, helium and alkali atoms. Relativistic corrections for energy levels of hydrogen atom, hyperfine structure and isotopic shift, width of spectrum lines, LS and JJ couplings. Zeeman, Paschen-Bach and Stark effects. Electron spin resonance, Nuclear magnetic resonance, Electronic, rotational, vibrational and Raman spectra of diatomic molecules, Frank - Condon principle and selection rules. Spontaneous and stimulated emission, Einstein A&B coefficients; Lasers, Optical pumping, population inversion, rate equation. Modes of resonators and coherence length.

#### **VIII. Condensed Matter Physics:**

Bravais lattices. Reciprocal lattice. Diffraction and structure factor. Bonding of solids. Elastic properties, phonons, lattice specific heat. Free electron theory and electronic specific heat. Response and relaxation phenomena. Drude model of electrical and thermal conductivity. Hall effect and thermoelectric power. Electron motion in a periodic potential, band theory of solids: metals, insulators and semiconductors. Superconductivity: type-I and type-II superconductors. Josephson junctions. Superfluidity. Defects and dislocations. Ordered phases of matter: translational and orientational order, kinds of liquid crystalline order. Quasicrystals.

#### **IX. Nuclear and Particle Physics:**

Basic nuclear properties; size, shape and charge distribution, spin and parity. Binding energy, semi-empirical mass formula, Liquid drop model. Nature of the nuclear force, form of nucleon-nucleon potential, charge independence and charge asymmetry of nuclear forces. Isospin; Deuteron problem. Evidence of shell structure, single particle shell model, its validity and limitations. Elementary ideas of alpha, beta and gamma decays and their selection rules. Fission and fusion, nuclear reactions, reaction mechanism, compound nuclei and direct reactions. Classification of fundamental forces; Elementary particles (quarks, baryons, mesons, leptons); C, P and T invariance and applications of symmetry arguments to particle reactions, parity non-conservation in weak interaction; Relativistic kinematics.

## **21. TEXTILE TECHNOLOGY**

### **I. INTRODUCTION TO FIBRES, MANUFACTURED FIBRES YARN FORMATION, POST SPINNING, ADVANCED YARN FORMATION**

**1. Introduction to Textile fibres:** Textile elements defined, Textile Institute Classification of Textile fibres, Physical and Chemical Properties of fibres, Classification of Count systems, Universal Yarn Numbering system, Conversion from one system to other and within the system. Classification of Unconventional Natural fibres

**2. Techno- Economical information of Natural fibres :** Cotton, Wool, Silk, Jute, Flax and

Linen fibres ; Varieties of these fibres , properties and applications . Special feature of Wool (Heat of Wetting, DFE, Bilateral structure, Felting) , Developments in Cotton ( Chemically modified, Bt, Coloured , Never dried )

a) *Classification of Unconventional Natural fibres* : Role of fibres like Asbestos, Basalt , Coir, Maize, in Technical Textiles

b) *Introduction to Silk Technology* : Life cycle of Silkworm, Types of crops in Silk growing , Various operations and their significance in Silk Technology, Classification of Silk yarns and Silk yarn testing .

c) *Jute Technology*: Flow chart of Jute fibre to yarn, Machines and technical parameters

**3. Technology of Manufactured Fibres** : Classification of Manufactured fibres, Unique properties, Principles of Man made fibre spinning , Basic aspects of process and machine elements, Substrate and Geometry of Manmade fibres , forms of production of Manufactured fibres, Batch and merge number, Surface modification of fibres, *Spin finishes for fibres*: Need , methods of application , removal and estimation *Manufacture of Manmade fibres*: Raw materials, Flow chart , properties and applications.

## II. YARN FORMATION PROCESS (SPINNING )

**i) Pre- Ginning & Ginning** : Modern Cotton pickers , Ginning percentage and Modern Gins for Indian Cotton ,Contamination in Cotton bales, Bale formation , Bale management , Selection of Cotton , Application of LPP Blending systems in Spinning, Mixing and Ideal Mixing and IBI , Modern Mixing vessels ,selection of openers , Degree of Opening and Cleaning ,Individual and Overall Cleaning efficiency , Bye pass , Selection of Spinning machines for low ,medium and finer grades of Cotton, Fibre fracture , processing of 100% synthetics and Blends . Chute feed systems and Autolevellers at Blow Room.

**ii) Carding**: Concept, elements and setting for Cotton, Synthetics and Blends, Snap and Nep study , Wrapping check , Modern Cards , Waste extraction at Cards, Autolevelling at Cards. Production problems

**iii) Drawframe**: Objectives, concept of Real and Ideal Draft, Drafting elements, drafting systems, types of Creels, selection of Pre- Drawing and Post —Drawing process. Treatment of Cotton, Synthetic and Blends, Modern Draw frames, Quality Control checks, Role of Break draft on Drawn sliver quality, Production problems.

**iv) Combing** : Need, Degrees of Combing, Preparatory process to Combing and Rait-of Pre- Comb Draft and selection of Comber preparatory machines, 5-min test at Comber, Waste extraction study, Head wise and Overall waste at Comber, Modern Comber and their elements .Production problems

**v) Simplex**: Objectives, Principles, Drafting systems and elements, Breakage study, Role of Break draft on Roving,Modern developments ,Production problems.

**vi) Ring Spinning** : Objectives, Principles , Drafting systems and elements, Breakage study, Idle Spindle study, Snap study, Count Control, imperfections , types of Builds and Hank meter gain and Loss ,Twist contraction , Snap efficiency , Bonda waste, Arrangements for doffing and donning , Number of doffer boys, Migration of fibres , Spinning Triangle, Role of Break draft on Roving ,Modern developments ,Production problems. Types of twists and selection of twist level

**vii) Post Spinning Process**: Selection of Process, Types , Bundling , Baling and pressing , Concept of Average and Resultant Count. Hank Yarn Obligation , Spin plan for

Cotton, blends and Synthetics. Production of Sewing thread .

**viii) Advanced Yarn Formation:** Limitations of Ring Spinning, Principle of Open-End Spinning, types, selection criterion, Effect of trash in Draw frame on Open end yarn quality, Working principle of Rotor , Friction, Airjet , Airjet- Ring spun , Air Vortex and Wrap technologies and applications of all these yarns .

**Yarn Texturising :** Need, Principles, Methods and Selection of methods , Testing of Textured yarn, Special care for weaving of Textured yarn.

## **II. FABRIC FORMATION (WEAVING )**

**i). Introduction to Weaving preparatory machines :** Need , imperfections in Ring Yarns, Systems of Yarn preparation and selection of a system ,Principles of Winding and their selection, Classification of winding machines, elements of winding machine ( Rotoconer and Autoconer) Optimum Yarn Clearing and Yarn Tensioning , Role of Electronic Yarn Clearers, Production problems , Material handling , Quality control studies.

**ii). Introduction to Pirn winding :** Principles, Selection , Elements of Pirn, working of Semi, Automatic and Fully Automatic Pirn winders, Quality control studies , production problems . Significance of spindle direction in relation to Yarn twist.

**iii). iii)..Introduction to Warping :** Principles, elements of Warping machine , Types of Creels and their performance and selection . Quality control study and material handling . Arrangements for selvage ends on Warper beams .Construction of Warper beams and their specification. Defects in Warping , Production problems

**iv) Introduction to Sizing :** Need, forms and Degrees of Sizing , methods of Sizing, Working of Hank, Ball and Tape warp sizing machines, Various zones in Multi-cylinder sizing machine , Selection of size recipe and size add on and pickup calculation , Back beam creeling , wet pick up control, distribution of size and steam to cylinders, Size preparation (selection of ingredients , concentration calculation, working of cookers and storage devices, Modern approach to size recipe and pickup) , working of various types of controls , Beam winding mechanism, arrangement to made for doffing and donning of sized beams, Beam press rollers and Mechanisms, Beam storage , After waxing , Cutmark motions ,modern developments and production problems .

**Introduction to Post Sizing operations:** Need, Types , working of semi and automatic machines, drawing calculations, selection of heald wire , drop wire and Reed

**v) Loom Gaiting and Loom operations and Mechanisms :** Types of gaiting , loom classification and specification, loom shafts and calculation of speeds in relation to picks per repeat, working principles of Tappet , Dobby and Jacquard Shedding mechanisms, Detailed working of Primary and Secondary motions. Modern developments, Loom timing for these mechanisms , defects of these motions. Quality control studies . Loom makes of India , Reed selection and Reed parameters, concept of Beatup and mechanics of Primary and Secondary motions. Construction of shedding tappets. Fabric defects.

**vi) Introduction to Automatic weaving :** Principle , need , concept of reserve on pirn, Weft feeler and Cop transfer mechanisms, transfer failure , Quality control aspects , Material handling in entire weaving preparatory and weaving sheds and their selection. Defects in Automatic looms.

**vii) Introduction to Shuttleless Weaving :** Need , draw backs of Shuttle loom, Principles of modern methods of weft insertion, selection , working principles , settings and Primary and Secondary motions on these looms , Yarn preparatory requirements, Techno-



Economics of Modern weaving , makes of Shuttless machines , Modern batching systems, Role of Cyclops

**viii) Introduction to Dobby and Jacquard Shedding :** Machines , types , classification ,working elements and material of construction and functions. Numerical problems . Selection of picks and Reed for different sorts on Dobby and Jacquard. Process of transfer of design on to lags and cards. Modern Positive Dobby and E- Jacquard. Casting out in Jacquards- Numerical examples.

**ix) Weft Patterning motions:** Need , types , conventional and modern , setting for a specific pattern in Conventional and modern looms. Defects and remedies

**x). Introduction to Knitting (Warp and Weft Knitting):** Terminology, Classification, machines, representation of structures , properties . Knit fabric defects, Knit Geometry, Knitting Dynamics, Knit patterning. Modern Developments , Production problems

**xi). Introduction to Nonwovens:** Need, terminology, Classification, Methods of manufacture as per Reverse Engineering , Testing and machinery. Modern developments, SMS, Industrial applications

**xii). Introduction to Fabric Structure :** fabric notation, role of interlacement diagrams, classification of weaves, Linear and Non —Linear relations of elements of fabric structure, modification of plain ,twill and sateen weaves. Loom arrangements for these modifications. construction and development of primary , secondary and fancy weaves in single and multilayered structure- Card cutting instructions for advanced fabrics —Yarn preparatory requirements and beaming and drafting arrangements- construction and production of complex weaves like Damask, Brocade, Figured terry , Backed , Double , Treble cloths. Arrangements of motifs on different basis .Colour and weave effects. Ornamentation of weaves and fabrics.

### **III. TEXTILE WET PROCESSING**

**i). Fundamentals of Textile Chemistry :** structure and bonds , molecular arrangement, flowchart for production of finished fabric from grey fabric.

Introduction to Desising ( methods, evaluation) , Scouring (methods, parameters evaluation), Bleaching (Need , degree of Bleaching methods , evaluation ), Mercerisation ( Need, methods and evaluation)- Quality Control aspects in preparatory process to wet processing .

**ii). Introduction to Dyeing :** Need , Colour and Constitution of Dyes, Classification of Dyes, dye uptake, elements of dyeing, principles of Dyeing . Industrial practices of Dyeing of Cotton , Synthetics and Blends

**iii). Introduction to Printing & Finishing :** Need , concept of Printing , Print fixation, Printing styles and methods of Printing , Print paste selection and Rheology-Printing defects and their remedies finishing and various of types of finishes for fabrics. and their evaluation . Fabric folding and packing.

### **IV. TEXTILE TESTING ,QUALITY ASSURANCE ,MILL MANAGEMENT & TEXTILE INDUSTRY**

**i). Introduction to Statistical Quality Control:** Need, methods of Sampling, Sample size determination with CV%, Sampling errors, Frequency and Weight distributions, Significance testing and ANOVA, Design of Experiments and Control Charts.

**ii). Introduction Textile Testing & Quality Assurance :** Need, Standard Testing conditions, fibre , yarn and fabric sampling , measurement and interpretation of fibre length, fibre fineness, maturity, strength, elongation, working principles of AFIS, HVI. measurement of fabric properties, Subjective Vs Objective properties, Interpretation of fabric properties and effect on fabric low stress mechanical properties in terms of

geometrical properties and treatment conditions. Effect of process parameters of Textile production like Spinning, weaving and Wet processing on fabric properties. Reverse Engineering and fabric designing . Role of KES-F, KES-Y and FAST methods of testing and interpretation. Correlation and Regression between properties of fibre, yarn and fabric .

**iii) . QUALITY STANDARDS FOR TEXTILES :** Role of ISO, SAS, ASTM, DIN, AATCC, BS, and their utility.

**iv). Industrial Climatology, Mill Management & Textile Industry :** Selection of suitable location, Layout, Maintenance programme, Concept and implementation of Safety , Work study and determination of Standard Time , Machine interference, Plant lighting , Ventilation , RH% and Humidification systems, types and levels of Management, functions, Authority and Delegation , Decision making process, Control process, MBO, Concept of **Quality Circles and Six Sigma. Concept of Lean production , Implementation of Lean and Six Sigma.** Brief note on various types of concepts like Cost sheet, process costing , Financial statements and Management , Inventory control and ABC analysis.

**V. ROLE OF GOVT. OF INDIA IN PROMOTION OF TEXTILE AND ITS ALLIED ACTIVITIES :** Role of Ministry of Textiles. Various branches of MOT, TMTT, TMC, 16- Technical Textiles as defined by MOT.

**VI. TECHNICAL TEXTILES:** Textiles in Aerospace, Dairy, Agriculture, Horticulture, Medical, Manufacturing fields, Protec, Buildtech, Automobile , Geotextiles, Filtration .

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**SCHEME & SYLLABUS OF EXAMINATION OF THE COMPUTER PROFICIENCY TEST (CPT)**

**Scheme for Computer Proficiency Test**

(As per G.O.Ms.No.26, G.A. (Ser.B) Dept., dt: 24.02.2023)

<b>Scheme of the examination (Practical Type)</b>					
Test	Duration (Minutes)	Maximum Marks	Minimum Qualifying Marks		
			SC/ST/PH	B.C's	O.C's
Proficiency in Office Automation with usage of Computers and Associated Software.	60	100	30	35	40

**Syllabus for Computer Proficiency Test**

**PART-A**

- 1. INTRODUCTION TO COMPUTERS:** Introduction to Computers - Components and their classification - Peripheral devices and their purpose. Input Devices - Keyboard, Mouse, Scanner, Lighten, Touch screens, Joystick, Micro phone, Scanner, Digital camera, Bar code reader, Biometric sensor Output Devices: Display devices, Printers, Monitor, Speaker, Plotter, Secondary Storage Devices – Feature- Driven Development (FDD), Magnetic tape, Universal Serial Bus(USB), Pen Drives, Disks - The Role of input Processing / output processing devices - Computing Concepts - Data - Information – Random Access Memory (RAM) – Read-Only Memory(ROM) - Control Unit - Memory Unit – Arithmetic Logic Unit(ALU).
- 2. COMPUTER SOFTWARE TYPES:** System Software, Application Software, Embedded software, Proprietary Software, Open source software (their purpose and characteristics only).
- 3. OPERATING SYSTEM:** Purpose of operating system, Single User and Multi User Operating Systems with Examples.
- 4. WINDOWS OPERATING SYSTEM:** Interfacing Graphical User Interface (GUI), Differences between Criminal Interdiction Unit(CUI) and Graphical User Interface(GUI) - working With Files and Folders - More About Files - Running An Application Through The File Manager - Running an Application Through The Program Manager - Setting up of Printer, Webcam, Scanner and other peripheral devices,
- 5. LINUX/MAC OS (only basic concepts):** Introduction to Linux - Features and advantages of Linux, File handling commands, directory handling commands - User Management - File permissions Media Access Control Address(MAC) OS - Introduction - Advantages of Media Access Control Address(MAC) OS . Basics commands
- 6. INTERNET CONCEPTS (only basic concepts):** Minimum Hardware and Software Requirements for a system to use internet, Communication Protocols and Facilities - Various browsers - What is Internet Protocol(IP) Address - Steps required in connecting system to network - Uploading and Downloading Files from Internet
- 7. ELECTRONIC MAIL (only basic concepts):** Sending and receiving mails, Basic E-Mail Functions, Using your word processor for E-mail, Finding E-Mail Address, Mailing Lists and lists Servers.
- 8. WORLD WIDE WEB (only basic concepts):** WWW advantages of the Web - how to navigate with the Web - Web Searching.

**PART – B**

- 1. OFFICE SUITE:** MSOFFICE or any open source office like Libre Office /Apache Open Office Neo office for Windows/Linux/Media Access Control Address (MAC)OS.
- 2. GETTING STARTED WITH OFFICE:** Introduction to Office Software- Starting and Exiting the Office Applications - Introducing the Office Shortcut Bar - Customizing Office Shortcut Bar.
- 3. FILE OPERATIONS IN THE OFFICE:** Common Office Tools and Techniques - Opening An Application - Creating Files - Entering And Editing Text - Saving Files - Opening Files -

Closing a File - Exiting The Application - Managing Your files With The Office Applications.

**4. TOOLS IN THE OFFICE APPLICATIONS:** Key Combinations - Cut, Copy and Paste - Drag And Drop Editing - Menu Bars And Toolbars - Undo and - Redo - Spell Checking - Auto Correct - Find and Replace - Help And The Office Assistants - Templates and Wizards.

**5. WORD PROCESSING (MS WORD or its equivalent in Libre office /Apache Open Office / Neo office for Windows/s/Linux/Mac OS):** Starting Word

- Title Bar - Menu Bar - Format Bar - Standard Bar - Ruler - Workspace Area - Scroll Bar - Status Bar - Different Toolbars - Option a Menu Bar - Creating New Document When Word is Running - Opening Pre existing Documents When Word is Running - Designing Your Document - Typing Text - Selection text - Deleting Text - Formatting text and document - copying and moving - Saving Document - Page Setup - Properties of a document - Undo-Redo-Cut-Copy a Document - Pasting a Document - Print Preview - Printing - Select All - Find - Replace - Go To - Four Different View Of A Document - Normal, Web Layout, Print Layout, and Outline Layout- Document Map - Full Screen - Zoom - Objects - Page Break - Header and Footer - Page Number - Auto Format - Auto Text - Inserting Date And Time - Working With Header, Footers-footnotes-Fields-Symbols-Caption Cross Reference-Index-Tabs-Table and Sorting - Working With Graphics - Inserting Pictures - Modifying Pictures - Word Art - Inserting Chart - Inserting Files - Hyper Linking - Bookmark - Using Different Fonts - Paragraph – Bullets Borders and Shading- Columns-Drop Cap-Theme-Change Case Background-Frames-Style-Spelling And Grammar - Set Language - Word Count - Auto Summarize - Auto Correct - Merge Document - Protect Document - Envelopes And Labels - - Templates, Wizards And Sample Documents - drawing Tables - Merge Cell - Spilt Cells - Spilt Table - Table Auto Format - Auto Fit - Sort - Formula - Arrange All-Split- Micro Soft Word Help - Macros - Custom Toolbars - Keyboard Shortcuts - Menus - Mail Merge.

**6. SPREAD SHEET (MS Excel or its equivalent in Libre Office / Apache Open Office / Neo office for Windows/s/Linux/ Maa OS):**

Features Of Excel - Excel worksheet - Selecting Cell - Navigating With The Mouse And Keyboard - Entering And Editing Text - Text Boxes - Text Notes - Checking Spelling - Undoing And Repeating Action - Entering And Editing Formulas - Referencing Cells - Order Of Evolution in Formulas - Copying Entries And Equations To Minimize Typing - More Auto Fill Examples - Creating Custom Fill Lists Protecting And Un Protecting Documents And Cell - Creating A New Worksheet - Excel Formatting Tips And Techniques - Moving cell - Copying Cells - Sorting Cell Data - Insertion Cells Inserting As You Paste - Deleting Parts Of Worksheet - Clearing Parts Of A Worksheet - Excel Page Setup - Changing Column Width And Row Heights - Auto Format - Manual Formatting - Using style - Format Code Alter A Number's Appearance - Format Painter Speeds-Up Format Copying - Changing Font Size And Attributes - Adjusting Alignments - Canterng Text Across Column - Using Border Buttons And Commands - Changing Color And Shading - Inserting And Removing Page Breaks - Hiding Rows And Columns - Rearranging Worksheet - Entering Formula - Excel Functions - Inserting Rows And Columns - Saving A Worksheet - Printing A Worksheet - Printing Tips For Large Excel Project - Parts Of A Function - Functions Requiring Add-ins - Function Wizard - Example Of Functions By Category - Organizing Your Data - Excel's Chart Features - Chart Parts And Terminology - Instant charts with The chart wizard - Creating Chart On Separating Worksheets - Resizing And Moving Charts - Adding Chart Notes And Arrows - Editing Charts - Rotating 3-D Charts - Printing Charts - Deleting Charts Setting The Default Chart Type - Creating Trend Lines Data Map - Working With Graphics in Excel - Creating And Pacing Graphic objects - Resizing Graphs - Possible Sources Of Excel Graphics - Creating and Running Macro - Sorting Excel Data - Adding Subtotals To Databases - Customizing Excel - Customizing Workspace – Comma Separated Value (CSV) File format - Using Worksheet As Databases.

**7. PRESENTATION SOFTWARE (MS Power Point or its equivalent in Libre Office/Apache Open office/Neo office for Windows/s/Linux/Mac Os):** Introduction - Starting Presentation Software - Views in Presentation Software - Slides - Terminology - Color Schemes -

Formatting Slides - Creating a Presentation - Using the Auto Content Wizard - Masters- - Using a Template - Creating a Blank Presentation - Working with Text in Power Point - Adding Slides Editing And Working Text - Working in Outlaying view – Spell checking - Finding And Replacing Text - Formatting Text - Aligning Text - Developing Your Presentation - Importing images From The Outside World - The Clipart Gallery - Drawing in Presentation software- Bringing A Presentation to Life - Inserting Objects in Your Presentation - Inserting A Picture - Working With Graphics - Multimedia in Power Point - Animating The Objects, Pictures, Graphics, - Enhancements to the Slide Show Showing Slides Out Of Order Printing Presentation Elements - Finalizing The Presentation - Assigning Transitions And Timings - Setting The Master Slide - Setting Up The Slide Show - Running The Slide Show.

**Assessment Pattern:**

**Part-A:** Test may be designed to assess the candidate by means of MCQs.

**(20 %of Total Marks)**

**Part-B:** A computer based assessment test where they need to:

1. Prepare a model document and organize the same in a formatted manner. This should cover evaluating the typing speed, organizing the document and covering several other aspects such as inserting tables, inserting Images/WordArt, mail merge, etc...).
2. Evaluating typing speed **(25% of Total Marks)**  
(This may be made mandatory for qualifying based on the norms existing)
3. Organizing and inserting different objects **(15% of Total Marks)**
4. Prepare an Excel Sheet to fill with data and format the sheet, merging/splitting cells, formulae for calculation in the cells, conditional formatting, preparation of different graphs based on the data. **(20% of Total Marks)**
5. Prepared a Power Point presentation using the standard layouts available and filling different slides with content (Formatted text, images, tables, transition effects, animation etc..).

**(20%of Total Marks)**

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### **ANNEXURE-III**

#### **INSTRUCTIONS TO CANDIDATES**

##### **A. INSTRUCTIONS REGARDING ONLINE APPLICATION:**

- A.1. The applicants are required to go through the user guide and satisfy themselves as to their eligibility for this recruitment carefully before applying and enter the particulars completely online.
- A.2. Applicant must compulsorily fill-up all relevant columns of application and submit application through website only. The particulars made available in the website will be processed through computer and the eligibility decided in terms of notification and confirmed accordingly.
- A.3. The applications received online in the prescribed proforma available in the website and within the time shall only be considered and the Commission will not be held responsible for any kind of delay/discrepancy on part of the candidate.
- A.4. Applicants must compulsorily upload his/her own scanned photo and signature through .jpg format.
- A.5. The applicants should not furnish any particulars that are false, tampered, fabricated or suppress any material information while making an application through website.
- A.6. Important:-Hand written/typed/Photostat copies/printed application form will not be entertained.
- A.7. The applicant shall produce all the essential certificates issued by the competent authority, for verification by the commission, as and when called for. If candidates fail to produce the same, his/her candidature shall be rejected / disqualified without any further correspondence.
- A.8. The following certificate formats are available on the Commission's Website (<https://psc.ap.gov.in>) for reference.
  - A.8.1. Community, Nativity and Date of Birth Certificate
  - A.8.2. Declaration by the Un-Employed
  - A.8.3. School Study Certificate
  - A.8.4. Certificate of Residence
  - A.8.5. Medical Certificate for the Blind
  - A.8.6. Certificate of Hearing Disability and Hearing Assessment
  - A.8.7. Medical Certificate in respect of Orthopedically Handicapped Candidates
  - A.8.8. Creamy Layer Certificate
  - A.8.9. Local status certificate (if applicable)

##### **B. INSTRUCTIONS REGARDING ON-LINE (CBT) EXAMINATION FOR CANDIDATES:**

- B.1. The candidates should take their seats at the prescribed time before the commencement of the examination. Biometric identification would be conducted before entry into examination hall. The entry time would be mentioned in the hall ticket. Late entry after the given entry time would not be allowed. Candidates should not leave the examination hall till the expiry of fulltime. Loaning and interchanging of articles among the candidates is not permitted in the examination hall. Electronic devices including cell phones and pagers are not allowed in the examination hall.
- B.2. The starting time of each examination paper and the entry time would be mentioned in the hall ticket
- B.3. Candidates will not be permitted to leave the examination hall till the expiry of full time. If any candidate leaves the examination hall in the middle, he would be disqualified. If there is any problem with computer system, the candidates have to wait without talking to others till the system is restored. In case of any violation, the candidate will be disqualified.

- B.4. The examination link with the login screen will already be available on your system. Please inform the invigilator if this is not the case.
- B.5. 10 minutes prior to the exam, you'll be prompted to login. Please type the Login ID (Roll No) and the Password (Password for Candidate will be given on exam day) to proceed further.
- B.6. Invigilator will announce the password 15 minutes before commencement of the Examination.
- B.7. Copying or noting down questions and/or options is not allowed. Severe action will be taken if any candidate is found noting down the questions and/or options.
- B.8. After logging in, your screen will display:
- \*Profile Information - Check the details & click on "I Confirm" or "I Deny".
  - \*Detailed exam instructions - Please read and understand thoroughly.
  - \*Please click on the "I am ready to Begin" button, after reading the instructions.
- B.9. You have to use the mouse to answer the multiple choice type questions with FOUR alternative answers.
- B.10. To answer any numerical answer type question, you need to use the virtual numeric key pad and the mouse.
- B.11. On the online exam question screen, the timer will display the balance time remaining for the completion of exam.
- B.12. The question numbers are color coordinated and of different shapes based on the process of recording your response: White (Square) - For un-attempted questions. Red (Inverted Pentagon) - For unanswered questions. Green (Pentagon) - For attempted questions. Violet (Circle) - Question marked by candidate for review, to be answered later. Violet (Circle with a Tick mark) - Question answered and marked by candidate for review.
- B.13. After answering a question, click the SAVE & NEXT button to save your response and move onto the next question.
- B.14. Click on Mark for Review & NEXT to mark your question for review, and then go to the next question.
- B.15. To clear any answer chosen for a particular question, please click on the CLEAR RESPONSE button.
- B.16. A summary of each section, (i.e. questions answered, not answered, marked for review) is available for each section. You have to place the cursor over the section name for this summary.
- B.17. In case you wish to view a larger font size, please inform the Invigilator. On the Invigilator's confirmation, click on the font size you wish to select. The font size will be visible on the top.
- B.18. You may view INSTRUCTIONS at any point of time during exam, by clicking on the INSTRUCTIONS button on your screen.
- B.19. The SUBMIT button will be activated after 150 Minutes. Please keep checking the timer on your screen.
- B.20. In case of automatic or manual log out, all your attempted responses will be saved. Also, the exam will start from the time where it had stopped.
- B.21. You will be provided a blank sheet for rough work. Do write your Login ID and Password on it. Please ensure that you return it to the invigilator at the end of the exam after tearing only the password from it.
- B.22. Please don't touch the key board as your exam ID will get locked. If your ID gets locked, please inform a nearby invigilator who will help in unlocking your ID and then you can continue with the exam.
- B.23. Please inform the invigilator in case of any technical issues.
- B.24. Please do not talk to or disturb other candidates.
- B.25. In case you are carrying articles other than the admit card, photo identity proof and pen, please leave them outside the exam room.

- B.26. You cannot leave exam room before submitting the paper. Please inform the invigilator if you want to use the wash room.

**C. GENERAL INSTRUCTIONS:**

- C.1. If the candidate notices any discrepancy printed on the Hall ticket, as to community, date of birth etc., he/she may immediately bring it to the notice of Commission's officials/Chief Superintendent in the examination centre and necessary corrections can be made in the Nominal Roll, in the Examination Hall against his/her Hall Ticket Number for being verified by the Commission's Office.
- C.2. The candidate should satisfy the Invigilator of his/her identity with reference to the signature and photographs available on the Nominal Rolls and Hall Ticket.
- C.3. The candidates should take their seats at the given time before the commencement of the examination and are not to be allowed after the scheduled time. The time of Examination and entry time would be mentioned in the hall ticket. Late entry after the given entry time would not be allowed. Candidates should not leave the examination hall till the expiry of fulltime.
- C.4. The candidates must note that his/her admission to the examination is strictly provisional. The mere fact that an Admission to the examination does not imply that his/her candidature has been finally cleared by the Commission or that the entries made by the candidate in his/her application have been accepted by the Commission as true and correct. The candidates have to be found suitable after verification of original certificates; and other eligibility criteria. The Applicants have to upload his/her scanned recent colour passport photo and signature to the Application Form. Failure to produce the same photograph, if required, at the time of interview/ verification, may lead to disqualification. Hence the candidates are advised not to change their appearance till the recruitment process is complete.
- C.5. The candidates are not allowed to bring any Electronic devices such as mobile / cell phones, programmable calculators, tablets, iPad, Bluetooth, pagers, watches or any other computing devices to examination Hall. Non programmable calculators would be permitted, wherever necessary. Loaning and interchanging of articles among the candidates is not permitted in the examination hall and any form of malpractice will not be permitted in the exam hall.
- C.6. The candidates are expected to behave in orderly and disciplined manner while writing the examination. Their candidature will be rejected in case of impersonation/ disorder/ rowdy behaviour during Examination and necessary F.I.R. for this incident will be lodged with concerned Police Station. The Chief Superintendent of the centre is authorized to take spot decision in this matter.
- C.7. Candidates trying to use unfair means shall be disqualified from the selection. No correspondence whatsoever will be entertained from the candidates.
- C.8. The Penal Provisions of Act 25/97 published in the A.P. Gazette No. 35, Part-IV.B Extraordinary dated: 21/08/1997 shall be invoked if malpractice and unfair means are noticed at any stage of the Examination. Action will be taken to penalize as per G.O.Ms.No.385, G.A. (Ser. A) Dept., Dt.18/10/2016.
- C.9. (a) Wherever the candidates are totally blind, they will be provided a scribe to write the examination and 20 minutes extra time is permitted to them per hour. Eligible candidates are also allowed to bring their own scribe after due intimation to the Commission after duly providing the full identification details of the scribe like name, address and appropriate proof of identification.
- (b) The applicants shall upload the certificate relating to percentage of disability for considering the appointment of scribe in the examination.
- (c) An extra time of 20 minutes per hour is also permitted for the candidates with locomotor disability and CEREBRAL PALSY where dominant (writing) extremity is affected for the extent slowing the performance of function (Minimum of 40% impairment). No scribe is allowed to such candidates.
- (d) The candidate as well as the scribe will have to give a suitable undertaking conforming to the rules applicable
- C.10. In case the Hall-Ticket is without photo or too small, he/she should affix a passport size photo on Hall-ticket and appear by duly getting attested by Gazetted Officer. He/she shall handover similar photo for each paper to Chief



Superintendent for affixing the same on the Nominal Rolls.

- C.11. The candidate will not be admitted to the examination Hall without procedural formalities.
- C.12. The candidate admission to the Examination is provisional, subject to the eligibility, confirmation/satisfaction of conditions laid down in this notification.
- C.13. The candidates should put his/ her signature and get the signature of the invigilator at the appropriate places in the Nominal Roll or OMR Answer Sheet.
- C.14. Instructions to be followed scrupulously in the Examination Hall.

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**ANNEXURE - IV**  
**LIST OF SCHEDULED CASTES**  
**(Definition 28 of General Rule - 2)**  
**SCHEDULE - I**

(Substituted with effect from 27-07-1977 through G.O.Ms.No. 838,  
 G.A. (Services-D) Department, dated 15/12/1977)

- 1 Adi Andhra
- 2 Adi Dravida
- 3 Anamuk
- 4 Aray Mala
- 5 Arundhatiya
- 6 Arwa Mala
- 7 Bariki
- 8 Bavuri
- 9 Beda Jangam, Budga Jangam (In Districts of Hyderabad,Rangareddy, Mahaboobnagar, Adilabad, Nizamabad,Medak,Karimnagar,Warangal, Khammam and Nalgonda)\*
- 10 Bindla
- 11 Byagara, Byagari\*
- 12 Chachati
- 13 Chalavadi
- 14 Chamar, Mochi, Muchi, Chamar-Ravidas, Chamar-Rohidas\*
- 15 Chambhar
- 16 Chandala
- 17 Dakkal, Dokkalwar
- 18 Dandasi
- 19 Dhor
- 20 Dom, Dombara, Paidi, Pano
- 21 Ellamalwar, Yellammalawandlu
- 22 Ghasi, Haddi, Relli, Chachandi
- 23 Godagali, Godagula (in the Districts of Srikakulam, Vizianagaram & Vishakapatnam) \*
- 24 Godari
- 25 Gosangi
- 26 Holey a
- 27 Holey a Dasari
- 28 Jaggali
- 29 Jambuwulu
- 30 Kolupulvandlu, Pambada, Pambanda, Pambala \*
- 31 Madasi Kuruva, Madari Kuruva
- 32 Madiga
- 33 Madiga Dasu, Mashteen
- 34 Mahar
- 35 Mala, Mala Ayawaru \*
- 36 Mala Dasari
- 37 Mala Dasu
- 38 Mala Hannai
- 39 Mala Jangam
- 40 Mala Masti
- 41 Mala Sale, Netkani
- 42 Mala Sanyasi
- 43 Mang
- 44 Mang Garodi
- 45 Manne
- 46 Mashti
- 47 Matangi
- 48 Mahter
- 49 Mitha Ayyalvar
- 50 Mundala
- 51 Paky, Moti, Thoti

- 52 (Omitted)\*  
 53 Pamidi  
 54 Panchama, Pariah  
 55 Relli  
 56 Samagara  
 57 Samban  
 58 Sapru  
 59 Sindhollu, Chindollu  
 60 Yatala (Srikakulam Dist. Only) Memo No. 8183/CV-1/2006-10 SW (CV-I) Dept., Dt. 31/03/2008  
 61 Valluvan \* (Chittoor and Nellore Dist. Only) Memo No. 8183/CV-1/2006- 10 SW (CV-I) Dept., Dt. 31/03/2008  
 \* As for the Constitution (Scheduled Caste) orders (Second Amendment) Act 2002, Act No. 61 of 2002

**LIST OF SCHEDULED TRIBES**

1. Andh, Sadhu Andh \*
  2. Bagata
  3. Bhil
  4. Chanchu (Chenchwar omitted) \*
  5. Gadabas, Boda Gadaba, Gutob Gadaba, Kallayi Gadaba, Parangi Gadaba, Kathera Gadaba, Kapu Gadaba \*
  6. Gond, Naikpod, Rajgond, Koitur \*
  7. Goudu (in the Agency tracts)
  8. Hill Reddis
  9. Jatapus
  10. Kammara
  11. Kattunayakan
  12. Kolam, Kolawar \*
  13. Konda Dhoras, Kubi \*
  14. Konda Kapus
  15. Konda Reddis
  16. Kondhs, Kodi, Kodhu, Desaya Kondhs, Dongria Kondhs, Kuttiya Konds, Tikiria Khondhs, Yenity Khondhs, Kuvinga \*
  17. Kotia, Benth Oriya, Bartika, Dulia, Holva, Sanrona, Sidhopaiko (Dhulia, Paiko, Putiya- omitted \*)
  18. Koya, Doli Koya, Gutta Koya, Kammara Koya, Musara Koya, Oddi Koya, Pattidi Koya, Rajah, Rasha Koya, Lingadhari Koya (Ordinary), Kottu Koya, Bhine Koya, Raj Koya (Goud-omitted \*)
  19. Kulia
  20. Malis (excluding Adilabad, Hyderabad, Karimnagar, Khammam, Mahabubnagar, Medak, Nalgonda, Nizamabad and Warangal District)
  21. Manna Dhora
  22. Nayaks (in the Agency tracts)
  23. Mukha Dhora, Nooka Dhora
  24. Pardhan
  25. Porja, Parangi Perja
  26. Reddi Dhoras
  27. Rona, Rena
  28. Savaras, Kapu Savaras, Maliya Savaras, Khutto Savaras
  29. Sugalis, Lambadis, Banjara \*
  30. Thoti (in Adilabad, Hyderabad, Karimnagar, Khammam, Mahabubnagar, Medak, Nalgonda, Nizamabad and Warangal Districts)
  31. Valmiki (in the Scheduled Areas of Vishakapatnam, Srikakulam, Vizianagaram, East Godavari and West Godavari Districts \*)
  32. Yenadis, Chella Yenadi, Kappala Yenadi, Manchi Yenadi, Reddi Yenadi \*
  33. Yerukulas, Koracha, Dabba Yerukula, Kunchapuri Yerukula, Uppu Yerukula \*
  34. Nakkala Kurivikaran (Nakkala – A.P. Gazette, Part – III (B) Central Acts ordinance and Regulations Issue No. 05 Dt. 02/10/2003 )
  35. Dhulia, Paiko, Putiya (in the districts of Vishakapatnam, Vizianagaram \*)
- \* As for the Scheduled Castes and Scheduled Tribes Orders (Amendment) Act 2002, Act No. 10 of 2003

**LIST OF SOCIALLY AND EDUCATIONALLY BACKWARD CLASSES**

(Amended from time to time as on 31/08/2007)

**GROUP- A**

Aboriginal Tribes, Vimuktha Jathis, Nomadic and Semi Nomadic Tribes etc.,

1. Agnikulakshatriya, Palli, Vadabaliya, Besta, jalari, Gangavar, Gangaputra, Goondla, Vanyakulakshatriya (Vannekapu, Vannereddi, Pallikapu, Pallireddy Neyyala and Pattapu) \*Mudiraj / Mutrasi / Tenugollu, The G.O. Ms.No. 15 BCW(C2) Dept., dt. 19/02/2009 is suspended. Hence the inclusion of Mudiraj / Mutrasi / Tenugollu is suspended)vide Hon'ble A.P. High Court orders in WP No. 2122/2009 dated: 29-04- 2009. Kandra added as per G.O.Ms.No.09 Backward Classes Welfare(F)Dept.,Dt:20.04.2023.
2. Balasanthu, Bahurupi
3. Bandara
4. Budabukkala
5. Rajaka (Chakali Vannar)
6. Dasari (formerly engaged in bikshatana)  
(amended vide G.O.Rt.No. 32, BCW(M1) Department, dated 23/02/1995)
7. Dommara
8. Gangiredlavaru
9. Jangam (whose traditional occupation is begging)
10. Jogi
11. Katipapala
12. Korcha
13. Lambada or Banjara in Telangana Area  
(deleted and included in S.T. list vide G.O.Ms.No. 149, SW, dated 3/5/1978)
14. Medari or Mahendra
15. Mondivaru, Mondibanda, Banda
16. Nayee Brahmin (Mangali), Mangala and Bajantri  
(amended vide G.O.Ms.No. 1, BCW(M1) Department, dated 6/1/1996)
17. Nakkala (Deleted vide G.O. Ms. No. 21, BCW(C2) Dept., Dt. 20/06/2011)
18. Vamsha Raj (amended vide G.O.Ms.No. 27, BCW(M1) Department, dated 23/06/1995 deleting the Original name Pitchiguntla)
19. Pamula
20. Pardhi (Mirshikari)
21. Pambala
22. Peddammavandlu, Devaravandlu, Yellammavandlu, Mutyalammavandlu (Dammali, Dammala, Dammula, Damala Castes confined to Srikakulam dist. Vide G.O.Ms. No.: 9 BCW(C2) Dept., Dt. 9/04/2008)
23. Veeramushti (Nettikotala), Veera bhadreeya (Amended vide G.O. Ms. No. 62, BCW (M1) Dept., Dt. 10/12/1996)
24. Valmiki boya (Boya, Bedar, Kirataka, Nishadi, Yellapi, Pedda Boya) Talayari and Chunduvallu  
(G.O.Ms. No. 124, SW, Dt. 24.06.85) Yellapi and Yellapu are one and the same amended vide G.O. Ms. No. 61, BCW(M1) Dept., Dt. 05.12.1996)
25. Yerukalas in Telangana area (deleted and included in the list of S.Ts)
26. Gudala
27. Kanjara - Bhatta
28. Kalinga (Kinthala deleted vide G.O.Ms. No. 53, SW, Dt. 07.03.1980)
29. Kepmare or Reddika
30. Mondipatta
31. Nokkar
32. Pariki Muggula
33. Yata
34. Chopemari
35. Kaikadi
36. Joshinandiwalas
37. Odde (Oddilu, Vaddi, Vaddelu)
38. Mandula (Govt. Memo No. 40-VI/70-1, Edn., Dt. 10.02.1972)
39. Mehator (Muslim) (Govt. Memo No. 234-VI/72-2, Edn., Dt.05.07.1972)
40. Kunapuli (Govt. Memo No. 1279/P1/74-10, E&SW, Dt. 03.08.1975)
41. Patra (included in G.O. Ms. No. 8, BCW(C2) Dept., Dt. 28.08.2006)
42. kurakula of Srikakulam, Vizianagaram and Visakhapatnam Districts

- only. Included vide in G.O.MS.No. 26 BC W (C2) Dept., Dt. 4/07/08
43. Pondara of Srikakulam, Vizianagaram, and Visakhapatnam Districts only. Included vide G.O.MS.No. 28 BC W (C2) Dept., Dt. 4/07/08
44. Samanthula, Samantha, sountia, Sauntia of Srikakulam District only. Included vide G.O.MS.No. 29 BC W (C2) Dept., Dt. 4/07/08
45. pala-Ekari, Ekila, Vyakula, Ekiri, Nayanivaru, Palegaru, Tolagari, Kavali of Chittoor, Cuddapah, Kurnool, Anantapur, Nellore, Hyderabad and Rangareddy Districts only. Included Vide G.O. MS. No. 23 B.C. W (C2) Dept., Dt. 4/07/08
46. Rajannala, Rajannalu of Karimnagar, Warangal, Nizamabad and Adilabad Districts only. (included in vide G.O.Ms. No. 44 B.C.W(C2) Dept., Dt.07/08/2008).
47. Bukka Ayyavars, Included vide G.O.Ms.No. 6 Backward Classes Welfare (C2) Dept., dt. 19/02/2009.
48. Gotrala, Included vide G.O.Ms.No. 7 Backward Classes Welfare (C2) Dept., dt. 19/02/2009. The area of operation shall be confined to Telangana Region only.
49. Kasikapadi / Kasikapudi, Included vide G.O.Ms.No. 8 Backward Classes Welfare (C2) Dept., dt. 19/02/2009. The area of operation shall be confined to Hyderabad, Rangareddy, Nizamabad, Mahaboobnagar and Adilabad Districts of Telangana Region only.
50. Siddula, Included vide G.O.Ms.No. 9 Backward Classes Welfare (C2) Dept., dt. 19/02/2009. The area of operation shall be confined to Telangana Region only.
51. Sikligar / Saikalgar, Included vide G.O.Ms.No. 10 Backward Classes Welfare (C2) Dept., dt. 19/02/2009.
52. Poosala included vide G.O. Ms.No. 16 Backward Classes Welfare (C2) Dept., dt. 19/02/2009.
53. Aasadula / Asadula, included vide G.O. Ms. No. 13, Backward Classes Welfare (C2) Dept., Dt. 27/05/2011. The area of operation shall be confined to East Godavari and West Godavari Districts only.
54. Keuta/Kevuto/Keviti, included vide G.O. Ms. No. 15, Backward Classes Welfare (C2) Dept., Dt. 27/05/2011. The area of operation shall be confined to Srikakulam District only.

**Group-B (Vocational)**

1. Achukatlavandlu in the Districts of Visakhapatnam and Guntur confined to Hindus only as amended vide G.O. Ms. No. 8, BCW(C2) Dept., Dt. 29.03.2000
2. Aryakshatriya, Chittari, Giniyar, Chitrakara, Nakshas (Muchi Telugu Speaking deleted vide G.O. Ms. No. 31, BCW (M1) Dept., 11.06.1996)
3. Devanga
4. Goud (Ediga) Gouda (Gamella) Kalalee, Goundla, Settibalija of Vishakhapatnam, East Godavari, West Godavari and Krishna Districts and Srisayana (Segidi) – (amended vide G.O. Ms. No. 16, BCW (A1) Dept., dt. 19.06.1997
5. Dudekula, Laddaf, Pinjari or Noorbash
6. Gandla, Telikula, Devatilakula (Amended vide G.O. Ms. No. 13, BCW(A1) Dept., dt. 20.05.1997)
7. Jandra
8. Kummara or Kulala, Salivahana (Salivahana added vide G.O. Ms. No. 28, BCW(M1) Dept., 24.06.1995)
9. Karikalabhakthulu, Kaikolan or Kaikala (Sengundam or Sengunther)
10. Karnabhakthulu
11. Kuruba or Kuruma
12. Nagavaddilu
13. Neelakanthi
14. Patkar (Khatari)
15. Perika (Perikabalija, Puragirikshatriya)
16. Nessi or Kurni
17. Padmasali (Sali, Salivan, Pattusali, Senapathulu, Thogata Sali)
18. Srisayana ((**sagidi**)- deleted and added to Sl.No. 4 of Group-B)
19. Swakulasali
20. Thogata, Thogati or Thogataveerakshtriya
21. Viswabrahmin, Viswakarma (Ausula or Kamsali, Kammari, Kanchari Vadla or Vadra or Vadrangi and Silpis) (Viswakarma added vide

- G.O. Ms. No. 59 BCW(M1) Dept., Dt. 06.12.1995)
22. Kunchiti, Vakkaliga, Vakkaligara, Kunchitiga of Anantapur Dist. Only vide G.O. Ms.No. 10 BCW(C-2) Dept., Dt. 9-04-2008
  23. Lodhi, Lodhi, Lodha of Hyderabad, Rangareddy, Khammam and Adilabad Districts only. Included in Vide G.O.Ms.No. 22 BC W (C2) Dept., Dt. 4/07/08
  24. Bondili (included in vide G.O.Ms. No. 42, B.C.W(C2) Dept., Dt.07/08/2008)
  25. Are Marathi, Maratha(Non-Brahmins), Arakalies and Surabhi Natakavallu. (included in vide G.O.Ms. No. 40, B.C.W(C2) Dept., Dt.07/08/2008). Tholu Bommalatavallu added as per G.O.Ms.No.08, Backward Classes Welfare(F) Dept., Dt:20.04.2023.
  26. Neeli (included in vide G.O.Ms. No. 43, B.C.W(C2) Dept., Dt.07/08/2008).
  27. Budubunjala/Bhunjwa/Bhadbhunja, included vide G.O.Ms. No. 11, Backward Classes Welfare (C2) Dept., Dt. 27/05/2011. The area of operation shall be confined to Hyderabad and Ranga Reddy District only.
  28. Gudia/Gudiya, included vide G.O.Ms. No. 14, Backward Classes Welfare (C2) Dept., Dt. 27/05/2011. The area of operation shall be confined to Srikakulam, Vizianagaram and Vishakhapatnam, district only.

**GROUP – C**

**Scheduled Castes converts to Christianity and their progeny (Substituted in G.O.Ms.No.159, G.A.(Ser.D) Dept., dt. 02/04/1981)**

**GROUP – D (Other Classes)**

1. Agar
2. Are-Katika, Katika, Are-Suryavamsi(Are-Suryavamsi added vide G.O. Ms. No. 39, B.C. W(C2) Dept., Dt. 7/08/08)
3. Atagara
4. Bhatraju
5. Chippolu (Mera)
6. Gavara
7. Godaba
8. Hatkar
9. Jakkala
10. Jingar
11. Kandra Deleted and added to Sl.No. 01 Under BC-A Group as per G.O.Ms.No.09 BCW(F)Dept., Dt:20.04.2023.
12. Kosthi
13. Kachi
14. Surya Baliya, (Kalavanthulu) Ganika (amended vide G.O.Ms. No. 20, BCW(P2) Dept., Dt. 19.07.1994)
15. Krishanabaliya (Dasari, Bukka)
16. Koppulavelama
17. Mathura
18. Mali (Bare, Barai, Marar and Tamboli of all Districts of Telangana Region added as synonyms vide G.O. Ms. No. 3, BCW(C2) Dept., Dt. 09.01.2004 and G.O. Ms. No. 45, B.C.W(C2) Dept., Dt.07/08/2008)
19. Mudiraj / Mutrasi / Tenugollu.
20. Munnurukapu (Telangana)
21. Nagavamsam (Nagavamsa) vide G.O.Ms.No. 53, BC Welfare Dept., dated:19/09/1996
22. Nelli(deleted vide G.O.Ms. No. 43, B.C.W(C2) Dept., Dt.07/08/2008)
23. Polinativelmas of Srikakulam and Visakhapatnam districts
24. deleted vide G.O. Ms.No. 16 Backward Classes Welfare (C2) Dept., dt. 19/02/2009
25. Passi
26. Rangrez or Bhavasarakshtriya
27. Sadhuchetty
28. Satani (Chattadasrivaishnava)
29. Tammali (Non-Brahmins) (Shudra Caste) whose traditional occupation is playing musical instruments, vending of flowers and giving assistance

- in temple service but not Shivarchakars. Included vide G.O. Ms. No. 7, Backward Classes Welfare (C2) Dept., Dt. 19/02/2011).
30. Turupukapus or Gajula kapus {... the words "of Srikakulam, Vizianagaram and Vishakapatnam Districts" were deleted vide G.O.Ms.No. 62, Backward Classes Welfare (C2) Dept., dt. 20/12/2008 and G.O. Ms.No. 19 Backward Classes Welfare (C2) Dept., dt. 19/02/2009} who are subject to Social customs or divorce and remarriage among their women (G.O. Ms. No. 65, E&SW, dt. 18.02.1994)
  31. Uppara or Sagara
  32. Vanjara (Vanjari)
  33. Yadava (Golla)
  34. Are, Arevally and Arollu of Telangana District (Included vide G.O.Ms.No. 11, Backward Classes Welfare (C-2) Department, dt. 13/5/2003 and G.O.Ms. No. 41, B.C.W(C2) Dept., Dt.07/08/2008)
  35. Sadara, Sadaru of Anantapur Dist. Only vide G.O.Ms.No. 11 BCW (C-2) Dept., Dt. 9- 04-2008
  36. Arava of Srikakulam District only. Included in vide G.O. MS. No. 24 BC W (C2) Dept., Dt. 4/07/08
  37. Ayyaraka, of Srikakulam, Vizianagaram, Visakhapatnam, East Godavari, West Godavari, Krishna, Guntur, Khammam and Warangal Districts only. Included in vide G.O. MS. No. 25 BC W (C2) Dept., Dt. 4/07/08
  38. Nagaralu of Srikakulam, Vizianagaram, Visakhapatnam, Krishna, Hyderabad and Rangareddy Districts only. Included in vide G.O. MS. No. 27 BC W (C2) Dept., Dt. 4/07/08
  39. Aghamudian, Aghamudiar, Agamudivellalar and Agamudimudaliar including Thuluva Vellalas of Chittoor, Nellore, Kurnool, Anantapur, Hyderabad and Rangareddy Districts only. Included in vide G.O. MS. No. 20 BC W (C2) Dept., Dt. 4/07/08
  40. Beri Vysya, Beri Chetty of Chittoor, Nellore and Krishna Districts only. Included in vide G.O. MS. No. 21 BC W (C2) Dept., Dt. 4/07/08
  41. Atirasa included vide G.O. Ms.No. 5 Backward Classes Welfare (C2) Dept., dt. 19/02/2009. The area of operation shall be confined to East Godavari and West Godavari Districts only.
  42. Sondi / Sundi included vide G.O. Ms.No. 11 Backward Classes Welfare (C2) Dept., dt. 19/02/2009.
  43. Varala included vide G.O. Ms.No. 12 Backward Classes Welfare (C2) Dept., dt. 19/02/2009. The area of operation shall be confined to Telangana region only.
  44. Sistakaranam included vide G.O. Ms.No. 13 Backward Classes Welfare (C2) Dept., dt. 19/02/2009.
  45. Lakkamari Kapu included vide G.O. Ms.No. 14 Backward Classes Welfare (C2) Dept., dt. 19/02/2009. The area of operation shall be confined to Telangana region only.
  46. Veerashaiva Lingayat/Lingabaliya, included vide G.O. Ms.No. 22 Backward Classes Welfare (C2) Dept., dt. 28/02/2009.
  47. Kurmi, included vide G.O.Ms. No. 12, Backward Classes Welfare (C2) Dept., Dt. 27/05/2011. The area of operation shall be confined to Telangana Region and also Krishna District only.
  48. Kalinga Komati / Kalinga Vysya vide G.O. Ms. No.10 Backward classes Welfare(c) Department Dated.24.9.2014. The area of operation shall be confined to Srikakulam, Vizianagaram and Visakhapatnam districts only.

#### **GROUP – E**

##### **(Socially and Educationally Backward Classes of Muslims)**

1. Achchukattalavandlu, Singali, Singamvally, Achchupanivally, Achchukattuvaru, Achukatlavandlu.
2. Attar Saibuli, Attarollu
3. Dhobi Muslim/ Muslim Dhobi/ Dhobi Musalman, Turka Chakla or Turka Sakala, Turaka Chakali, Tulukka Vannan, Tskalas or Chakalas, Muslim Rajakas.
4. Faqir, Fhakir Budbudki, Ghanti, Fhakir, Ghanta Fhakirlu, Turaka Budbudki, Derves, Fakeer
5. Garadi Muslim, Garadi Saibulu, Pamulavally, Kani-Kattuvally, Garadollu, Garadiga.

6. Gosangi Muslim, Phakeer Sayebulu
7. Guddi Eluguvallu, Elugu Bantuvallu, Musalman Keelu Gurravallu
8. Hajam, Nai, Nai Muslim, Navid
9. Labbi, Labbai, Labbon, Labba
10. Pakeerla, Borewale, Deraphakirlu, Bonthala
11. Kureshi/ Khureshi, Khasab, Marati Khasab, Muslim Katika, Khatik Muslim
12. Shaik/ Sheikh
13. Siddi, Yaba, Habshi, Jasi
14. Turaka Kasha, Kakkukotte Zinka Saibulu, chakkitakanevale, Terugadu Gontalavaru, Thirugatiganta, Rollaku Kakku Kottevaru, Pattar Phodulu, Chakketakare, Thuraka Kasha
15. Other Muslim groups excluding Syed, Saiyed, Sayyad, Mushaik; Mughal, Moghal; Pathans; Irani; Arab; Bohara, Bohra; Shia Imami Ismaili, Khoja; Cutchi-Memon; Jamayat; Navayat; and all the synonyms and sub-groups of the excluded groups; and except those who have been already included in the State List of Backward Classes.

- N.B.: 1. The above list is for information and subject to confirmation with reference to G.O. Ms. No. 58, SW(J) Department, dated 12/05/1997 and time to time orders.
2. On account of any reason whatsoever in case of any doubt/ dispute arising in the matter of community status (SC/ST/BC/OC) of any candidate, subject to satisfaction with regard to relevant rules and regulations in force the decision of the Commission shall be final in all such cases.

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**(Socially and Educationally Backward Classes of Muslims)**

16. Achchukattalavandlu, Singali, Singamvallu, Achchupanivallu, Achchukattuvaru, Achukatlavandlu.
17. Attar Saibuli, Attarollu
18. Dhobi Muslim/ Muslim Dhobi/ Dhobi Musalman, Turka Chakla or Turka Sakala, Turaka Chakali, Tulukka Vannan, Tskalas or Chakalas, Muslim Rajakas.
19. Faqir, Fhakir Budbudki, Ghanti, Fhakir, Ghanta Fhakirlu, Turaka Budbudki, Derves, Fakeer
20. Garadi Muslim, Garadi Saibulu, Pamulavallu, Kani-Kattuvallu, Garadollu, Garadiga.
21. Gosangi Muslim, Phakeer Sayebulu
22. Guddi Eluguvallu, Elugu Bantuvallu, Musalman Keelu Gurravallu
23. Hajam, Nai, Nai Muslim, Navid
24. Labbi, Labbai, Labbon, Labba
25. Pakeerla, Borewale, Deraphakirlu, Bonthala
26. Kureshi/ Khureshi, Khasab, Marati Khasab, Muslim Katika, Khatik Muslim
27. Shaik/ Sheikh
28. Siddi, Yaba, Habshi, Jasi
29. Turaka Kasha, Kakkukotte Zinka Saibulu, chakkitakanevale, Terugadu Gontalavaru, Thirugatiganta, Rollaku Kakku Kottevaru, Pattar Phodulu, Chakketakare, Thuraka Kasha
30. Other Muslim groups excluding Syed, Saiyed, Sayyad, Mushaik; Mughal, Moghal; Pathans; Irani; Arab; Bohara, Bohra; Shia Imami Ismaili, Khoja; Cutchi-Memon; Jamayat; Navayat; and all the synonyms and sub-groups of the excluded groups; and except those who have been already included in the State List of Backward Classes.

- N.B.: 1. The above list is for information and subject to confirmation with reference to G.O. Ms. No. 58, SW(J) Department, dated 12/05/1997 and time to time orders.

2. On account of any reason whatsoever in case of any doubt/ dispute arising in the matter of community status (SC/ST/BC/OC) of any candidate, subject to satisfaction with regard to relevant rules and regulations in force the decision of the Commission shall be final in all such cases.

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# ANDHRA PRADESH STATE COUNCIL OF HIGHER EDUCATION

(A Statutory Body of the Government of A.P.)  
Opp. Mahavir Hospital, Mahavir Marg, Masab Tank, Hyderabad - 500 028.  
☎ : (O) 040-23311594 & 23310395 Fax : 040-23311470  
Grams : 'APSCHÉ' E-mail:apsche@ap.nic.in;apsche2003@yahoo.co.in URL:www.apsche.org



**Dr. P.SATHI REDDY**  
**SECRETARY (I/C)**

Lr.No.APSCHÉ/PGP/Equiv./APPSC-Mech.Eng.-2012

Dt. 31.12.2012



To  
The Secretary  
A.P. Public Service Commission  
Nampally, Hyderabad- 500 001

24  
AS (RS-38)  
3/1/13

Sir,

Sub: APSCHÉ – PGP – APPSC - Recruitment (Direct) to the post of Lecturers in Government Polytechnics vide Notification No: 19/2012 – Equivalence of certain subjects – clarification - furnished - reg,

- Ref:1. Your Lr. No. 1940/RS-38/2/2012, dt: 22/11/2012
- 2. Your Lr. No. 1425/RS-38/2011, dt: 06.12.2012

-oOo-

While referring to the subject and references cited, I am by direction, to inform that A.P. State Council of Higher Education has constituted a Committee consisting of University professors and representative from the O/o Commissioner of Technical Education, Hyderabad, to examine the equivalence of B.Tech Mechanical Engineering with that of B.Tech Automobile Engineering, Production Engineering and Aeronautical Engineering.

After going through the syllabi of B.Tech Mechanical Engineering, Automobile Engineering, Production Engineering and Aeronautical Engineering, the committee opined that

Received  
in the Sec. RS-38  
3/1/13

1. Above 80% of syllabi pertaining to B.Tech (Automobile Engineering) and B.Tech (Production Engineering) is common with B.Tech (Mechanical Engineering).
2. Whereas 42% of syllabi of B.Tech (Aeronautical Engineering) is common with B.Tech (Mechanical Engineering).
3. As per the procedure in vogue of JNT University, Hyderabad, Osmania University, Hyderabad and Andhra University, Visakhapatnam, the academic equivalence will be considered for the courses where the syllabi and course structure is common about 80%.
4. In this context, B.Tech (Automobile Engineering) and B.Tech (Production Engineering) may be considered as academically equivalent with B.Tech (Mechanical Engineering). However, B.Tech (Aeronautical Engineering) will not be considered academically equivalent with B.Tech (Mechanical Engineering).
5. The details of common subjects semester wise are furnished below:

The particulars of subjects common with Mechanical Engineering

Year	Semester Wise	Production Engineering	Automobile Engineering	Aeronautical Engineering
1 <sup>st</sup> Year		7	7	7
2 <sup>nd</sup> Year	1 <sup>st</sup>	6	6	4
	2 <sup>nd</sup>	6	6	1
3 <sup>rd</sup> Year	1 <sup>st</sup>	6	6	1
	2 <sup>nd</sup>	4	4	2
4 <sup>th</sup> Year	1 <sup>st</sup>	3	4	1
	2 <sup>nd</sup>	1	1	Nil
Total		33	34	16

Total No. of B.Tech (Mechanical Engineering) course subjects are 38.

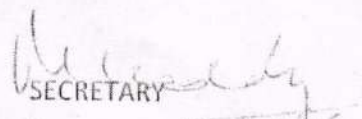

Finally the committee recommended that B.Tech (Automobile Engineering) and B.Tech (Production Engineering) may be considered as academically equivalent with B.Tech (Mechanical Engineering). B.Tech (Aeronautical Engineering) will not be considered academically equivalent with B.Tech (Mechanical Engineering).

While referring to the equivalence of M.Sc. Astronomy, M.Sc. Electronics, M.Sc. Instrumentation with that of M.Sc. Physics vide reference (1) cited and equivalence of B.Tech Civil Environmental Engineering with that of Civil Engineering vide reference 2 cited, A.P. State Council of Higher Education has already examined these issues on 07.02.2012 and 13.06.2012 and the recommendations of the Committees in concerned subjects were already communicated (copies enclosed).

With regard to clarification on the eligibility of candidates with M.Tech 1<sup>st</sup> class and a pass in 1<sup>st</sup>/2<sup>nd</sup> class in B.Tech for this notification, copy of Govt. Memo vide No. 13208/TE.I/A1/12-1 dt: 01.12.2012 addressed to CTE, Hyderabad is herewith enclosed.

Encl: a.a

Yours faithfully

  
SECRETARY  
  
01/11/13



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## ANDHRA PRADESH STATE COUNCIL OF HIGHER EDUCATION

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**Dr. P.SATHI REDDY**  
**SECRETARY (I/C)**

Lr.No.APSCHÉ/PGP/Equiv./APPSC/AEE/2012

Dt. 16.06.2012

To

The Secretary

A.P. Public Service Commission

Nampally, Hyderabad- 500 001

Sir

Sub: APSCHÉ – PGP – APPSC - Recruitment (Direct) to the post of AEEs in various Engineering Services - clarification on equivalence of B.E Civil Environmental Engineering with that of B.E/B.Tech Civil – information – furnished- reg.,

Ref: Letter No. 120/RS-20/AEE/2008, dt: 17/05/2012 from the Secretary, APPSC

-oOo-

While referring to the subject and reference cited, I am by direction, to inform that A.P. State Council of Higher Education has constituted a two man committee consisting of University professors, to examine the equivalence of B.E Civil Environmental Engineering offered by Andhra University with that of B.E/B.Tech Civil Engineering of other Universities.

The Committee examined the syllabus of B.Tech Civil Engineering and B.Tech Civil Environmental Engineering rigorously and viewed that B.E Civil Environmental Engineering offered by Andhra University is equivalent to regular B.E/B.Tech Civil Engineering syllabus. In addition to the regular subjects, more focus is given on Environmental Engineering.

Finally it is resolved by the Members that B.E Civil Environmental engineering offered by Andhra University is equivalent to regular B.E/B.Tech Civil Engineering.

Yours faithfully

(SECRETARY)  
P.S.

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ESPATCHED

18/6/2012

SECRETARY I/C

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Minutes of the Meeting of the Subject Committee in Physics discipline to examine the  
vacancy of M.Sc Specialization for the Lecturer post in Physics at Undergraduate level held on  
Friday the 07.02.2012 at 11.00 AM in the O/o A.P. State Council of Higher Education,  
Hyderabad.

Members Present:

1. Prof. M.Nagabhushanam  
Chairperson, Board of Studies,  
Dept. of Physics, Osmania University  
Hyderabad
2. Prof. K.Niranjan  
Chairperson, Board of Studies,  
Dept. of Physics, Andhra University  
Visakhapatnam
3. Prof. S Buddhudu  
Chairperson, Board of Studies,  
Dept. of Physics, Sri Venkateswara  
University, Tirupati, Chittoor. Dist

The Chairman, A.P. State Council of Higher Education welcomed the Members for  
attending the Meeting and explained that the background for constituting this Committee. While  
addressing, it is informed that the Government accorded permission to fill up 354 vacancies by  
recruitment of lecturers in various subjects in Government Degree Colleges under direct  
recruitment. In this connection, O/o CCE requested for subject relevancy for various posts to  
the Director of Collegiate Education, Hyderabad for issue of notification. Accordingly, the Director of Collegiate Education, Hyderabad  
requested clarification on the relevance and eligibility of subjects at PG level for various lecturer  
posts. Further, the Chairman requested the **Subject Committee in Physics** to examine the  
relevant documents and other relevant documents before arriving at a undisputed decision in this matter.

The Members of the **Subject Committee in Physics** have examined the material and  
discussed in detail about the eligibility criteria for the recruitment of lecturer in Physics at  
Undergraduate level based on various courses/ specializations offered at Postgraduate level in  
Universities.

It is resolved that all the candidates who possess Masters degree (M.Sc, M.Sc (Tech) in  
the following subjects with Physics as one of the main subjects at B.Sc level in all the  
years of Undergraduate Courses are eligible for the recruitment of lecturer in Physics at UG  
level. It is mandatory that the candidate should have studied Physics at UG level. Apart from

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the above, all the candidates who possess M.Sc (Physics) under 5 year integrated courses are eligible as it includes both UG and PG Physics subjects.

S.NO	Qualification	Specialization	Remarks
1	M.Sc/ M.Sc Tech	Physics	The candidates should have studied Physics Subject at UG level
2		Materials Science	
3		Solid State Physics	
4		Condensed Matter Physics	
5		Space Physics	
6		Nuclear Physics	
7		Electronics	
8		Electronics & Instrumentation	
9		Applied Physics	
10		Instrumentation	
11		Opto-Electronics	
12		Five Integrated M.Sc Physics	
13		Microwaves	
14		Bio Physics	
15		Meteorology & Oceanography	
16		Geo Physics	
17		Astro Physics	
18		Astronomy	
19		Nano Science	
20		Nano technology	
21		Photonics	
22		Energy Management	
23		Electronic Communications	

Memo.No.132

Sub:

Ref: Fr

The attention invited to the reference Class in Bachelors even those who p. examined at Government academic institution

To The Commissioner of A.P., Hyderabad. SF/Sc

*M. Nagabhushanam*  
7/2/12  
**Prof. M. Nagabhushanam**  
Chairperson, BOS,  
Dept. of Physics, Osmania  
University, Hyderabad

*K. Niranjan*  
7/2/12  
**Prof. K. Niranjan**  
Chairperson, BOS,  
Dept. of Physics,  
Andhra University  
Visakhapatnam

*S. Buddharaju*  
**Prof. S. Buddharaju**  
Chairperson, BOS,  
Dept. of Physics,  
Venkateswara  
University, Tirunelveli

*DDNS*

*W*  
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*1/13*  
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*AS*

# ANDHRA PRADESH STATE COUNCIL OF HIGHER EDUCATION

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Grams : 'APSICHE' E-mail:apsche@ap.nic.in;apsche2003@yahoo.co.in URL:www.apsche.org

DR. P. SAHI REDDY  
SECRETARY I/C

U.NO.APSICHE/PGP/equiv/APPSC/Poly.lec/2013

Dt. 12.08.2013

To  
The Secretary  
A.P. Public Service Commission  
Nampally, Hyderabad - 500 001

Sir,

Sub: APSICHE- PGP- APPSC- Recruitment (Direct) to the posts of lecturers in Govt. Polytechnic Colleges vide notification No. 19/2012, dt:30.07.2012 - clarification on equivalence of certain subjects- furnished - reg.

Ref: Two Letters No. 1940/RS-38/2012 dt: 05.07.2013 received from APPSC

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While referring to the subject and reference cited, I am by direction, to inform that A.P. State Council of Higher Education has constituted two Expert Subject Committees in Mechanical and Civil Engineering consisting of University Professors, to examine the equivalence of the degrees mentioned in the reference cited to that of B.Tech/ B.E Civil Engineering/ Mechanical Engineering branches.

The Committees examined the syllabi of Degrees mentioned in the reference cited thoroughly and recommended that;

## I. Mechanical Engineering

- In first year the subjects are common for B.Tech Production Engineering offered by Acharya Nagarjuna University & B.Tech Industrial & Production Engineering offered by Sri Venkateswara University & Sri Krishnadevaraya University on par with B.Tech Mechanical Engineering offered by Andhra University, Kakatiya University, Osmania University and Jawaharlal Nehru Technological University Hyderabad/ Kakinada/ Ananthapur.
- However from the 2<sup>nd</sup> year to 4<sup>th</sup> year, the components of various areas like Thermal Engineering group, Design group and Manufacturing groups covered in B.Tech Production Engineering offered by Acharya Nagarjuna University & B.Tech Industrial & Production Engineering offered by Sri Venkateswara University & Sri Krishnadevaraya University are mapping with B.Tech Production Engineering offered by Andhra, Kakatiya, Osmania and JNTU Hyderabad/ Kakinada/ Anantapur.

Therefore, it is finally resolved that;

**The B.Tech Production, Industrial & Production Engineering courses offered by Acharya Nagarjuna University, Sri Venkateswara University and Sri Krishnadevaraya University respectively are equivalent with B.Tech Mechanical Engineering, Production & Industrial Engineering offered by Andhra, Kakatiya, Osmania & JNTU Hyderabad/ Kakinada/ Anantapur.**



## II. **Civil Engineering**

- (A) Basic Sciences, Humanities & Social Science subjects viz., English, Engineering Mathematics, Engineering Physics, Engineering Chemistry and Corresponding Laboratories are not covered in B. Architecture.
- (B) The following subjects are need to be covered under B.E/B.Tech Civil Engineering
1. Basic Civil Engineering subjects viz.,
    - i. Strength Materials – I & II,
    - ii. Fluid Mechanics
    - iii. Engineering Geology and
    - iv. Corresponding Labs
  2. Core Civil Engineering subjects viz.,
    - i. Soil Mechanics
    - ii. Foundation Engineering,
    - iii. Hydraulic Machinery,
    - iv. Transportation Engineering and
    - v. Corresponding Labs
  3. Other essential Civil Engineering subjects viz.,
    - i. Structural Analysis – I & II,
    - ii. Water Resources Engineering I & II
  4. Some Elective subjects viz.,
    - i. Bridge Engineering ,
    - ii. Ground improvement Techniques
    - iii. Advanced Transportation Engineering
    - iv. Pre-Stressed Concrete
    - v. Advanced Structural Analysis
    - vi. Advanced Structural Engineering

Overall, the following subjects are not covered under B. Architecture programme.

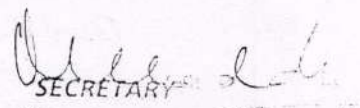
Engineering Mathematics, Engineering Physics & Laboratory, Engineering Chemistry & Laboratory, Engineering Drawing, English Language, Strength of Materials – I & II, Fluid Mechanics, Hydraulic Machinery, Water Resources Engineering , Transportation Engineering, Soil Mechanics, Foundation Engineering, Structural Analysis I & II, Engineering Geology, Strength of Materials – Lab, Fluid Mechanics – Lab, Soil Mechanics – Lab, Engineering Geology Lab, Concrete Technology & Lab, Transportation Engineering Lab, Environmental Engineering Lab

*It is inferred that, most of the Courses/Subjects of B.E/B.Tech Civil Engineering courses and Syllabi are not matching with B. Architecture Course and Syllabi*

**Hence, it is finally recommended that, B. Architecture cannot be considered as an equivalent to B.E/B.Tech Civil Engineering Course.**

*This is for favour of information*

Yours faithfully

  
SECRETARY  
12/12/16





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Dr. P. SATHI REDDY  
SECRETARY (I/C)

Lr.No.APSCHÉ/PGP/Equiv./APPSC/IGNOU/2012

Dt. 28.12.2012

To  
The Secretary  
A.P. Public Service Commission  
Nampally, Hyderabad- 500 001

*Immediate on file*  
*28/12/12*

Sir

Sub: APSCHÉ – PGP – APPSC - Recruitment (Direct) to the post of AEEs in various Engineering Services - clarification on equivalence of B.E Civil Construction Management of IGNOU, New Delhi with that of B.E/B.Tech Civil Engineering- furnished- reg.,

*AS (AS-20)*  
*u/m*

Ref: Your Letter No. 120/RS-20/AEE/2008, dt: 18.10.2012  
-oOo-

While referring to the subject and reference cited, I am by direction, to inform that A.P. State Council of Higher Education has constituted a three member committee consisting of University professors, to examine the equivalence of B.E Civil Construction Management of IGNOU, New Delhi with that of B.E/B.Tech Civil Engineering offered in A.P. State Universities.

The Committee reviewed the course structure of B.Tech Civil (Construction Management) offered by Indira Gandhi National Open University (IGNOU), New Delhi and found that the essential courses of B.Tech/ B.E Civil Engineering as detailed below are missing.

*S.O (RS20)*  
*4/12/12*

- i) Surveying I & II
- ii) Engineering graphics / Drawing
- iii) Engineering Geology
- iv) Building drawing & material
- v) English (Technical)
- vi) All laboratories including physics and chemistry

Further the Committee noted that the laboratory courses which is essential component in Engineering education are missing. For conventional Civil Engineering Course at least 16 (sixteen) laboratory courses are required where as only 2 (two) laboratory courses are found in B.Tech Civil (Construction Management) of IGNOU, New Delhi.

Keeping in view of the above shortfalls, the Committee finally resolved that the **B.Tech Civil (Construction Management) offered by IGNOU, New Delhi could not be considered as an equivalent to B.Tech / B.E Civil Engineering course.**

Yours faithfully

*P. Sathi Reddy*  
(SECRETARY)  
*30/12/12*





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Dr. P.SATHI REDDY  
SECRETARY (I/C)

Rc.No.APSCH/PGP/equiv/APPSC/Poly.lec/2013

Dt. 24.08.2013

To  
The Secretary  
A.P. Public Service Commission  
Nampally, Hyderabad- 500 001

Sir,

Sub: APSCH- PGP- APPSC- Recruitment (Direct) to the posts of lecturers in Govt. Polytechnic Colleges vide notification No. 19/2012, dt:30.07.2012 - equivalence of B.Tech CSIT/IT with that of B.Tech CSE and vice versa clarification furnished - reg.

27 AUG 2013

Ref: Two Letters No. 1940/RS-38/2012 dt: 17.07.2013 & 20.08.2013 of APPSC

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While referring to the subject and reference cited, I am by direction, to inform that A.P. State Council of Higher Education has constituted Expert Subject Committee consisting of University Professors, to examine the equivalence of B.E/B.Tech CSIT/ IT/IST with that of B.E/B.Tech Computer Science Engineering and vice versa.

The Committee after going through the syllabi and thorough discussion, made the following observations;

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- ✓
- 24/8/13
- The B.Tech CSE(Computer Science Engineering), IT(Information Technology), IST (Information Science and Technology) and CSIT (Computer Science and Information Technology) syllabus of various Universities in the State have been reviewed and found that more than 75% of the syllabi is same for all these courses.
  - In the remaining 25%, in case of B.Tech CSE (Computer Science Engineering) , it is hardware oriented and for B.Tech IT (Information Technology), it is of application oriented.

Therefore, it is finally recommended by the Committee that (the courses B.E/B.Tech CSIT/, IT and IST are considered equivalent with that of B.E/B.Tech Computer Science Engineering (CSE) and vice versa for recruitment to the posts of lecturers in Govt. Polytechnic Colleges.)

This is for your kind information

Yours faithfully

SECRETARY  
BP  
24/8



1299-1301  
22377

# ANDHRA PRADESH STATE COUNCIL OF HIGHER EDUCATION

(A Statutory Body of the Government of A.P.)

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**Dr. P.SATHI REDDY**  
**SECRETARY (I/C)**

Lr. No. APSCHÉ/PGP/equiv/APPSC/AEE/2013

Dt. 17.05.2013

To  
The Secretary  
A.P. Public Service Commission  
Nampally, Hyderabad- 500 001

Madam,

Sub: APSCHÉ- PGP- APPSC- Recruitment Direct to the post of Assistant Executive Engineers, Commissions Notification No. 41/2011- Equivalence of Qualification in Engineering Degree - clarification — requested - reg.

Ref: Your Lr. No. 1790/RS-20/AEE/2010, dt: 25.04.2013

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While referring to the subject and reference cited, I am by direction, to inform that A.P. State Council of Higher Education has constituted two Expert Subject Committees in Mechanical and Civil Engineering consisting of University Professors, to examine the equivalence of the degrees mentioned in the reference cited to that of B.Tech/ B.E Civil Engineering/ Mechanical Engineering branches.

The Committees examined the syllabi of Degrees mentioned in the reference cited thoroughly and recommended that;

- a. B.Sc Engg (Mechanical) offered at *Tilkamanji Bhagalpur University, Bhagalpur* is considered equivalent to *B.Tech Mechanical Engineering program offered by any standard University.*
- b. B.Tech Mechanical Engineering (Mechatronics) offered by JNTU Hyderabad is considered equivalent to *B.Tech Mechanical Engineering program offered by any standard University.*
- c. B.Tech (Mechanical & Automation Engineering) offered by *Gurugobind Singh Indraprastha University, Delhi*, is considered equivalent to *B.Tech Mechanical Engineering program offered by any standard University.*
- d. B.Tech Civil Engineering offered by *Malavya Rashtriya Institute of Technology (National Institute of Technology), Jaipur* is considered equivalent to *BE/ B.Tech Civil Engg.*
- e. B.Sc Engg ( Civil Engineering) offered by *Tilkamanjhi Bhagalpur University, Bhagalpur* is considered equivalent to *BE/ B.Tech Civil Engg.*



- f. B.Sc Engg ( Civil Engineering) offered by Muzaffarpur Institute of Technology, Muzaffarpur, Bihar is considered equivalent to BE/ B.Tech Civil Engg
- g. B.Sc Engg ( Civil Engineering) offered by Magadh University, Bodhgaya, Bihar is considered equivalent to BE/ B.Tech Civil Engg
- h. B.Tech Civil & Transportation Engineering offered by National Institute of Technology, Agarthala is considered equivalent to BE/ B.Tech Civil Engg.

Regarding validity of Degrees obtained through Vinayaka Missions University, Tamil Nadu under distance mode, I am by direction to inform that Vinayaka Missions University is a deemed to be University. The degrees awarded by the Deemed to be Universities for the programs offered under distance education mode through study centres located in A.P. are not recognized. AICTE, whose approval is mandatory to run professional programs under distance mode, has not granted approval to any University to run Engineering courses under distance mode. Hence such Degree are not recognized. Govt. has also given clarification in this regard vide Ir. no.273/EC/A2/2013 dt: 19.03.2013 (copy enclosed)

This is for favour of information.

Yours faithfully

*[Handwritten Signature]*  
SECRETARY 17/15