TAMIL NADU PUBLIC SERVICE COMMISSION

Advertisement No.672
Notification No.23/2023 **DATED:13.10.2023**

Applications are invited from eligible candidates only through online mode up to 11.11.2023 for direct recruitment to the posts included in the **Combined Engineering Services Examination.**

WARNING

- All recruitments by the Tamil Nadu Public Service Commission are purely merit based.
- The Tamil Nadu Public Service Commission hereby cautions the applicants against touts and agents who may cheat, by making false promises of securing jobs through unfair means.
- The Tamil Nadu Public Service Commission shall not be responsible or liable for any loss that may be caused to any applicant on account of indulging in any sort of dealings with such unscrupulous elements.
- Applicants are solely responsible for their claims in the online application. They cannot blame service providers like internet cafes/browsing centres / Common Service centres for the mistakes made while applying online for recruitment. Applicants are advised to check the filled in online application along with required documents (see Annexure IV) before finally submitting the same.
- The applicants shall mandatorily upload the certificates / documents (in support of all the claims made / details furnished in the online application) at the time of submission of online application itself. It shall be ensured by the applicants that the online application shall not be submitted without uploading the required certificates.
- Applicants are directed to read all the information / instructions / guidelines given in this notification and the Commission's "Instructions to applicants" before applying for this recruitment. Clarification if any required, may be obtained over phone and email well ahead of the last date for submission of online application. Candidates should follow the instructions given in the online application also.

1. ONE TIME REGISTRATION:

It is mandatory for applicants to register their basic particulars through one-time online registration system on payment of Rs.150/- (Rupees One Hundred and Fifty only) towards registration fee and then they should apply online for this recruitment. [The one-time registration will be valid for five years from the date of registration. Thereafter, the registration should be renewed by paying the prescribed fee] One Time Registration will not be considered as an application for any post. For further details refer para 2 of the "Commission's Instructions to Applicants".

DETAILS OF VACANCIES:

Table-I (Interview-Posts)
Posts for which selection is made in two stages
(i) Written Examination (ii) Oral Test

Sl.No	Name of the post	Name of the service	No. of vacancies	Scale of pay
1	**Principal, Industrial Training Institute/ Assistant Director of Training** (Post Code 1729)	Tamil Nadu Employment and Training Service (Service Code 027)	**1* C/f GT(G)(LV)-1**	**Rs.56100 - 205700 (Level 22)**
2	**Assistant Engineer (Civil) (Water Resources Department, PWD)** (Post Code 1656)	Tamil Nadu Engineering Service (Service Code 011)	**4* C/f SC(W) (HH)-1 BC (W) (HH)-1, GT (G) (HH) -2**	Rs.37700-138500 (Level 20)
3	**Assistant Engineer (Civil) (PWD)** (Post Code 3656)		**5* C/f SC (G) (HH)-1, SC (W) (HH)-1 MBC/DC (G)(HH)-1, MBC/DC (W) (HH)-1 GT (G) (HH)-1**	
4	**Assistant Engineer (Rural Development and Panchayat Raj Department)** (Post Code 1660)	Tamil Nadu Panchayat Development Service (Service Code 011)	**1* C/f SC(W) HH-1**	
5	**Assistant Engineer (Highways Department)** (Post Code – 1661)	Tamil Nadu Highways Engineering Service (Service Code 011)	**52 + 1* C/f GT(W) (HH) -1**	
6	**Assistant Engineer (Agricultural Engineering)** (Post Code - 1667)	Tamil Nadu Agricultural Engineering Service (Service Code 011)	**1* C/f BC (G) (HH/HI) -1**	
7	**Assistant Director of Industrial Safety and Health** (Post Code 1664)	Tamil Nadu Factory Service (Service Code 011)	**20**	
8	**Assistant Engineer (Industries)** (Post Code 1900)	Tamil Nadu Industries Subordinate Service (Service Code 044)	**9**	
8-A	**Assistant Engineer(Electrical) (PWD)** (Post Code No.1657)	Tamil Nadu Engineering Service (Service Code 011)	**36**	

The following Posts included as per Tamil Nadu Public Service Commission (Additional Functions) Act, 2022 (Act No. 14 of 2022)

Sl. No	Name of the post	Name of the service	No. of vacancies	Scale of pay
9	**Senior Officer (Technical)** Tamil Nadu Industrial & Investment Corporation (Post Code 3265)	Tamil Nadu Industrial & Investment Corporation(Service Code 127)	**8**	Rs.56100-177500 - (Level 22)

10	**Assistant Engineer (Electrical)** TANGEDCO (Post Code 3266)	Tamil Nadu Generation and Distribution Corporation (Service Code 123)	**36 (SC/ST) (Shortfall Vacancies)**	Rs.39800 – 126500
11	**Assistant Engineer(Civil)** TANGEDCO (Post Code 3267)		**5 (SC/ST) (Shortfall Vacancies)**	
12	**Assistant Engineer(Mechanical)** TANGEDCO (Post Code 3268)		**9 (SC/ST) (Shortfall Vacancies)**	
13	**Assistant Engineer (Civil)** (Tamil Nadu Urban Habitat Development Board) (Post Code. 3230)	Tamil Nadu Urban Habitat Development Board Service (Service Code 111)	**1* C/f MBC/DC (G) (HH)-1**	Rs.37700-138500 (Level 20)
14	**Assistant Engineer** Tamil Nadu Pollution Control Board(Post Code 3269)	Tamil Nadu Pollution Control Board (Service Code 121)	**49** Including Backlog -2 (ST(G))**	
15	**Assistant Engineer (Civil)** Tamil Nadu Water Supply and Drainage Board (Post Code 3270)	Tamil Nadu Water Supply and Drainage Board [TWAD] (Service Code 126)	**78****	Rs. 37700 - 138500 (Level 20)
16	**Assistant Engineer (Mechanical)** Tamil Nadu Water Supply and Drainage Board(Post Code 3275)		**20**	
17	**Manager - Engineering** (TNCMPFL) (Post Code 3271)	Tamil Nadu Co-operative Milk Producers' Federation Limited (TNCMPFL) (Service Code 125)	**7**	Rs.37700 - 119500 Level 20
18	**Manager – Civil** (TNCMPFL) (Post Code 3272)		**1**	

Table-II (Non-Interview Post)
Post for which selection is made in single stage Written Examination

Sl.No	Name of the post	Name of the service	No. of vacancies	Scale of pay
19	**Assistant Engineer(Civil)** Tamil Nadu Adi Dravidar Housing & Development Corporation Limited (Post Code 3273)	Tamil Nadu Adi Dravidar Housing & Development Corporation Limited (Service Code 119)	**25**	Rs. 36400-134200 (Level 16)

*** c/f –Carried Forward Vacancies**

****Vacancies shown here are the vacancies after deducting 3% of vacancies for the reservation for meritorious sports persons as per G.O.(Ms) No.6, Youth Welfare and Sports Development (S1) Department, Dated 20.02.2019.**

Note:-

Unless and otherwise specified, the number of vacancies notified is approximate and is liable to modification as indicated in para. 11-A of 'Instructions to Applicants'.

2. DISTRIBUTION OF VACANCIES

The rule of reservation of appointments is applicable to this recruitment and the post wise Distribution of vacancies will be announced later.

3. IMPORTANT DATES AND TIME:

Date of notification		**13.10.2023**
Last date for submission of online application		**11.11.2023**
Application Correction Window Period		**From 16.11.2023 - 12.01 AM To 18.11.2023 - 11.59 PM**
DATE OF WRITTEN EXAMINATION		
For Posts in Sl.No.2,3,4,5,6,7,8-A, 10,11, 12, 13, 15,16, 17, 18, 19	**Paper-I : Subject paper (Degree standard)**	**06.01.2024 09.30A.M. to 12.30 P.M.**
For all the Posts from Sl.No.1 to 19	**Paper-II: (Compulsory) *Part-A* Tamil Eligibility Test (SSLC Standard) Part-B General Studies (Degree Standard)**	**06.01.2024 02.00P.M. to 05.00 P.M.**
For post in Sl.No.14	**Paper-I: Subject paper (PG Degree Standard)**	**07.01.2024 09.30 A.M to 12.30 P.M.**
For posts in Sl.No.1, 8, 9, 17	**Paper-I : Subject Paper (Degree standard) (Basics of Engineering)**	**07.01.2024 02.00P.M. to 05.00 P.M.**

Note

Refer Annexure-VII of this notification regarding tentative timeline for the recruitment process.

4. QUALIFICATIONS:

(A) AGE LIMIT (as on 01.07.2023):

Sl.No.	Maximum Age Limit	
	"Others" [i.e., Applicants not belonging to SCs, SC(A)s, STs, MBCs/DCs, BC(OBCMs) and BCMs]	Scheduled Castes / Scheduled Castes (Arunthathiyars), Scheduled Tribes, Most Backward Classes / Denotified Communities, Backward Classes (OBCMs), Backward Classes (Muslims) and Destitute Widows of all categories.
For Posts from Sl.No.1 to 19 except Sl.No.8, 10, 11, 12	32* years	No Maximum age limit
For the post in Sl.No.8	37** years	No Maximum age limit
For posts in Sl.No.10, 11, 12	35 Years for SC/ST (The candidates belongs to the other categories i.e., BC(OBCMs), BCMs, MBCs/DCs and others are not applicable for this post due to Shortfall vacancy for SC/ST)	

Note:

(i) As per G.O (Ms) No.91, Human Resources Management (S) Department, dated 13.09.2021, the Maximum Age Limit prescribed for appointment by direct recruitment is enhanced by 2 years.

[*Maximum Age Limit has been increased from 30 to 32 years.

**** Maximum Age Limit has been increased from 35 to 37 years].**

Explanation: No maximum age limit shall mean that the applicants should not have completed 60 years of age either on the date of notification or at the time of selection /appointment to the post.

(ii) "Others" [i.e., Applicants not belonging to SCs, SC(A)s, STs, MBC/DCs, BC(OBCM)s, BCMs] who have put in five years and more of service in the State/Central Government are not eligible even if they are within the age limit. (For further details refer to para 3(F) of "Instructions to Applicants", Section 3(r) of Tamil Nadu Government Servants (Conditions of Service) Act, 2016).

AGE CONCESSION:

(i) **For Persons with Benchmark Disability:**

Persons with Benchmark Disability are eligible for age concession upto 10 years over and above the maximum age limit prescribed.

(Section 64 of the Tamil Nadu Government Servants (Conditions of Service) Act, 2016)

(ii) **For Ex-servicemen (Others):**

a) The maximum age limit for Ex-servicemen is 50 years.

(Section 63 of the Tamil Nadu Government Servants (Conditions of Service) Act, 2016 and as per G.O (Ms) No.91, Human Resources Management (S) Department, dated 13.09.2021).

b) The above mentioned age concession **will not apply** to the Ex-servicemen applicants who have already been recruited to any class or service or category.

(Section 3(j) of the Tamil Nadu Government Servants (Conditions of Service) Act, 2016)

(B) EDUCATIONAL QUALIFICATION (as on 13.10.2023)

Applicants should possess the following or its equivalent qualification awarded by any University or Institution recognized by the University Grants Commission/AICTE as the case may be.

Sl.No	Name of the post	Educational Qualification
1	**Principal, ITI/ AD of Training**	i. A degree in any branch of Engineering or Technology of any recognised University or institution under the purview of All India Council for Technical Education (AICTE) AND ii. Practical experience in a workshop or factory for a period of not less than three years. **Note:** 1. A factory or workshop shall mean a factory as defined in Section 2(m) of the Factories Act, 1948 (Central Act 63 of 1948) 2. Other things being equal, preference will be given to persons who have completed one year Apprenticeship under the Government of India Scheme or one year training under the State Government Apprenticeship scheme.
2	**Assistant Engineer (Civil)** (Water Resources Department)(PWD)	(1) Must possess a B.E degree in Civil Engineering or Civil and Structural Engineering. (or) (2) Must have passed in Sections A and B of the Institution Examinations under Civil Engineering branch
3	**Assistant Engineer (Civil)** (PWD)	
4	**Assistant Engineer** (Rural Development and Panchayat Raj Department)	Must possess a B.E degree in Civil Engineering (or) Must have passed Sections A and B of the Institution of Engineers (India) under Civil Engineering Branch, and he should furnish evidence of having undergone practical training in surveying for a period of not less than one year. **Note:-**Provided that other things being equal preference shall be given for appointment to a person who has undergone one year of apprenticeship training under the Government of India Scheme or the State Government Apprenticeship Scheme.
5	**Assistant Engineer** (Highways Department)	Must possess degree in Civil Engineering (or) A pass in Sections A and B of the A.M.I.E (India) Examinations under Civil Engineering branch (renamed as Institution of Examinations) **Note:-**Provided that other things being equal, preference shall be given to a person who has

		undergone one year of apprenticeship training under the Government of India Scheme or one year of training under the State Government Apprenticeship Scheme.
6	**Assistant Engineer** (Agricultural Engineering)	i) B.E. (Agriculture) or B. Tech (Agricultural Engineering) or B.Sc., (Agricultural Engineering) (or) ii) B.E. (Mechanical) (or) B.E. (Civil) (or) B.Tech (Automobile Engineering) or B.E. (Production Engineering) or B.E.(Industrial Engineering) (or) B.E (Civil and Structural Engineering) or B.E (Mechanical and Production Engineering). Provided that candidates possessing the qualification in item (ii) shall be considered only if no candidate with qualification item (i) is available.
7	**Assistant Director of Industrial Safety and Health**	A Degree in Mechanical or Electrical or Chemical or Textile Technology or Industrial Engineering or Production Engineering.
8	**Assistant Engineer** (Industries)	Must possess a Bachelor of Engineering or Bachelor of Technology degree of any discipline except Civil Engineering and Architectural Engineering of any University recognised by the University Grants Commission or Institution recognised by the All India Council for Technical Education.
8-A	**Assistant Engineer(Electrical)** (PWD)	Must possess a degree in Electrical Engineering or Electronics and Communication Engineering OR A pass in Sections A and B of the Institution Examination with Electrical Engineering as a subject with three years practical experience as Junior Engineer in Public Works Department or Tamil Nadu Electricity Board, either before or after passing Sections A and B of the Institution Examination. Provided that other things being equal, preference shall be given to those who have undergone one year of apprenticeship training under the Government of India scheme or one year training under the Government of Tamil Nadu Special Apprenticeship Training Scheme.
9	**Senior Officer (Technical)** Tamil Nadu Industrial Investment Corporation	Degree in B.E., / B.Tech., /AMIE
10	**Assistant Engineer (Electrical)** TANGEDCO	Degree in Electrical and Electronics Engineering / Electronics and Communication Engineering / Instrumentation Engineering or A pass in AMIE (Sections A & B) under Electrical Engineering or equivalent recognized by the UGC
11	**Assistant Engineer(Civil)** TANGEDCO	Degree in Civil Engineering or A pass in AMIE (Sections A & B) under Civil Engineering or equivalent recognized by the UGC

12	**Assistant Engineer (Mechanical)** TANGEDCO	Degree in Mechanical Engineering or A pass in AMIE (Sections A & B) under Mechanical Engineering or equivalent recognized by the UGC
13	**Assistant Engineer (Civil)** (Tamil Nadu Urban Habitat Development Board)	Must possess a degree in Engineering (Civil) OR Must have passed Sections A and B of the A.M.I.E (India) Examination with the following:- i) A Pass in H.Sc. Examination ii) Must have passed 'Geology' under Section B as an optional or additional subject.
14	**Assistant Engineer** Tamil Nadu Pollution Control Board	Basic qualification should be a Bachelor's Degree in Civil Engineering or Chemical Engineering or Environmental Engineering and Master's Degree in Environmental Engineering / Chemical Engineering / M.Tech. Environmental Science and Technology awarded by Anna University/M.Tech. Petroleum Refining and Petrochemicals awarded by Anna University/ M.E. Environmental Management awarded by Anna University.
15	**Assistant Engineer (Civil)** Tamil Nadu Water Supply and Drainage Board **[TWAD]**	Must possess a Degree in Engineering (Civil) from any university or Institution recognised by the University Grants Commission for the purpose of its Grant. Preference shall be given in the case of persons who possess the Post Graduate Degree or Post Graduate Diploma in Public Health Engineering.
16	**Assistant Engineer (Mechanical)** Tamil Nadu Water Supply and Drainage Board **[TWAD]**	Must possess a Degree in Engineering (Mechanical) from any university or Institution recognised by the University Grants Commission for the purpose of its Grant. Preference shall be given in the case of persons who possess the Post Graduate Degree or Post Graduate Diploma in Public Health Engineering.
17	**Manager - Engineering** TNCMPFL	Must possess a Degree in Electrical & Electronics / Electronics & Instrumentation /Electrical & Instrumentation / Electronics and Communication / Automobile / Mechanical Engineering from a recognized University
18	**Manager – Civil** TNCMPFL	Must possess a Bachelor Degree in Civil Engineering
19	**Assistant Engineer(Civil)** Tamil Nadu Adi Dravidar Housing & Development Corporation Limited	Bachelor Degree in Civil Engineering

Note:

(i) The educational qualifications prescribed for these posts should have been obtained by passing the required qualification in the following order of studies viz. **10th + HSC/Diploma or its equivalent + U.G. Degree + P.G. Degree** as required under Section 25 of the Tamil Nadu Government Servants (Conditions of Service) Act, 2016. The results of examination should have been declared on or before the date of Notification. [Section 20 (4) (iv) of the Tamil Nadu Government Servants (Conditions of Service) Act 2016]

(ii) Applicants claiming equivalence of qualification to the prescribed qualification should upload and submit evidence for equivalence of qualification in the form of Government Order issued on or before the date of this notification and **submit along with online application**, failing which, their application **will be summarily rejected after due process**. The Government Orders regarding equivalence of qualification issued after the date of this notification will not be accepted.

[Refer Para 9 of the "Instructions to Applicants" and "Disclaimer"]

(iii) The qualifications considered equivalent are indicated in Annexure-II to this notification

(iv) The Period of practical or other experience should have been acquired after obtaining the educational qualification prescribed for the posts.

(C) KNOWLEDGE IN TAMIL:

Applicants should possess adequate knowledge in Tamil. (For further details refer para 14(I) of 'Instructions to Applicants').

(D) CERTIFICATE OF PHYSICAL FITNESS:

Applicants selected for appointment to the said post will be required to produce a certificate of physical fitness in the form prescribed below. The model format is enclosed with **Annexure III** of the notification. **The said Certificate should be submitted by the selected candidate to the Appointing Authority at the time of joining to the said post**

Sl.No	Name of the Post	Standard of Vision	Form of Certificate of Physical Fitness
1	**Principal, ITI/ AD of Training**	Standard III or better	Form prescribed for Executive post
2	**Assistant Engineer (Civil) (WRD)** (PWD)	Standard-III or better	
3	**Assistant Engineer (Civil)** (PWD)		
4	**Assistant Engineer** (Rural Development and Panchayat Raj Department)	Standard-II or better	

5	**Assistant Engineer** (Highways Department)	Standard II or better	
6	**Assistant Engineer** (Agricultural Engineering)	Standard II	
7	**Assistant Director of Industrial and Safety Health**	Standard II or better	
8	**Assistant Engineer(Industries)** Tamil Nadu Industries Subordinate Service	Standard III or better	
8-A	**Assistant Engineer (Electrical)** (PWD)	Standard III or better	
9	**Senior Officer (Technical)** Tamil Nadu Industrial & Investment Corporation	Standard III	
10	**Assistant Engineer(Electrical)** TANGEDCO	Standard III or better	
11	**Assistant Engineer(Civil)** TANGEDCO		
12	**Assistant Engineer(Mechanical)** TANGEDCO		
13	**Assistant Engineer** (Tamil Nadu Urban Habitat Development Board)	Standard III or better	
14	**Assistant Engineer** Tamil Nadu Pollution Control Board	-	
15	**Assistant Engineer (Civil)** Tamil Nadu Water Supply and Drainage Board [TWAD]	Standard III or better	
16	**Assistant Engineer (Mechanical)** Tamil Nadu Water Supply and Drainage Board [TWAD]		
17	**Manager - Engineering** TNCMPFL	Not suitable for VI	
18	**Manager – Civil** TNCMPFL		
19	**Assistant Engineer(Civil)** Tamil Nadu Adi Dravidar Housing & Development Corporation Limited	Standard III or better	Form prescribed for Executive post

Colour blindness will be a disqualification. Applicants with defective vision should produce Eye Fitness Certificate from a qualified Eye Specialist working in Government Hospital.

5. FEES:

a)	**Registration Fee** For One Time Registration (G.O.(Ms).No.32, Personnel and Administrative Reforms (M) Department, dated 01.03.2017). **Note** Applicants who have already registered in One Time online Registration system and are within the validity period of 5 years are exempted.	Rs.150/-
b)	**Examination Fee** **Note** The Examination fee **should be paid** at the time of submitting the online application for this recruitment if they are not eligible for the concession noted below.	Rs.200/-

Note:

(i) Linking Aadhaar number with One Time Registration (OTR) is mandatory for applicants.[For further details refer para 2B of 'Instructions to Applicants'.]

(ii) One Time Registration is valid for five years from the date of registration. After completion of five years, the applicant must renew the One Time Registration by paying the fee prescribed. The One Time Registration is different from the application for the examination. An applicant should make an online application separately for each and every examination for which he intends to appear. [Para 2C of 'Instructions to Applicants'.

EXAMINATION FEE CONCESSIONS:

	Category	Concession
(i)	Scheduled Castes / Scheduled Caste (Arunthathiyars)	Full Exemption
(ii)	Scheduled Tribes	Full Exemption
(iii)	Most Backward Classes / Denotified Communities	Three Free Chances
(iv)	Backward Classes (other than Muslim) / Backward Classes (Muslim)	Three Free Chances
(v)	Ex-Servicemen	Two Free Chances
(vi)	Persons with Benchmark Disability	Full Exemption
(vii)	Destitute Widow	Full Exemption

Note:

(i) The total number of free chances availed, will be calculated on the basis of claims made in previous applications.

(ii) The number of free chances availed by the applicant may be verified by the Commission at any stage of the selection process.

(iii) In case an applicant who makes a false claim for exemption from payment of application fee by suppressing information regarding his previous application(s) his

candidature shall be rejected after due process and he shall be debarred for a period of one year from appearing for examinations and selections conducted by the Commission.

(iv) Applicants are directed to carefully choose the options 'Yes' or 'No' regarding availing the fee concession.

(v) Applicants are advised in their own interest, to keep an account of the number of times fee concession has been availed, irrespective of the information displayed in the <Application History> of the applicant dashboard.

(vi) An application (irrespective of the post applied for) claiming fee concession will operate to exclude one chance from the number of free chances allowed.

(vii) Applicants who have availed the maximum number of free chances permitted / applicants who do not wish to avail of the fee concession / applicants who are not eligible for fee concession, shall choose the option 'No' against the query regarding fee concession. Such applicants shall thereafter pay the requisite fee through the prescribed mode of payment.

(viii) Failure to pay the prescribed fee along with the online application, will result in the rejection of application after due process. (for further details regarding examination fee concessions refer to Para 6 of 'Instructions to Applicants')

6. MODE OF PAYMENT OF EXAMINATION FEE:

- Written Examination fee of Rs.200/- (Rupees Two hundred only), is payable by online mode through Net Banking / Credit card / Debit card on or before the last date of submission of online application by choosing the option in the online application.
- Applicants have to pay the service charges also as applicable.
- Applicants can avail exemption from paying examination fee as per eligibility criteria.
- **Offline mode of payment in the form of Demand Draft / Postal Order etc. will not be accepted and the applications of candidates with such modes of payment will be summarily rejected after due process**.
- **The Commission is not responsible for online payment failure or delayed reconciliation of fee by the banks**. (For further details regarding the Examination fee, refer para.2-U(i) of " Instructions to Applicants).

7. CONCESSIONS:

(i) Concessions in the matter of age and / or examination fees allowed to SCs, SC(A)s, STs, MBCs/DCs, BCs(OBCM), BCMs, Destitute Widows and Ex-Servicemen are given in para's 3D, 5 and 6 of the 'Instructions to Applicants'.

(ii) Persons claiming concessions referred to above have to produce evidence for such claims when called for, otherwise their application will be **rejected after due process.**

Note:

In all cases, an **Ex-Serviceman once recruited** to a post in any class or service or category, **cannot claim the concession** of being called an Ex-Serviceman for his further recruitment. [Section 3(j) of the Tamil Nadu Government Servants (Conditions of Service) Act, 2016].

8. SCHEME OF EXAMINATION: I)WRITTEN EXAMINATION(OBJECTIVE TYPE)(OMR METHOD)

Subject	Duration	Maximum marks		Minimum qualifying marks for selection			
				SCs,SC(A)s, STs,MBC/DC, BC(OBCM)s& BCMs		Others	
		FOR ORAL TEST POST	FOR NON-ORAL TEST POST	FOR ORAL TEST POST	FOR NON-ORAL TEST POST	FOR ORAL TEST POST	FOR NON-ORAL TEST POST
For Posts in Sl.No.2,3,4,5,6,7,8-A, 10,11, 12, 13, 15,16, 17, 18, 19 **<u>One of the following subjects in which the candidate has acquired his/her degree qualification Paper –I</u> (Subject Paper) (Degree Standard)** (200 Questions**)** i) Agricultural Engineering (Code No. 409) ii) Automobile Engineering (Code No. 404) iii) Civil Engineering (Code No.398) iv) Chemical Engineering (Code No.405) v) Electrical Engineering / Electrical and Electronics Engineering (Code No.400) vi) Electronics / Electronics and Communication Engineering (Code No.403) vii) Electronics and Instrumentation Engineering (Code No.402) viii) Mechanical / Production Engineering/Manufacturing Engineering (Code.No.399) ix) Textile Technology (Code No.406) **For post in Sl.No.14** **<u>Paper –I</u> (Subject Paper) (P.G. Degree Standard)** (200 Questions) Environmental Engineering and Chemical Engineering (Code No.393) **For posts in Sl.No.1, 8, 9, 17** **<u>Paper –I</u> (Subject Paper) (Degree Standard)** (200 Questions) Basics of Engineering (Code No. 422)	**3 Hours**	**300**	**300**	**153**	**135**	**204**	**180**
<u>For All the Posts</u>: **<u>Paper-II (Objective Type)</u>** ***<u>Part-A</u>*** ***Tamil Eligibility Test (SSLC Std)*** ***(100 Questions/150 Marks)***	**3 Hours**	***Note: Minimum qualifying marks – 60 marks (40% of 150). Marks secured in Part-A of Paper-II will not be taken into account for ranking.***					
<u>Part-B</u> **General Studies** (100 questions) (150 marks)(Code No:003) **General studies** (Degree standard) – 75 questions and **Aptitude and Mental ability test** (SSLC standard) - 25 questions		**150**	**150**				
(II) INTERVIEW AND RECORDS		**60***	**–**	*** Interview will be conducted only for the candidates who are eligible for interview posts**			
Total		**510**	**450**				

- ***Those who have possessed a degree in Electrical and Instrumentation Engineering should choose Basics of Engineering (Code No. 422) for Paper-I***

- ***Those who have possessed a degree in Industrial Engineering should choose Mechanical Engineering / Production Engineering/Manufacturing Engineering (Code.No.399) for Paper - I.***

Note:

a) Answer sheets of Paper-I, and Part B of Paper II of the candidates will not be evaluated, if the candidate does not secure minimum qualifying marks in Part-A of Paper-II.

b) Only marks secured in Paper-I and Part-B of Paper-II will be considered for ranking.

c) The questions for all the subjects (Except Civil Engineering and Mechanical Engineering) included in Paper I will be set in English language only. The questions for the subjects in Civil Engineering and Mechanical Engineering will be set both in English and Tamil Languages. The questions in Part–B of Paper-II will be set both in Tamil and English Languages. Candidates should choose and specify in the application, only the prescribed subject in which they have obtained the educational qualification for appearing to the examination.

d) The candidate should appear for exam in any one of the sessions or all the three sessions in paper - I based on their eligibility.

e) The Candidate should appear Paper-II for his / her answers to be evaluated in Paper I and in case the candidate absents himself / herself, the papers attended will not be evaluated.

f) If answers of a candidate for one paper is declared deemed not fit for valuation, the answers of the candidate for the remaining papers will not be evaluated.

g) Refer para 17 of "Instructions to Applicants" in regard to instructions to be followed while appearing for competitive examinations conducted by the Commission.

h) The syllabus is available in Annexure-I to this Notification and also available in the Commission's website www.tnpsc.gov.in

i) As per the orders issued in G.O. (Ms) No.49, Human Resources Management (M) Department, dated 23.05.2022, the differently abled candidates can avail exemption from writing Part- A in Paper-II (Objective Type) (Tamil Eligibility Test). Such candidates have to furnish the required details in the online application without fail. Subsequent claim will receive no attention. The candidates need to upload Disability Certificate as prescribed in G.O. (Ms) No. 08, Welfare of Differently Abled Persons (DAP3.2) Department dated 21.09.2021. Model format enclosed with Annexure–V of this notification.

Instructions to the candidates who are claiming exemption for Tamil Eligibility Test:

(i) As per the orders issued in G.O. (Ms.) No.49, Human Resource Management (M) Department, dated 23.05.2022, read along with G.O. Ms.No.8, Welfare of Differently Abled Persons (DAP 3.2) Department, dated 21.09.2021, the differently-abled candidates who are even below the 40% of disability can also avail the exemptions from writing Tamil Eligibility Test i.e., Part-A in Paper-II of examination if they have claimed such exemptions in their online application.

(ii) The candidates who have been exempted to write Tamil Eligibility Test shall be allowed to write only General Studies Paper i.e. Part-B in Paper-II.

(iii) Part-A of Paper-II Tamil Eligibility Test shall contain 100 questions from 1 to 100. Part-B of Paper-II the General Studies paper contains 100 questions from 101 to 200 and time duration to write each part of the said examination shall be given 1 Hour and 30 minutes.

(iv) All the exempted candidates with disability who have physical limitation with regard to writing, including that of speed and not availing the services of a scribe shall also be allowed compensatory time of a minimum of thirty minutes for an examination of one and a half hour (1 Hour and 30 minutes.) duration in the General Studies paper as per G.O.Ms.No.8, Welfare of Differently Abled Persons (DAP 3.2) Department, dated 21.09.2021.

(v) The said exempted candidates must also enter into the examination hall in the A.N. session half an hour before the commencement of examination.

(vi) In the case of OMR method of examination, they shall be allowed to write the examination from 2.00 P.M. to 4.00 P.M., and in the case of CBT method, they shall be allowed to write the examination from 2.30 P.M. to 4.30 P.M. All the candidates are permitted to leave the examination hall only after the closure of examination even though they are exempted to write Tamil Eligibility Test.

(vii) The disability certificate as prescribed in the Appendix to G.O. (Ms.) No. 8, Welfare of Differently Abled Persons (DAP 3.2) Department, dated 21.09.2021, should be obtained from the competent authority (viz. Chief Medical Officer / Civil Surgeon / Medical Superintendent /Notified Medical Authority of a Government Health Care Institution) and it has to be produced / uploaded along with the online application failing which, the application of the candidate (who claims exemption from Tamil Eligibility Test) will be rejected after due process.

(viii) The exemption from Tamil Eligibility Test, Compensatory time and scribe will be provided only if the candidates have made such claims in their online application and uploaded the Medical Certificate as prescribed in Appendix to the G.O. (Ms.) No. 8, Welfare of Differently Abled Persons (DAP 3.2) Department, dated 21.09.2021

9. SELECTION PROCEDURE:

A) Interview Posts:

Selection will be made in two stages i.e., (i) Written Examination and (ii) Oral Test in the shape of an interview. The final selection will be made on the basis of the total marks obtained by the applicants at the written examination and oral test taken together subject to the rule of reservation of appointments. Applicants' appearance in the written examination and oral test is compulsory. The applicant who has not appeared for any of the subjects in the written examination or Oral Test will not be considered for selection, even if he/she secures the minimum qualifying marks for selection. (For further details refer to para 18(B) of the 'Instructions to Applicants')

B) Non-Interview Posts:

Selection will be made based on the marks obtained in written Examination subject to rule of reservation of appointments.

- A rank list will be prepared for interview posts after the conduct of oral test (Marks secured in written examination and oral test taken together). The candidates who have been selected for interview post will not be considered for non-interview posts.

- After finalisation of selection in respect of interview posts, a fresh rank list (Marks secured in written examination) will be prepared for selection of candidates in respect of non-interview posts, excluding the candidates who have been selected for interview post.

- Selection in respect of non-interview posts will be taken up after finalising the selection for interview posts.

Note :

1. First, the selection will be made for the carried forward vacancies. [Section 27 of the Tamil Nadu Government Servants (Conditions of Service) Act, 2016]
2. Secondly, the selection will be made for regular vacancies following the rule of reservation of appointments.

10. CENTRES FOR EXAMINATION:

The examination will be held at the following centres**.**

Sl.No	Name of the Centre	Centre Code	Sl.No	Name of the Centre	Centre Code
1.	Ariyalur	3001	21.	Ranipet	3501
2.	Chengalpattu	3301	22.	Salem	1701
3.	Chennai	0101	23.	Sivagangai	1801
4.	Coimbatore	0201	24.	Tenkasi	3601
5.	Cuddalore	0301	25.	Thanjavur	1901
6.	Dharmapuri	0401	26.	The Nilgiris	1301
7.	Dindigul	0501	27.	Theni	2001
8.	Erode	0601	28.	Thiruvallur	2101
9.	Kallakurichi	3401	29.	Thiruvannamalai	2201
10.	Kancheepuram	0701	30.	Thiruvarur	2301

11.	Nagercoil	0801	31.	Thoothukudi	2401
12.	Karur	0901	32.	Tiruchirappalli	2501
13.	Krishnagiri	3101	33.	Tirunelveli	2601
14.	Madurai	1001	34.	Tirupathur	3701
15.	Mayiladuthurai	3801	35.	Tiruppur	3201
16.	Nagapattinam	1101	36.	Vellore	2701
17.	Namakkal	1201	37.	Villupuram	2801
18.	Perambalur	1401	38.	Virudhunagar	2901
19.	Pudukkottai	1501			
20.	Ramanathapuram	1601			

Note:

(i) Applicants should choose any two of the above centres for writing the examination. Applicants will be allotted a venue in one of these two centres. However, applicants with benchmark disability (Differently Abled Applicants), shall be permitted to choose only one district centre. (for further details refer para 2 (Q) of Instructions to Applicants)

(ii) Request for change of examination centre will not be permitted (For further details refer Para 17(A)(ii) of "Instructions to Applicants")

(iii) The Commission reserves the right to increase or decrease the number of examination centres and to re-allot the applicants accordingly.

(iv) Applicants should appear for the written examinations / certificate verification / oral test at their own expenses.

11. (A) EMPLOYMENT DETAILS

Candidates who are in the service of the Indian Union or a State in India or in the employment of Local Bodies or Universities or Quasi Government Organizations or Public Sector Units constituted under the authority of the Government of India or of a State in India, whether in regular service or in temporary service must inform the Commission of such fact, at the time of applying. Suppression of the fact of employment by candidates shall result in rejection of candidature after due process. Candidates should produce No Objection Certificate when called for.[For further details refer para. 14 (P) of "Instructions to Applicants'

(B) DECLARATION REGARDING CRIMINAL CASES (OR) DISCIPLINARY CASES:

(A) Candidates who have declared pending criminal or disciplinary cases in their online application, must upload / produce the copy of First Information Report (FIR) or memorandum of charges / show cause notice, as the case may be. Failure to **upload / produce such papers along with online application**, shall result in rejection of candidature after due process.

(B) Candidates who have declared conviction in criminal cases or punishment in disciplinary cases, in their online application, must upload / produce the relevant court orders and/or release orders or memorandum of proceedings, as the case may be, **along with online application**. Failure to upload / produce such papers, shall result in rejection of candidature after due process.

(C) In case of any criminal case is filed / disciplinary action is taken against or conviction / punishment is imposed on a candidate after submission of the on-line application at any stage of the recruitment process before the completion of entire selection process such candidates should report this fact to the Commission in the next immediate stage. Failure to comply with these instructions shall result in rejection of candidature after due process and debarment for a period of one year.

[Para. 14 (S) & 2W of "Instructions to Applicants']

(D)Any violation of instruction therein will result in rejection of application and forfeiture of his/her candidature after due process.

12. GENERAL INFORMATION:

(A) The rule of reservation of appointments is applicable to this recruitment separately for each post.

(B) <u>Person Studied in Tamil Medium</u>

(i) As per Section 2(d) of the Tamil Nadu Appointment on preferential basis in the services under the State of Persons Studied in Tamil Medium Act, 2010, as amended by Act 35 of 2020, **Person studied in Tamil medium means a person who has studied through Tamil medium of instruction upto the educational qualification prescribed for direct recruitment in the rules or regulations or orders applicable to any appointment in the services under the State.**

(ii) Candidates claiming to be Persons studied in Tamil Medium (PSTM) must **upload the document at the time of submission of online application** for the same in the form of SSLC, HSC, Transfer Certificate, Provisional Certificate, Convocation Certificate, Degree Certificate, PG Degree Certificate, Mark Sheets, Certificate from the Board or University or from the Institution, as the case may be, with a recording that he/she had studied **the entire duration of the respective course(s) through Tamil Medium of instruction.**

(iii) Candidates must upload documents **at the time of submission of online application** as evidence of having studied in the Tamil medium, all educational qualification upto the educational qualification prescribed

<u>Example:</u>

If the prescribed educational qualification is Degree, then the candidate should have studied from the First Standard to SSLC, Higher Secondary Course and Degree through Tamil Medium of instruction.

(Refer para 14 (R) of Instructions to Applicants).

(iv) If no such document as evidence for 'PSTM' is available, a certificate from the Principal / Head Master / District Educational Officer / Chief Educational Officer / District Adi Dravidar Welfare Officer / Controller of Examinations / Head / Director of Educational Institution / Director / Joint Director of Technical

Education / Registrar of Universities, as the case may be, in the prescribed format must be uploaded **at the time of submission of online application**, for each and every educational qualification up to the educational qualification prescribed.

(v) Failure to upload such documents **at the time of submission of online application** as evidence for 'Persons Studied in Tamil Medium' for all educational qualification up to the educational qualification prescribed, shall result in the rejection of candidature after due process.

(vi) Documents uploaded **at the time of submission of online application** as proof of having studied in Tamil medium, for the partial duration of any course / private appearance at any examination, shall not be accepted and shall result in the rejection of candidature after due process.

(For further details refer to para. 14 (R) of 2W of the "Instructions to Applicants")

(C) The selection for appointment to the said posts is purely provisional subject to the final orders in the writ petitions, if any, pending on the files of the Hon'ble Madras High Court and its Madurai Bench.

(D) As per Sections 26 and 27 (c) of the Tamil Nadu Government Servants (Conditions of Service) Act, 2016, reservation of appointment to "Destitute Widows" and "Ex-servicemen" will not apply to this recruitment.

(E) **PERSONS WITH BENCHMARK DISABILITY** :

The 4% reservation for DAP will be applicable as per G.O. (Ms.) No. 20, Welfare of Differently Abled Persons (DAP.3.2) Department, dated 20.06.2018, G.O (Ms.) No.08, Welfare of the Differently Abled Persons (DAP 3.2) Department dated 15.07.2020, G.O (Ms.) No.06, Welfare of the Differently Abled Persons (DAP 3.2) Department dated 21.10.2019, G.O. (Ms.) No. 22, Welfare of Differently Abled Persons (DAP.3.2) Department, dated 03.08.2023, G.O. (Ms.) No. 35, Welfare of Differently Abled Persons (DAP.3.2) Department, dated 27.12.2022, and G.O (Ms.) No.133, Labour Welfare and Skill Development (M1) Department dated 27.07.2023, the following posts have been identified with suitable Differently Abled Categories as detailed below:

Sl. No.	Name of the Post	Name of the Service	Categories of Disabilities is to be accommodated for the post
1	Principal, Industrial Training Institute/ Assistant Director of Training	Tamil Nadu Employment and Training Service	LV,HH,LD(OA,OL,BL)
2	Assistant Engineer (Civil) (Water Resources Department)	Tamil Nadu Engineering Service	LD (OA, OL), HH, DF, AC
3	Assistant Engineer (Civil) (PWD)		
4	Assistant Engineer (Rural Development and Panchayat Raj Department)	Tamil Nadu Panchayat Development Service	HH,LD(OA,OL), LC,AC,DF

5	Assistant Engineer (Highways Department)	Tamil Nadu Highways Engineering Service	HH
6	Assistant Engineer (Agricultural Engineering)	Tamil Nadu Agricultural Engineering Service	LV,HI,HH,LD,LC,DF,AC
7	Assistant Director of Industrial and Safety Health	Tamil Nadu Factory Service	No categories of Disabilities is to be accommodate for this post.
8	Assistant Engineer (Industries)	Tamil Nadu Industries Subordinate Service	No categories of Disabilities is to be accommodate for this post.
8-A	Assistant Engineer(Electrical) (PWD)	Tamil Nadu Engineering Service	LD (OA,OL), HH, DF, AC
9	Senior Officer (Technical) Tamil Nadu Industrial & Investment Corporation	Tamil Nadu Industrial & Investment Corporation	HH,LD(OA,OL,)
10	Assistant Engineer (Electrical) TANGEDCO	Tamil Nadu Generation and Distribution Corporation	HH,LD(OA,OL)LC,AC,DF
11	Assistant Engineer(Civil) TANGEDCO	Tamil Nadu Generation and Distribution Corporation	HH,LD(OA,OL)LC,AC,DF
12	Assistant Engineer(Mechanical) TANGEDCO	Tamil Nadu Generation and Distribution Corporation	HH,LD(OA,OL)LC,AC,DF
13	Assistant Engineer (Civil) (Tamil Nadu Urban Habitat Development Board)	Tamil Nadu Slum Clearance Board Service	LD (OA,OL),HH,LC,DF,AC
14	Assistant Engineer Tamil Nadu Pollution Control Board	Tamil Nadu Pollution Control Board	LV,LD(OA,OL,OAOL),HH,AC,LC, DF
15	Assistant Engineer (Civil) Tamil Nadu Water Supply and Drainage Board	Tamil Nadu Water Supply and Drainage Board [TWAD]	HH,LD(OA,OL,OTHERS),LC,AC, DF,SLD
16	Assistant Engineer (Mechanical) Tamil Nadu Water Supply and Drainage Board		HH,LD(OA,OL,OTHERS),LC,AC, DF,SLD
17	Manager - Engineering (TNCMPFL)	(TNCMPFL)	LD(OA,OL),DF,AC
18	Manager – Civil (TNCMPFL)		LV,HI,HH,LD(OA,OL),LC,DF,AC
19	Assistant Engineer(Civil) Tamil Nadu Adi Dravidar Housing & Development Corporation Limited	Tamil Nadu Adi Dravidar Housing & Development Corporation Limited	HH,LD(OA,OL),LC,AC,DF

(F) Persons with Benchmark Disability should upload a copy of Disability Certificate in the format prescribed in the Rights of Persons with Disabilities Rules, 2017

[Department of Empowerment of Persons with Disabilities (Divyangjan), Ministry of Social Justice and Empowerment, Government of India] and issued by the competent authority defined in GO Ms. No. 28, Welfare of Differently Abled Persons (DAP 3.1), dated 27.07.2018 **while submitting the online application.**

[For further details refer Para. 14 (M) of "Instructions to Applicants']

(G) If no qualified and suitable women applicants are available for selection against the vacancies reserved for them, those vacancies will be filled by male applicants belonging to the respective communal categories. (Section 26(5) of the Tamil Nadu Government Servants (Conditions of Service) Act, 2016).

(H) Wherever vacancies are reserved for Arunthathiyars on preferential basis, even after filling the vacancies reserved for SC (Arunthathiyars) on preferential basis, if more number of qualified Arunthathiyars are available, they shall be entitled to compete with the Scheduled Castes other than Arunthathiyars in the inter-se-merit among them and if any posts reserved for Arunthathiyars remain unfilled for want of adequate number of qualified applicants, it shall be filled by Scheduled Castes other than Arunthathiyars. (Section 27 of the Tamil Nadu Government Servants (Conditions of Service) Act, 2016).

(I) **Evidence for all the claims made in the online application should be uploaded at the time of submission of online application. Any subsequent claim made after submission of online application will not be entertained. Failure to upload the documents at the time of submission of online application will entail rejection of application after due process**.

(J) Suppression of following material information in the online application regarding (i) free chances availed (ii) Employment in the Service of the Indian Union or a State in India or in the employment of Local Bodies or University or Quasi Government Organization or Public Sector units constituted under the authority of the Government of India or of a State in India in regular service or temporary service (iii) Wilful suppression of criminal cases / disciplinary action pending / punishments if any, against the applicant (iv) violation of undertaking given by the applicant in the online application etc,. may invite suitable penal action including debarment for a specific period as decided by the Commission for various recruitments/ selections conducted by the Commission, besides rejection of application after due process.

(K) Correct and true information regarding arrest, convictions, criminal or any disciplinary proceedings initiated / pending or finalised, debarment / disqualification by any recruiting agency if any, should also be furnished to the Commission **at the time of online application**. The details thereof, i.e. originals of the judgement / order / G.O. dropping further action in the departmental proceedings or any document that may prove the suitability of such applicants for appointment in such cases must be produced at the stage / time of certificate verification without fail. All such events that occur after the submission of online application and till the date of his / her selection and appointment shall be reported to the Commission forthwith. Failure to report on the part of the applicant will be considered as suppression of material information and will attract

suitable penal action. [For further details refer para.12 of the Instructions to applicants]

(L) Incomplete applications and applications containing wrong claims or incorrect particulars relating to category of reservation / eligibility / age /gender / communal category / educational qualification / medium of instruction / physical qualification / other basic qualifications and other basic eligibility criteria will be summarily rejected after due process.

(M) One Time Registration is not an application for any post / recruitment. Though the details/particulars have already been furnished by the applicants under One Time Registration system, **the claims made in the online application for this recruitment alone will be taken into consideration**. The Commission will not be responsible for any consequences arising out of furnishing of incorrect and incomplete details in the application or omission to provide the required details in the application for this recruitment.

(N) Determination of Community for Transgender:

(i) The Transgender candidates, who do not possess any community certificate may choose to be considered under Most Backward Classes as per G.O.(Ms) No.28, Backward Classes, Most Backward Class and Minorities Welfare Department, dated 06.04.2015 or under 'others'.

(ii) The Transgender candidates who belong to Scheduled Caste/ Scheduled Caste (Arunthathiyar)/ Scheduled Tribe communities and possess community certificate as such, shall be considered as per their respective community.

(iii) The Transgender candidates who belong to the communities other than Scheduled Caste/ Scheduled Caste (Arunthathiyar) / Scheduled Tribe and possess community certificate as such are permitted to choose to be considered as belonging to their own community or as Most Backward Class whichever is advantageous to them, at the time of One Time Registration itself. Once the individual opts to be considered as a particular community, it shall be crystallized and this option shall not be changed in future. G.O.(Ms.) No.90, Social Welfare and Nutritious Meal Programme [SW8(2)] Department, dated 22.12.2017 [Refer Para. 14 (F) (vi – xi) of "Instructions to Applicants']

(O) <u>Reservation in Employment for Transgender:-</u>

(i) The Transgender candidates who identify themselves as 'Female' shall be considered against both 30% reservation for women as well as 70% reservation for the General category (both Men & Women).

(ii) The Transgender candidates, who identify themselves as 'Male' or 'Transgender', shall be considered against the 70 % reservation for General category (both Men & Women).

(iii) The above concessions shall be granted subject to production of certificate identifying them as Transgender or Transgender (Male) or Transgender (Female), as the case may be, issued by the Tamil Nadu Transgender Welfare Board (TNTGWB)."

13. OTHER IMPORTANT INSTRUCTIONS:

a) **Applicants should ensure their eligibility for the examination.** Before applying for / appearing for the examination, the applicants should ensure their eligibility for such examination and that they fulfil all the conditions in regard to age, educational qualifications, number of chances for fee concession, etc., as prescribed by the Commission's notification. Their admission to all stages of the examination will be purely provisional, subject to their satisfying the eligibility conditions. Mere admission to the written examination / certificate verification / oral test / counselling or inclusion of name in the selection list will not confer on the candidates any right to appointment. The candidature is therefore, provisional at all stages and the Commission reserves the right to reject candidature at any stage after due process, even after selection has been made, if a wrong claim or violation of rules or instructions is confirmed.

[Refer Para. 11 (B) (C) and (D) of "Instructions to Applicants']

b) The memorandum of admission (hall ticket) for eligible applicants will be made available in the Commission's website **www.tnpscexams.in** / **www.tnpsc.gov.in** for downloading by applicants. The memorandum of admission will **not** be sent by post. The applicants must comply with each and every instruction given in the memorandum of admission.[Refer in Note (g) under Para 2(V) of "Instructions to applicants"]

c) Applicants requiring clarification, can contact the office of the Tamil Nadu Public Service Commission in person or over the Toll-Free No.1800 419 0958 on all working days between 10.00 am and 5.45 pm. Queries relating to One Time Registration/ online application may be sent to helpdesk@tnpscexams.in. Other queries may be sent to **grievance.tnpsc@tn.gov.in** [Refer in Note (h),(i),(j) under Para 2(V) of "Instructions to applicants"]

d) **COMMUNICATION TO APPLICANTS:** Individual communication regarding the date and time of certificate verification, oral test and counselling (as applicable) will not be sent to the applicants by post. The details will be made available on the Commission's website. Applicants will be informed of the above fact only through SMS and e-mail and they should watch the Commission's website in this regard. Commission is not responsible for non-delivery of SMS/e-mail due to any reasons.

e) ***During the process of recruitment, from Notification till completion of selection process, NO information / clarification on the selection particulars / details will be furnished to any petitions / representations including petitions received under Right to Information Act, CM cell petitions, and GRC would be furnished.***

f) **MOBILE PHONES AND OTHER ARTICLES BANNED :**

i) Except the permitted writing material (Black ball point pen), applicants are not allowed to bring cellular phones, electronic or any other type of calculators, watches and rings with inbuilt memory notes, recording devices either as a separate piece or part of something used by the applicant such as watch or ring etc., or any other electronic devices and non - electronic devices such as P&G design data book, mathematical and drawing instruments, log tables, stencils of maps, slide rules books, notes, loose sheets, rough sheets, hand bags etc., into the examination hall / room.

ii) If they are found to be in possession of any such things or instruments, they will not be allowed to write the examination further, besides invalidation of answer paper and / or debarment. If it is considered necessary, they will be subjected to thorough physical search including frisking on the spot.

iii) Applicants are advised, in their own interest, not to bring any of the banned items including mobile phones to the venue of the examination, as arrangements for safekeeping of the same cannot be assured. (For further details refer Para 17-E to "Instructions to Applicants").

g) Unless specific instruction is given, applicants are not required to submit along with their application any certificates (in support of their claims regarding age, educational qualifications, physical qualification, community, physical disability etc.,) which should be submitted when called for by the Commission. Applicants applying for the examination should ensure that they fulfil all the eligibility conditions for admission to the examination. Their admission at all the stages of examination for which they are admitted by the Commission will be purely provisional, subject to their satisfying the prescribed eligibility conditions. **If, on verification at any time before or after the written examination /certificate verification / oral test, it is found that they do not fulfil any of the eligibility conditions, their candidature for the recruitment will be summarily rejected after due process.**

h) If any of their claims is found to be incorrect, it will lead to rejection of their candidature after due process and suitable penal action including debarment.

i) **UNFAIR MEANS STRICTLY PROHIBITED**: No applicant shall copy from the papers of any other applicant or permit his / her papers to be copied or give or attempt to give or obtain or attempt to obtain irregular assistance of any description.

j) **CONDUCT IN THE EXAMINATION HALL**: No applicant should misbehave in any manner or create a disorderly scene in the examination hall or harass the staff employed by the Commission for the conduct of the examination. Any such misconduct will be viewed seriously and penalised.

k) For violation of "Instructions to Applicants" in any manner, suitable penalty will be imposed as per Para 17-E to "Instructions to Applicants" or as deemed fit by the Commission.

l) a) Tentative answer keys will be hosted in the Commission's website within 6 working days from the date of conduct of objective type examination. Candidates can challenge the tentative answer keys of the objective type examination through the 'Answer Key Challenge' window available in the Commission's website [Results → Answer Keys].

b) Representations, if any, challenging the tentative answer keys shall be submitted only through online mode **within seven days from the date of publication of tentative answer keys**. Representations received by post or e-mail will receive no attention.

c) Detailed instructions, procedures to challenge the tentative answer keys have been made available in the Commission's website. Representations made online / offline after the closure of the window will also receive no attention. The challenges submitted on time, through the online mode, shall be referred to a committee comprising of experts in each subject. The decision on the final answer key shall be made, based on the recommendations of the expert committee and paper evaluation shall commence thereafter.

d) The Commission shall not publish the final answer key until the completion of the entire selection process.

e) Requests from candidates for furnishing of their marks or answer paper copy before the completion of the entire selection process, will not be entertained by the Commission.

f) After conclusion of the entire selection process, complete particulars of all candidates who had applied for recruitment to the post shall be made available on the Commission's website.[Refer Para 17(D) (v) to (xii) of "Instructions to Applicants"]

14. HOW TO APPLY:

1) Applicants should apply only through online mode in the Commission's websites www.tnpsc.gov.in or www.tnpscexams.in

2) "*One Time Registration*" using Aadhaar is mandatory before applying for any post. Applicant should register only once in the One Time Registration by paying Rs.150/- as registration fee. Successfully registered One Time Registration is valid for five years from the date of registration. All the applications should be submitted using the One Time Registration ID and password registered by the applicant.

3) To apply under One Time Registration system, applicants should have a scanned image of their photograph, certificates specified, if any, and signature in CD/DVD/Pen Drive to upload the same, as per the specifications given in the guidelines for scanning and uploading of photograph and signature. (Refer para 2 of the instructions to applicants).

4) No applicant is permitted to create more than one registration ID under One Time Registration system.

5) Applicants should enter the Unique ID and password to view the already available information and update them. They shall not share the ID with any other person or agency.

6) One Time Registration is not an application for any post. It is just a collection of information from the applicants and provides a separate dashboard to each applicant to facilitate maintenance of their own profile. Applicants who wish to apply for this recruitment shall click "Apply" against the recruitment notified in the Commission's website using the same USER ID and PASSWORD given for ONE TIME REGISTRATION.

7) Applicants should select the name of the post for which the applicant wishes to apply.

8) Online applications uploaded without the photograph, details of specified documents in **Annexure IV** and signature will be rejected after due process.

9) Online Application Correction Window:
After the last date for submission of online application, the candidates are allowed to edit their online application during the Online Application Correction Window period as mentioned in Para 3 of the Notification (Important Date and Time). After the last date of Correction Window period, no modification is allowed in the online applications. The applications will be processed as per the details finally furnished by the candidates. It is the responsibility of the candidates and the Commission has no liability for subsequent rejection of application caused due to editing the details already submitted in online application. Request / representation addressed to the Commission for modification of claims in the online application, in any mode, will not be entertained. Hence, the applicants are instructed to fill the online application with utmost care and caution.

10) **PRINT OPTION**:

a) After submitting the application, applicants can save / print their application in PDF format.

b) On entering user ID and password, applicants can download their application and print, if required.

c) Applicants need not send the printout of the online application or any other supporting documents to the Commission.

For further details refer para 2 of "Instructions to Applicants"

15. UPLOAD OF DOCUMENTS:

I. (a) In respect of recruitment to this post, the candidates shall mandatorily upload the certificates / documents (in support of all the claims made / details furnished in the online application) at the time of submission of online application itself. It shall be ensured that the online application shall not be submitted by the candidates without mandatorily uploading the required certificates.

(b) The applicants shall have the option of verifying the uploaded certificates through their OTR. If any of the credentials have wrongly been uploaded or not uploaded or if any modifications are to be done in the uploading of documents, the applicants shall be permitted to edit and upload / re-upload the documents till two days prior to the date of hosting of hall tickets for that particular post (i.e. twelve days prior to the date of examination)

Refer Annexure IV for the list of documents to be uploaded by the Applicants" For further details refer para 2W of "Instructions to Applicants"

II. Intimation to the Candidates: Individual Communication regarding the Date and Time of Certificate Verification (CV), Oral Test (OT) and Counselling will not be sent to the applicants by Post, the details will be made available in the Commission's website. However, the Commission provides an additional facility to the candidates by informing the above said date and time of Certificate Verification and Oral Test etc., via SMS and e-mail through their registered Mobile Number and email ID. Candidates are directed to watch the Commission's website periodically for all updates and intimations. Commission is not responsible for failure / delay in delivery of SMS / email to the candidates due to any reason including technical issues. Any representation from the candidates for non-receipt of SMS or e-mail will receive no attention.

16. LAST DATE FOR SUBMISSION OF APPLICATION:

Online application can be edited/ submitted upto **11.11.2023** till 11.59 p.m., after which the link will be disabled. Online application correction window period is from **16.11.2023 12.01 A.M. to 18.11.2023 11.59 P.M**. The applicants are permitted to upload/ re-upload the documents upto **24.12.2023** till 11.59 P.M, after which the link will be disabled.

(For detailed information, applicants may refer to the "Instructions to Applicants" at the Commission's website www.tnpsc.gov.in).

DISCLAIMER

"The Government orders relating to Equivalence of qualification are available in the Annexure II of the Notification. However, if the applicant possesses an equivalence of qualification other than one mentioned in the Commission's website and if Government orders to this effect have been issued on or before the date of this notification, applicants should furnish the details of the same while applying and should **upload** a copy of the Government orders, **along with online application**, failing which their application will be rejected after due process. The Government orders regarding equivalence of qualification issued after the date of this notification will not be considered for this recruitment".

Secretary

ANNEXURE-I
Paper –I [SYLLABUS FOR WRITTEN EXAMINATION]

TAMIL NADU PUBLIC SERVICE COMMISSION

AGRICULTURAL ENGINEERING CODE: 409

(DEGREE STANDARD)

UNIT-I: SURVEYING AND HYDROLOGY

Surveying – Instruments - Methods of surveying – Linear measurements - Computation of area – Triangulation, intersection, traversing, cross staff survey – Plane table survey – Earth work computation -Simpson's and trapezoidal rule - Levelling - Definition - Types of benchmarks - Different types of levels – Reduced level by rise and fall method and height of collimation method - Contouring – Profile surveying - Cross section survey - Use of Minor instruments - Theodolite survey - Total station - GPS survey. Hydrology – Measurement of rainfall, evaporation and infiltration – Estimation of runoff – Factors affecting runoff – Computation of volume of runoff and peak flow – Unit hydrograph - Occurrence and movement of ground water - ground water exploration techniques - hydraulics of wells, types of wells and their construction - Well drilling – Methods and machinery - Techniques for different formations - Well logging - Types of well screen - Design of well screens - Well development - Yield testing.

UNIT-II: SOIL EROSION AND CONSERVATION

Soil erosion – Types – Factors affecting erosion by water and wind - Stages of water erosion - Biological control measures and their suitability - Contour farming, strip cropping, mixed cropping, intercropping and mulching - Mechanical control measures and their suitability – Design and construction of contour bunds, graded bunds, terraces, contour stone walls, contour trenches, staggered trenches and diversion drain - Gully control structures and check dams - Wind erosion – Types and control - Wind breaks and shelter belts - Dry farming techniques for improving crop production - Estimation of soil erosion - Universal Soil Loss Equation.

UNIT-III: WATERSHED DEVELOPMENT AND MANAGEMENT

Watershed – Concept, types and delineation - Land capability classification - Participatory Rural Appraisal Technique – Watershed development plan – Estimation of cost and benefits -Gully and ravine reclamation – In-situ & Ex-situ water harvesting, micro catchments – Ground water recharge - Artificial recharge techniques and methods - Farm pond and percolation pond – Selection of suitable soil and water conservation practices – Afforestation – Holistic planning - Watershed based rural development – Use of aerial photography and remote sensing in watershed management - Applications of Remote sensing and GIS in planning and development of watersheds including forest cover and water resources.

UNIT-IV: IRRIGATION AND DRAINAGE

Irrigation - Sources – Soil- water- Plant relationship - Water requirement of crops – Measurement of irrigation water - Weirs and flumes - Methods of irrigation - Surface, Sprinkler, Rain gun and drip irrigation - Irrigation automation - Drip irrigation – Components - Wetting pattern - Filters and Fertigation tanks - Design of laterals - Submain - Main lines - Pump capacity - Operation and maintenance - Sprinkler irrigation - Components - Sprinkler performance - Hydraulic design of sprinkler systems - Duty and delta relationship – Irrigation scheduling - Irrigation efficiencies and their estimation - Pumps - Types, selection and installation - Drainage - Causes of water logging and salt problem - Methods of drainage - Design of surface, sub-surface and vertical drainage systems - Improvement and utilization of poor quality water - Reclamation of saline and alkali soils.

UNIT-V: FARM AND IRRIGATION STRUCTURES

Design and construction of farm structures – Site selection - Materials of construction – Quality– types of masonry – RCC - Foundation, basement and superstructure – Types of roofs – building plan and estimation, requirements of farm house, threshing floor, drying floor, poultry house, dairy farm, rat proof godown and farm roads - Design features earthen dams and gravity dams - Water conveyance structures – Earthen channels and lined channels – Advantages of lining – materials of lining – Design of channel cross section – Crossing control structures – Drop spillway, chute spillway, pipe inlet spill way – Road crossing structures – Culvert, inverted siphon aqueduct – Their uses - Underground pipe line system – Components and their functions – Structures for plant environment – Green houses, polyhouses and shade nets – Construction and utilization - Soilless culture.

UNIT-VI: FARM POWER

Sources of Farm Power- Construction and working of IC engines-SI and CI engines-Thermodynamic principles of SI an CI engine - two stroke and four stroke engines- Turbo charging - Fuel, Ignition, lubrication, air cleaning, cooling, governing, electrical, systems of IC engines- Different types of tractors, bull dozers and power tillers - power transmission systems, clutches, gear system, differential, Final drive system, Brake system, steering system, hydraulic system, hitching system, three point linkage- tractor power outlets-traction-traction theory-operations using bull dozer, wheels and tyres-terminology-tractor stability-mechanics of tractor implement combination, weight transfer - Ergonomical considerations in operation of tractors and safety devices in tractor-care and maintenance of tractors. Single phase induction motor - three phase power measurement methods- Power factor- Electrical pump sets - regulated DC power supply, DC machine, DC generator, DC motor, starter - torque and efficiency - Electronics in Agriculture - Semi conductors, transistors, operational amplifiers - Digital electronics, counters, encoders, decoders, Digital to Analog and Analog to digital converter-Instrumentation - transducers - strain gauges, types and gauge factor - force measurement using

strain gauges, Torque measurement, pressure measurement, flow measurement temperature measurement, thermocouples, speed measurement micro processors, micro controllers, PID controllers, PLC - Electric vehicles in Agriculture.

UNIT- VII: FARM MACHINERY

Earth moving equipment - Back hoe with front end loader, Crawler excavator - Bull dozer - blades-shovels-soil digging machines-primary tillage implements-indigenous plough, Mould board plough, disc plough, chisel plough, sub soiler, methods of ploughing – secondary tillage implements-cultivators, harrows, rotary tillers, rotavator, land shaping machinery- laser leveller, ridger, bund former, raised bed former, puddler. Calculation of field capacity, field efficiency. Sowing and transplanting –seed drills, types - different types of metering mechanisms, planters, broadcasters and rice transplanters, pneumatic planters- intercultural implements - dryland weeders, wetland weeders, manual and power operated weeders - plant protection equipments - sprayers - types of sprayers - Drone sprayer - calibration of sprayer, types of nozzles, drift –harvesters - sickle, mower, cutter bar, reaper, binders, windrowers - threshers - principle of threshing, types of threshers, threshing drums, calculation of output capacity, combines, working principles, components of combine. Root crop harvesters, cotton harvesters, cotton strippers, sugarcane harvester, maize harvesters, vegetable and fruit harvesters, crop residue management machinery - cost estimation of farm machinery.

UNIT-VIII: UNIT OPERATIONS IN FOOD AND AGRICULTURAL PROCESSING

Heat transfer principles – Conduction, convection and radiation - Types of heat exchangers - Unit operations – Evaporators - Types - Mechanical separation – Filtration – Sedimentation – Settling – Centrifugal separation – Cyclone separation - Size reduction – Mixing – Blending – emulsification - Food processing operations - Pasteurization – Sterilization – Canning - Retort processing - Extrusion processing of foods - Methods of drying of foods – Preservation of food by irradiation - Microwave and dielectric heating - Fats and oil processing – Extraction methods and equipments - Food packaging – Materials and characteristics – Suitability - Processing of milk and milk products, packaging of milk - Principles of refrigeration and applications in food industries – Cold storage of fruits and vegetables - Design aspects.

UNIT- IX: PROCESS ENGINEERING OF AGRICULTURAL AND HORTICULTURALCROPS

Engineering properties of food materials – Moisture content – Methods of determination – Psychrometry - Drying – Thin layer and deep bed drying – Types of heat sources and types of dryers - Cleaning and grading – Principles – Separators – Efficiency – Performance index - Shelling and decortication – Seed

processing and layout of seed processing units - Rice processing – Parboiling and dehusking of paddy – Machines used - Milling of corn, pulses and millets - Material handling equipments - Conveyors and elevators - Storage – Conditions for safe storage – Bag and bulk storage – Silo storage - Design aspects - Modified atmosphere storage – Storage structures - Equipments used for processing of horticultural crops – Preservation of fresh fruits and vegetables – Drying and dehydration – Processing of coffee, tea, rubber, cashew nut, coconut, oil palm, aromatic plants, flowers and spices.

UNIT-X: RENEWABLE AND BIOENERGY

Solar energy – Solar collectors – Air heaters - Solar dryers – Water heaters - Solar cold storage– Solar photovoltaic systems and applications- Solar PV pump, fencing - Wind energy - Suitable sites – Types of wind mills – Wind mill components – Applications – Performance of wind mills - Biomass resources – Agro residues – Characteristics - Conversion technologies – Biochemical conversion – Biogas plant – Types and selection, construction, operation and maintenance - Slurry handling - Thermochemical conversion – Stoves – Types - Improved stoves – Pyrolysis – Charcoal production – Gasification – Briquetting – Alternate renewable energy systems - Hydro power, Geothermal, ocean and hydrogen energy- Energy storage systems- Energy Conservation- Cogeneration - Energy plantation and environmental impact – Global warming – Clean development mechanism (CDM) and role of afforestation - Biofuels – Biodiesel feedstock, production and by-product utilization – Ethanol – Production and utilization – Emission - Standards and control.

AUTOMOBILE ENGINEERING
(DEGREE STANDARD)

CODE: 404

UNIT I ENGINES

Working principle and constructional details of petrol and diesel engines, four stroke and two stroke engines. Fuel supply system in SI engines – Carburettors, types, working principle, different circuits, compensation circuits, TBFI, MPFI, GDI. Fuel Injection system in diesel engines – Mechanical injection, CRDI. Dual fuel engines. Engine Accessories - Cooling system, air and water cooling system, forced circulation and pressure cooling system. Lubrication system – pressure lubrication – splash lubrication – wet and dry sump lubrication. Properties of lubricants and coolants. Combustion in SI and CI engines – stages of combustion – flame propagation – detonation in SI engine and knocking in CI engines. Combustion chambers – Turbo and super chargers. Fuels for IC engines, Desirable Properties of IC engine fuels, Gaseous fuels, LPG, CNG, Hydrogen, Alcoholic fuels, Flexi fuel engines. Advanced engine technologies - VVT, HCCI, Lean burn engines. Engine testing – Performance parameter calculations.

UNIT II AUTOMOTIVE CHASSIS

Types of chassis layout – various types of frames – front axles – types, stub axle, front wheel geometry – Condition for true rolling motion - Ackermann and Davis steering mechanism – steering gear boxes – Under steer, Neutral steer and Over steer - Hydraulic and Electric Power Assisted Steering. Hotchkiss and torque tube drive. Propeller shaft – Universal Joint and Constant Velocity joint - Final drive – types. Differential – principle and construction details – Differential housing - Limited Slip Differential – Rear axle - types. Wheels – types and construction. Tyres – types and construction details.

UNIT III SUSPENSION AND BRAKING SYSTEM

Suspension system – requirements – types - construction details of leaf spring, coil spring and torsion bar. Rubber and air suspension systems. Front and rear independent suspension systems – shock absorbers. Braking system – need, stopping distance, classification of brakes. Constructional details of drum brake and disc brakes - Power assisted braking systems. Retarders, ABS, TCS, EBD, ESP.

UNIT IV AUTOMOTIVE TRANSMISSION

Clutches – coils spring, diaphragm clutches – centrifugal and semi centrifugal clutches – multiplate clutches. Electromagnetic clutch - Gear box – sliding mesh, constant mesh and synchromesh – construction and operation. Automated Manual Transmission - Automatic transmission – fluid coupling, torque converter, epicyclic gear box, CVT, Dual Clutch Transmission – Hydrostatic transmission, Electric Vehicle powertrain.

UNIT V AUTOMOTIVE ELECTRICAL AND ELECTRONICS

Lead acid battery – types, battery charging, rating, and testing. Lithium Ion battery. Ignition system – principle and operation of coil, magneto and electronic ignition system. Spark plug. Starting system – types of drives - bendix drive, solenoid drive system. Charging system – generator system – types – alternator, principle and operation of cut-out and regulators. Engine sensors and actuators – types, principle and operation. Recent Trends - Navigation system, ADAS, TPS, Rain sensing wipers, micro-hybrid, keyless entry, antitheft technologies, V2V communication, CAN, LIN, OBD, Climate control system, Power windows and central locking system.

UNIT VI VEHICLE BODY ENGINEERING

Classification of cars, buses, HCVs and LCVs – Driver visibility – forward and rearward visibility – Vehicle Safety – Passive and Active Safety systems. Car Body terminology - Constructional details of cars body panels. Construction of buses – conventional and integral construction. Driver's seat design considerations – compactness of driver's cab – segmental design – modern painting processes for car bodies. Body trim items. Body mechanisms – window winding, door locking and seat height adjustment – Body repair – hand and power tools - Aerodynamics of vehicles – different types of drags – optimization techniques - Wind tunnel testing to measure aerodynamic coefficients.

UNIT VII VEHICLE DYNAMICS

Concept of vibration –Types of vibration. Response analysis of single DOF, Two DOF and multi DOF. Magnification factor and Transmissibility factor. Vibration absorbers. Tyre forces and moments – longitudinal and lateral forces. Rolling resistance. Tractive and cornering properties of tyres. Tire Testing. Human response to vehicle vibration. Design and analysis of passive, semi active and active suspension using quarter car, half car and full car models. Load distribution. Vehicle Resistances to motion, vehicle performance characteristics. Steady state and transient state handling characteristics – direction control of vehicle. Stability of vehicle under various conditions.

UNIT VIII VEHICLE CONTROL SYSTEMS

Degree of freedom for vehicle control – calculation of the control - degree of freedom. Selection of control, manipulator and measured disturbances variables. General types of vehicle controllers configuration. Dynamic behaviour of first order and second order vehicle system – dynamic responses characteristics of vehicle systems. Basic control modes – proportional control – integral control. PID controls. Lambda control – knock control – adaptive knock control – drive line modelling – active suspension control. Adaptive cruise control. Lane Departure Warning System. Adaptive Headlamps.

UNIT IX AUTOMOTIVE POLLUTION AND CONTROL

Pollutants – sources, formation and effects on environment and human beings. Emission standards. HC, CO and NOx formation in SI and CI engines. Smoke

formation and NOx emission and its types from diesel engine, Particulate emissions. Control techniques – EGR, SCR, LNT, Secondary air induction, Positive crankcase ventilation system particulate trap and catalytic converters. Test procedures CVS1, CVS3 – Test cycles – SHED test. NDIR analyser – Flame ionization detectors – Chemiluminescent analyser – dilution tunnels – gas chromatograph – smoke meters.

UNIT X MOTOR VEHICLE ACT, MAINTENANCE & SERVICING

Motor vehicle act – registration, driving licence, insurance, pollution and control. organization and management of workshop - Scheduled and unscheduled maintenance – Workshop stores – inventory management – 5S Principles in workshops – Cost estimation for maintenance and servicing – Different forms and registers for workshop – Workshop Safety - Trouble shooting and servicing of clutch, gear box, brakes, suspension and steering systems. Trouble shooting and servicing of engine and its auxiliary systems – Servicing of vehicle air conditioning system – Manual, power tools and equipment required for servicing and maintenance.

CIVIL ENGINEERING

(DEGREE STANDARD) CODE: 398

UNIT I :BUILDING MATERIALS AND CONSTRUCTION PRACTICES

Properties and testing of engineering materials-brick, stones, M-sand, aggregates, cement, timber, recycled and modern materials-glass, plastic FRP, ceramic- concrete – properties and testing- mix design-admixtures, Self-compacting concrete steel construction practice-stone masonry, brick masonry ,R.C.C. and block masonry – construction equipment - building bye-laws and development regulations practiced in Tamil Nadu - Provisions for fire safety, lighting and ventilation- Acoustics.

UNIT II : ENGINEERING SURVEY

Survey - Chain- Compass - Plane table - levelling - Theodolite- computation of area and volume-L.S. and C.S. – Contour - Traversing – traverse adjustment- -Heights and Distances - Tacheometry and Triangulation - total station and GPS and Remote sensing techniques for surveying.

UNIT III : ENGINEERING MECHANICS AND STRENGTH OF MATERIALS

Forces- types-laws - centre of gravity-moment of inertia-friction-Stresses and strains -Thermal stress - elastic constants - Beams - Bending moment and shear force in beams - Theory of simple bending - deflection of beams - torsion - Combined stresses – stresses on inclined planes - Principal stresses and principal planes - Theories of Failure – Analysis of plane trusses.

UNIT IV :STRUCTURAL ANALYSIS

Indeterminate beams - Stiffness and flexibility methods of structural analysis - Slope deflection - Moment Distribution method – Arches and suspension cables - Theory of columns - moving loads and influence lines – Matrix method- Stability of retaining walls – plastic theory- Seismic analysis of high rise building

UNIT V : GEOTECHNICAL ENGINEERING

Formation of soils - types of soils - classification of soils for engineering practice - Field identification of soils - Physical properties and testing of soils - Three phase diagram - permeability characteristics of soils - stress distribution in soils - Theory of consolidation, shear strength parameters of soils – stabilization of soil -Compaction of soils- Stability analysis of slope - Soil exploration - Soil sampling techniques – SPT -Borelog profile - shallow foundations - Terzhagi's bearing capacity theory - Pile foundation –pile load test- Group action of piles - settlement of foundations- Ground Improvement techniques.

UNIT VI : ENVIRONMENTAL ENGINEERING AND POLLUTION CONTROL

Sources of water - Water Demand -- Characteristics and analysis of water – hydraulics for conveyance and transmission - water borne diseases – Functional design of water treatment plant – desalination plant- water distribution system – pipe network analysis- characteristics and composition of sewage - Planning and design of sewerage system - sewer appurtenances - Pumping of sewage - sewage treatment and disposal - Design of storm water

drain- plumbing system in high rise building - industrial waste treatment - solid waste management – Air and Noise pollution control – E-Waste management.

UNIT VII : DESIGN OF REINFORCED CONCRETE, PRESTRESSED CONCRETE AND STEEL STRUCTURES

Design of concrete members - limit state and working stress design concepts - design of slabs - one way, two way and flat slabs - Design of singly and doubly reinforced sections and flanged sections -design of columns and footings – pre- stressing - systems and methods- post tensioning slabs - Design of pre-stressed members for flexure.

Design of tension and compression members - Design of bolted and welded connections design of members of truss - designs of columns and bases - design of beams, plate girders and gantry girder- design of liquid storage structures –elevated and underground- design of retaining wall.

UNIT VIII : HYDRAULICS AND WATER RESOURCES ENGINEERING

Hydrostatics-applications of Bernoulli equation – losses in pipes - flow measurement in channels - open channel flow- types of pumps and characteristics - Applications of Momentum equation, Kinematics of flow.

Water resources in Tamil Nadu - Water resource planning - Master plan for water management - flood control – Runoff estimation – hydrograph – flood routing - Soil plant water relationship - Water requirement for crops - Irrigation methods – Design of alluvial canal and design of headworks. Water logging and land reclamation - cross drainage works.

UNIT IX : URBAN AND TRANSPORTATION ENGINEERING

Urbanization trend and impact - Slum clearance and slum improvement programmes - Different modes of transport and their characteristics. Geometric design of highways. – Pavement materials and testing – alternate pavement materials- modified binders - Design and Construction of bituminous and concrete roads – pavement distress and evaluation - Maintenance of roads – Railways - Components of permanent way - Signalling, Interlocking and train control - drainage in roads and railways. Airport planning - Components of Airport - Site selection – Runways – Planning of terminal buildings Harbours & Ports - Layout of a harbour - Docks - Breakwaters.

UNIT X : PROJECT MANAGEMENT AND ESTIMATION

Construction management - Construction planning - Scheduling and monitoring - Cost control, Quality control and inspection - Network analysis - CPM and PERT -methods of project management - Resources planning and resource management - Types of estimates - Preparation of technical specifications and tender documents – e-tender - Building valuation - law relating to contracts and arbitration.

MECHANICAL ENGINEERING / PRODUCTION ENGINEERING / MANUFACTURING ENGINEERING CODE :399
(DEGREE STANDARD)

UNIT – I MECHANICS, KINETICS AND DYNAMICS:

Statics of Particles, Equilibrium of Rigid bodies, Mechanism of Deformable Bodies, Properties of Surfaces and Solids, Centroid, Centre of Gravity, Dynamics of Particles, Elements of Rigid Body Dynamics, Basics of Mechanisms, Kinematics of mechanisms, gyroscope, Gears and Gear Trains, Fly Wheels and Governors, Balancing of Rotating and Reciprocating Masses, Friction in Machine Elements, Force Analysis, Balancing, Single Degree Free Vibration, Forced Vibration, mechanisms for Vibration Control, Effect of Damping, Vibration Isolation, Resonance, Critical Speed of Shaft.

UNIT – II STRENGTH OF MATERIALS AND DESIGN:

Stress, Strain and Deformation of Solids, Combined Stresses, Theories of Failures, Transverse Loading on Beams, Stresses in Beams, Torsion, Deflection of Beams, Energy Principles, Thin Cylinders and Thick Cylinders, Spherical Shells, Fundamentals of Design for Strength and Stiffness of Machine Members, Design of Shafts and Couplings, Design for Static and Dynamic Loading, Design of Fasteners and Welded Joints, Reverted Joints, Design of Springs, Design of Bearings, Design of Flywheels, Design of Transmission Systems for Flexible Elements, Spur Gears and Parallel Axis Helical Gears, Bevel Gears, Worm Gears and Crossed Helical Gears, Design of single and two stage speed reducers, Design of cam, Clutches and Brakes, Design of Piston and Connecting Rods.

UNIT - III FLUID MECHANICS AND TURBO MACHINERY:

Fluid properties, fluid statics, manometry, buoyancy, control volume analysis of mass, momentum and energy, fluid acceleration, differential equations of continuity and momentum, Bernoulli's equation, Dimensional Analysis, viscous flow of incompressible fluids, boundary layer, elementary turbulent flow, flow through pipes, head losses in pipes, bends. Turbomachinery: Pelton wheel, Francis and Kaplan turbines - impulse and reaction principles – velocity diagrams, pumps and its applications-Valves and Types - Theory of Jet Propulsion- Pulse Jet – Ram Jet Engines, Online Continuous Flow Monitoring System.

UNIT – IV THERMAL ENGINEERING AND THERMODYNAMICS:

Basic concepts, Zeroth, First and Second laws of thermodynamics, thermodynamic system and processes, Carnot cycle. irreversibility and availability, behaviour of ideal and real gases, thermodynamic relations, properties of pure substances, calculation of work and heat in ideal processes, analysis of thermodynamic cycles related to energy conversion, Fuel and combustion, Fuels Characteristics, Emissions and Controls, Testing of IC Engine-Renewable sources of Energy.

Power Engineering: Steam Tables, Rankine, Brayton cycles with regeneration and reheat. I.C. Engines: air-standard Otto, Diesel cycles. Refrigeration and air-conditioning: Vapour refrigeration cycle, heat pumps, gas refrigeration, Reverse Brayton cycle; moist air: psychometric chart, basic psychometric processes.

UNIT – V HEAT AND MASS TRANSFER:

Modes of heat transfer - one dimensional heat conduction, resistance concept, electrical analogy, unsteady heat conduction, fins dimensionless parameters in free and forced convective heat transfer, various correlations for heat transfer in flow over flat plates and through pipes, thermal boundary layer, effect of turbulence, radiative heat transfer, black and grey surfaces, shape factors, network analysis; heat exchanger performance, LMTD and NTU methods.

Basic Concepts of Mass transfer, Diffusion Mass Transfer, Fick's Law of Diffusion Steady state Molecular diffusion, Convective Mass Transfer, Momentum, Heat and Mass Transfer Analogy , Convective Mass Transfer Correlations, Radiactive Heat Transfer.

UNIT – VI MATERIALS SCIENCE AND METALLURGY:

Constitution of alloys and phase diagrams, Iron – Iron Carbide Phase Diagram - steels, cast iron, phase transformations- diffusion-TTT diagram, ferrous and nonferrous alloys, heat treatment of ferrous and non-ferrous metal, surface modification techniques, powder metallurgy, non-metallic materials, mechanical properties and testing, crystal defects and strengthening mechanisms, conducting and semi conducting materials, magnetic and dielectric materials, Engineering ceramics, Engineering and commodity polymers, composites, nano-materials.

UNIT – VII PRODUCTION TECHNOLOGY:

Foundry Technology- types of pattern, cores, moulding and casting methods, Solidification, design of castings, defects, Melting Furnaces, Hot and Cold working, Metal Forming Processes - types, Defects and Remedies, Sheet Metal Operation, metal joining processes, types and design of weldment, welding metallurgy, welding defects, Casting, Welding Inspection (NDT), Manufacturing of Thermo Setting and Thermo Plastic Products, Metal cutting, Cutting Tool Nomenclature, Machinability machine tools - center lathe, drilling, milling, grinding, gear cutting and broaching, Machining Time Calculation, unconventional machining processes, Micro Manufacturing, CNC machine tools, Manual Part Programming - Machining and Turning Centre.

UNIT – VIII METROLOGY AND QUALITY CONTROL:

Limits, Fits and Tolerance, Linear and angular measurements, Interferometry, laser interferometers - Types, Computer Aided Inspection, Basic concept of CMM - Types of CMM, Machine vision, Form measurement-Straightness-Flatness, Roundness, Surface finish measurement, contact and non-contact method, Measurement of power, flow and temperature. Statistical quality control, control charts, acceptance sampling, reliability, TQM, 5S, ISO standards.

UNIT - IX CAD / CAM / CIM / FEA:

Fundamentals of Computer Graphics, Geometric Modeling, Visual Realism, Assembly of Parts, CAD Standards, Fundamentals of CIM, Production Planning and Control, Computer Aided Process Planning, Cellular Manufacturing, Flexible Manufacturing System and Automated Guided Vehicle System, Group Technology, Production Flow Analysis, Industrial Robotics, Additive Manufacturing, Just in Time(JIT), lean manufacturing, One Dimensional Problems in FEA, Two Dimensional Scalar Variable Problems, Two dimensional vector variable problems, Isometric Parametric Formulation.

UNIT – X INDUSTRIAL ENGINEERING AND MANAGEMENT:

Work study - Techniques, Method study and work measurements - objectives - basic procedure, machine loading and scheduling, product sequencing, inventory control - E O Q - quantity discounts, ABC Analysis material handling systems, operations research, Linear Programming, simplex method, Transportation model, Assignment model CPM and PERT, Queuing Models. Management theory and practice, planning - Decision making, Organising, staffing, Motivation, Leadership, controlling, control techniques, Industrial Safety - Standards – OSHA.

CHEMICAL ENGINEERING

(DEGREE STANDARD) CODE: 405

UNIT I: CHEMICAL PROCESS CALCULATIONS AND CHEMICAL ENGINEERING THERMODYNAMICS

Properties of gases, liquids and solids, Humidity and saturation, Gas laws, steady and unsteady state material and Energy balances including multiphase-involving recycle, by-pass and purge systems, Material and Energy balance with reactions, use of tie components, Gibbs Phase rule and degree of freedom analysis. Laws of Thermodynamics and its applications- Thermodynamics functions - Chemical and Phase Equilibrium -Ideal and non-ideal gases and solutions – Equation of state and residual properties, compression of fluids, Second law and entropy, Chemical potentials, properties of mixtures- fugacity, partial molal properties, excess properties and activity coefficient. Predicting VLE of systems, Free Energy Change and Chemical Reaction Equilibrium.

UNIT II: MECHANICAL OPERATIONS AND ENGINEERING MATERIALS

Characteristics of solids, laws of size Reduction, free and hindered settling, centrifuge and cyclone, thickeners and classifiers, Mixing and agitation, Filtration, Sedimentation. Conveying of solids. Materials of construction for chemical Industries, Metallic, Non-metallic, Polymeric and composite materials, Refractory, corrosion -prevention and control. Smart materials for Chemical Engineering applications- Nano and biomaterials.

UNIT III: CHEMICAL TECHNOLOGY AND RENEWABLE ENERGY SOURCES

Acids, Fertilizers, marine Chemicals, Cement, Glass, Ceramic and Refractories, Petroleum Refining Products, Fermentation Products, Oils, Soaps and Detergents, Pulp and paper, Dyes, sugar, leather and rubber, polymer, pharmaceutical and food industries. Sustainable energy resources- solar, thermal, photoelectric, tidal, geothermal, nuclear, wind, bio-energy, sources, energy storage and conversion- battery and fuel Cells, Energy efficiency estimation.

UNIT IV: FLUID MECHANICS AND HEAT TRANSFER OPERATIONS

Fluid Statics, Newtonian and Non-Newtonian fluids, Types of Manometers, Equation of continuity, Equation of motion, Bernoulli equation, Friction Factor, Dimensional analysis and similitude, Flow though pipes, velocity profiles, flow through fixed and fluidized beds, flow meters, Fans, blowers, pumps and compressors, Energy Equations, Modes of Heat transfers, Heat transfer with phase change, thermal insulation, thermal boundary layer and heat transfer coefficient. Design of heat exchangers- Double pipe, Shell and tube, single and multiple effect evaporators

UNIT V: MASS TRANSFER AND SEPARATION OPERATIONS

Fick’s Laws, Diffusion, Mass Transfer Coefficient and theories of Mass Transfer, Momentum, heat and mass transfer analogies, Inter phase Mass transfer operations, HTU, NTU and HETP concepts, Design of equipment -Distillation column, Extraction, Adsorption, Absorption, Drying, humidification and de-humidification. Crystallization, Membrane separation processes - frame, tubular, spiral wound and hollow fibre membrane reactors, dialysis, reverse

osmosis, nano/ultra filtration, microfiltration. Ion Exchange chromatography and electrodialysis, Separations involving pervaporation and permeation techniques for solids, liquids and gases, supercritical fluid extraction.

UNIT VI: CHEMICAL REACTION ENGINEERING

Reaction rates - laws - theories and analysis, homogeneous and heterogeneous reactions, single and multiple reactions in ideal reactors. Kinetics of enzyme reactions. Non ideal reactors - Residence time distribution, Single parameter model. Design of reactors- Isothermal and adiabatic fixed bed reactors, non-isothermal and non-adiabatic fixed bed reactors, fluidized bed reactors. Kinetics of heterogeneous catalytic reactions. Diffusion effects in catalysis- rate and performance equations for Catalyst deactivation.

UNIT VII: PROCESS DESIGN, INSTRUMENTATION AND CONTROL

Problem formulation, degree of freedom analysis, objective functions, Simplex method, Barrier method, sensitivity analysis, Convex and concave functions, unconstrained NLP, Newton's method, Quasi-Newton's method, Direct substitution, Quadratic programming, Cost estimation, Plant utilities, Heat exchanger networks, Pinch technology. Principles of measurements and classification of process instruments, measurement of process variables - Laplace transformation, application to solve ODEs. Open-loop systems, first order systems, first order systems in series, linearization and its application in process control, second order systems and their dynamics; transportation lag. Closed loop control systems, feed-back control systems, BODE diagram, stability criterion, frequency response, tuning of controller settings, cascade control, feed forward control, control of distillation towers and heat exchangers.

UNIT VIII: NUMERICAL AND COMPUTATIONAL METHODS

Curve fitting, Equations with real and rational Coefficients, Imaginary roots and irrational roots, Transformation of equations. Numerical solutions of linear and non linear algebraic equations- solution of initial value and boundary value, ordinary and non-linear differential equations, Integration of trapezoidal and Simpson rule. Solution of partial differential equations. Partial Differential equation – finite element, finite difference method - Matrix, determinants and properties – Elementary Row transformations algebraic equations; ordinary differential equations and non homogeneous first order ordinary differential equations, rank of Matrix, Eigen value problems, Orthogonal and ortho normal vectors; Gram-Schmidt orthogonalization; Theorem for Eigen values and Eigen functions.

UNIT IX: ENVIRONMENTAL ENGINEERING, OCCUPATIONAL SAFETY AND HEALTH IN CHEMICAL INDUSTRIES

Air, Water and soil pollution, causes, effects and remedies, Nuclear waste disposal, Noise control. Wastewater treatment by various methods: Chemical, biochemical and advanced oxidation process. Industrial hygiene, occupational safety & health in chemical industries, Industrial safety principles, site selection and plant layout, chemical hazards identification & classification, Safety in

operations and processes, fire safety, hazard identification techniques, disposal of hazardous and toxic wastes, onsite and offsite emergency preparedness plan, safety audit, work permit system, roles and responsibilities of safety officers and welfare officers, occupational diseases.

UNIT X: PROFESSIONAL ETHICS, LAWS & LEGISLATIONS:

Morals, values and Ethics – Integrity – Work ethic - Valuing time – Cooperation – Commitment – Empathy – Senses of Engineering Ethics – Variety of moral issues – Types of inquiry – Moral dilemmas – Moral Autonomy – Kohlberg's theory – Gilligan's theory – Consensus and Controversy – Models of professional roles – Theories about right action - Engineering as Experimentation – Engineers as responsible Experimenters – Codes of Ethics – A Balanced Outlook on Law. Safety and Risk – Assessment of Safety and Risk – Risk Benefit Analysis and Reducing Risk – Respect for Authority – Collective Bargaining – Confidentiality – Conflicts of Interest – Occupational Crime – Professional Rights – Employee Rights. Intellectual Property Rights (IPR), Employee Discrimination. Multinational Corporations, Environmental Ethics & legislation – Engineers as Managers, Expert Witnesses and Advisors. Moral Leadership, Code of Conduct, Corporate Social Responsibility. Labour laws and legislations – Criminal procedure code – Indian Penal Code.

TEXTILE TECHNOLOGY
(DEGREE STANDARD)

CODE:406

UNIT- I: FIBRE PROPERTIES AND MANUFACTURE

i) Classification of fibres, production of natural fibres - cotton, jute, silk, wool; Identification of natural and synthetic fibres
ii) Fine, gross structure and properties of fibres
iii) Microscopic, physical and chemical test methods for fibre identification; blend analysis
iv) Morphology characterization – Density, XRD, Electron microscopy
v) Thermal characterization methods - DSC, TGA, DMA / TMA, FTIR spectroscopy
vi) Mechanical – Tensile, Elastic recovery, Time Effect, Bending, Twisting and Compression
vii) Optical - Absorption and dichroism, Reflection and lustre.
viii) Electrical and Thermal Properties - Dielectric property, Static Electricity, Structural changes in fibres on thermal treatment.
ix) Moisture Property – Absorption, Desorption, Swelling, Theories of moisture sorption
x) Requirements of fibre forming polymers
xi) Spinning of Polymers - Melt Spinning, Wet spinning, Dry spinning, Dry-jet-wet Spinning and Gel spinning
xii) Post Spinning Operations – Drawing, Crimping, Heat setting, Tow-to-top conversion, Texturing methods.

UNIT- II: YARN MANUFACTURE, YARN STRUCTURE AND PROPERTIES

i) Principle of ginning
ii) Blow room machines; principles of opening, cleaning and mixing / blending of fibrous materials; cleaning efficiency; calculations
iii) Carding machine; Fundamentals of carding, settings, card clothing, autoleveller; calculations
iv) Comber; Lap preparation, combing cycle, mechanisms; combing efficiency; calculations
v) Draw frame; doubling and drafting, settings, autoleveller; calculations
vi) Roving frame; drafting, twisting, bobbin building; calculations
vii) Ring frame; drafting, twisting, cop formation, forces acting on yarn and traveller; limitations, compact yarn spinning; calculations
viii) Ring doubler and TFO - principle; single and folded yarn twist
ix) Alternate Spinning systems - rotor, two nozzle air-jet, air vortex, friction, core, wrap, twist-less spinning process
x) Helical geometry, packing density, yarn diameter, yarn contraction, yarn twist and relation to yarn strength - staple fibre yarn and filament; mass irregularity of yarn; structure - property relations of ring, rotor, air-jet and friction spun yarns

UNIT- III: WEAVING PREPARATORY AND WEAVING, FABRIC STRUCTURE AND PROPERTIES

i) Cheese, Cone winding - random and precision winding, winding parameters
ii) Yarn clearers and Tensioners; yarn splicing
iii) Types of warping - beam and sectional warping, pirn winding process;
iv) Sizing techniques, sizing of spun and filament yarns; Beam Gaiting
v) Principles of fabric formation in shuttle looms – primary, secondary and auxiliary motions
vi) Shedding – Types and Principles, Reversing Motions
vii) Beat up - types, kinematics of sley
viii) Principles of weft insertion in shuttleless looms - Rapier, air-jet, projectile, water-jet, circular and multiphase
ix) Basic woven fabric constructions and its derivatives - plain, twill, satin; honeycomb, warp and weft figuring, warp and weft pile, backed fabrics, double cloth
x) Pierce's geometry of plain woven fabrics; structure - property relationship

UNIT - IV: KNITTING and NONWOVEN MANUFACTURE

i) Knitting - yarn quality requirements, principles of weft and warp knitting
ii) Basic weft and warp knitted structures and its properties; calculations
iii) Circular, Flat and Warp knitting machines
iv) Geometry of plain knitted fabrics
v) Nonwovens – Needle punch, spun lace, spun bond, melt blown, thermal bond
vi) Finishing of nonwovens - mechanical, chemical

UNIT - V: PREPARATORY AND COLOURATION

i) Preparatory processes for natural fibres, synthetics and common blends
ii) Classification of dyes, auxiliaries and their properties
iii) Dyeing of fabrics using various dye classes.
iv) Batch-wise and continuous dyeing techniques
v) Dyeing machines for fibre, yarn, woven and knitted fabrics
vi) Styles and methods of printing; print paste preparation
vii) Pigment printing
viii) Digital Printing and Transfer Printing
ix) Fixation and after treatment process
x) Washing and drying of fabrics
xi) Colour measurement and colour difference calculation of dyed fabrics
xii) Fastness to wash, perspiration, light and rub

UNIT - VI: FINISHING AND SUSTAINABLE PROCESSING

i) Mechanical finishing of Textiles - shrink proof, raising and calendering
ii) Heat setting of synthetic fabrics
iii) Chemical finishes - crease resistant, water proof, water repellant, flame retardant, soil release, UV resistant, anti microbial, anti-static, softening, stiffening, elastomeric, self cleaning
iv) Bio-polishing of cotton fabrics
v) Washing and fading of denim fabrics
vi) Eco-friendly processing; Eco standards and Eco labels
vii) Minimum application technique, waterless dyeing
viii) Characteristics of Effluent and Effluent treatment

UNIT- VII: QUALITY EVALUATION OF TEXTILES

i) Sampling techniques
ii) Measurement of fibre properties - length, strength, fineness, maturity and trash
iii) HVI and AFIS techniques
iv) Determination of yarn properties - count, twist, strength and elongation, unevenness and hairiness
v) Determination of fabric properties - construction parameters, tear, tensile strength and elongation; air permeability, drape, bending, crease and wrinkle recovery, thickness, pilling, abrasion, shrinkage
vi) Low stress mechanical properties of fabrics - FAST and KESF
vii) Yarn defects and analysis; diagram, spectrogram, VL curve

UNIT- VIII: GARMENT MANUFACTURE AND SPECIAL FINISHES

i) Fabric defects and analysis
ii) Garment manufacture - Pattern making, Marker planning, Spreading and Cutting,
iii) Stitches and Seams, Sewing defects
iv) Types of spreading, cutting and sewing machines; mechanisms and accessories
v) Sewing threads
vi) Components and trims
vii) Pressing, packing, care labels
viii) Garment Inspection and Merchandising

UNIT- IX: TECHNICAL TEXTILES

Fibre, yarn and fabric requirement for

i) Industrial Textiles - Belts, Ropes, Tyre-cords, Coated abrasives
ii) Automotive Textiles - Filter fabrics, Airbags, Seatbelts
iii) Geotextiles – Applications in civil engineering
iv) Agriculture Textiles – Crop covers, bird nets, soil mats and sacks

v) Medical Textiles – Non-implantable, Implantable, hygiene products
vi) Protective Textiles - Ballistic textiles, cold protective clothing, UV Protection, Clean room garments
vii) Sports Textiles

UNIT X: MANAGEMENT OF TEXTILE INDUSTRY

i) Industrial Engineering – Work study, method study, motion study, work measurement
ii) Costing of yarn, fabric and garment; costing - elements, cost sheet, Balance sheet, P & L Account, ratio analysis
iii) Depreciation, investment appraisal techniques
iv) Management Tools – Lean, TQM, TPM, 5S, Kaizen, MIS, Supply chain management, six sigma, FMEA
v) Industrial safety and industrial hygiene
vi) Industrial relations and Labour laws
vii) Energy conservation in textile industry

ELECTRICAL ENGINEERING /
ELECTRICAL AND ELECTRONICS ENGINEERING

(DEGREE STANDARD) CODE: 400

UNIT – I ELECTRICAL CIRCUITS

Circuit elements – Kirchoff's Laws – Mesh and Nodal Analysis - Network Theorems and Applications for DC and AC circuits: Thevenin's Theorem, Norton's Theorem, Superposition Theorem, Maximum Power Transfer Theorem – Sinusoidal Steady State Analysis of RL-RC-RLC Circuits- Resonant Circuits - Natural and Forced Response – Transient Response of RL-RC-RLC Circuits-Two-port networks – Three Phase Circuits-Star-delta transformation-real and reactive power-powerfactor

UNIT – II ELECTRIC AND MAGNETIC 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- Magnetic Circuits- Magnetomotive force - Reluctance-Faraday's laws-Lenz's law-Biot-Savart's law - Ampere's law - Fleming's Left and Right Hand Rule-Lorentz force - Inductance - Self and Mutual Inductance-Dot Convention-Coupled Circuits

UNIT – III MEASUREMENTS AND INSTRUMENTATION

Units and Standards – Static and Dynamic Characteristics-Types of Errors-Error Analysis – Measurement of Current, Voltage, Power, Power-factor and Energy – Indicating instruments – Measurement of Resistance, Inductance, Capacitance and Frequency – Bridge Measurements – Instrument Transformers-Electronic Measuring Instruments – Multi meters-True RMS meter-Spectrum Analyzer-Power Quality Analyser- Recording Instruments-X-Y Recorder-Magnetic Recorders-Digital Data Recorder-Oscilloscopes-DSO-LED and LCD Display-Transducers and their applications to the Measurement of Non-Electrical Quantities like Temperature, Pressure, Flow-rate, Displacement, Acceleration, Noise level –– Data Acquisition Systems – A/D and D/A Converters- Data Transmission Systems-PLC –smart meters

UNIT – IV CONTROL SYSTEMS

Mathematical Modelling of Physical Systems – Transfer Function - Block Diagrams and Signal Flow Graphs and their Reduction using Mason's Rule – Time Domain and Frequency Domain Analysis of Linear Time Invariant (LTI) System – Errors for Different Type of Inputs and Stability Criteria for Feedback Systems – Stability Analysis Using Routh-Hurwitz Array – Nyquist Plot and Bode Plot – Root Locus – Gain and Phase Margin – Basic Concepts of Compensator Design – PI,PD and PID Controllers-State Variable formulation-state transition matrix- Eigen values and Eigen vectors-free and forced responses of Time Invariant systems-controllability and observability.

UNIT –V ELECTRICAL MACHINES

D.C. Machines – Construction, Excitation methods – Armature Reaction and Commutation – Characteristics and Performance Analysis – Generators and Motors – Starting ,Speed Control and braking – Testing – Losses and Efficiency. Transformers-Types-Construction and Operation- Testing – Equivalent Circuits – Losses and Efficiency-All day efficiency – Regulation – Parallel Operation – Three Phase Transformers – Auto-transformer. Induction Machines – Construction, Principle of operation – Rotating Magnetic Field – Performance, Torque-Speed Characteristics, No-load and Blocked Rotor tests, Equivalent Circuit, – Starting ,Speed Control and braking – Single-Phase Induction Motors – Linear Induction Motors – Hysteresis Motors – Reluctance Motors. Synchronous Machines – Construction – Operating characteristics and Performance analysis – Efficiency and Voltage regulation – Parallel operation – V and inverted V curves of synchronous motors – Power factor improvement-permanent magnet synchronous motor-Permanent magnet brushless dc motor – stepper motor

UNIT –VI POWER SYSTEMS

Single Line Diagram of Power System-Per Unit Quantities-Power Generation Types- Hydro, Thermal and Nuclear Stations – Pumped storage plants – Co generation– Economic and operating factors – Modelling and performance characteristics of Power transmission lines and Cables-HVDC transmission– Mechanical Design of Transmission Lines-Sag-Insulators - Z_{Bus} and Y_{Bus} formulation - Load flow studies – Shunt and Series Compensation- Symmetrical and Un symmetrical Faults Analysis - Transient and Steady-State Stability of Power Systems – Equal Area Criterion-Voltage and Frequency Control – Power System Transients – Power System Protection – Circuit Breakers – Relays classification of protection schemes-overcurrent, distance, differential and carrier-Equipment protection-transformer, generator, motor, busbars and transmission line –AC and DC Distribution-deregulation-energy conservation and energy auditing

UNIT –VII ANALOG AND DIGITAL ELECTRONICS

Semiconductor Devices – PN junctions – Transistors – FET – Zener, Photo diodes and their applications – Rectifier circuits – Voltage regulators – Multipliers. Biasing circuits – Small signal amplifiers – Frequency response – Multistage amplifiers – Coupling methods – Large signal amplifiers – Push-pull amplifiers – Feedback amplifiers – Oscillators – Operational amplifiers and its applications – Precision rectifiers – Multivibrators - Voltage Controlled Oscillator-Timer. Digital logic gate families (DTL,TTL,ECL,MOS,CMOS) – Logic gates - Simplification of Logic Functions- Design of Combinational circuits - Sequential logic circuits-latch–Flipflops– Counters – Registers – multiplexers and demultiplexers- Schmitt triggers-Memories(ROM,PLA and FPGA).

UNIT - VIII POWER ELECTRONICS AND DRIVES

Principle of Operation and Static and dynamic behaviour of Power Semiconductor devices –- Power Diode, DIAC, SCR, TRIAC, GTO, MOSFET and IGBT- - Single and Three Phase AC to DC Converters –uncontrolled and controlled rectifiers -performance parameters – Single and Three Phase AC to AC converters - Switched Mode Power Supplies – buck ,boost and buck-boost

converter topologies -switching losses-Inverters-Single and Three Phase Inverters – Voltage control- Pulse Width Modulation techniques-harmonic elimination techniques– Uninterrupted Power Supplies- Electrical drives-motor load dynamics-load torque characteristics-Speed Control of DC Drives– Converter/Chopper fed dc motor drives- Speed control of AC drives- induction motor drives –stator voltage control and V/f control -synchronous motor drives-V/f control, self control, margin angle control and power factor control

UNIT –IX DIGITAL PROCESSORS AND COMMUNICATION

Architecture of 8085, 8086 and 8051 – Instruction Sets – Assembly Language Programming – Interfacing for memory and I/O: 8255 Programmable Peripheral Interface – 8253 Programmable Timer Interface – 8279 Programmable Keyboard and Display Interface – 8257 Direct Memory Access Interface - Embedded processors (ARM and PIC basics only). Classification of Signals and systems – Properties of Discrete Fourier Transforms - FFT Computation – FIR Filters – IIR Filters: Butterworth Filters – Chebyshev Filters. Digital Communication Systems**:** Pulse Code Modulation and Demodulation – Adaptive Delta Modulation - Frequency Division and Time Division Multiplexing – Data Communication Network Topologies - 7-layer OSI Protocol-IoT concepts

UNIT –X RENEWABLE ENERGY SOURCES AND STORAGE DEVICES

Renewable Energy – Sources and Features - Solar Radiation Spectrum-Radiation Measurement-Solar Photovoltaic Cell –principle of operation-types-MPPT - Microhydel- Operating principle- Wind Energy –components- wind power turbine types-MPPT- Site Selection-Types of Wind Generators-smart grid - Electric vehicles -V2G and G2V- Fuel Cells- Batteries-types and characteristics- Super Capacitors.

ELECTRONICS AND INSTRUMENTATION ENGINEERING
(DEGREE STANDARD) CODE : 402

UNIT-I ANALOG ELECTRONICS

Characteristics and Applications of Diode, BJT, JFET, SCR, UJT, MOSFET-Small Signal Analysis of BJT and JFET amplifiers, Feedback Amplifiers, RC and LC Oscillators –Characteristics and Applications of Operational Amplifier, Differentiator, Integrator, Instrumentation Amplifier, Precision Rectifier, V to I and I to V Converter, Active Filters, Oscillators and Signal Generators.

UNIT-II DIGITAL ELECTRONICS

Digital Logic Theory:
Number Systems – Combinational Logic Circuits – Minimization of Boolean Functions – IC Families: TTL and CMOS – Arithmetic Circuits, Multiplexer & Decoders – Sequential Circuits: Flipflops, Counters, Shift Registers, Schmitt Trigger, Timers, Multivibrators, S/H Circuit,– Analog to Digital Converter (Successive approximation, Integrating and Sigma Delta) – Digital to Analog Converters (Binary Weighted Resistor, R-2R, Inverted R-2R) – Characteristics of ADC and DAC.

Embedded Systems:
Microprocessor and Microcontroller Applications, RISC and CISC Processors, Memory and Input-Output Interfacing, Embedded C Programming, Multiprocessors, Scheduling, Power Optimization Strategies, I^2C and CAN Buses.

UNIT-III DIGITAL SIGNAL PROCESSING AND COMMUNICATION ENGINEERING

Discrete Time Signals and Systems:
Sampling Theorem, Characteristics and Classifications of DT Signals and Systems - LTI System Characteristics, Convolution and Correlation, Time Domain and Frequency Domain Analysis – ZT, DTFT, DFT - FFT Algorithms –IIR and FIR Filters.

Communication Engineering:
Amplitude and Frequency Modulation and Demodulation – Shannon's Sampling Theorem, Pulse Code Modulation, Frequency and Time Division Multiplexing. Digital Communication System (ASK, FSK, PSK and QAM) - Digital Communication Concepts – Network Protocols – ISO/OSI reference model – Fiber Optic Communication.

UNIT-IV TRANSDUCER ENGINEERING

Units and Standards - Calibration Methods – Errors in Measurement and Uncertainty analysis – Static and Dynamic Characteristics of First and Second Order Transducers - Resistive, Capacitive, Inductive, Piezoelectric, Magnetostrictive, Hall Effect and Smart Sensors and Associated Signal Conditioning Circuits.

UNIT-V ELECTRICAL AND ELECTRONIC MEASUREMENTS

Measurement of Resistance, Capacitance, Inductance and Frequency using Bridges (Wheatstone, Kelvin, Megohm, Maxwell, Anderson, Schering and Wien Bridge) - Q-meter– Galvanometer, Measurement of Voltage and Current - Power and Energy Measurements – Potentiometers, and Instrument Transformers - Digital Voltmeter, Digital Multimeter, Time, Phase and Frequency Measurements – Oscilloscopes – Digital and Recording Devices.

UNIT-VI INDUSTRIAL INSTRUMENTATION

Measurement of Displacement (Linear and Angular), Force, Torque, Velocity, Acceleration, Vibration, Density, Viscosity, Humidity and Moisture, Measurement of Flow (Variable Head, Variable Area, Mass, Electromagnetic, Ultrasonic, Turbine and Open Channel Flow Meters) – Measurement of Level, pH, Temperature (Thermocouple, Bolometer, RTD, Thermistor, Pyrometer and Semiconductor) and Pressure – Universal Smart Transmitter.

UNIT-VII ANALYTICAL AND BIO-MEDICAL INSTRUMENTATION

Analytical Instruments: Spectrophotometers – Spectral Methods of Analysis – Source, Detectors and Applications – Ion Conductivity: Sampling System, Ion Selective Electrodes, Conductivity and pH meters – Gas Analyzers – Chromatography – NMR Spectroscopy – Mass Spectrometers – Dust and Smoke Measurements – Water Quality Analyzer.
Biomedical Instruments: Bio-potentials and their Measurement Techniques & Signal Conditioning Circuits – ECG, EEG, EMG and ERG - Medical Imaging Systems: X-Ray, Computed Tomography (CT), Magnetic Resonance Imaging (MRI), Positron Emission Tomography (PET), Ultrasound.

UNIT VIII - CONTROL SYSTEMS

Modeling of Mechanical and Electrical Systems (First Principle, Transfer Function and State Space Models) **-**Block Diagram Reduction-Signal Flow Graphs-Time and Frequency Domain Analysis - Stability Analysis (Root Locus, Routh Hurwitz Criterion, Nyquist Stability Criterion) -Lead/Lag Compensators-Controllability and Observability.

UNIT IX -PROCESS CONTROL

Process Modeling: Level and Thermal Processes-Interacting and Non-Interacting Systems- Self regulation - Degrees of freedom - Characteristics of ON/OFF, PID Control Modes-PID Controller Tuning (Z-N, Cohen-Coon and Continuous Cycling)- PID Implementation Issues (Bumpless Transfer and Anti-reset Windup)- Control Valve Characteristics and Sizing- Control Schemes: Cascade, Feed-Forward, Ratio, Adaptive, Internal Model Controller and Model Predictive Control.

UNIT X PLC, SCADA AND DCS

PLC: Architecture, I/O Modules, Programming Languages (Ladder Logic, Instruction List and Functional Block Diagram) -Internet of Things.
SCADA: RTU, Master Station and Communication Architectures.
DCS: Architecture, Local Control Unit, Field Control Unit, Operator and Engineering Human Interface Station, Displays – HART and Field Bus Communication Protocols.

ELECTRONICS / ELECTRONICS AND COMMUNICATION ENGINEERING

(Degree Standard) CODE : 403

UNIT – I SEMICONDUCTOR THEORY AND ELECTRONIC DEVICES

Intrinsic and Extrinsic semiconductors, Energy Bands, Diffusion ad Drift current densities. PN junction diode, current equation, Transition and Diffusion capacitances, Zener diode, Tunnel diode, Varactor diode, Photo diode, Schottky diode, LED, BJT, FET, JFET, MOSFET, UJT, SCR, DIAC, TRIAC.

UNIT - II CIRCUIT THEORY, SIGNALS AND SYSTEMS

Circuit analysis: Kirchoff's laws, Nodal and Mesh analysis, Network Theorems: Superposition, Thevenin, Norton, Miller and Reciprocity. Sinusoidal steady state analysis: phasors, complex power, maximum power transfer. Time and frequency domain analysis of linear circuits: RL, RC and RLC circuits, solution of network equations using Laplace transform. Linear 2-port network parameters, Wye-Delta transformation.
Characteristics and classifications of Continuous and Discrete Time signals – CT signal analysis – Fourier Series, Fourier Transform and Laplace Transform. Sampling theorem, Discrete Time signal analysis – DTFT and Z-Transform. CT and DT systems – Impulse response and convolution, Frequency response, Transform domain analysis using FT, LT, DTFT and Z-Transform – Recursive and non-recursive systems.

UNIT-III ANALOG CIRCUITS

BJT, JFET, MOSFET amplifiers – Biasing analysis, Small signal analysis and frequency response, BJT and MOSFET multistage amplifiers: Differential, Darlington, Cascade and Cascode, Feedback amplifiers, Tuned amplifiers, RC and LC oscillators, Power amplifiers. Rectifiers and wave-shaping circuits, Operational amplifier characteristics and applications, CMRR, slew rate, waveform generators, active filters, timers, PLL, VCO, ADC, DAC, Regulators and Converters.

UNIT-IV CONTROL SYSTEMS

Control system components, Feedback, Transfer function, Transient and Steady state analysis of LTI systems, Frequency response, Bode, Polar and Nyquist plots, Routh-Hurwitz and Nyquist stabilities, Lag, Lead, Lag-lead compensation, State variable model.

UNIT – V COMMUNICATION SYSTEMS

Random Processes: Stationary process, Ergodic process, Auto correlation, Power spectral density, White noise, Filtering of random signals through LTI systems.

Analog Communication: Amplitude and angle modulation / demodulation, Spectral characteristics.
Noise: Thermal noise, Noise figure and Noise temperature.
Digital Communication: PCM, DPCM, ADPCM, DM, ADM, LPC.
ine coding schemes, Bandpass signaling: Binary and M-ary versions of ASK, PSK, FSK, BER and spectral characteristics. Principles of QAM, OQPSK, MSK, GMSK. Link budget calculations, Eye diagram, ISI, Symbol and carrier synchronization, Frame synchronization.
Information Theory and coding: Entropy, Mutual information, Channel capacity (AWGN), Source coding and Channel coding techniques.

UNIT-VI ELECTROMAGNETIC THEORY

Divergence, Stokes, Coulomb, Poisson and Laplace Equation, Ampere's law, Biot-Savart law, Gauss law for magnetic fields, Maxwell's equations, Displacement current, Uniform plane waves, 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.
Rectangular and circular waveguides.
Dipole and monopole antennas, Linear antenna arrays.

UNIT-VII WIRELESS COMMUNICATION TECHNIQUES

Wireless channel characteristics, Frequency reuse, Channel assignment and and handoff, Multipath effect, Spread spectrum, OFDM, Adaptive equalization, Rake receiver, Diversity techniques, MIMO systems.

UNIT – VIII DIGITAL SIGNAL AND IMAGE PROCESSING

DFT, FFT, Overlap and save methods, IIR filters: Butterworth and Chebyshev filters, Impulse invariant and Bilinear transformation methods, FIR filter: Linear phase design, Windowing techniques: Rectangular, Barlett, Hanning and Hamming, Digital Filter realization structures, Finite word length effects in IIR and FIR filters, Scaling, Decimation and interpolation, multirate signal processing.
Image enhancement: Contrast enhancement, Histogram equalization, Filtering. Image compression: JPEG. Video compression: Intra-frame / Inter-frame redundancy and motion estimation.

UNIT – IX DIGITAL CIRCUITS

Number representations: Binary, Integer and Floating point numbers, Combinational logic 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.
Sequential circuits: Latches and flip-flops, Counters, Shift registers, Finite

state machines, Propagation delay, Setup and hold time, Critical path delay.
Data converters: Sample and hold circuit, ADC and DAC.
Semiconductor memories: ROM, SRAM, DRAM.
Computer organization: Machine instructions, Addressing modes, ALU, Data path and Control unit, Instruction pipelining.

UNIT – X: DATA NETWORKS

OSI model, TCP/IP reference model, Data link layer: Framing, error and flow control, HDLC, P to P – Medium Access Control: Random and controlled access, Channelization. Network layer: IPV4 and IPV6, ARP and RARP, Network routing algorithms – Distance Vector routing, OSPF, Dijkstra's and Bellman Ford, Congestion control, Transport layer: TCP and UDP, Application layer: WWW, HTTP, FTP and TELNET.

SYLLABUS
BASICS OF ENGINEERING
(UG DEGREE STANDARD)

Code :422

UNIT-I: MATHEMATICS:

Matrices: Eigenvalues - Eigenvectors of a real matrix - Cayley - Hamilton theorem - Similar and Orthogonal transformations - Reduction of a quadratic form to Canonical form by orthogonal transformation. Ordinary differential equations: Order and degree - Higher order linear ODE with constant coefficients - Method of undetermined coefficients - Method of variation of parameters - Cauchy's and Legendre's linear equations. Functions of several variables: Partial derivatives - Total derivatives - Euler's theorem - Implicit functions - Jacobians - Taylor's theorem - Maxima and Minima. Integration: Definite and indefinite Integrals - Techniques of integration using integration by parts and Trigonometric Integrals - Double Integrals - Change of order of integration - Volume Integrals. Vector Calculus: Vectors and scalars - Gradient and Directional derivatives - Divergence and Curl - Applications of Green's theorem, Gauss divergence theorem and Stoke's theorem. Complex variables: Analytic functions - Verification of Analyticity - Construction of Analytic functions - Conformal Mappings - Bilinear transformations. Complex Integration: Cauchy's integral theorem - Cauchy's fundamental theorem - Cauchy's residue theorem - Taylor's and Laurent's series - Contour integration (excluding poles on the real axis). Laplace transform: Existence of Laplace transform - Laplace transform of elementary functions- Properties - Laplace transform of Periodic functions - Inverse Laplace transform - Convolution theorem - Solution of linear second order ODE by Laplace transform technique.

UNIT-II: ENGINEERING PHYSICS:

Mechanics: Newton's laws of motion – gravitation – work, energy and power - Properties of matter : Elasticity – moduli of elasticity - Sound : intensity level – reverberation – Ultrasonics : production, detection and applications - Thermal Physics : Thermal expansion - thermal stress - expansion joints - bimetallic strips - thermal conductivity- heat conductions in solids – flow of heat through compound media – Thermodynamics – Laws of thermodynamics – Carnot engine - Applied Optics : Interference – Young's double slit experiment - anti-reflection coatings - Diffraction - Lasers – principle and applications – CO_2 and Nd:YAG laser - semiconductor lasers – applications of Lasers - Optical fibres: classification (index & mode based) - principle and propagation of light in optical fibres - acceptance angle and numerical aperture - fibre optic communication system - Quantum Physics : Photoelectric effect– dual nature of matter and radiation – Heisenberg's uncertainty principle - Schrödinger's wave equation - Physics of Materials : Crystal structures – unit cell – packing factor – Superconductivity : Properties

and applications - Magnetisation of matter: Magnetic dipole moment – atomic magnetic moments- magnetic permeability and susceptibility - Magnetic material classification : diamagnetism – paramagnetism – ferromagnetism – Semiconductors : Intrinsic Semiconductors – Energy band diagram – direct and indirect band gap - extrinsic semiconductors – Dielectric materials: Matter polarization and relative permittivity - dipole moment and polarization vector -polarization mechanisms: electronic, ionic, orientational, interfacial and total polarization- frequency dependence - dielectric strength and break-down in gases, liquids and solids.

UNIT-III: ENGINEERING CHEMISTRY:

Fuel -Classification of fuels - Calorific value - Solid fuel - Liquid fuel - Gaseous fuel - Octane number - Cetane Number -Lubricants - Classification - Greases - Solid Lubricants. Water - Sources - Classifications - Softening process - Desalination - RO Method - Internal treatment - Treatment of Water for Municipal purposes. Plastics - High polymer - classification - Polymerization techniques - Thermoplastics - Thermosetting resins - examples. Rubber - "Types of Rubber - Vulcanisation - Properties-Unvulcanised and Vulcanised. Natural Rubber - Synthetic Rubber - examples. Refractories - Classification - Manufacture of Refractories - Magnesite - Silica - Zirconia -Chromite. Abrasives - Natural - Artificial-Abrasive paper & cloth. Corrosion: Dry and Wet corrosion - Factors affecting corrosion- Different types of corrosion. Productive coating - Hot dipping- metal cladding, electro deposition - Organic Coatings - Paints - Varnishes. Cement and lime- setting and hardening. Explosives- classifications- characteristics-requirements for good explosives-nitrocellulose- TNT- TNB-DNB-PETN- RDX. Alloys- purpose of making alloy-types of alloys- Ferrous alloys. Electrochemistry - conductors and non-conductors - Kohlrausch law - Electrochemical cell-reversible and irreversible cells - EMF - Concentration cell- polarization - over voltage, decomposition potential. Fuel Cells. Nano Chemistry-Basics- distinction between molecules, Nano materials and bulk materials. Size dependent properties and applications of Nano Materials

UNIT-IV: BASICS OF COMPUTER ENGINEERING:

Computer Organisation - CPU and Microprocessor [ALU, Control Unit and Bus Structure] - Data Storage [Primary, Secondary and Virtual] - Input and Output Devices.
System Software - Assembler - Compiler - Loader - Linker - Operating Systems.
Programming Languages - Classification of Programming Language, Algorithm, Flow chart, Pseudo code, High-Level Languages – Fundamental concepts of C Programming.
Basic Computer Networking - Network Components [Routers, Bridges, Gateways] - ISO-OSI Reference Model - LAN - WAN - Client-Server Architecture - Internet - World Wide Web.

Applications - Office Tools - Word processor - Spreadsheet - Power point - Introduction to Database concepts - E-mail - Browser.
IT Enabled Services - E-Governance - E-Commerce - Multimedia.

UNIT-V: BASICS OF CIVIL AND MECHANICAL ENGINEERING:

Introduction to Engineering mechanics - Units and Dimensions - Laws of Mechanics - Coplanar Forces - Static Equilibrium of Rigid body - Moment of force - free body diagram - friction - laws of friction - sliding friction - wedge friction - Rolling resistance - Lader friction - Friction in screws - Screw jack - Belt friction - Properties of surfaces and solids - Centroids and centre of mass - line and areas - Rectangular, circular, triangular areas by integration - T-section, I- Section, Angle section, Hollow section - Area moment of inertia of plane areas - Parallel axis theorem – Perpendicular axis theorem, Polar moment of Inertia, Principle moment of Inertia Mass moment of inertia- Centroid of the simple solids - Dynamics of particle - Displacement, velocity and acceleration - Different types of motion - Rectilinear , Curvilinear and Projectile motions - Newton's II-law of motion - Work Energy equation - Impulse and momentum principles.

UNIT-VI: BASICS OF ELECTRICAL AND ELECTRONICS ENGINEERING:

Ohm's law- Kirchoff's laws - Introduction to DC and AC circuits - single phase and three phase circuits – Power and Power factor, Unbalanced and Balanced loads, Operating principles of moving coil and moving iron instruments (voltmeters and ammeters) – wattmeters, multimeter, energy meters and megger, Construction and principle of operation: DC motors- DC generators-Transformers- Induction motors, Characteristics of PN junction diode - zener diode- half wave and full wave rectifiers - Bipolar junction transistor (CC,CE,CB configurations), SCR, Amplifiers- Operational amplifiers – Inverting and Non-inverting amplifiers, Binary number system- logic gates- Boolean algebra - Half and full adders- Flip-flops -registers and counters- A/D and D/A conversion, Types of analog and digital signals- Modulation and Demodulation(amplitude and frequency) Communication systems: Radio- TV- Fax- Microwave-Satellite and optical fibre.

UNIT-VII: PRINCIPLES OF MANAGEMENT:

Management - Definition, Evolution of Management Philosophies, Types of Business, Environment Analysis - Planning- Types, Steps, Forecasting, MBO, MBE. Organizing – Departmentation, Line and Staff Authority, Delegation and Decentralization. Staffing - Manpower Planning, Recruitment and Selection, Training, Performance Appraisal. Directing –Theories of Motivation, Leadership Styles, Power and Politics, Change Management, Conflict Management, Communication in Business-Controlling Types, Control Techniques, Budgetary and Non-Budgetary Control.

UNIT-VIII: TOTAL QUALITY MANAGEMENT:

Quality – Definitions, Vision, Mission and Policy statements-Dimensions of Product and Service Quality-Contributions of Quality Gurus-Deming, Juran, Crosby, Masaaki lmai, Feigenbaum, lshikawa. Costs of Quality- Continuous Process Improvement- PDCA, Quality Circle, 5S, Kaizen-Statistical Process Control (SPC), 7QC Tools, New Management Tools of Quality, Bench Marking, 6 sigma, Quality Function Deployment (QFD), POKAYOKE, Total Productive Maintenance (TPM), Business Process Reengineering (BPR), Quality Certifications.

UNIT-IX: ENVIRONMENTAL SCIENCE AND ENGINEERING:

Definition, scope and importance of environment – need for public awareness. Eco-system and Energy flow– ecological succession. Types of biodiversity: genetic, species and ecosystem diversity– values of biodiversity, India as a mega-diversity nation – hot-spots of biodiversity – threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts – endangered and endemic species of India – conservation of biodiversity: In-situ and ex-situ. Environmental pollution: Causes, Effects and Preventive measures of Water, Soil, Air and Noise Pollutions. Solid, Hazardous and E-Waste management. Energy management and conservation, New Energy Sources - Need of new sources. Different types new energy sources. Applications of- Hydrogen energy, Ocean energy resources, Tidal energy conversion. Concept, origin and power plants of geothermal energy. Sustainability and management - Development , GDP ,Sustainability- concept, needs and challenges-economic, social and aspects of sustainability-from unsustainability to sustainability-millennium development goals, and protocols-Sustainable Development Goals-targets, indicators and intervention areas. Climate change- Global, Regional and local environmental issues and possible solutions. Concept of Carbon Credit - Carbon Footprint. Environmental management in industry- Material Life cycle assessment, Environmental Impact Assessment. Sustainable habitat: Green buildings, Green materials, Energy efficiency, Sustainable transports. Sustainable energy: Non-conventional Sources, Energy Cycles carbon cycle, emission and sequestration, Green Engineering: Sustainable urbanization- Socio-economical and technological change.

Environmental Engineering and Chemical Engineering (P.G. Degree Std.)

Subject Code: 393

Unit –I Environmental Policy, Environmental Legislations and Environmental Impact Assessment

National Environment Policy - International Conventions and Obligations, International treaties of Environment-Water (P&C) Act, 1974 as amended - Air (P&C) Act, 1981 as amended - Environmental Protection Act, 1986 with amendments and Rules and Notifications made under Environmental (Protection) Act, 1986 for the management of hazardous waste, solid waste, e-waste, bio-medical waste, plastic waste, C & D wastes, battery waste etc., EIA - Notification, Methodology, models, Environmental Monitoring and Management Plan, Public consultations as per EIA Notification.

Unit -II Environmental Chemistry and Environmental Microbiology

Chemical mass balance – Emission calculations – Green Chemistry principles –Aquatic Chemistry - Atmospheric Chemistry and Soil chemistry – Representative sample collection techniques- Field and lab analysis - Wet and Instrumentation Methods - Chemical speciation, Classification and Characteristics of microorganisms - Microorganisms in wastewater and air - Applications of microorganisms in wastewater treatment and soil remediation.

Unit -III Principles & Design of Physico- Chemical treatment of Wastewater

Water Quality criteria and indices - Wastewater characteristics - Unit operations - Principles and design of screens, grit chamber, skimming tanks - Flow equalisation and neutralisation - Aeration and gas transfer mechanisms – Sedimentation -Types of settling – analysis and Design of Sedimentation tanks - Process and design of filtration systems - Adsorption, ion exchange, electro-coagulation, Electrodialysis, reverse osmosis – RO reject Management - Disinfection.

Unit –IV Principles and Design of Biological Treatment of Wastewater

Types of Reactors - Mass Balance Analysis - Reaction and Reaction rates - Suspended growth process - Role of microorganism - Growth kinetics, oxidation, modelling, mCRT, F/M Ratio, Bio kinetic coefficients - Design of activated sludge process, Plug flow Reactor, Aerated lagoon - Oxygen Requirement, transfer of oxygen, Equipments-Secondary clarifier, Sludge Volume Index, Sludge production, Operation and maintenance, Attached growth process - Trickling filter - process, substrate removal, classification, design, NRC, Rankine's and Eccenfelder equation - Rotating Biological contactors - UASB - Sludge digestion - sludge management – Advanced Biological Treatment – SBR, MBR, ANSBR.

Unit –V Air and Noise pollution Control

Sources and Effects– Classification-Photochemical reactions, Atmospheric Stability-Lapse Rates, Inversions, Plume Behaviour -Pollutant Dispersion, Emission Standards and Air Quality Standards, Air Quality Index, Methods of Pollutant Sampling and Measurement, Continuous emission and Air Quality monitoring. Control Methods for Particulate Emissions, Black carbon and Gaseous Pollutants; Indoor Air Pollution, Automobile Pollution-Emission Norms and Control Techniques, Source apportionment studies, Noise Pollution-Source-Effects-Standards-Measurement and Control Measures- Industrial Noise Measurement and control.

Unit -VI Solid and Hazardous Waste Management

Sources, generation rate, classification and characteristics - source segregation and storage - methods of collection - transportation - route optimisation – treatment – Incineration, Pyrolysis, Composting, MBT and Landfilling, Bioremediation ,Bioaccumulations - disposal – Coprocess - Centralised and de-centralised

processing - Landfill design and operation - Dumpsite rehabilitation, Management of hazardous waste, biomedical waste, plastic waste, construction and demolition wastes and E waste - Resource recovery, recycle, reuse and product development from waste.

Unit : VII Statistical Approach and Modelling of Environmental Systems

Principles of Environmental modelling, Statistical approach, model building, environmental models, Data Sampling –Distributions – Inference- Estimation – Hypothesis Testing, Calibration, Validation, and Sensitivity Analysis. Types of air quality models-dispersion and emission models, chemical and ecological models, Pollutant and nutrient dynamics. Operational control of wastewater treatment processes, microbial dynamics calculations, Surface and ground water Modeling.

Unit –VIII Industrial Pollution Prevention and Cleaner Production Technologies

Industrial Manufacturing process description, Wastewater Characteristics, Source reduction, Treatment and disposal, key issues emerging contamination and pollution control measures for highly polluting industries such as Paper and Pulp, Sugar, Distillery, Chemical plants - Metal finishing, Iron and Steel, fertilizer, Meat packing, Poultry plant - Automobile - Thermal power plants, Cement Plants, Textile dying, Tanneries, Pharmaceutical, pesticides, petroleum refinery and petrochemicals - Integrated Waste Management for zero discharge, Cleaner production process including process modification, raw material substitution - Recycle and reuse of waste.

Unit : IX Environmental Safety and Risk Assessment

Health and Safety systems in work places. Hierarchy of control measures for occupational health risks. Accident, causes, mechanical and electrical hazards and preventive steps. Role of personal protective equipment and the selection criteria. Significance of human factors in the establishment emergency preparedness. Qualitative and quantitative risk assessment- Hazard identification and control, Hazard assessment, Overall risk contours for different failure scenarios – disaster management plan – Safety measures design in process operations. Ergonomics effects on humans. Inspections and audits, safety policies, EHS issues.

Unit –X Sustainable Development, Environmental Management and Economics and Global, Regional and Local Environmental Issues

Sustainable Development Principles - International Conventions and treaties- Sustainable Development Goals and Indicators, Environmental Management Systems – ISO 14001, 19000 - Environmental Auditing – Ecolabelling- Life cycle Assessment- Design for Environment, Economics of pollution prevention -Cost Benefit Analysis - Circular economy - Economic instruments for environmental protection - Pollutant tax and emission trading - Natural resource economics, Green building concepts.

சிவில் இன்ஜினியரிங்

(பட்டப்படிப்பு தரம்) **குறியீடு: 398**

அலகு I: கட்டுமானப் பொருட்கள் மற்றும் கட்டுமான நடைமுறைகள்

பொறியியல் பொருட்களின் பண்புகள் மற்றும் பரிசோதனை - செங்கல், கற்கள், எம்-சாண்ட், மணல் மற்றும் சல்லி கற்கள், சிமெண்ட், மரம், மறுசுழற்சி மற்றும் நவீன பொருட்கள் - கண்ணாடி, பிளாஸ்டிக், நார் வலுவூட்டபட்ட பாலிமர் (FRP), பீங்கான்- கற்காரை - பண்புகள் மற்றும் பரிசோதனை- கலவை உட்பொருட்கள் தீர்மானம் (Mix Design) – கலவை ஊக்கிகள் (Admixers), சுய இறுக்க கற்காரை (Self Compacted Concret), எஃகு கட்டுமானம் - கல், செங்கல் கட்டுமானம், கம்பி இழையூட்டப்பட்ட கற்காரை (RCC) மற்றும் திண்ம கட்டி கட்டுமானம் (Block Masonary) - கட்டுமான உபகரணங்கள் - கட்டிட விதிகள் மற்றும் தமிழ்நாட்டில் நடைமுறையில் உள்ள கட்டுமான விதிமுறைகள் - தீ பாதுகாப்பு, வெளிச்சம் மற்றும் காற்றோட்டம் - ஒலியியல்.

அலகு II: இன்ஜினியரிங் சர்வே

சர்வே - செயின்- திசைகாட்டி - ப்ளேன் டேபிள் - லெவலிங் - தியோடோலைட் – பரப்பளவு மற்றும் கனஅளவு கணக்கீடு –நீளஅளவு (LS) மற்றும் குறுக்களவு (C.S.) – சமநிலைக் கோடுகள் (Contur) - டிராவர்சிங் – டிராவர்ஸ் அட்ஜஸ்ட்மெண்ட்- -உயரங்கள் மற்றும் தூரங்கள் - டேக்கியோமெட்ரி மற்றும் முக்கோணவியல் (Triangulation) - டோட்டல் ஸ்டேசன் (Total Station) மற்றும் புவியிடங்காட்டி (GPS) அளவீட்டிற்கான தொலை நுண்ணுணர்வு முறைகள்.

அலகு III: பொறியியல் இயக்கவியல் மற்றும் பொருள் வலிமையியல்

விசைகள் - வகைகள் - விதிகள் - புவியீர்ப்பு மையம் - உழற் திருப்புமை (Moment of Inertia) - உராய்வு - தகைவுகள் மற்றும் திரிபுகள் - வெப்பத் தகைவுகள் - மீள் எல்லை மாறிலிகள் (Elastic Constants) - விட்டங்கள் - விட்டங்களில் வளை திருப்புமை (Bending moment) மற்றும் வெட்டுவிசை (Shear Force) - எளிய வளைவுக்கான கோட்பாடு - விட்டங்களின் விலகல் - முறுக்கம் - கூட்டுத் தகைவுகள் - சாய்ந்த தளங்களில் தகைவுகள் - முதன்மை தகை வுகள் மற்றும் முதன்மை தளங்கள் - முறிவுகளின் கோட்பாடு - சமதள தாங்கணைவுகளின் பகுப்பாய்வு.

அலகு IV: கட்டமைப்புப் பகுப்பாய்வு

நேர்முகக் கண்க்கீடற்ற விட்டம் - கட்டமைப்புப் பகுப்பாய்வின் விறைப்பு மற்றும் நெகிழ்தன்மை முறைகள் - சாய்வு விலகல் - திருப்புமைப் பகிர்வு முறை -வளைவுகள் மற்றும் தொங்கல் வடங்கள் - தூண்களின் கோட்பாடு - நகரும் சுமைகள் மற்றும் விளைவுக் கோடுகள் - அணி முறை - தாங்கு சுவரின் நிலைப்புத் தன்மை - குழைமவியல் கோட்பாடு - உயரமான கட்டிடங்களின் நிலநடுக்க பகுப்பாய்வு

அலகு V: புவி தொழில்நுட்ப பொறியியல்

மண்ணின் உருவாக்கம் - மண்ணின் வகைகள் - பொறியியல் பயிற்சிக்கான மண்ணின் வாய்ப்பாடு - மண்ணின் கள அடையாளம் - மண்ணின் புறநிலை இயல்புகள் மற்றும் சோதனைகள் - மூன்று கட்ட வரைபடம் - மண்ணின் ஊடுருவும் பண்புகள் - மண்ணில் தகைவுப் பரவல் - ஒருங்கிணைத்தல்

(Consolidation) கோட்பாடு - வெட்டு வலிமை காரணிகள் - மண்ணின் நிலைப்புத்தன்மை - மண்ணின் இறுக்கத்தன்மை - சாய்வு நிலைப்பாட்டின் பகுப்பாய்வு - மண் ஆய்வு - மண் மாதிரிக்கான நுட்பங்கள் – எஸ்பிடி (SPT) - மண் துளை விவரம் - ஆழமற்ற அடித்தளங்கள் - டெர்சாகியின் மண் தாங்கு திறனுக்கான கோட்பாடு - நிலத்தூண் அடித்தளம் - நிலத்தூண் சுமை சோதனை - நிலத்தூண்களின் குழு நடவடிக்கை - அடித்தளங்களின் புதையிறக்கம் - தரை மேம்பாட்டு நுட்பங்கள்

அலகு VI: சுற்றுச்சூழல் பொறியியல் மற்றும் மாசுக் கட்டுப்பாடு

நீரின் ஆதாரங்கள் - நீரின் தேவை - நீரின் பண்புகள் மற்றும் பரிசோதனை - கடத்தல் மற்றும் பரிமாற்றத்திற்கான நீரியல் - நீர் மூலம் பரவும் நோய்கள் - நீர் சுத்திகரிப்பு - நீர் சுத்திகரிப்பு நிலைய இயக்க வடிவமைப்பு - உப்பு நீக்கும் ஆலை - நீர் விநியோக அமைப்பு - குழாய் பின்னல் (Pipe Network) பகுப்பாய்வு - கழிவுநீரின் தன்மைகள் மற்றும் அங்ககங்கள் – கழிவுநீர் அமைப்பின் திட்டமிடல் மற்றும் வடிவமைப்பு - கழிவுநீர் இணைப்புகள் - கழிவுநீர் உந்துதல் - கழிவுநீர் சுத்திகரிப்பு மற்றும் அகற்றல் - மழைநீர் வடிகால் அமைப்பு - உயரமான கட்டிடத்தில் குழாய்கள் அமைப்பு - தொழிற்சாலை கழிவு சுத்திகரிப்பு - திடக்கழிவு மேலாண்மை – காற்று மற்றும் ஒலி மாசு கட்டுப்பாடு – மின்னணு கழிவு மேலாண்மை.

அலகு VII: வலுவூட்டப்பட்ட கற்காரை வடிவமைப்பு, அழுத்தப்பட்ட கற்காரை மற்றும் எஃகு கட்டமைப்புகள்

கட்டிட பாகங்களின் வடிவமைப்பு – லிமிட் ஸ்டேட் (Limit State) மற்றும் ஓர்க்கிங் ஸ்ட்ரஸ் (Working Stress) வடிவமைப்பு முறைகள் – தளம்/கூரை வடிவமைப்பு – ஒரு வழி, இரு வழி மற்றும் தட்டையான தளம்/கூரை - ஒற்றை மற்றும் இரட்டிப்பாக வலுவூட்டப்பட்ட பிரிவுகள் மற்றும் பிளாஞ்ச் (Flange) பிரிவுகளின் வடிவமைப்பு – தூண்கள் மற்றும் அஸ்திவாரங்களின் வடிவமைப்பு - முன்-அழுத்த – கற்காரை அமைப்புகள் மற்றும் முறைகள் - பிந்தைய இழுவிசை தளம்/கூரை - நெகிழ்வுக்கான முன்-அழுத்தப்பட்ட பாகங்களின் வடிவமைப்பு. இழுவிசை மற்றும் அமுக்கவிசை கட்டிட பாகங்களின் வடிவமைப்பு - போல்ட் மற்றும் வெல்டட் இணைப்புகளின் வடிவமைப்பு - தூண்கள் மற்றும் அடித்தளங்களின் வடிவமைப்பு - விட்டம், பிளேட் கர்டர் (Plate Griders) மற்றும் கேன்ட்ரி கர்டர் (Gantry Griders) வடிவமைப்பு - உயர்த்தப்பட்ட மற்றும் நிலத்தடி- திரவ சேமிப்பு கட்டமைப்புகளின் வடிவமைப்பு – தாங்கு சுவர் வடிவமைப்பு (Retaining Wall).

அலகு VIII : நீரியல் மற்றும் நீர்வள பொறியியல்

நீர்ம நிலையியல் - பெர்னோலி சமன்பாட்டின் பயன்பாடுகள் - குழாய்களில் ஏற்படும் இழப்புகள்- திறந்த பெருங்கால்வாய் (Channel) ஓட்ட அளவீடு - பம்புகளின் வகைகள் மற்றும் பண்புகள்-உந்த சமன்பாட்டின் பயன்பாடுகள், ஓட்டத்தின் இயக்கவியல்.

தமிழ்நாட்டின் நீர் ஆதாரங்கள் - நீர் வளத் திட்டமிடல் - நீர் மேலாண்மை வெள்ளக் கட்டுப்பாட்டுக்கான மாஸ்டர் பிளான் – நீர் ஓட்ட (run off) மதிப்பீடு - ஹைட்ரோகிராஃப் - வெள்ள வழித்தடம் – மண், பயிர் நீர்தொடர்பு - பயிர்களின் நீர் தேவை - நீர்ப்பாசன முறைகள் - வண்டல் கால்வாய் வடிவமைப்பு மற்றும் தலையணி வடிவமைப்பு. நீர் தேக்கம் மற்றும் நில மீட்பு - குறுக்கு வடிகால் பணிகள்.

அலகு IX: நகர்ப்புற மற்றும் போக்குவரத்து பொறியியல்

நகரமயமாக்கல் போக்கு மற்றும் தாக்கம் - குடிசை அகற்றுதல் மற்றும் குடிசை அபிவிருத்தி திட்டங்கள் - பல்வேறு போக்குவரத்து முறைகள் மற்றும் அவற்றின் பண்புகள். நெடுஞ்சாலைகளின் வடிவியல் வடிவமைப்பு. – சாலை பொருட்கள் மற்றும் சோதனை - மாற்று சாலை பொருட்கள்- மாற்றியமைக்கப்பட்ட ஒட்டுபொருட்கள் - பிட்மினஸ் மற்றும் கற்காரை சாலைகளின் வடிவமைப்பு மற்றும் கட்டுமானம் – சாலை தேய்மானம் மற்றும் மதிப்பீடு - சாலைகளை பராமரித்தல் - ரயில்வே - நிரந்தர வழி கூறுகள் (Permanent Way) - சிக்னல், இன்டர்லாக் மற்றும் ரயில் கட்டுப்பாடு - சாலைகள் மற்றும் ரயில்களில் வடிகால் .. விமான நிலைய திட்டமிடல்-விமான நிலையத்தின் கூறுகள் - தள தேர்வு - ஓடுபாதைகள் - முனைய கட்டிடங்களின் திட்டமிடல். சிறு மற்றும் பெருந்துறைமுகங்கள் - ஒரு துறைமுகத்தின் தளவமைப்பு - கப்பல்துறைகள் – கடல்நீர் தடுப்பு அமைப்பு (Breakwaters).

அலகு X : திட்ட மேலாண்மை மற்றும் மதிப்பீடு

கட்டுமான மேலாண்மை - கட்டுமானத் திட்டமிடல் - திட்டமிடல் மற்றும் கண்காணிப்பு - செலவுக் கட்டுப்பாடு, தரக் கட்டுப்பாடு மற்றும் ஆய்வு - நெட்வொர்க் பகுப்பாய்வு - CPM மற்றும் PERT திட்ட மேலாண்மை முறைகள் - வளங்கள் திட்டமிடல் மற்றும் வள மேலாண்மை. மதிப்பீடுகளின் வகைகள் - தொழில்நுட்ப விவரக்குறிப்புகள் மற்றும் ஒப்பந்தப்புள்ளி ஆவணங்களைத் தயாரித்தல் - மின்-ஒப்பந்தப்புள்ளி - கட்டிட மதிப்பீடு - ஒப்பந்தங்கள் மற்றும் நடுவர் தொடர்பான சட்டம்.

இயந்திர பொறியியல் / உற்பத்தி பொறியியல் / உருவாக்க பொறியியல்

(பட்டப்படிப்பு தரம்) குறியீடு: 399

அலகு - I இயக்கவியல், இயக்கியல் மற்றும் இயங்குவியல்:

துகள்களின் நிலையியல், திடமான உடல்களின் சமநிலை, உருமாறக்கூடிய உடல்களின் பொறிமுறை, மேற்பரப்பு மற்றும் திடப்பொருட்களின் பண்புகள், நடுமம், ஈர்ப்பு மையம், துகள்களின் இயங்குவியல், திடமான உடல் இயங்குவியலின் கூறுகள், பொறிமுறைகளின் அடிப்படைகள், பொறிமுறைகளின் இயக்கவியல், சுழலாளி, பற்சக்கரங்கள் மற்றும் பற்சக்கரங்களின் இணைவமைவு ஓடுவரி, விசையாள்சில்லு மற்றும் ஆள்கருவி, சுழலும் மற்றும் தண்டலையும் நிறைகளை சமநிலைப்படுத்துதல், இயந்திர உறுப்புகளிலுள்ள உராய்வு, விசை பகுப்பாய்வு, சமநிலைப்படுத்துதல், தனிப்பாகை கட்டில்லாவதிர்வு, வலிந்தவதிர்வு, அதிர்வு கட்டுப்பாட்டுக்கான பொறிமுறைகள், தணிப்பின் விளைவு, அதிர்வுராது தனிமைப்படுத்தல், ஒத்ததிர்வு, தண்டின் உய்ய வேகம்.

அலகு - II பருப்பொருளின் வலிமை மற்றும் வடிவமைப்பு

தகைவு, திரிபு, மற்றும் திடப்பொருட்களின் உருமாற்றம், ஒருங்கிணைந்த தகைவுகள், வீழச்சிகளின் கோட்பாடுகள், விட்டங்களில் குறுக்குவாட்டு சுமை ஏற்றம், விட்டங்களிலுள்ள தகைவுகள், முறுக்கம், விட்டங்களின் விலகல், ஆற்றல் கோட்பாடுகள், மெல்லிய உருளைகள் மற்றும் தடிமனான உருளைகள், கோள வடிவ ஓடுகள், இயந்திர உறுப்புகளின் வலிமை மற்றும் விரைப்பிர்க்கான அடிப்படை வடிவமைப்பு, தண்டுகள் மற்றும் பிணைப்பிகளின் வடிவமைப்பு, நிலையான மற்றும் நிலையற்ற சுமை ஏற்றுதலுக்கான வடிவமைப்பு, கட்டுவான்கள் மற்றும் பற்றவைப்பு இணைப்புகளின் வடிவமைப்பு, நிலையிணையாணியிட்ட இணைப்புகள், சுருள்வில்களின் வடிவமைப்பு, தாங்கு உருளைகளின் வடிவமைப்பு, விசையாள்சில்களின் வடிவமைப்பு, நெகிழ்வான கூறுகளுக்கான விசைசெலுத்த அமைப்புகளின் வடிவமைப்பு, கூர்முளை பற்சக்கரம் மற்றும் இணை அச்சு திருகுசுழல் பற்சக்கரம், சாய்வியக்க பற்சக்கரம், திருகுப் பற்சக்கரம் மற்றும் குறுக்கு திருகுசுழல் பற்சக்கரம், ஒருமை மற்றும் இருமை நிலை வேகந்தனிப்பான், ஓடிதழ் வடிவமைப்பு, உரசினைப்பி மற்றும் தடுக்கிகளின் வடிவமைப்பு, உந்துதண்டு மற்றும் இணைப்புத்தண்டுகளின் வடிவமைப்பு.

அலகு - III பாய்ம இயக்கவியல் மற்றும் சுழலூட்ட இயந்திரத்தொகுதி:

பாய்ம பண்புகள், பாய்ம நிலையியல், அழுத்த அளவியல், மிதப்பு, நிறை, உந்தம் மற்றும் ஆற்றலின் கட்டுப்பாட்டு தொகுதி பகுப்பாய்வு, பாய்ம முடுக்கம், தொடர்ச்சி மற்றும் உந்தத்தின் வகையீட்டு சமன்பாடுகள், பெர்னூலியின் சமன்பாடு, பரிமாண பகுப்பாய்வு, அமுக்க முடியாத திரவங்களின் பாகுநிலைப் பாய்ச்சல், விளிம்பு அடுக்கு, அடிப்படை மீசீரற்ற பாய்ச்சல், குழாய்கள் வழி பாய்ச்சல், குழாய்களில் நிலைமட்ட இழப்புகள், வளைவுகள். சுழலூட்ட இயந்திரத்தொகுதி: பெல்டன் சக்கரம், பிரான்சிஸ் மற்றும் கப்லான் சுழலிகள் - உந்துவிசை மற்றும் எதிர்வினை கோட்பாடுகள் - வேக வரைபடங்கள், எக்கிகள் மற்றும் அதன் பயன்பாடுகள்-தடுக்கிதழ்கள் மற்றும் வகைகள் - தாரை உந்தல் கோட்பாடு - அதிர் தாரை – திமிசு தாரை பொறிகள், நிகழ்நிலை தொடர்பாய்ச்சல் கண்காணிப்பு அமைப்பு.

அலகு - IV வெப்ப பொறியியல் மற்றும் வெப்ப இயங்குவியல்:

அடிப்படை கருத்துக்கள், வெப்ப இயங்குவியலின் பூஜிய, முதல் மற்றும் இரண்டாவது விதிகள், வெப்ப இயங்குவியல் அமைப்பு மற்றும் செயல்முறைகள், கார்னோட் சுழற்சி. மீளமுடியாத்தன்மை மற்றும் கிடைப்புத்தன்மை, சீர்மை மற்றும் இயல்பு வாயுக்களின் பண்பு, வெப்ப இயங்குவியல் சார்ந்த தொடர்புகள், தூய பொருட்களின் பண்புகள், சீர்மை செயல்முறைகளிலுள்ள செய்பணி மற்றும் செலுத்து வெப்பத்தை கணக்கிடுதல், ஆற்றல் மாற்றம் தொடர்பான வெப்ப இயங்குவியல் சுழற்சிகளின் பகுப்பாய்வு, எரிபொருள் மற்றும் கனற்சி, எரிபொருள்களின் பண்புகள், உமிழ்வு மற்றும் கட்டுப்பாடுகள், உட்கனர்வு பொறிகளின் சோதனை - புதுப்பிக்கத்தக்க ஆற்றல் மூலங்கள். சக்திசார் பொறியியல்: நீராவி அட்டவணைகள், மீளுருவாக்கம் மற்றும் மறுசூடுபடுத்தல் நிகழ் ரேங்கின், பிரைட்டன் சுழற்சிகள். உட்கனர்வு பொறிகள்: காற்று-செந்தர ஓட்டோ, டீசல் சுழற்சிகள். குளிரூட்டல் மற்றும் காற்றுச்சீரமைத்தல்: நீராவி குளிர்பதன சுழற்சி, வெப்ப எக்கிகள், வாயு குளிரூட்டல், தலைகீழ் பிரேட்டன் சுழற்சி; ஈர காற்று: ஈரப்பதபகுப்புசார் விளக்கப்படம், அடிப்படை ஈரப்பதபகுப்புசார் செயல்முறைகள்.

அலகு - V வெப்பம் மற்றும் நிறை பரிமாற்றம்:

வெப்ப பரிமாற்ற முறைகள் - ஒரு பரிமாண வெப்ப கடத்தல், வெப்பந்தடை கருத்து, மின்சார் ஒப்புமை, நிலையற்ற வெப்ப கடத்துத்திறன், நிமிர் நேர் விளிம்புடைய தகடு, கட்டில்லா மற்றும் கட்டுறு பாய்ம விரவு வகை பரிமாற்றத்தின் பரிமாணமற்ற அளவுருக்கள். தட்டையான தட்டுகள் மற்றும் குழாய்கள் வழியாக வெப்ப பரிமாற்றத்திற்கான பல்வேறு தொடர்புகள், வெப்ப விளிம்பு அடுக்கு, மீசீரற்ற பாய்ச்சலின் விளைவு, கதிர்வீச்சு வெப்ப பரிமாற்றம், கருப்பு மற்றும் சாம்பல் மேற்பரப்புகள், வடிவ

காரணிகள், பிணைய பகுப்பாய்வு: வெப்பப் பரிமாற்றியின் செயல்திறன், LMTD மற்றும் NTU முறைகள். நிறை பரிமாற்றம், ஊடுபரவ நிறை பரிமாற்றம், ஊடுபரவலின் ஃபிக்கின் விதி, நிலைப்பு நிலை மூலக்கூறு ஊடுபரவல், பாய்ம விரவு முறை நிறை பரிமாற்றம், உந்தம், வெப்பம் மற்றும் நிறை பரிமாற்ற ஒப்புமை, பாய்ம விரவு முறை நிறை பரிமாற்ற இணை தொடர்புகள், கதிரியக்க வெப்ப பரிமாற்றம்.

அலகு - VI மூலப்பொருள்கள்சார் அறிவியல் மற்றும் உலோகவியல்:

உலோகக்கலவைகள் மற்றும் நிலை வரைபடங்கள், இரும்பு இரும்பு கார்பைடு நிலை வரைபடம் - எஃகுகள், வார்ப்பிரும்பு, நிலை மாற்றங்கள்- பரவல் - TTT வரைபடம், இரும்பு மற்றும் இரும்பு அல்லாத உலோகக் கலவைகள், இரும்பு மற்றும் இரும்பு அல்லாத உலோகத்தின் வெப்பச் சிகிச்சை, மேற்பரப்பு மாற்றும் நுட்பங்கள், தூள்சார் உலோகவியல், உலோக அல்லாத பொருட்கள், இயந்திர பண்புகள் மற்றும் சோதனை, படிக குறைபாடுகள் மற்றும் வலுப்படுத்தும் வழிமுறைகள், கடத்துதல் மற்றும் குறை-கடத்துதல் பொருட்கள், காந்த மற்றும் மின்கடத்தா பொருட்கள், பொறியியல்வுரு வெங்களி, பொறியியல் மற்றும் பயன்பாட்டு பலபடிமங்கள், கலவைகள், மீநுண் பொருட்கள்.

அலகு - VII உற்பத்தி தொழில்நுட்பம்:

வார்ப்பக தொழில்நுட்பம் – வடிவ உரு வகைகள், அகடு உள்ளகம், அச்சுருவாக்கம் மற்றும் வார்ப்பு முறைகள், திடப்படுத்துதல், வார்ப்புகளின் வடிவமைப்பு, குறைபாடுகள், உருக்கும் உலைகள், தனல் மற்றும் தனலற்ற செயல்பாடு, உலோகத்தை உருவாக்கும் செயல்முறைகள் - வகைகள், குறைபாடுகள் மற்றும் தீர்வுகள், தாள் உலோக செயல்பாடு, உலோகத்தை இணைக்கும் செயல்முறைகள், வகைகள் மற்றும் பற்றவைப்பு வடிவமைப்பு, வெல்டிங் உலோகம். பற்றவைப்பின் குறைபாடுகள், வார்ப்பு, பற்றவைப்பு ஆய்வு (NDT), வெப்ப இறுக்க மற்றும் வெப்பத் தளர்வு நெகிழியின் உற்பத்தி, உலோக வெட்டு, வெட்டு கருவியின் இடுபெயர்த்தொகுதி, இழைப்புறு இயந்திர கருவிகள் – நடும கடைசல் இயந்திரம், துளையிடுதல், துருவல், அரைத்தல், பற்சக்கரம் வெட்டுதல் மற்றும் கொந்துதல், இழைப்பு நேரத்தை கணக்கிடுதல், வழக்கஞ்சாரா இழைப்பு செயல்முறைகள், நுண் இழைப்பு, CNC இயந்திர கருவிகள், கைமுறை உறுப்பு நிரலாக்கம் – இழைத்தல் மற்றும் கடைதல் நிலையம்.

அலகு - VIII அளவையியல் மற்றும் தரக் கட்டுப்பாடு:

வரம்புகள், பொருத்தங்கள் மற்றும் ஏற்புமை, நேரியல் மற்றும் கோண அளவீடுகள், ஒளி அளவியல், லேசர் ஒளி அளவை மானி- வகைகள், கணினிசார் ஆய்வு, CMM இன் அடிப்படைக் கருத்து - CMM

இன் வகைகள், இயந்திர நோக்கு, உருவடிவ அளவீடு - நேர் தன்மை – தட்டை தன்மை, உருள் தன்மை, மேற்பரப்பு சீர்மை அளவீடு, தொடர்பு மற்றும் தொடர்பற்ற முறைகள், சக்தி, பாய்ச்சல் மற்றும் வெப்பநிலை அளவீடு. புள்ளியியல் தரக் கட்டுப்பாடு, கட்டுப்பாட்டு விளக்கப்படங்கள், ஏற்பு மாதிரி, நம்பகத்தன்மை, TQM, 5S, ISO தரநிலைகள்.

அலகு: IX CAD / CAM / CIM / FEA:

கணினிசார் வரைகலையின் அடிப்படைகள், வடிவியல்சார் மாதிரியாக்கள், காட்சி நடப்பியல், கூறுகளின் இணைப்பு, CAD தரநிலைகள், CIM இன் அடிப்படைகள், உற்பத்தித் திட்டமிடல் மற்றும் கட்டுப்பாடு, கணினிசார் செயல்முறை திட்டமிடல், தனியறை உற்பத்தி, நெகிழ்வான உற்பத்தி அமைப்பு மற்றும் தானியங்கு வழிகாட்டி வாகன அமைப்பு, குழு தொழில்நுட்பம், உற்பத்தி அடுக்கு நிகழ்வு பகுப்பாய்வு, தொழில்துறை எந்திரனியல், சேர்க்கை உற்பத்தி, நிகழ் நேர உற்பத்தி (JIT), மெலிவு உற்பத்தி, FEA விலுள்ள ஒரு பரிமாண கணக்குகள், இரு பரிமாண அளவுரு மாறிகள் சார் கணக்குகள், இரு பரிமாண திசையன் மாறிகள் சார் கணக்குகள், சமநீள துணைமாறி உருவாக்கம்.

அலகு – X தொழில்துறை பொறியியல் மற்றும் மேலாண்மை:

பணி ஆய்வு - நுட்பங்கள், முறை ஆய்வு மற்றும் பணி அளவீடுகள் நோக்கங்கள் - அடிப்படை, செயல்முறை, இயந்திர சுமை ஏற்றுதல் மற்றும் திட்டமிடல், தயாரிப்பு வரிசைமுறை, சரக்கு கட்டுப்பாடு - E O Q - அளவு தள்ளுபடிகள், ABC பகுப்பாய்வு பொருள் கையாளுதல் அமைப்புகள், செயல்பாட்டு ஆராய்ச்சி, நேரியல் நிரலாக்கம், சிம்ப்லெக்ஸ் முறை, போக்குவரத்து மாதிரி, ஒதுக்கீட்டு மாதிரி CPM மற்றும் PERT, வரிசை மாதிரிகள். மேலாண்மை கோட்பாடு மற்றும் நடைமுறை, திட்டமிடல் - முடிவெடுத்தல், ஒழுங்கமைத்தல், பணியாளர்கள் இடுகை, உந்துதல், தலைமைத்துவம், கட்டுப்படுத்துதல், கட்டுப்பாட்டு நுட்பங்கள், தொழில்துறை பாதுகாப்பு - தரநிலைகள் - OSHA.

PAPER -II

SYLLABUS FOR WRITTEN EXAMINATION

Part-A

கட்டாய தமிழ் மொழி தகுதித் தேர்விற்கான பாடத்திட்டம்

(கொள்குறி வினாவிற்கான தலைப்புகள்)

பத்தாம் வகுப்பு தரம்

1. பிரித்தெழுதுதல் / சேர்த்தெழுதுதல்.
2. எதிர்ச்சொல்லை எடுத்தெழுதுதல்.
3. பொருந்தாச் சொல்லைக் கண்டறிதல்.
4. பிழை திருத்தம் (i) சந்திப்பிழையை நீக்குதல் (ii) மரபுப் பிழைகள், வழுவுச் சொற்களை நீக்குதல் / பிறமொழிச் சொற்களை நீக்குதல்.
5. ஆங்கிலச் சொல்லுக்கு நேரான தமிழ்ச் சொல்லை அறிதல்.
6. ஒலி மற்றும் பொருள் வேறுபாடறிந்து சரியான பொருளையறிதல்.
7. ஒரு பொருள் தரும் பல சொற்கள்.
8. வேர்ச்சொல்லைத் தேர்வு செய்தல்.
9. வேர்ச்சொல்லைக் கொடுத்து / வினைமுற்று, வினையெச்சம், வினையாலணையும் பெயர், தொழிற் பெயரை / உருவாக்கல்.
10. அகர வரிசைப்படி சொற்களை சீர் செய்தல்.
11. சொற்களை ஒழுங்குப்படுத்தி சொற்றொடராக்குதல்.
12. இருவினைகளின் பொருள் வேறுபாடு அறிதல்.
    (எ.கா.) குவிந்து-குவித்து
13. விடைக்கேற்ற வினாவைத் தேர்ந்தெடுத்தல்.
14. எவ்வகை வாக்கியம் எனக் கண்டெழுதுதல் - தன்வினை, பிறவினை, செய்வினை, செயப்பாட்டு வினை வாக்கியங்களைக் கண்டெழுதுதல்.
15. உவமையால் விளக்கப்பெறும் பொருத்தமான பொருளைத் தேர்ந்தெழுதுதல்
16. அலுவல் சார்ந்த சொற்கள் (கலைச் சொல்)
17 விடை வகைகள்.
18. பிறமொழிச் சொற்களுக்கு இணையான தமிழ்ச் சொற்களைக்

கண்டறிதல் (எ.கா.) கோல்டு பிஸ்கட் – தங்கக் கட்டி.

19. ஊர்ப் பெயர்களின் மரூஉவை எழுதுக (எ.கா.) தஞ்சாவூர் – தஞ்சை

20. நிறுத்தற்குறிகளை அறிதல்.

21. பேச்சு வழக்கு, எழுத்து வழக்கு (வாரான் – வருகிறான்).

22. சொற்களை இணைத்து புதிய சொல் உருவாக்கல்.

23. பொருத்தமான காலம் அமைத்தல்

(இறந்தகாலம், நிகழ்காலம், எதிர்காலம்).

24. சரியான வினாச் சொல்லைத் தேர்ந்தெடு.

25. சரியான இணைப்புச் சொல்

(எனவே, ஏனெனில், ஆகையால், அதனால், அதுபோல).

26. அடைப்புக்குள் உள்ள சொல்லைத் தகுந்த இடத்தில் சேர்க்க.

27. இருபொருள் தருக.

28. குறில் – நெடில் மாற்றம், பொருள் வேறுபாடு.

29. கூற்று, காரணம் – சரியா? தவறா?

30. கலைச் சொற்களை அறிதல் :-

எ.கா. – Artificial Intelligence – செயற்கை நுண்ணறிவு

Super Computer - மீத்திறன் கணினி

31. பொருத்தமான பொருளைத் தெரிவு செய்தல்

32. சொற்களின் கூட்டுப் பெயர்கள் (எ.கா.) புல் –புற்கள்

33. சரியான தொடரைத் தேர்ந்தெடுத்தல்

34. பிழை திருத்துதல் (ஒரு-ஓர்)

35. சொல் – பொருள் – பொருத்துக

36 ஒருமை-பன்மை பிழை

37. **பத்தியிலிருந்து வினாவிற்கான சரியான விடையைத் தேர்ந்தெடு.**

PAPER-II Part –B General Studies (Degree Standard)

Code No.003

UNIT-I: GENERAL SCIENCE

(i) Scientific Knowledge and Scientific Temper - Power of Reasoning - Rote Learning vs Conceptual Learning - Science as a tool to understand the past, present and future.

(ii) Nature of Universe - General Scientific Laws – Mechanics - Properties of Matter, Force, Motion and Energy - Everyday application of the Basic Principles of Mechanics, Electricity and Magnetism, Light, Sound, Heat, Nuclear Physics, Laser, Electronics and Communications.

(iii) Elements and Compounds, Acids, Bases, Salts, Petroleum Products, Fertilisers, Pesticides.

(iv) Main concepts of Life Science, Classification of Living Organisms, Evolution, Genetics, Physiology, Nutrition, Health and Hygiene, Human Diseases.

(v) Environment and Ecology.

UNIT-II: CURRENT EVENTS

(i) History - Latest diary of events - National symbols - Profile of States - Eminent personalities and places in news – Sports - Books and authors.

(ii) Polity - Political parties and political system in India - Public awareness and General administration - Welfare oriented Government schemes and their utility, Problems in Public Delivery Systems.

(iii) Geography - Geographical landmarks.

(iv) Economics - Current socio - economic issues.

(v) Science - Latest inventions in Science and Technology.

(vi) Prominent Personalities in various spheres – Arts, Science, Literature and Philosophy.

UNIT-III: GEOGRAPHY OF INDIA

(i) Location – Physical features - Monsoon, Rainfall, Weather and Climate - Water Resources - Rivers in India - Soil, Minerals and Natural Resources - Forest and Wildlife - Agricultural pattern.

(ii) Transport - Communication.

(iii) Social Geography – Population density and distribution - Racial, Linguistic Groups and Major Tribes.

(iv) Natural calamity – Disaster Management – Environmental pollution: Reasons and preventive measures – Climate change – Green energy.

UNIT–IV: HISTORY AND CULTURE OF INDIA

(i) Indus Valley Civilization - Guptas, Delhi Sultans, Mughals and Marathas - Age of Vijayanagaram and Bahmani Kingdoms - South Indian History.

(ii) Change and Continuity in the Socio-Cultural History of India.

(iii) Characteristics of Indian Culture, Unity in Diversity – Race, Language, Custom.

(iv) India as a Secular State, Social Harmony.

UNIT-V: INDIAN POLITY

(i) Constitution of India - Preamble to the Constitution - Salient features of the Constitution - Union, State and Union Territory.

(ii) Citizenship, Fundamental Rights, Fundamental Duties, Directive Principles of State Policy.

(iii) Union Executive, Union Legislature – State Executive, State Legislature – Local Governments, Panchayat Raj.

(iv) Spirit of Federalism: Centre - State Relationships.

(v) Election - Judiciary in India – Rule of Law.

(vi) Corruption in Public Life – Anti-corruption measures – Lokpal and Lok Ayukta - Right to Information - Empowerment of Women - Consumer Protection Forums, Human Rights Charter.

UNIT-VI: INDIAN ECONOMY

(i) Nature of Indian Economy – Five year plan models - an assessment – Planning Commission and Niti Ayog.

(ii) Sources of revenue – Reserve Bank of India – Fiscal Policy and Monetary Policy - Finance Commission – Resource sharing between Union and State Governments - Goods and Services Tax.

(iii) Structure of Indian Economy and Employment Generation, Land Reforms and Agriculture - Application of Science and Technology in Agriculture - Industrial growth - Rural Welfare Oriented Programmes – Social Problems – Population, Education, Health, Employment, Poverty.

UNIT-VII: INDIAN NATIONAL MOVEMENT

(i) National Renaissance – Early uprising against British rule - Indian National Congress - Emergence of leaders – B.R.Ambedkar, Bhagat Singh, Bharathiar, V.O.Chidambaranar Jawaharlal Nehru, Kamarajar, Mahatma Gandhi, Maulana Abul Kalam Azad, Thanthai Periyar, Rajaji, Subash Chandra Bose, Rabindranath Tagore and others.

(ii) Different modes of Agitation: Growth of Satyagraha and Militant Movements.

(iii) Communalism and Partition.

UNIT-VIII: History, Culture, Heritage and Socio - Political Movements in Tamil Nadu

(i) History of Tamil Society, related Archaeological discoveries, Tamil Literature from Sangam Age till contemporary times.

(ii) Thirukkural : (a) Significance as a Secular Literature
(b) Relevance to Everyday Life
(c) Impact of Thirukkural on Humanity
(d) Thirukkural and Universal Values - Equality, Humanism, etc
(e) Relevance to Socio - Politico - Economic affairs
(f) Philosophical content in Thirukkural

(iii) Role of Tamil Nadu in freedom struggle - Early agitations against British Rule - Role of women in freedom struggle.

(iv) Evolution of 19^{th} and 20^{th} Century Socio-Political Movements in Tamil Nadu - Justice Party, Growth of Rationalism - Self Respect Movement, Dravidian Movement and Principles underlying both

these Movements, Contributions of Thanthai Periyar and Perarignar Anna.

UNIT–IX: Development Administration in Tamil Nadu

(i) Human Development Indicators in Tamil Nadu and a comparative assessment across the Country – Impact of Social Reform Movements in the Socio - Economic Development of Tamil Nadu.

(ii) Political parties and Welfare schemes for various sections of people – Rationale behind Reservation Policy and access to Social Resources - Economic trends in Tamil Nadu – Role and impact of social welfare schemes in the Socio - Economic Development of Tamil Nadu.

(iii) Social Justice and Social Harmony as the Cornerstones of Socio-Economic Development.

(iv) Education and Health Systems in Tamil Nadu.

(v) Geography of Tamil Nadu and its impact on Economic growth.

(vi) Achievements of Tamil Nadu in various fields.

(vii) e-Governance in Tamil Nadu.

UNIT-X: APTITUDE AND MENTAL ABILITY

(i) Simplification – Percentage - Highest Common Factor (HCF) - Lowest Common Multiple (LCM).

(ii) Ratio and Proportion.

(iii) Simple interest - Compound interest - Area - Volume - Time and Work.

(iv) Logical Reasoning - Puzzles-Dice - Visual Reasoning - Alpha numeric Reasoning – Number Series.

ANNEXURE – II

Sl. No.	Degree considered as Equivalent to the Qualification prescribed in the Rule	G.O.
1	B.E. (Production Engineering) and B.E. (Industrial Engineering) awarded by the Universities in Tamil Nadu be treated as an equivalent qualification to the B.E. Degree in Mechanical Engineering.	G.O.No.183, Personnel and Administrative Reforms (R) Department, dated 06.06.1995.
2	B.E. (Civil and Transportation Engineering) awarded by Bharathiyar University is equivalent to B.E. (Civil Engineering).	G.O.(Ms).No.110, Public Works (B2) Department, dated 30.04.2008.
3	B.E. (Civil Engineering with Diversification in Construction Engineering and Management) awarded by Anna University, B.E. (Civil Engineering and Computer based construction) awarded by Anna University and Madurai Kamaraj University and B.E. (Civil Engineering with Diversification in Environmental Engineering) awarded by the Anna University are equivalent to B.E. (Civil Engineering).	G.O.(Ms).No.232, Public Works (B2) Department, dated 23.07.2008.
4	B.Sc., (Civil Engineering) awarded by Kurukshetra University is equivalent to B.E. (Civil Engineering).	G.O.Ms.No.260, Public Works (B2) Department, dated 16.11.09.
5	B.E Manufacturing Engineering awarded by Anna University is equivalent to that of B.E Mechanical Engineering.	G.O.(Ms) No.309, Higher Education (J2) Department, dated 17.12.2018.
6	B.E Manufacturing Engineering (Part-time) awarded by Anna University is equivalent to that of B.E Mechanical Engineering of the Anna University.	G.O.Ms.No.9 Energy (B2) Department, dated 28.01.2010.
7	(i) B.E. (Civil and Structural Engineering) is equivalent to B.E. (Civil Engineering) and (ii) B.E. (Mechanical and Production Engineering) is equivalent to B.E. (Mechanical Engineering).	G.O.(Ms) No.102, Agriculture (AA3) Department, dated 11.05.2010.

8	6 years integrated U.G. Level Engineering B.Tech. Degree programme in Civil Engineering / Mechanical Engineering (for Speech and Hearing Impaired Students) awarded by Kalasalingam University is equivalent to B.Tech. in similar programmes offered by Anna University.	G.O.(Ms) No.41, Higher Education (J2) Department, dated 03.03.2014.
9	(i) B.E. (Environmental Engineering) Degree of Avinashilingam Institute for Home Science and Higher Education for Women Deemed University is equivalent to B.E. (Civil Engineering) (ii) B.E. (Civil Engineering with Diversification in Building Technology) Degree of Anna University is equivalent to B.E. (Civil Engineering).	G.O.(Ms)No.178, Higher Education (J1) Department, dated 17.07.2015.
10	B.Tech (Mechanical) / B.Tech (Civil) (Part-Time) obtained from Vellore Institute of Technology, Vellore is equivalent to B.E. (Mechanical) / B.E. (Civil) (Regular)	G.O.(Ms) No.77, Higher Education (J2) Department, dated 03.03.2016.
11	பி.இ.(மின்னியல் மற்றும மின்னணுவியல்) பட்டப்படிப்பினை பி.இ.(மின்னியல்) பட்டப்படிப்பிற்கு இணையானதாக கருதப்படுகிறது.	அரசாணை(நிலை)எண்.262,உயர்கல்வித்(ஜே2) துறை, நாள 28.07.09
12	1. B.Tech, (Chemical and Electro Chemical Engineering) Degree awarded by Anna University is equivalent to Chemical Engineering 2. B.Tech.(Petrochemical Technology) Degree awarded by Bharathidasan University is equivalent to B.E (Chemical Engineering) 3. B.E (Electronics & Instrumentation Engineering) Degree awarded by Anna University is equivalent to B.E Electrical Engineering or Electronics and Communication Engineering	G.O.(Ms).No.178, Higher Education (J1) Department, dated 17-07-2015

13	Government of India has recognized the following courses of Section A & B Examination as revised, conducted by the Institution of Engineers (India), Kolkata as equivalent to Degree in the Appropriate branch of Engineering of the Recognized Universities in India. 1. Agricultural Engineering 2. Chemical Engineering 3. Civil Engineering 4. Electrical Engineering. 5. Mechanical Engineering 6. Production Engineering 7. Textile Engineering	The Gazette of India, February 11, 2006(MAGHA 22, 1927) Part–I–Section1
14.	B.Tech Petrochemical Technology Degree awarded by Anna University(Tiruchirappalli) is equivalent to Degree in B.E. Chemical Engineering	G.O(Ms)No.284 Higher Education (J1) Department dated 03.10.2017
15.	Graduateship Examination of Indian Institution of Industrial Engineering, Navy Mumbai is equivalent to B.E. Industrial Engineering	G.O(Ms)No.86 Higher Education (J1) Department dated 27.04.2015
16.	B.E/B.Tech in 'Production Engineering' degree offered by Anna University is equivalent to B.E/B.Tech in 'Mechanical Engineering'	G.O(Ms)No.270, Higher Education (J1) Department dated 03.12.2019
17.	B.E/B.Tech in 'Manufacturing Engineering' degree offered by Anna University is equivalent to B.E/B.Tech in 'Mechanical Engineering' offered by Anna University	
18.	B.E/B.Tech in 'Mechanical (sandwich – 5 year Engineering' degree offered by Anna University is equivalent to B.E/B.Tech in 'Mechanical Engineering' offered by Anna University	
19.	B.E/B.Tech in 'Handlooms and Textile Technology' degree offered by Anna University is equivalent to B.E/B.Tech in 'Textile Technology offered by Anna University	

20.	B.E/B.Tech in Electrical and Electronics Engineering (sandwich) degree offered by Anna University is equivalent to B.E/B.Tech in 'Electrical and Electronics Engineering' offered by Anna University	
21.	B.E/B.Tech in Production Engineering (sandwich) degree offered by Anna University is equivalent to B.E/B.Tech in 'Production Engineering' offered by Anna University	
22.	B.E/B.Tech in Mechanical Engineering degree offered by Anna University is equivalent to B.E/B.Tech in 'Production Engineering' offered by Anna University	
23.	B.E/B.Tech in Manufacturing Engineering degree offered by Anna University is equivalent to B.E/B.Tech in 'Production Engineering' offered by Anna University	
24.	B.E Petrochemical Engineering awarded by Anna University is equivalent to B.E/B.Tech Chemical Engineering.	G.O(Ms)No.4, Higher Education (J1) Department dated 07.01.2022
25.	B.E., degree acquired through Distance Learning Mode by the candidates enrolled during academic seasons 2001-2005 in (i) JRN Rajasthan, Vidyapeeth, Udaipur (Rajasthan),(ii) IASE Sardarshahar, (Rajasthan), (iii) AAI, Allahabad, (Uttar Pradesh) validated by AICTE – UGC by conducting special examination as per the Supreme Court's Order(C) Nos.19807 – 19808/2012, Dated 03.11.2017 be validated and approved as equivalent to degrees of regular stream for the purpose of employment in Public Services	G.O(Ms)No.19, Higher Education (K1) Department dated 02.02.2022
26.	M.Tech Environmental Science and Technology is equivalent to M.E. (Environmental Engineering).	G.O.Ms.No.61, Higher Education (J1) Department, dated 17.04.2013.

27.	M.Tech Petroleum Refining and Petromedicals is awarded by Anna University is equivalent to M.Tech (Chemical Engineering).	G.O.Ms.No.157, Higher Education (J1) Department, dated 27.08.2013.
28.	M.E. (Environmental Management) awarded by Anna University is equivalent to M.E. (Environmental Engineering).	G.O.Ms.No.190, Higher Education (J1) Department, dated 18.11.2014.
29.	B.E. (Electronics and Communication) awarded by Anna University is equivalent to B.E. (Electronics)	
30.	M.Tech. (Environmental Science and Engineering) (2011-2013) offered by Anna University, Tirunelveli is equivalent to M.Tech./M.E (Environmental Engineering).	G.O.Ms.No.29, Higher Education (k1) Department, dated 09.02.2021.
	M.Tech. (Environmental Science and Engineering) (2012-2014) offered by Anna University is equivalent to M.Tech./M.E (Environmental Engineering).	
31	B.E. Production Engineering (Sandwich) offered by P.S.G College of Technology, Coimbatore affiliated to Anna University is equivalent to B.E Mechanical Engineering	G.O.Ms.No.58, Higher Education (J1) Department, dated 06.05.2022
32.	B.E. Civil Engineering and Planning offered by SNS College of Technology, Coimbatore affiliated to Anna University is equivalent to B.E/B.Tech Civil Engineering	G.O.Ms.No.150, Higher Education (J1) Department, dated 03.05.2023
33	B.E. Mechatronics Engineering awarded by Anna University is equivalent to B.E Mechanical Engineering	G.O.Ms.No.211, Higher Education (K1) Department, dated 17.07.2023

ANNEXURE -III

CERTIFICATE OF PHYSICAL FITNESS BY A SINGLE MEDICAL OFFICER / THE CIVIL MEDICAL BOARD

Signature of Candidate_____

I/We do hereby certify that I/We have examined (full name)Thiru / Thirumathi / Selvan / Selvi _____ a Candidate _____ for employment under the Government as _____ in the _____ Office in the _____ Department and whose signature is given above and cannot discover that he/she has any disease, communicable or otherwise, constitutional affliction or bodily infirmity/except that his/her weight is in excess of/below the standard prescribed, or except

I/We do notconsider this a disqualification of the employment he/she seeks.

His/Her age is according to his / her own statement _____ years and by appearanceabout ___ / ___ years.

I/We also certify that he/she has marks of Small Pox/ Vaccination.

Chest measurement inInches
On full Inspiration
On full expiration
Difference expansion

Height in ft.
Weight in kg.
Cardio–Vascular System
Respiratory System
His/Her vision is normal
Hypermetropic/ Myopic/ Astigmatic/
[Here enter the degree of defect and the strength of correction glasses]
Hearing is normal / defective (much or slight)
Urine-Does chemical examination show
(i) Albumen (ii) Sugar State specific gravity:
Personal marks (at least two should be mentioned) For Identification
1.
2.

SIGNATURE:
RANK:
DESIGNATION:

PRESIDENT:
Member (I)
(II)

STATION:
DATE:

STATION:
DATE:

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The candidate must make the statement required below prior to his / her Medical Examination and must sign the declaration appended thereto.His attention is speciallydirected to the warning contained in the notebelow:-

1. State your name in full:

2. State your age and birth place:

3. (a) Have you ever had small pox, intermittent or any other fever, enlargement or suppuration of glands spitting of blood, asthma, inflammation of lungs, heart disease, fainting attacks, rheumatism, appendicitis?

OR

(b) any other disease or accident requiring confinement to bed and medical or surgical treatment?

4. When, where your last vaccinated

5. Have you or any of your near relations been afflicted with consumption, serefula gout, asthma, fits, epilepsy or insanity?

6. Have you suffered from any form of nervousness due to over work or any other cause?

7. Furnish the following particulars concerning your family:

Father's age, if living and state of health	Father's age at death and cause of death	No. of brothers living, their ages, state of health	No. of brothers dead, their ages at and cause of death
(1)	(2)	(3)	(4)

Mother's age, if living and state of health	Mother's age at death and cause of death	No. of Sisters living, their ages and state of health	No. of Sisters dead, their ages at and cause of death
(1)	(2)	(3)	(4)

I declare all the above answers to be to the best of my belief, true and correct.

CANDIDATE'S SIGNATURE

Note:The candidate will be held responsible for the accuracy of the above statement by willfully suppressing any information he will incur the risk of losing the appointment and if appointed, of forfeiting all claim to superannuation allowance or gratuity.

ANNEXURE – IV

List of Documents to be uploaded (Not less than 200KB in PDF) (single or multiple page in 200 KB in PDF)

1.	SSLC Mark Sheet
2.	HSC Mark Sheet or its equivalent
3.	**Educational qualification: Diploma / PG Diploma/ UG / PG degree:** Diploma Certificate / PG Diploma Certificate / Degree certificate / Consolidated Mark Sheet / PG Degree certificate / PG Degree Consolidated Mark Sheet (As mentioned in Para 5(B) of this Notification).
4.	G.O. for Equivalence of qualification to the prescribed qualification (if applicable)
5.	PSTM Certificate up to prescribed entire qualification (1st std to entire qualification) as prescribed in para 14 – R of the Instruction to Applicants. (if applicable)
6.	**a.** Certificate regarding physical limitation in an examinee to write as prescribed in Appendix-I of the G.O.(Ms) No.8, Welfare of Differently Abled Persons (DAP 3.2) Department, dated 21.09.2021 **(for persons claiming exemption from Tamil Eligibility Test / scribe / compensatory time) (if applicable)** b. A copy of Disability Certificate in the format prescribed in the Rights of Persons with Disabilities Rules, 2017 [Department of Empowerment of Persons with Disabilities (Divyangjan), Ministry of Social Justice and Empowerment, Government of India] and issued by the competent authority defined in G.O.Ms. No.28, Welfare of Differently Abled Persons (DAP 3.1), dated 27.07.2018.
7.	Community Certificate obtained from the Competent authority (In case of women candidate, in the name of her Father / Mother)
8.	Differently Abled Certificate obtained from the Medical Board / (if applicable)
9.	Experience Certificate (if applicable)
10.	Destitute Widow Certificate (if applicable)
11.	Ex-servicemen Certificate (if applicable) (P.P.O, Bonofide certificate)
12.	Transgender ID Card with Gender (if applicable)
13.	Gazetted copy for name change (if applicable)
14.	No Objection Certificate (mentioning the Disciplinary cases if any) as prescribed as per instruction to applicants para 14 P (ii) (if applicable)
15.	Documents / Court Orders proving Acquittal / Conviction or FIR in case of pending cases for Criminal cases registered (if applicable)
16.	Other Documents (if any)

For further details refer para 2W of "Instructions to Applicants"

ANNEXURE -V

APPENDIX-I

Certificate regarding physical limitation in an examinee to write

This is to certify that, I have examined Mr/Ms/Mrs _____(name of the candidate with disability) a person with _____(nature and percentage of disability as mentioned in the certificate of disability), S/O/D/o_____ a resident of _____ (Village / District / State) and to state that He / She has physical limitation which hampers his/her writing capabilities owning to his/her disability.

Due to the above mentioned disability following concession may be given:-

1. Exemption from tamil / second language.
2. Extra _____ hours for writing theory exam.
3. Allocation of a scribe.
4. Over looking spelling mistakes and grammatical errors.
5. Using calculator / assistive devices.
6. _____(any other assistive devices or concessions).

*strike out the not applicable.

Signature

(Chief Medical Officer/Civil Surgeon/Medical Superintendent/signature of the notified medical authority of a Government health care institution)

Name & Designation

Name of the Government Hospital/ Health Care Centre/The notified medical authority

Place:

Date:

Signature / Thumb impression

of the Differently abled person

(Photo of the Differently Abled Person and Stamp to be fixed here)

Note:

Certificate should be given by a specialist of the relevant stream/ disability

(eg, Visual impairment – Ophthalmologist, Locomotor disability – Orthopedic specialist/ PMR .etc)

ANNEXURE – VI

EXPERIENCE CERTIFICATE (MODEL FORMAT)
FORMAT - I

1	Name and Address of the Firm/Workshop/ Company / Government Department / Public Sector under taking	:	
2	Whether the said Firm / Workshop/ Company registered under the Factories Act 1948(Central Act LXIII of 1948)	:	
3	Registration Number of Firm / Workshop / Company (Under Factories Act, 1948)	:	
4	Nature of work of the organisation (Production/Service)	:	
5	Name of the Employee and Date of Birth	:	
6	Qualification possessed by the Employee on the Date of Joining Service	:	
7	Designation and period of Experience of the Employee	:	
8	Nature of the Work/Duty performed by the Employee (To be mentioned in Brief)	:	
9	Whether the employee possesses experience as laid in para 4(B) of the notification		
	a) Period of Experience		From..... To.....
9	Whether Attendance Register / Attendance Rolls / Pay Register and other records /available for this Employee	:	Yes / No
10	Certificate by Manager of the Firm Firm/Workshop/ Company / Government Department / Public Sector under taking	:	The above said employee is experienced in this Firm/Workshop/ Company / as stated above. The above particulars furnished by us are correct

Office Seal:
Date:
Place: Signature

Name & Designation of
the Issuing Authority

Note:

Firms/Workshop which issues the certificate is cautioned that issuing of any certificate containing false details will lead to legal/penal action on them.

FORMAT - II

1	Name and Address of the Firm/Workshop/ Company / Government Department / Public Sector under taking	:	
2	Whether the said Firm / Workshop/ Company registered under the Factories Act 1948(Central Act LXIII of 1948)	:	
3	Registration Number of Firm / Workshop / Company (Under Factories Act, 1948)	:	
4	Nature of work of the organisation (Production/Service)	:	
5	Name of the Employee and Date of Birth	:	
6	Qualification possessed by the Employee on the Date of Joining Service	:	
7	Designation and period of Experience of the Employee	:	
8	Nature of the Work/Duty performed by the Employee (To be mentioned in Brief)	:	
9	Whether the employee possesses experience as laid in para 4(B) of the notification		
	a) Period of Experience		From..... To.....
10	Whether Attendance Register / Attendance Rolls / Pay Register and other records /available for this Employee	:	Yes / No

@ strike out which is not applicable.

Note:-

Firms / Research Institution which issues the certificate is cautioned that issuing of any certificate containing false details will lead to legal / penal action on them.

CERTIFICATE

This is to certify that Thiru/Tmt/Selvi ..... possesses the said experience as stated above is true as per the information given by the Employee.

Signature of the Applicant

Signature

Office Seal:

Name & Designation of the
Head of Institution / Firm

Place
Date:

ANNEXURE – VII

TENTATIVE TIMELINE FOR THE RECRUITMENT PROCESS

Sl. No.	Process	Timeline
1.	Last date upto which the Online Application can be edited/ submitted/ payment of fees can be made	11.11.2023
2.	Online Application Correction Window period	From 16.11.2023 - 12.01 A.M. to 18.11.2023 - 11.59 P.M.
3.	Last date upto which the applicants are permitted to upload / re-upload the documents	24.12.2023
4.	Publication of Examination Results	February 2024
5.	Certificate Verification / Oral Test	March 2024
6.	Counselling	March 2024

Secretary