# INDIAN INSTITUTE OF TECHNOLOGY BOMBAY
## DEPARTMENT OF CIVIL ENGINEERING

**Sub: Selection Process for the Admission to Ph.D. Programme, Civil Engineering Department, IIT Bombay for 2021-22 (Spring Semester).**

Dear Candidate,

This letter should be read in conjunction with the call letter that you have received from the academic office, IIT Bombay.

You have to attend the interview via online Video (VC) Mode only, which will be organized by various specializations (i.e. CE1 to CE7) of the Civil Engineering Department, IIT Bombay during **December 4 to 5, 2021** from **IST 9:00 hrs. onwards**. Note that for CE4: Structural Engineering, there will be an online written test and an interview of the shortlisted candidates from the written test. For all other specializations, i.e. CE1, CE2, CE3, CE5, CE6 and CE7, there will be only interview.

The schedule of the written test/interviews will be displayed on the websites of Academic office of IIT Bombay and Civil Engineering department. The exact time and the VC link (either WebEx / Zoom / MS Teams / Google meet) for the interview and modalities of the written test will be made available before the test/interview.

Please ensure to visit **www.civil.iitb.ac.in** frequently for all updates regarding the details on written test/interview. In case of urgency, please contact: Ms. Ekta / Mr. Sanjay; Phone: 022-25767301 / 25764313; Mobile: 9768124098 (Ms. Ekta); Mobile: 9820157595 (Mr. Sanjay). email: pgadm@civil.iitb.ac.in

The selection will be based on the performance in the interview. During the interview, in addition to the technical knowledge on the subject, research aptitude and communication skills will also be tested. Decision of the committee is final and cannot be changed under any circumstances.

The candidates are advised to refer to the research activities of the Civil Engg. Department faculty members at https://www.civil.iitb.ac.in/people/faculty before appearing for the interview. Candidates are also encouraged to contact prospective research supervisors (through email) well before the interview to understand their requirements and expectations.

Candidates shall prepare a research proposal for each of the opted specializations (at the most two) research topics and present the same at the time of interview. Each research proposal should be written in about 500-1000 words highlighting the research need, proposed methodology, design of model/experiment, expected contributions, and a few key references.

Wish you all the best.

*Prof. Deepankar Choudhury,*
*Prof. T. Kant Chair Professor & Head,*
*Department of Civil Engineering, IIT Bombay.*
*Issued on 29th October 2021*

# Instructions for PhD Admission 2021-2022 (Structural Engineering: CE4) Spring Semester

## Civil Engineering Department, IIT Bombay
**(https://www.civil.iitb.ac.in)**

Date of Written test: Dec 4, 2021
Date of announcement of results of shortlisted candidates: Dec 4, 2021
Date(s) of interview for shortlisted candidates who qualified written test: 4-5 Dec 2021

### Part I: General instructions for online written test and interview

1. Please ensure to visit **https://www.civil.iitb.ac.in** frequently for all updates regarding the written test and interview. It will **not** be possible to communicate with the candidate thorough email or phone unless otherwise required.
2. The written test shall be of **90 minutes** duration and the syllabus for the written test is given in the **Part II** of the instructions. The written test will be used only for shortlisting the candidates for the interview. The **cut-off marks** for the written test to qualify is set to (**mean + 0.5 standard deviation**) for General/Open category (GEN) candidates. For OBC-NCL & GEN-EWS, on successful submission of proper certificate, the cut-off marks will be 0.9 times cut-off marks for GEN candidates. For SC/ST/PwD candidates, on successful submission of proper certificate, the cut-off marks will be 0.67 times cut-off marks for GEN candidates. The final selection of the shortlisted candidates is based on interview marks only.
3. The written test will be conducted in **5 parallel sessions using Full-View Proctoring Exam mode.** This exam mode shall use SAFE mobile app for the test along with WebEx meeting for Video feed. **Refer to Part III of the instructions for Full-View Proctoring Exam**.
4. The **registration code** for SAFE App and the WebEx **meeting link** along with **time** of joining for your session will be uploaded on the website **2 days** before the written test. Candidate should register in SAFE App using their Application ID (e.g RCE202020000) before appearing for the written test.
5. The format of the written test will be multiple choice question **(MCQ)** and/or numerical answer type **(NAT).** The candidate is allowed to refer to printed or hand written materials.
6. On the day of the written test, candidate should join using the WebEx meeting link at the allotted time and wait in the virtual lobby. You will be admitted by the invigilators. There will be a **trial run (mock test)** prior to the actual written test to help facilitate the candidate.
7. If the candidate is **not available** at the allotted time, and unable to appear for the written test, no further queries in this context will be entertained. Further, candidate **should ensure** Full-View Proctoring Exam is setup properly as per Part II of the instructions for Full-View Proctoring Exam.
8. The institute **shall not** be held **responsible** for poor internet connection and/or any other disruptions faced by the candidate that may affect the written test or proctoring.
9. Candidate **shall** make a **note** that SAFE App can detect use of whatspp, messenger services and phone call as potential academic malpractice. **Do not** access any of these (or any other) applications and **do not** accept phone call during written test while using SAFE app. Any inappropriate behaviour shall result in **disqualification** of the candidate from the written test.

10. After the written test, the list **of shortlisted candidates** appearing for **interview** will be declared on the website along with the time of interview and WebEx link to join the interview**.**
11. The interview is expected to be held in several sessions. Candidate's interview will mostly happen during the allotted slot time falls under a particular session. **40 Mins before their scheduled time**, they can join with the WebEx link and wait in the virtual lobby. However, candidates are instructed to be available for the interview anytime during their allotted session. If required, we may call and ask them to join.
12. In case of the poor connectivity of the internet or internet issues during interview, it is advised that the candidate should be ready for a telecon.
13. The candidate appearing for **written test/interview** should be ready with **all documents** prescribed by the academic office.
14. Candidates appearing for interview should keep white sheet/note book with pen/pencil with them and should write and explain if needed during the interview. Whiteboard can also be used for answering.
15. Shortlisted candidates for interview may wish to email a brief write up on the master's project followed by a very brief research proposal (maximum 1 page). Save it as a PDF file. File name would be Your First Name_Your Last Name.pdf. The PDF file may be sent to IIT Bombay CE4 Admission Team, Email: admission.str@civil.iitb.ac.in

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---------------------------
Only for urgent communication
CE4 IIT Bombay Admission Team
Civil Engineering Department
IIT Bombay
Email: admission.str@civil.iitb.ac.in
Phone:9833198146 (Mr. Preshit)
      9833177978 (Mr. Vivin)
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**Part II: Syllabus for the Written Test in Structural Engineering (CE4)**

**Engineering Mechanics:** System of forces, free-body diagrams, equilibrium equations; Internal forces in structures; Friction and its applications; Kinematics of point mass and rigid body; Centre of mass; Euler's equations of motion; Impulse-momentum; Energy methods; Principles of virtual work.

**Solid Mechanics:** Bending moment and shear force in statically determinate beams; Simple stress and strain relationships; Theories of failures; Simple bending theory, flexural and shear stresses, shear centre; Uniform torsion, buckling of column, combined and direct bending stresses.

**Structural Analysis:** Statically determinate and indeterminate structures by force/ energy methods; Method of superposition; Analysis of trusses, arches, beams, cables and frames; Displacement methods: Slope deflection and moment distribution methods; Influence lines; Stiffness and flexibility methods of structural analysis

**Concrete Structures:** Working stress, Limit state and Ultimate load design concepts; Design of beams, slabs, columns; Bond and development length; Prestressed concrete; Analysis of beam sections at transfer and service loads.

**Steel Structures:** Working stress and Limit state design concepts; Design of tension and compression members, beams and beam-columns, column bases; Connections- simple and eccentric, beam-column connections, plate girders and trusses; Plastic analysis of beams and frames

**Part III: Instructions for Full-View Proctoring Exam**

**General Instructions:**

- The written test will be held in SAFE Mobile App along with WebEx meeting for video feed
- Smartphone is mandatory for SAFE App and a Laptop/Desktop for WEBEX Video Feed **or 2 Smartphones if no Laptop/Desktop.** Good data connection is prerequisite.
- In this mode, the student is not expected to approach the laptop (or second smart phone) or use anything on it after the exam starts. The candidate will have his/her mobile phone with his/her constantly, as well as rough papers or blank answer papers
- SAFE is a mobile app with a lot of useful features such as ability to run timed exams even if the network is down; details on how to use SAFE are given later in this document.
- Candidate shall be cautioned that SAFE App can detect use of whatspp, messenger services and phone call as potential academic malpractice
- You should not get up from your seat, go to washroom, etc. during the examination. Follow your instructor's policy.

1. You require a laptop with a webcam and smartphone (or 2 smartphones if no laptop). Check the following:
   1.1. Both devices should be connected to internet; laptop can be connected via mobile hotspot.
   1.2. Both devices should have sufficient charge (or UPS) to run for at least 3 hours without power

2. Exams uses the SAFE App

   SEE THE "**SAFE App Instructions for Candidate**"

3. Ensure the following before/during the exam

   3.1. Keep your INSTITUTE ID Card or other Government-issued ID Card handy to record your identity at the time of taking the examination.
   3.2. Keep sufficient number of blank papers for writing your examination.
   3.3. Find a convenient place to take the exam (place should be well lit, be quiet, nobody should be moving around in background, etc.)
   3.4. Keep pen, paper, calculator, water-bottle, etc. on your table within easy reach. All of these items should be visible from the laptop webcam. (For this, you should be seated at sufficient distance away from the laptop)
   3.5. You should not approach the laptop computer or do anything on it during the exam.

**Full-View Proctoring Instructions before Start of Exam:**

1. Laptop computer (or second smartphone) should be connected to internet and kept at a suitable distance from the student writing the exam. It should be facing the student so that student's face, hands, answer papers and smartphone are visible. Part of surrounding area near the student should be also seen on camera.
2. Seating:

➢ Make sure you have cleared an area where you can give your quiz such that your laptop computer's (or second smartphone's) camera is trained on your face, shoulder and hands, the papers and other material on the table, and some area around you, and we can see all this clearly.

➢ Make sure that you are not sitting in the dark, and the camera is able to clearly show you and the surrounding area. If in daytime, having the camera between you and the window will help.

3. Connect the laptop computer to the exam meeting link shared by instructor. Laptop computer's camera should be ON. Your video should be shown in nearly full-screen size.

4. Disable incoming video to preserve your bandwidth in Webex.

**Full-View Proctoring Instructions at Start of Exam:**

➢ After sitting down at the place from where the exam will be taken, login on your smartphone using SAFE app. Connect to your course on SAFE.

➢ SAFE may ask to take a selfie. Take a photo that clearly shows your face.

➢ From your seat, show your INSTITUTE ID Card or other Government-issued ID card to the laptop webcam running Webex.

➢ The exam will start at the specified time on SAFE. At the start, show the screen of your smartphone running SAFE app to the laptop webcam, in a way that the remaining time is clearly shown.

**Full-View Proctoring Instructions During the Exam:**

1. If the exam is objective to be answered on SAFE itself, proceed to do so. You may use your blank papers for rough work.

2. If SAFE is being used for pen and paper exam,

➢ You should write your answers on only one side of paper. You can use extra papers that will not be submitted for rough calculations.

➢ After you have completed the paper (within specified time limit), choose to submit the paper. It will ask if you would like to take picture. Take a picture of all answer pages pertaining to a question one by one and submit.

3. There is no need to look at the laptop (or the second smartphone) or operate it in any manner during the exam (barring network disruption). Thus, do not look at the screen, and do not bring your hands towards the laptop/second smartphone during the exam.

4. Note that you may be asked to do ALL THIS IN ONE SESSION WHILE SITTING. If instructor announces no breaks are allowed for any reason, follow it diligently.

➢ Getting up from your seat or leaving the exam location may be construed as indulging in unfair practice.

## WEBEX Video Feed:

- Personal Room Name: To be shared (e.g CE4 – Session 1/2/3/4/5)
- Link to Join the meeting: To be shared <Webex Link>
- Enter your Name and Email for joining the meeting.
- Once login you will come to the "LOBBY".
- Invigilator (HOST) who has initiated the meeting will "ADMIT" you accordingly, till then you have to wait in Lobby room.

## SAFE App Instructions for Candidate:

- Install SAFE app from (for Android): https://apkpure.com/safe/com.Institute.cse.arkenstone.safe_v2
- SAFE iOS app: (search app store for "INSTITUTE SAFE"), direct link: https://itunes.apple.com/app/id1435105567
- Open app, (give necessary permissions), use google-Sign-In
- Register for Exam: ask instructor for registration code (to be shared with you); when registering for the very first time, you can enter your Application ID
- Press "sync to server" after logging in
- Attendance: during exam, mark your attendance by clicking the "Attendance" --> "Mark attendance" buttons
- Quiz: during exam, when instructor tells, press "Quiz" --> "View Quiz" and attempt the demo quiz; instructor will give the decryption password

- SAFE Platform videos on YouTube: https://www.youtube.com/playlist?list=PL-bZp8Qhr-SYTlD9SGsxGzmONXx9AzUdl

- Don't worry if there is disruption of internet on your smartphone. SAFE App is disruption proof. Your answer will be automatically uploaded once the exam is over.