HOW TO OPEN IIT KHARAGPUR

A Case Study

PROPOSAL REPORT

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INDEX

QUESTION-WISE SOLUTIONS

(Q1)

State the rules and regulations pertaining to the safety and hygiene of the students, faculty, and staff in a complete offline academic session. Details should include all the academic and non-academic aspects of the campus.

Rules and regulations pertaining to the safety and hygiene of the students and faculty

1. The physical distancing of at least 6 feet to be followed as far as feasible.
2. Use of face covers/masks to be made mandatory.
3. Frequent handwashing with soap (for at least 40-60 seconds) even when hands are not visibly dirty. Use of alcohol-based hand sanitizers (for at least 20 seconds) can be done wherever feasible.
4. Respiratory etiquettes to be strictly followed. This involves the strict practice of covering one's mouth and nose while coughing/sneezing with a tissue/handkerchief/flexed elbow and disposing of used tissues properly.
5. Self-monitoring of health by all and reporting any illness at the earliest.
6. Spitting shall be strictly prohibited.
7. Installation & use of the Aarogya Setu App shall be advised wherever feasible.
8. Cashless transactions to be preferred whenever possible.
9. Groups with more than 3 members are to be highly discouraged.
10. Yantrakaar (https://yantrakaar.com), developed by IIT KGP students shall be used for social distancing enforcement.
11. Use signs, tape marks, or other visual cues, such as decals or colored tape on the floor, placed 6 feet apart, to show where to stand when physical barriers are not possible.
12. Replace high-touch communal items, such as coffee pots and bulk snacks, with alternatives such as pre-packaged, single-serving items. Encourage office staff to bring their own water to minimize use and touching of water fountains or consider installing no-touch activation methods for water fountains.
13. Have a procedure in place for the safe and accessible transport of an employee who becomes sick while at work. The employee may need to be transported home or to a healthcare provider.
14. Decrease occupancy in areas where outdoor ventilation cannot be increased.
15. Modify or adjust cardio equipment, free weight areas, weight training equipment, and classrooms to maintain social distancing of at least 6 feet between students and coaching staff and athletic trainers.
16. Clean and disinfect all exercise equipment and tools between users.
17. Keep areas where social distancing is particularly challenging closed until local infection risks are lowered.

Rules and regulations pertaining to the safety of the staff (for mess workers, maintenance staff, etc. in addition to the previous rules)

1. Develop a schedule and daily checklist for increased, routine cleaning and disinfection. An established schedule can avoid under-or over-use of cleaning products.

2. Discard disposable gloves after each cleaning. For reusable gloves, dedicate a pair for disinfecting surfaces to prevent the spread of COVID-19. After removing gloves, wash hands with soap and water for at least 20 seconds.

3. Modify or adjust seats, furniture, and workstations to maintain social distancing of 6 feet between office staff, where possible and incorporating accessibility requirements.

4. If a staff member falls or reports being sick, clean and disinfect the work area and any shared common areas (including restrooms) and any supplies, tools, or equipment handled by that staff member.

5. Provide easy-to-understand instructional materials and training in languages other than Hindi, as needed. Train staff who use cleaners and disinfectants on the comprehensive written protocol to read and interpret all instruction labels and understand safe and appropriate use.

6. Arrange chairs in reception or other communal seating areas, by turning, draping (covering the chair with tape or fabric so seats cannot be used), spacing, or removing chairs, to maintain social distancing.

7. Ensure restroom exhaust fans are functional and operating at full capacity when the building is occupied.
8. Inspect and maintain local exhaust ventilation in areas such as restrooms, kitchens, cooking areas, etc.
9. Create physical barriers to protect the mess staff and those they serve, including students and other college staff.

10. Install plastic or plexiglass barriers between workstations to protect staff in situations where social distancing is difficult to maintain, for examples mess.

11. Plan menus, production, and food preparation schedules to allow employees to maintain the recommended social distance of 6 feet while working, when possible.

12. Limit the number of staff accessing storage areas or large equipment, like refrigerators.
13. Limit occupancy in health offices and isolation rooms to adhere to physical distancing guidance, as much as possible.

14. Whenever possible, drivers and aides should open bus windows to increase the circulation of outdoor air, but not if doing so might pose a safety or health risk (e.g., risk of falling).

15. Special care should be exercised when performing disinfection to avoid overexposures to disinfectants in poorly ventilated buses. Consider the use of natural ventilation (i.e., opening windows) to increase outdoor air dilution of indoor air, when environmental conditions allow.

16. Minimize elevator use, wherever possible, and encourage the use of stairs.
17. Place hand sanitizers with at least 60% alcohol at the entrance of the bus and encourage safe use when getting on/off the bus for driver and students.

(Source)

(Q2)

As of now, there are many cheap and effective methods developed for testing. Using these techniques, our aim is to identify students for quarantine before they enter the campus. How do you facilitate such arrangements? You are required to propose a model for pre-arrival testing of Covid before students arrive on campus. And also explain a simultaneous model for post-arrival testing before we allow students to go to halls.

We plan to call the students in a phase-wise manner. Initially, the PG students should be called back to campus. Later, all students (except the current 1st year) from a particular Hall will be called back. This will help maintain a single Hall as a social bubble. After the quarantine period of the students from a particular hall is over and the students have vacated the 1st year rooms, the first-year students of that hall will be called back. After 3 days, all students from another hall can arrive in the aforementioned process. Since we have 23 halls, it will take approximately 70 (~23x3) days to call back all the students to the campus. Students will be informed about the schedule beforehand so that there is ample time to buy tickets.

Students will be asked to fill an entry form which will be shared with them via email. They have to bring a printed copy of it on arrival. This form will also contain a consent letter filled by the students and signed by the parents/guardians. During the time of arrival of students, online and offline classes will go on as usual. Students who have already arrived can start attending offline classes as per the allotted time table.

Quarantine centres
Guest Houses (TGH, VGH and SAM) will be used as quarantine centres. These will house COVID-19 infected patients, students who have symptoms, students who have not brought RT-PCR test on arrival and potentially positive students during pool testing (refer Q3). There will be 2 types of blocks inside quarantine centres: “Covid Positive” and “Potentially Positive”. The “Covid Positive" block will contain confirmed cases. All the other types of students will be kept in the “Potentially Positive” block.

Helpline and dashboard
Helpline numbers will be set up hall-wise. Each hall will have 2-3 helpline numbers, including the numbers of the Hall Manager and Hall President. Students who are feeling symptomatic or know someone else who is feeling symptomatic can report to these numbers. There will also be 3 central helpline numbers managed directly by the Deans’ Office.

Apart from this, a central dashboard (Example: Cornell) will be set up containing information like the number of tests, number of positive cases, number of students arrived in the campus, infection ratio etc. This will also contain hall-wise information regarding these numbers.

Testing
Only the RT-PCR test will be considered due to its availability and accuracy. The cost of testing will be compensated from medical insurance and in case of the shortfall will be distributed between the institute and students.

- **Pre-arrival:**

Items to be brought by the students:

1. Face masks (cloth or disposable)
2. Sanitizers
3. Set of utensils (plate, glass, spoons, water bottle, etc)
4. Digital thermometer
5. Oximeter
6. Aadhar card and Institute ID card
7. Negative RT-PCR test within 72 hours of arrival.
8. The students travelling from far away (>16 hours train journey) will be suggested to come by flight to reduce the risk of infection.
9. Entry form.

- **On arrival:**

1. The entry to the campus will be restricted from 8 am to 8 pm only. The students will have to plan their journey accordingly.
2. At the main entrance, the security guard will check the RT-PCR test and ID card to ensure whether the student is from the specified Hall of Residence. The student will also get an ID card holder given by the institute, which is to be worn by the student at all times.
3. The students who have come with negative RT-PCR tests will be sent to their respective Hall for a 14-day self-quarantine. Assuming all the toilets and bathrooms have been repaired, the General Secretary Maintenance will assign students to each bathroom and toilet. The washrooms will be sanitized twice a day (during the afternoon and night). During the whole quarantine period, the hall staff will stay in the hall as well. While cleaning is going on, no one will be allowed to use the washroom to minimize contact.

   After 7 days, all the students of the hall will be tested. During those days, the students have to monitor themselves. If a student tests positive, he/she will be taken to the quarantine centre (“Covid Positive” block). At the end of the 12th day, the students will be tested again. Only after the negative results come, their self-quarantine will be over. The same procedure will be followed by the students who are positive. Students who show symptoms anytime should immediately inform about this to the available helpline numbers. They will be taken to the quarantine centre (“Potentially Positive” block).
   For testing strategy, Pool Testing will be followed (details in Q3).

4. If the student has come without the test, then he/she will be tested immediately and sent to quarantine centres (Guest houses, “Potentially Positive” block) for isolation. After the result comes out to be negative, they will be sent to their Halls for further self-quarantining (previous point). If positive, he/she will be sent to the “Covid Positive” block.

(Q3)

Due to the budget constraint, testing everyone in our vast community (like Cornell) is not feasible on a daily basis. How do you plan to execute random testing for students, faculty, staff, and other campus communities during Autumn’21? What percentage of the population would you like to test every week? Give mathematical evidence.

We answer this question in the scenario that the students are out of their compulsory quarantine after arriving on campus.

Estimating the testing capacity we have:
As we only have the data for the number of tests in West Bengal and not district wise data, we estimated the testing capacity of Paschim Medinipur district using the following method:

$$\frac{Population\ of\ Paschim\ Medinipur}{Population\ of\ West\ Bengal} \approx \frac{Testing\ capacity\ Paschim\ Medinipur}{Testing\ capacity\ of\ West\ Bengal}$$

$$\Rightarrow Testing\ capacity\ Paschim\ Medinipur = \left\lfloor \frac{Population\ of\ Paschim\ Medinipur}{Population\ of\ West\ Bengal} * Testing\ capacity\ of\ West\ Bengal \right\rfloor$$

The numbers respectively are:
Population of Paschim Medinipur = 62,97,653 (Projected, Source)
Population of West Bengal = 9,69,06,000 (Projected. Source)
Testing capacity of West Bengal = 45000 per day (Approx. Source)
Note: This was approximately the maximum number of tests happening in West Bengal during the peak of the 1st wave.

Using this we get:
Number of tests in Paschim Medinipur = 2924 per day.
We assume that out of this, we can reserve at max 250 tests per day for IIT Kharagpur.

Students:
Distribution and method of testing:
Taking numbers from the HMC website, we saw the number of rooms of different capacities. We follow the strategy of Pool Testing.

Pool Testing: In pool testing, samples of swabs from around five people are mixed together and tested in a single unit and individuals are screened individually only when the pool test result is positive.
We use the following strategy for Pool Testing, which follows the ICMR required limit for the maximum number of samples required in a pool:

- *Single rooms:* 5 adjacent rooms will be pooled.
- *Double rooms:* 3 adjacent rooms will be pooled.
- Triple rooms: 2 adjacent rooms will be pooled.
- Four-sharing rooms: 1 room will be pooled.

Our average pool size is 5.
Hence, the total number of pool tests is given as:

$$P(N) = \sum_{i=1}^{N} P_i(s_i, d_i, t_i, f_i)$$

$Where,$

$N = Total\ number\ of\ Halls$

$P_i(s_i, d_i, t_i, f_i) = Number\ of\ pool\ tests\ in\ the\ i^{th}\ Hall, given\ by,$

$$P_i(s_i, d_i, t_i, f_i) = \left\lceil \frac{s_i}{5} \right\rceil + \left\lceil \frac{d_i}{3} \right\rceil + \left\lceil \frac{t_i}{2} \right\rceil + f_i$$

$s_i = Number\ of\ single\ rooms\ in\ the\ i^{th}\ Hall$

$d_i = Number\ of\ double\ rooms\ in\ the\ i^{th}\ Hall$

$t_i = Number\ of\ triple\ rooms\ in\ the\ i^{th}\ Hall$

$f_i = Number\ of\ four - sharing\ rooms\ in\ the\ i^{th}\ Hall$

Using the above formula, we can fill the following table.

Hall	Single	Double	Triple	Four	Students	Pool
Nivedita	35	43	1	2	132	25
Gokhale	10	0	44	0	142	24
BC Roy	162	0	0	0	162	33
HJB	163	0	0	0	163	33
SAM	0	92	0	0	184	31
RLB	250	0	0	0	250	50
JCB	262	0	0	0	262	53
SNIG	213	16	20	0	305	59
LLR	334	0	0	0	334	67
VS	335	0	0	0	335	67
MS	397	0	0	0	397	80
Patel	262	19	45	0	435	83
Nehru	263	21	45	2	448	85
MT	0	0	164	0	492	82

RK	302	23	96	0	636	117
AZ	260	21	143	0	731	131
RP	307	22	160	0	831	150
BRH	1390	0	0	0	1390	278
MMM	0	789	0	0	1578	263
LBS	0	0	650	0	1950	325
Sum	**4945**	**1046**	**1368**	**4**	**11,157**	**2036**

Our entire methodology is to test in such a way that we can declare entire Halls as Covid-free zones as soons as possible so they can act as a safety bubble on their own. So we test Hall-wise accordingly.

How the testing will be carried out:
We will carry out testing for a given person in a cycle of 14 days, ie., the median incubation period of the virus.
Regular testing will be done hall-wise (see list below). Pool testing, as described above, will be done to ensure cheaper and faster testing. Hence, there will be $\left[\frac{2036}{14}\right]$ = 146 (roughly) tests done for this purpose, every day (Where [.] is the Greatest Integer Function). We have an overhead of around 100 more tests every day, which will be used to test staff, faculty, students in isolation and students with positive pool tests.

Testing schedule:
Note: We divide the bigger halls (LBS, MMM, BRH) into sections. Each section will be treated as a separate Hall during testing.

1. ***LBS***
   Has 13 equal blocks.
   Number of testing per block =$\frac{325}{13}$= 25
   We are dividing it into 4 sections:

Section Number	Blocks	Pool tests required
1	AA, A (2 wings), AB	100
2	B (2 wings), BC	75
3	C (2 wings), CD	75
4	D (2 wings), DD	75

2. ***MMM***
   Has 4 equal blocks (DSK Block, RR Block, SDS block and HK block).

Number of testing per block = $\left[\frac{263}{4}\right]$ = 66

We are keeping each block as a section.

3. ***BRH***

Has 4 equal blocks (A Block, B Block, C block and D block).

Number of testing per block = $\left[\frac{278}{4}\right]$ = 70

We are keeping each block as a section.

Day 1 (166 tests): Nivedita, Gokhale, HJB, SAM, JCB
Day 2 (149 tests): RLB, SNIG, BC Roy
Day 3 (134 tests): VS, LLR
Day 4 (162 tests): MS, MT
Day 5 (168 tests): Patel, Nehru
Day 6 (131 tests): Azad
Day 7 (117 tests): RK
Day 8 (150 tests): RP
Day 9 (175 tests): LBS Section 1, 2
Day 10 (150 tests): LBS Section 3,4
Day 11 (132 tests): MMM 2 Blocks (SDS, HK)
Day 12 (132 tests): MMM 2 Blocks (DSK, RR)
Day 13 (139 tests): BRH 2 Blocks (A, B)
Day 14 (139 tests): BRH 2 Blocks (C, D)

Note: This list has been made keeping in mind the number of tests possible and proximity of the halls.

In case a pool has come out to be positive, the students will be put in the quarantine center in the "**Potentially Positive"** block. Here, they will be individually tested for a 2nd time. The students who test positive, will be transferred to the **"Covid Positive"** block and who are negative will be sent back to their hall. Their room in the hall will be sanitised.

Faculty and staff:

Each faculty/staff above the age of 45 (as per current rules), has to get vaccinated compulsorily.
Vaccinated faculty have to get themselves tested every 28 days and submit the test report to their HOD/manager.
Non-vaccinated faculty/staff have to get themselves tested every 14 days and submit the test report to their HOD/staff.
The cost of testing will be paid using their institute medical insurance.

For faculty:

In case they are positive, they can choose to isolate themselves in their homes or in the quarantine centres. In case they are isolated in their homes, they have to measure their vitals (oxygen, temperature, etc.) every day and report to an allotted doctor. In case of emergency, they can contact the central helpline number to call for a doctor.
At the end of each month, a report will be sent by the HODs to the Deans and the Director.

For staff:
In case they are positive, they can choose to isolate themselves in their homes or in the quarantine centres. In case of emergency, they can contact the central helpline number for help. At the end of each month, a report will be sent by the managers to the Deans and the Director.

Suggestions and Notes:

- We could've mentioned COVIRAP in our answer but we are not sure about its commercial viability and scalability. In case we are able to procure the COVIRAP testing machine, we can use its advantages to the full extent. One of its main advantages is that it gives results of similar accuracy as an RT-PCR test in 65 minutes (as per its official press conference). Hence, a more broad and widespread testing plan can be set up in the campus.
- For in-house testing, the institute can procure one (or multiple) RT-PCR machine(s). In this case, we can increase the number of tests that can be done.

(Q4)

What kind of innovation do you plan to bring in to minimize the risk of spreading the virus during possible super spreader events like short lunch hours, crowds in buses, rush in bicycle paths, and main roads. Suggestions may include stretched timetables, longer lunch hours, etc. Also, what will be the new sitting guidelines in classrooms?

- Bus service to be stopped as it will make it impossibly hard to track the contagion.
- As students are to be let out of buildings in batches of 10 min each, the number of bikes on the road at a time will be fewer. Security at every building will ensure there are no straddlers at the end of a slot. (Exceptions for persons with physical disabilities)
- During peak traffic hours (start and end of the classes, lunch break) the cycles will be allowed on the main road in addition to the bike path provided they are travelling in the direction of the main traffic flow (i.e. towards the hall when classes end/start of lunch towards classes when classes start/end of lunch)
- Students will be intimated beforehand at what time attendance will be taken in their particular classes. Failure to reach at that time will lead to losing attendance. This attendance time will be designed so as to ensure the traffic arriving at classes is spread out.
- Bus service should be available only in some special circumstances for the disabled or injured. Prior registration must be done for all those who would be using the bus facilities, thus making it easier to trace in case of a spread.
- The mess timing must be stretched with respect to the time slot distribution according to academic schedule i.e. people having a free afternoon can go later. The maximum capacity of the mess according to size will be decided. For eg., if there are 50 people in the mess then no one will be allowed to enter till someone leaves the mess.
- In classrooms, students should be seated only on the letter code as seated during examinations. Masks are compulsory while sitting in the classrooms and students are advised to sanitize as frequently as they can. It is advised not to share stationary or any other item that requires physical contact in the classroom.

Seating guidelines:

Seat spacing/marking chairs/marking floors-

- Rooms with mobile tables and chairs:
  Marking the location for each student on the table with a “Sit Here” sticker. In these types of classrooms, the chair would be placed at the location of these table stickers and used accordingly. Marking chair locations should not be necessary.
- Rooms with fixed seating (auditoriums):
  Applying the “Sit Here” stickers in designated, predetermined places.
- Rooms with fixed tables/mobile chairs:
  Mark the tables with the “Sit Here” sticker, not chairs, of the pre-designated locations.
- Desks: Marking the location for each desk is with the “Sit Here” sticker (using either fabric-ready or hard surface stickers).

(Q5)

How do you plan to implement the sanitation process at different places like halls, academic areas, and community areas? Describe the plan including how to enforce them in detail. Suggestions may include increased frequency of cleaning washrooms by maintenance staff, wiping of desks, tables, and chairs at regular intervals by maintenance staff or by students themselves while leaving the classrooms, etc.

Sanitation at different places:

Halls: The sanitation of the rooms should be left to the students. Social distancing and bubble measures like assigning the urinals/washrooms students would reduce the contact among the students of the same wing. The frequency of washing/sanitisation of the washrooms by the maintenance staff needs to be increased by 2-fold at the bare minimum. Positioning foot-operated sanitiser dispensers at the entrance of each wing are compulsory.

Academic Areas: All the doors need to be foot operated to reduce the risk of high contact at the doorknobs. The cleaning of these high-frequency touchpoints like doorknobs, switchboards needs to be done after every class by the maintenance staff.

The sanitation of desks, tables and chairs need to be left to the students. Soap solution and a paper towel should be provided to every student to wipe off the bench/chair & table before the beginning of the class. The staircases should be made unidirectional wherever possible to avoid the commotion/ face to face interaction of the individuals and students will be strictly prohibited from touching the railings.

The washrooms need to be sanitised every 2 hours considering the higher frequency of usage. The washrooms should always operate at 50% occupancy with restrictions to be self-imposed by the students themselves.

Community Areas: Until a steady-state in the number of positive cases (minimum growth rate of increase in cases) is reached in the campus, all the community areas need to be shut down and the usage/sanitation of these places should be kept to the bare minimum. Initially, the entire resources should be focused on maximizing the sanitation of essential places. Essential community areas such as TechM should be sanitised once every day, preferably disinfected. The operation procedure of the shops is discussed in further questions in detail.

Library, considering it an essential area should be operational in the initial phase at least to the extent of dispensing/returning books. Once the steady-state is reached it can be characterized

as a high activity area and should work under the guidelines of 50% occupancy with alternate seats blocked from usage. The sanitation will be similar to that of the classrooms in the academic area. Soap solution/disinfectant along with a paper towel will be provided to every student upon entry apart from a general cleaning by the maintenance staff once every 2 days.

Post the steady-state, once the restrictions are eased up, the community areas should be categorised into 3 groups, high, medium and low activity w.r.t the number of students active in the areas. High activity areas like Tech M and Nalanda should follow the guidelines of 50% occupancy and sanitation twice a day. Medium and low activity areas can operate with more ease. However, 50% occupancy can be left to be self-imposed by the students and the sanitation of these places can be done once a day in case it is a medium activity area and once every couple of days for low activity areas.

(Q6)

To minimize the interactions, is there any need for the modification of existing rules to enter academic complexes, hall premises, roam around wings, use hall facilities, commute on campus roads, etc. Suggestions may include formulations of a new code of conduct or modification of existing guidelines. (For example - putting on a mask all the time except while in a mess, social distancing, etc.)

Academic section:

- People should not congregate in groups of more than 3 to avoid crowding.
- As far as possible, reduce classroom shifting.
- First years will attend all classes in the same room and appropriate accommodations will be made for the faculty as they will be sharing the equipment. (no. of sections proportional to the seating guidelines)
- Arogya Setu App should be downloaded on the phone

- **Rules for Nalanda:**
    - The two wings of Nalanda (subway side, old bus parking side) shall have an impassable block.
    - Cycles should be parked near the respective wings only and should have appropriate gaps between them which will be monitored by the guard.
    - During lunchtime and at the end of class hours, each floor will be allotted a time slot of 10 minutes to exit the building to avoid crowding of staircases and every staircase barring the 2 ramps (one for each wing) will be allotted for downward traffic only.
    - During the end of lunchtime and beginning of the classes, every staircase barring the 2 ramps (one for each wing) will be allotted for upward traffic only.
    - During class hours the staircases will be allotted a particular direction of traffic.

      The above three rules are to prevent face to face interaction

- Students will be advised to wear masks and gloves at all times and to avoid touching walls, notice boards, railings etc
- Students will be asked to use the washroom on their floor only.
- Water dispensers will be shut down. Water facilities will be provided near each room like it is during the exams, but water can only be filled in their respective bottles.

Administrative Steps:

- Institute ID required to enter the Hall.
- Rooms will not be cleaned by sanitation workers.
- Students involved in mess activities (mess duty) will be provided protective gear that will be sanitized before use.
- Sanitizing stands on every floor near each staircase.
- Any student that notices flu-like symptoms in a peer should inform the hall warden or hall council immediately to avoid further infection.
- Celebration of festivals will be suspended until further notice.
- No more than 3 students should be in a room together.
- Wardens and Hall Council are responsible to ensure the above rules along with government guidelines followed in the halls.

Student Guidelines:

- Students are advised to wear masks at all times when they are not in their rooms and should avoid physical contact.
- Social distancing should be observed and all physical interpersonal interaction should be minimized
- Students are advised to use washrooms in their wings only so as to avoid getting infected from elsewhere.
- Slots should be allotted in each wing while using the common washing machine.
- Sharing of toiletries should be avoided among peers.
- People should not congregate in groups of more than 3 to avoid crowding.

(Q7)

There are various courses across disciplines (like EVS, BS, Breadth subjects, etc.) that don't require offline presence. Dropping off such courses or continuing with the online classes, what option would you choose? Based on that, give a revised curriculum that the students would follow across disciplines for the upcoming semester to reduce the number of student-to-student interactions in academic complexes.

All the courses which are offered to/opted by students from various departments and branches and have class strength above 200 per section will have online classes only.

For all the other courses, we propose a hybrid offline and online model of classes. Offline classes would help students clear their doubts, effectively communicate with the teachers and teaching assistants and participate better in discussions. Online classes would help in keeping the class strength relatively lower, avoiding crowding in classes, corridors, roads and eventually reduce student-to-student interactions. In order to further reduce the student-to-student interactions, we have two proposals:

- A revised timetable to reduce the student movements and intermingling of students from various departments and years.
- Allowing only 50% of the students enrolled in a course to attend the offline classes, with the alternative set of students getting the chance every week.

Let us consider both our proposals in depth.

I. The Revised Timetable:
In order to minimize the student movements and interactions, we propose a new timetable. The timetable will consist of two alternative schedules:

A. First Alternative

	0800 to 0855	**0900 to 0955**	**1000 to 1055**	**1100 to 1155**	**1200 to 1255**	**1300 to 1355**	**1400 to 1455**	**1500 to 1555**	**1600 to 1655**	**1700 to 1755**	**1800 to 1855**
Monday	C41	C42	B31	B32			H33O	U44O	U43O		G33O
Tuesday	A31	A32	D41	D42			U41	U42	H31	H32	S33O
Wednesday	E41	E42	F41	F42			X41	X42	X43	X44	
Thursday	E43	E44	G31	G32			I21	I22	V41	V42	B33O
Friday	S31	S32	F43	F44			V43O	V44O			A33O
Saturday	EAA	EAA	EAA	EAA	EAA		C43	C44	D43	D44	

B. Second Alternative

	0800 to 0855	**0900 to 0955**	**1000 to 1055**	**1100 to 1155**	**1200 to 1255**	**1300 to 1355**	**1400 to 1455**	**1500 to 1555**	**1600 to 1655**	**1700 to 1755**	**1800 to 1855**
Monday		C41	C42	B31	B32		H33O	U44O	U43O		G33O
Tuesday		A31	A32	D41	D42		U41	U42	H31	H32	S33O
Wednesday		E41	E42	F41	F42		X41	X42	X43	X44	
Thursday		E43	E44	G31	G32		I21	I22	V41	V42	B33O
Friday		S31	S32	F43	F44		V43O	V44O			A33O
Saturday	EAA	EAA	EAA	EAA	EAA			C43	C44	D43	D44

C. Laboratory Timetable

	0800 to 0855	**0900 to 0955**	**1000 to 1055**	**1100 to 1155**	**1200 to 1255**	**1300 to 1355**	**1400 to 1455**	**1500 to 1555**	**1600 to 1655**	**1700 to 1755**	**1800 to 1855**
Monday		Q	Q	Q	Q		J	J	J	J	
Tuesday		K	K	K	K		L	L	L	L	
Wednesday		R	R	R	R		X	X	X	X	
Thursday		M	M	M	M		N	N	N	N	
Friday		O	O	O	O		P	P	P	P	
Saturday		Compensation Labs					Compensation Labs				

Features of this timetable:

- Slots ending with O have to conduct online classes compulsorily. For such slots, no course may use an offline medium of instruction.
- Each slot (A to I and U, V, X) will get at least 2 hours of offline classes per week so that students can reap the benefits of classroom learning. For subjects that fall under the category as mentioned in point 1, which will fully be conducted online, online classes can be kept in these offline slots.
- Slots have been rescheduled such that there is minimal movement, intermingling and interaction of students. Therefore, each offline class slot will have 2 continuous hours of teaching. It has been taken care that these rescheduled slots for subjects do not clash with the lab timings, with there being just a single instance of a clash across subjects from all departments and schools, across all years, according to the timetable of the last offline Autumn Semester, i.e., Autumn Semester 2019-20. This single clash can easily be accommodated.
- The concept of the alternative timetable: For approximately half the courses, the timetable followed will be as per the first alternative, and for the rest, the timetable followed will be as per the second alternative. Alongside, there will be an allowance for this choice to be made separately for each weekday but fixed throughout the course of the semester.
  This has been done to make sure that at any point, only 50% of students will commute from one place to another (as both these alternatives differ by 1 hour, and classes are supposed to be conducted continuously for 2 hours). So this will reduce the crowding in academic complexes. Similarly, it would also help in mitigating the crowding in messes, hostels, corridors, roads et cetera.
  Therefore, for each batch and department, we will only have to make sure that either of the alternatives is chosen for each weekday and each subject.
- Since the slots remain the same, each course can be assigned the same slot in which it is usually offered. Therefore, there will be no need to reassign slots to all the subjects again, which would have been a cumbersome task. And moreover, this would also help in avoiding backlogs which can creep in if we avoid offering some subjects altogether. Therefore, we can conduct all the subjects using these measures.
- Lab slots have been increased by an hour so that in whichever labs possible, the lab can be conducted in two batches of two hours each, such that half the students perform the lab at any point of time. This would make it easier to practise social distancing norms in the labs.
- Sundays will be officially off, so that teachers and students get enough time to rest. Similarly, no classes will be conducted after 7 PM so that students get ample time to engage in other activities like those involving CDC, or GCs or for rest and recreation. No theory class would need any extra slot for completion. However, for a mere 4 hours period, classes will be kept on Saturday for slots C and D only.
- For students who may miss labs because of being quarantined, on a special provision, as per the convenience of the course instructors, compensatory labs can be conducted on Saturday in the time slots mentioned.

II. Allowing 50% Students in Offline Classes:
For each course that is being conducted in a hybrid manner, i.e., 2 hours offline + 1-2 hours online/offline, during the offline classes, only 50% of students will be allowed in the

class. For the rest of the students, the same offline classes can be live-streamed as well as recorded using cameras or mobile phones, whose responsibility will reside with a TA for the course. The next week, the students who were made to participate through the online medium will be allowed for offline classes and vice-versa. This way, we will be able to keep a check on the class strength. And since there will be no issues of electricity or poor internet connectivity on the campus, students will be able to learn from the online classes hassle-free, unlike the present online classes scenario. Also, dividing these groups and seating them together on the basis of their halls would also ensure that if the virus transmits, it still remains limited to the halls which have been classed together. These same hall-wise divisions can also be used during the lab classes, for the two-hour batches as mentioned above in point f.

(Q8)

The senior faculty can be considered more vulnerable to the effects of the virus as compared to others. How do you ensure their safety? Will you shift their classes online or is it possible to provide them with a more protective environment inside the class?

The first layer of protection for senior faculty would be to get vaccinated. The government is already offering the vaccines to all 45+ year citizens.
All emeritus faculty members (>65 years old) are advised to remain at home and not visit the campus until further notice.
(Source)
Classes can be conducted offline with proper sanitization of desks, boards, chalks or markers, mics, mouse and other accessories.
The senior faculty should enter 5 mins after class commences so that everyone has settled in the classroom by then. Late entry into the class wouldn't be allowed. The students should wait for the faculty to exit and depart from class after it ends. TAs can ensure smooth functioning by implementing these rules. This would ensure social distancing and minimise interaction with faculty. An added incentive would be attendance based on timing to enforce these rules.

(Q9)

A number of PG and RS students visit the campus as day scholars. They are prone to higher contact and transmission as they are in daily contact with the external community of Kharagpur. How would you incorporate day scholars in your solution?

PG/RS Day Scholars should be offered accommodation within campus. This would be preferred and should be encouraged. Disincentives for staying outside would be limited working hours, isolation from the campus community and high uncertainty based on the evolving situation.
If this accommodation cannot be arranged, is infeasible or unacceptable to certain Day Scholars then as a last resort the following measures can be taken:
Provide different colour ID Cards. This would grant them access only to academic areas, main building, department.
Submission of an RT PCR test every 15 days.

Daily random testing with leftover tests.
Daily temperature, oxygen check while entering campus.

(Q10)

The space in labs is limited and hence, social distancing is difficult to follow. Design an efficient way of lab scheduling and space utilization for research for PG and RS students to minimize transmission in lab facilities. Clearly mention the modalities along with the person responsible for the same. Suggest any other change you would like to make to uplift the existing procedure. Suggestions may include a change in policy for biometric attendance, CRF, CIC labs, etc. (It is advised to consult Research Scholars to know their trouble and propose a solution for the same)

Since the space in labs is limited, we have come up with some suggestions that will be helpful in ensuring minimal contact at all times.

First - Engineering Controls: includes designs or modifications to workstations, systems or processes that reduce the source of exposure.

- Temporary chambers with sheets can be installed for Research Scholars (RS) if the lab is big enough. Instead of one common table, smaller desks and chairs can be placed in the rooms at different corners so as to not be in close proximity with other RS and professors.

- Biometric attendance should be replaced by manual attendance by keeping a record in an online document that can be regularly updated.
- A lab map with maximum room/bay occupancy to maintain social distancing should also be posted inside the lab entryway. Appropriate floor markings, wall signs to be demarcated.

Second - Administrative Controls: controls that alter the way the work is done, including timing of work, policies and procedures, and work practices such as standards operating procedures (including training, housekeeping, and equipment maintenance, and personal hygiene practices).

- RS from each lab can divide themselves into groups such that they come on alternate days and there's no crowding in the lab. Since some RS stay outside the campus as well, they may be grouped together so that RS living inside the campus are relatively safer. Use a scheduling program such as Outlook so that all group members know when and how many people are in the lab at all times.

- The pairing of researchers (this does not mean working in pairs) may be necessary to accomplish research projects if ongoing experiments require working beyond designated shifts or scheduled times. This pair must have a thorough understanding of the other's research to be able to properly take over the ongoing experiment – this should be highly documented.

- Regular PPE necessary for the lab environment should be provided as usual by the professor or supervisor. Ensure an adequate supply is available before starting experiments. PPE that is shared such as laser safety eyewear should be disinfected after each use. Develop a system to indicate this - label the pouches ‘sanitized’ for example. Do not share lab coats - assign/label and provide to individuals. Lab gloves should not be worn outside the lab.

- Some tasks/experiments may be limited or not possible during this time due to the physical distancing requirements. Organize and plan accordingly. Clearly outline what tasks/experiments cannot be performed. Researchers in the labs should check in regularly with their supervisors.

- All the lab equipment should be regularly and carefully sanitized after use by the researcher themselves with the help of the laboratory staff.

- Faculty, students, and research staff can continue working until 7:00 pm if they live outside the campus, and until 9:00 pm if they live on campus, but the PI must maintain a daily log of those working in his/her lab after 6:00 pm.

Third - Sanitization:

- Equipment worn by individuals to reduce exposure to the hazard (ex. chemicals, noise, etc.).

- Door knobs, common work surfaces, equipment, and workstations (e.g. keyboards, mice, touchpads) should be regularly sanitized on a daily basis.

Fourth - Operations

- For safety reasons, there should always be a person within earshot.
- Whatever training activities can be done remotely, should be done remotely instead of doing them in-person. Pre-recorded videos can be handed over for such training
- Usage of sign-in sheets, clipboards, online calendars or other means of signifying who is present in lab space at any given time should be encouraged.
  (Source)

(Q11)

Describe the set of rules which will be useful to handle the violations of the afore proposed (anywhere in answers to questions from 1 to 10) guidelines. Clearly mention all the punishments, Disciplinary actions, etc.

All the Students and Faculty will wear their ID card whenever they are in campus. If someone is caught violating the safety rules by the guards, the guards shall scan the code on their ID cards using their personal smartphones and send a complaint in one line to the central complaint system. This application can be made by the students of the campus itself that is connected to the central database. The authority shall be strict and unless the fines are paid, the students would not get their results and teachers’ and staffs fine shall be deducted from their salaries. Any other punishments that are not mentioned here shall be taken care of by the authority and the intensity of the punishment would be proportional to the violation.

Violations	Punishment
1. Not wearing a mask in public	The defaulter shall be ignored the first time but if he/she is caught without a mask again, a fine of ₹ 300.00 shall be levied.
2. People stand in groups of >3 without social distancing	Students would be made to sanitize the essential areas in their halls.
3. More than 3 students found in one room in their halls	The student volunteers of the halls must randomly check rooms from time to time. The list of defaulters will go to CIC and their institute WiFi limit would be cut to 2 GB/day for 7 days.
4. Found spitting or smoking in public	A fine of ₹ 200.00 shall be levied on the spot.

(Q12)

Identify people who are critical for university operations, like the mess and maintenance staff, and sketch a plan on how to protect them. How would you accommodate government protocols in your plan if the maintenance staff is vaccinated under the union govt's direction to vaccinate sanitary staff? Study the timelines and describe both scenarios.

The workers crucial for the university operations include mess and maintenance staff, security guards, doctors & nurses, and bus drivers.

In both vaccinated and unvaccinated cases, the intra-campus bus service needs to be shut down as this would be counter-productive to our efforts to reduce random contact among the students.

Assuming that the doctors and the nurses are front line workers and have already been vaccinated the movement among them should not be restricted. However, they must adhere to strict protocols to avoid contact with people outside the campus as they can still act as a carrier for the virus and could potentially infect people inside the campus.

It is evident from Cornell University's study of covid-19 cases among employees that the virus is usually picked up from outside rather than from the campus interaction. It is of utmost priority to reducing the movement of them from in and out of the campus.

Case 1 – No Vaccination

IIT Kanpur, having a similar mess system as IIT Kharagpur, has adapted to a centralised mess system. There are obviously higher benefits of adapting to this system while operating a centralised mess. Considering the massive size and the dispersed nature of the campus and the halls, we propose operating one centralised mess for every 4-5 halls. The benefits are:

- The cooking staff can be separated from the serving staff. Considering the least amount of interaction of these people with residents and the support staff, they can be allowed to move in and out of the campus.

- This will reduce the amount of testing that is required for these people as we are already isolating them by reducing their interaction.

The cost effectiveness, feasibility and budget allocation of this proposal will be addressed separately.

The entire capacity of the mess serving and maintenance staff should be divided into 2/3 groups and should be accommodated one group at a time inside the respective halls/common rooms. The entire group can be group tested on arrival and bio-bubble can be maintained among them during their entire stay. This will also reduce the number of tests required per day.

The sanitation staff will also be accommodated in the halls along with the mess serving staff at a reduced capacity of 1/3rd and a similar circulation policy/testing policy will be adapted.

Case 2 – Post Vaccination

Post-vaccination the mess operation can revert back to the existing decentralised manner. Though the threat of severe illness reduces they can still transmit the virus. Though the mess may be allowed to operate independently based on the infection count in Kharagpur outside the campus either a similar rotation policy should be adopted or the regulations can be eased and the staff can be allowed to move in and out of the campus with heavy reliance on temperature testing/ auto reporting of symptoms.

In either of the cases the contact between the students and support staff should be minimal to 0.

- The use of masks and gloves by all the staff should be made compulsory for all the staff at all times.

- Sanitizers should be made available to both the staff and students at points of interaction.

(Q13)

Shopkeepers of Tech Market form a large population who are again at high risk of external contact and susceptible to exposure. TechM was operating under restrictions during the Junta Curfew and post Junta Curfew. Provide a model for the functioning of the Tech Market. Mention the steps you would take to make the execution better.

Tech Market often referred to as **Tech M** is a market inside the campus providing day-to-day necessities and groceries. This market caters to the daily needs of the students and staff residing on the campus. There are a variety of shops in Tech M including fruit shops, bakeries, stationery shops, etc.

We aim to continue the operation of Tech M with some restrictions when students are called back to the campus.

- Opening Tech M is essential for the smooth functioning of campus as it serves the daily needs of the campus residents. Moreover, with 135 shops in Tech M, a lot of shopkeepers' families depend on it for their livelihood. So, all shops in and around Tech M excluding food outlets (vegetable and fruit shops not included), laundry shops and barber shops shall remain open. In the barber and laundry shops, there is close proximity between the shopkeeper and the customers and there are a lot of shared surfaces. Moreover, as the food outlets are the main hub of overcrowding in Tech M, we are planning to keep these shops closed until the cases in the campus have reached a steady state.
- The number of campus residents present in Tech M will be limited to 60 at a time to prevent overcrowding. This will help in ensuring social distancing within the market. This can be ensured with the help of guards and police.
- Each shop has to install a layer of plexiglass to ensure distancing between the customer and shopkeeper. They also have to make sure that all items in the shops are kept behind the layer of plexiglass.
- Random Sampling needs to be done in Tech M to keep track of the spread of the Covid-19 infection in the market.
- Each and every shop in Tech M requires a regular supply of items for their smooth functioning. This leads to a large number of suppliers moving in and out of the campus. To avoid campus residents coming in contact with suppliers, we plan to allow suppliers within Tech M during fixed hours. Tech M will operate from 8 AM – 3 PM and 5 PM - 8 PM for campus residents. For the shopkeepers, Tech M will operate from 6 AM – 10 PM. The suppliers can supply items during the time when Tech M is closed for the staff and students. This will enable students and staff to avoid coming in contact with outsiders.
- Social distancing markers need to be drawn outside the shop while standing in the queue outside the shop.
- Hand Sanitizers need to be installed at the gates of Tech M. Wearing a mask within the Tech M premises is compulsory.

(Q14)

For the functioning of the campus, proper functioning of mess on a large scale will be a bigger challenge. Because it makes lots of suppliers move in and out of the campus. How do you plan to minimize the risk? Suggestions may include procuring dry ingredients at once, changes in the menu, etc.

Operating mess in a pandemic situation poses the maximum threat to the student community. It's not only because of higher interaction among the students but also because of students getting in direct contact with the mess workers who pose a much higher risk as they keep moving in and out of the IIT campus. To tackle this situation, we have come up with the idea of centralised messes. Under this, we are going to choose 4 messes of halls BRH, LBS, RK and SNIG. The food is going to be prepared only in these messes initially which would further be carried to the halls in their neighbourhood. The idea of centralised messes is going to help our cause in two ways.

Firstly, we would be able to reduce the risk posed by the suppliers as now the suppliers need to supply the items only to some particular halls instead of all. Due to this they won't be coming in contact with the people of other halls.

Secondly, due to centralised messes, we would be able to divide the workers into two segments, i.e. cooking side and serving side. Through this, we can avoid the direct contact between the students and the mess workers as except chapati, all the food items would be prepared in the chosen messes which will be further carried to other halls for serving. While the workers deployed for cooking will be allowed to commute from their residences daily, the serving side mess workers will be given permission to stay overnight in the designated halls. They will not be allowed to leave the hall premises till the time their batch is changed (20/25 days). A layer of plexiglass would also be installed on the serving counters. Only the mess workers will serve the food and touch the utensils. Students will only touch their plates and nothing else. Even the plates, glasses and spoons will be handed to the student by a mess worker. Only cooked food and water shall be served in the mess. Uncooked food items like salad, cold milk, non-toasted bread will not be served.

The interaction amongst the students in the mess premises is another area of concern that needs to be minimised. This can be handled in the following ways:-

- To avoid/reduce interaction amongst the students within the mess premises, batch (wing) wise dining can be introduced. The students of a particular wing of the hall shall take their food at the particular time allotted to them.
- Due to a batch wise dining system, the normal mess timings need to be increased. In order to compensate for the increased timings, we are proposing to remove the snacks from the menu. The mess funds being saved from here would also further help us in managing the extra costs being incurred in the mess operations due to the Covid-19 situation. New mess hours will be according to the schedule given below:-

(i) Breakfast: 7:30 A.M. to 10:30 A.M.
(ii) Lunch: 12:00 P.M. to 3:00 P.M.
(iii) Dinner: 07.00 P.M. to 10:00 P.M.

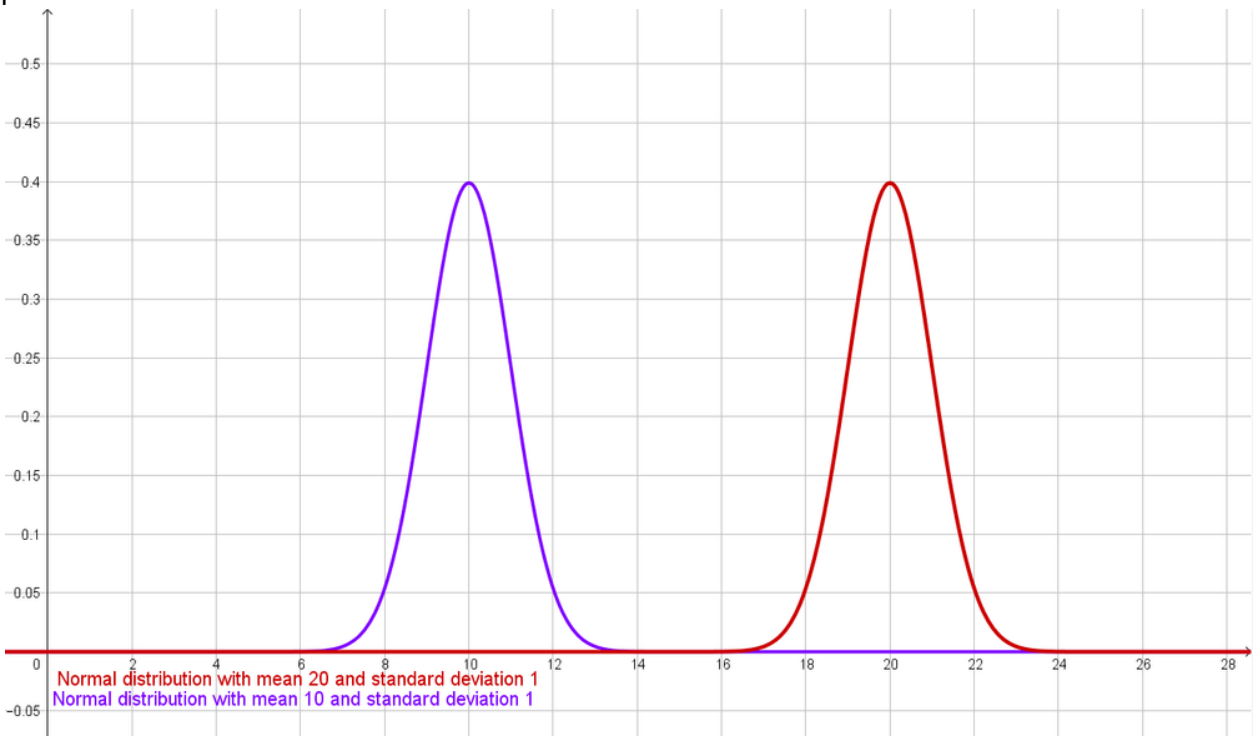
More precautions can be taken which are as follows:

- Before entering the mess, temperature readings will be taken.
- While standing in the queue for food, students need to stand on social distancing markers.
- “H” shaped see-through plexi glasses will be installed on the mess tables.
- The dining area will be disinfected with Sodium hypochlorite(NaOCl) solution twice a week and with a normal soap solution after every meal.
- Students will not be allowed to move chairs from their fixed position.
- Maximum capacity of mess will be determined according to size and this limit cannot be breached i.e. if the capacity is determined to be 50 then more than 50 people can’t be in mess premises. Those wanting to enter will have to wait till someone exits the mess.

(Q15)

There will be daily traffic due to the swimming pool, gym, various school children, their parents, etc inside IIT Kharagpur Campus. How will you tackle this traffic in order to minimize the risk?

Source
Swimming pools and gyms will just add up to the immense risk and also the workload on sanitation workers. It will also unnecessarily increase the budget and they are surely not the most important thing that we need to operate on the campus. But if in the later phases, the cases are under control and we have enough resources to tackle any complications, we can consider the opening of swimming pools and gyms according to government guidelines.
For tackling the traffic caused by the schools on the campus, we can shift their timings slightly, which will help in avoiding the sudden crowd on the paths during going and returning from the classes. If we assume that the distribution of crowd on roads with respect to the time follows a normal distribution, then :
Y or f(x) is the probability density of the number of students being on pathways and x is the time difference (in minutes) from the time when the roads are most likely to be crowded (say 7:50 am to 8:10 am). So, we can see that the probability of crowding decreases abruptly if we schedule the arrival or dispersal of the school students 10 mins before or after the time of mass movement of IIT KGP students. This will restrict the mix up of those students with our students and so the bubble is not broken. The below is the ideal scenario where the minimum overlap is there. The normal distribution is assumed because maximum students are near the time of class, less early and less late. There are some outliers that will be very early and very late. Thus, instead of complete overlap, now we will have minimum overlap with just tail end with the peak.



(Q16)

There are many small businesses in each hall, which fulfill the daily needs of many students. Would you allow such small businesses in halls to open? If yes, how do you plan to do it? If not, why do you want the businesses in halls to be shut?

Small businesses in each hall form a very major chunk of people who help in meeting the daily needs of students in their respective halls itself. There are varieties of such businesses in halls including the general stores, night canteens, stationary shops, etc.
Initially for few months, these small businesses won't be allowed to open as they are the people who keep on commuting in and out of the campus on the daily basis, as well as opening them would bring in the extra crowd of suppliers in the halls, hence posing even a higher risk to the safety of the campus residents. As these small businesses would be closed initially, TechM would help in meeting those daily needs of the students.
After some months, when the cases in campus have reached a steady state, we aim to continue the operation of these small businesses with some restrictions. Opening these businesses is essential now for the smooth functioning of campus as it serves the daily needs of the campus residents. Moreover, a lot of families depend on it for their livelihood. So, All businesses will be allowed to open but along with the following restrictions:

- All the shops will be allowed to open, but whichever shop will be serving cooked food, only take away facility would be available along with the room delivery option as they are the main hub of overcrowding.
- Each shop has to install a layer of plexiglass to ensure distancing between the customer and shopkeeper. They also have to make sure that all items in the shops are kept behind the layer of plexiglass.
- Random Sampling needs to be done for these shopkeepers to keep track of the spread of the Covid-19 infection in these shops.
- Each and every shop of these halls requires regular supply of items for their smooth functioning. This leads to a large number of suppliers moving in and out of the campus. To avoid campus residents coming in contact with suppliers, we plan to allow suppliers within hall premises during fixed hours. The suppliers can supply items during the time when these shops are closed for the students. This will enable students to avoid coming in contact with the outsiders.
- Social distancing markers need to be drawn outside the shop while standing in the queue outside the shop.
- Hand Sanitizers need to be installed at the entry of these shops. Wearing a mask within the shops is compulsory.

(Q17)

What all extra-curricular activities do you plan to allow on campus? Provide limitations of Interhall General Championship and open IIT activities. State the precautions that need to be taken for the same. Can implementation of government guidelines with respect to sports activities be possible inside the campus?

All extra-curricular activities which involve limited participation can be all allowed on campus which include all tech related events as they don't involve mass gathering. For Social, Cultural and Sports Activities, we can consider events which involve participation of a limited number of people. We can group events into two categories

a.**) Non-contact Individual Event**
b.) Minimal/Medium contact Events.

In the initial phase we can develop Standard Operating Procedure for events in a. Category i.e Non- Contact Individual Event. The events in **(a)** category don't require physical contact during training or competition and there is a minimal requirement for sharing of equipment so they pose very little threat and can be considered in the first phase.

The event in **(b)** category requires some level of physical contact during training or competition and where equipment is usually shared thus exposing the larger population to viruses. So all activities in category (b) might be prevented in the beginning and once things start getting normal or after vaccination, we can look forward to making SOP for organising the event in this category.

The Precaution for Interhall General Championship and Open IIT Activities:

- The SOP also calls for a "Covid task force" to be constituted for competitions by the respective organizing committee. Apart from being responsible for the overall implementation of the SOP, the task force closely regulates and monitors "travel of athletes and ASP (Athlete Support Personnel".

- The audience in all the events to be limited and proper with proper social distancing norms.

- Athletes are also to avoid physiotherapy or massages "unless absolutely necessary" and ensure physical distancing and wear masks at all times except when it becomes necessary on the field of play.

- Thermal screening is to be done at the entrance of the competition area and athletes and support staff living in "containment zones shall not be allowed entry in the main competition arena/field of play, warm-up area".

- Organising committees are to designate a Covid response team that athletes and their support staff can contact if they experience symptoms suggestive of coronavirus.

- It is to be mandatory for athletes and support staff to undergo RT-PCR tests within 72 hours of the event.

- All personal training equipment belonging to an athlete shall be disinfected while the athlete is inducted into the training centre.

- On-field training shall be conducted in small groups ensuring a distance of minimum of 2 metres is maintained at all times by trainees and staff.

- Physical contact of any form shall be avoided as part of training routine, for example, handshakes, high-fives, tackling, sparring etc.

Yes, the implementation of government guidelines with respect to sports activities is possible inside the campus but we need to be extra careful and devise our own guidelines according to facilities and infrastructure available.

(Q18)

Considering our vast student community and the campus population, it is likely to have some positive cases inside the campus. What steps will you take if a student is tested positive? How would you perform contact tracing? Where will you quarantine them and how would you deal with the people who came in contact with the infected person?

Some points to consider for the answer: the students are in the least vulnerable age to get sick due to being infected (18-30). Precaution, self-control and care is the best way to tackle the problem. Panic is surely not the solution.

We have mentioned in Q3, that we will follow Pool testing for students.

If a pool is found Covid-Positive:

- Isolation facilities in the guest houses ("Potentially Positive" Section) will be created for the students in the pool.
- Each student will be tested individually. He/she will stay in the quarantine centre till the test report comes.
- If the report is negative, he/she will be transferred back to their respective Hall. Their room will be thoroughly sanitized. This has to be insured by Hall Management.
- If the report is positive, the student will be taken to the "Covid Positive" section.
- For a student with comorbidities, he/she will self-report temperature, and blood oxygen levels every 4 hours in a Google Sheet. That sheet will be monitored by the doctor on duty.
- If the student has any comorbidity he/she will be monitored by medical staff, by conducting regular rounds. The medical staff will be working in shifts. They will be provided extra perks, payable by the student as treatment fees.
- The next test will be done 7 days after the first test, if negative, the student will be released, if not tests will be done again on the 14th day and then after every 3 days.
- In the least likely cases, if conditions get critical, they will be shifted to a hospital in Medinipur or, if required in Kolkata. Parents/Guardians of the student will be informed and will be asked to come as soon as possible.

For contact tracing:

- The bulletin will be updated with the student's name with information about the Hall and Department.
- It is the responsibility of the positively tested student and their primary contact (Last 7 days) to self-report to Hall Council via the helpline number
- Primary contacts and their room-mates will be isolated in their room itself. They too will not attend classes or labs physically.
- They will immediately be tested. If tested positive, they will be shifted to the "Covid positive" block.
- In the meantime, food will be sent to them in disposable cutlery. These facilities will be charged.
- Washrooms will be reserved for them in each block.

(Q19)

In the scenario that the campus reopens in the near future, what is your detailed plan to complete labs that are currently incomplete, given the virtual semester? How do you plan to deal with academic challenges like missing lab classes that the students in isolation/quarantine will face? What new policies can be of help?

Our proposed timetable extends until Saturday and we believe students should have Sundays free. We propose that the remaining labs of the Autumn 2020 virtual semester of the undergraduate students be conducted in the first two weeks of December after the Autumn Semester 2021 ends since we have proposed that students stay back during the winters.

A lot of the labs cannot accommodate all the students simultaneously during the pandemic because of the social distancing guidelines. Hence, we suggest the changes mentioned below:

- Ideally, all the students should be able to attend all the labs. But in case some of the students are infected by the virus, they won't be able to attend labs further. Assuming there are 8 practicals during the semester, the concerned teacher should evaluate any 6 of them/prioritize a few of them. This would reduce the burden on the professors and teaching assistants since they would also have to correct answers of the end semester exams. This solution would also be fair to the students in case they miss lab classes due to being in quarantine.

- Lab theory should be taught online so that there is no unnecessary movement in the day. Theory can be sent in the form of lecture slides, be taught online, or simulations of the lab instruments can be shown during the theory classes for the students to grasp it better.

- Two weeks may be given to the Spring semester labs in the subsequent semester and two weeks for the Autumn semester labs in December.

- Two lab classes of the department, of each year, can be conducted in a day. For example, Crop Production Technology and Soil Technology labs may be conducted simultaneously. Half of the class should be engaged in one lab and half in the other. If 50% of the students cannot be accommodated in smaller labs, further division of batches should take place and more labs should be conducted simultaneously. Students will rotate from one lab to the other over the week. In this manner, students will always be engaged and lab classes of the whole semester can be finished in 2 weeks.

- If a student misses a lab due to being quarantined, a Teaching Assistant can live stream the lab or record the demonstration for the student so that he/she does not miss the important components and has a basic understanding of the lab session at the least.

- If time permits, compensation labs may be conducted for the students who missed the sessions whenever the professors and TAs are free.

(Q20)

A new batch of first-year students will join us from next semester. Can you suggest any new innovations in the first-year curriculum? For example - If someone decides not to go for a department change, then what's the need of him/her to take the full 45 credit year? Keeping this in mind, give a reduced first-year curriculum. Give a mathematical model for assessing the impact of how many interactions can be reduced in large classrooms in such a reduced curriculum setting.

The new batch of first-year students shall follow a modified version of the original first-year curriculum. It is described comprehensively below -

- The courses are divided into 3 parts - Offline only, Online + Offline, Online courses.

Offline Only	Online + Offline	Online Only
1. Maths 1 2. Maths 2 3. PDS 4. PDS LAB 5. DIY LAB	1. Physics 2. Physics Lab 3. Electrical Technology 4. Electrical Technology Lab 5. Mechanics 6. Engineering Lab 7. Chemistry 8. Chemistry Lab	1. Environmental Studies 2. Science of Living Systems 3. English for Communication 4. Engineering Drawing 5. EAA

- These divisions have been made keeping in mind the requirements of the respective courses.
- The division of these courses into 2 semesters will be as per the original distribution as they alternate between two different batches of the first years. It is illustrated below -

1st Semester	2nd Semester
1. Maths 1 {Offline} 2. PDS {Offline} 3. PDS LAB {Offline} 4. Physics Lab {Offline} 5. Physics {Online / Offline} 6. Mechanics {Online / Offline} 7. Science of Living Systems {Online} 8. Environmental Studies {Online} 9. Engineering Drawing {Online}	1. Maths 2 {Offline} 2. DIY LAB {Offline} 3. Engineering Lab {Offline} 4. ET LAB {Offline} 5. Chemistry Lab {Offline} 6. Chemistry {Offline / Online} 7. ET {Offline / Online} 8. English for Communication {Online} 9. EAA {Online}

- We plan to either remove EAA for the first years or make it only a 0-credit course restricted to only 1 semester to reduce the burden.
- This revised curriculum forces only at max 1 or 2 theory courses and 4 or 2 lab courses respectively offline per sem. This will reduce the burden on the institute in conducting smooth covid - safe physical classes. Less number of offline classes will curtail students of specific sections to a fixed number of physical classrooms. This will make the tracking part easier if anyone gets tested positive.
- Courses like Physics, Mechanics, Chemistry will have majorly online classes except for special cases like class tests or some demonstrations by the respective profs.
- The courses like PDS Lab which can be easily conducted online will be done offline for the two main reasons -

  a. Some of the first-year students come from not so well off places and hence may never have seen a PC or worked upon it. So they need to be taught basics in the supervision of the TAs and profs. They need to be taught basic programming skills and not force it to online mode.

  b. Many first year students don't have a laptop at first, so an offline mode of PDS lab is much needed.

- Section having labs can be divided into further sub sections for maintaining proper covid protocols inside the labs. This may force the departments to have labs at night as well as on Saturdays. This will not increase the load on lab assistants or TAs as only a pre-assigned number of them will attend a specific timing of the lab and not all at once (which was in the pre-covid case). Also like other labs, here too the TAs or the profs may release a tutorial or lab intro video beforehand in online mode. This will ensure that less time is allotted to complete tasks in the lab and decrease interaction.

Revised Rules for Branch Change

- The students interested in Branch Change should have an overall CG of 8.5 (as usual cutoff) but there will be a different method to calculate branch wise cutoff grade.
- The table given below depicts the weightage and method to calculate branch wise cutoff grade for each sem.

1st Semester

Course	Credits*	Weightage
Maths 1	4	4
PDS	4	4
PDS Lab	2	2
Physics Lab	2	2
Physics	4	4
Mechanics	4	4
Environmental Studies	2	0
Engineering Drawing	3	0
Total	**25**	**20**

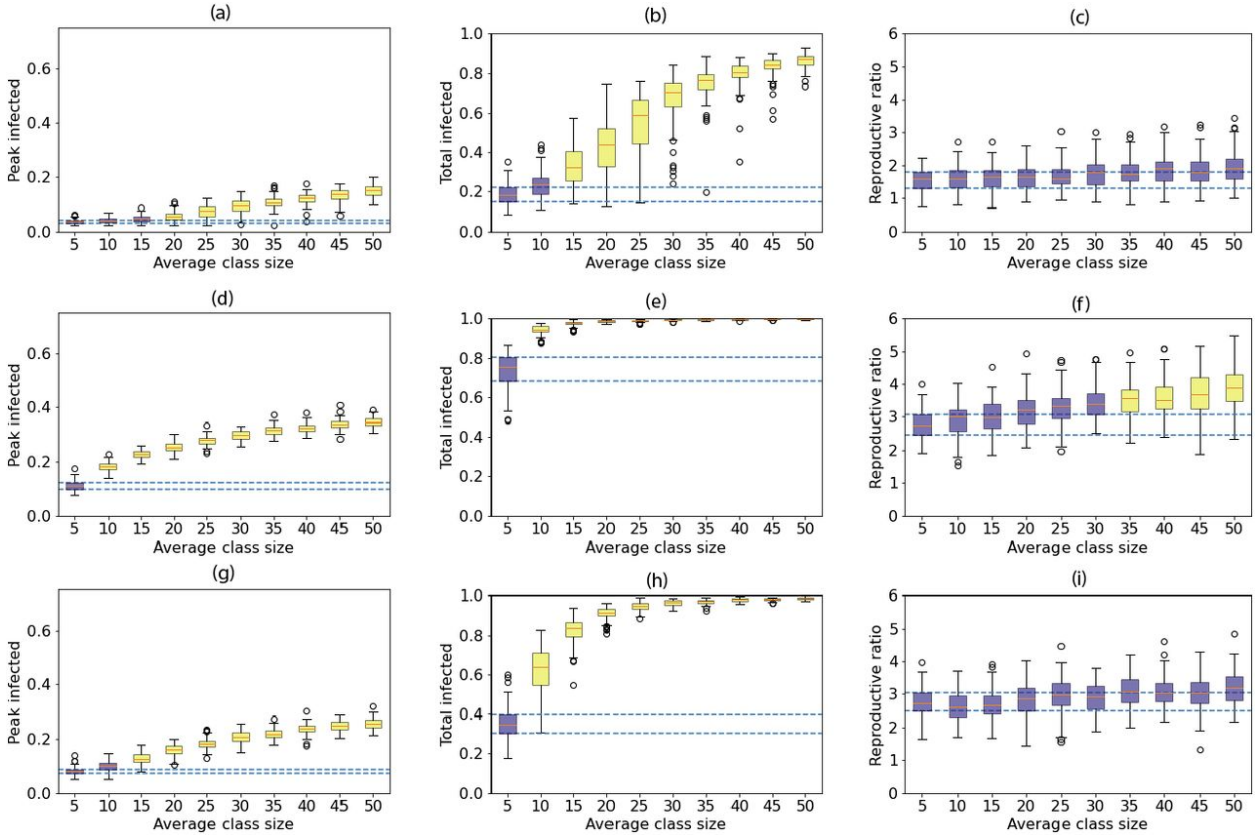
2nd Semester

Course	Credits*	Weightage
Maths 2	4	4
DIY Lab	2	2
Engineering Lab	2	2
ET Lab	2	2
Chemistry Lab	2	2
Chemistry	4	4
ET	4	4
Science of Living Systems	2	0
English for Communication	3	0
EAA	0	0
Total	**25**	**20**

* Credits are based upon the existing system of weightage.

- Credits will be used to calculate the SG and CG of the student. It will feature as a cutoff of 8.5 for qualifying for Branch Change.
- Weightage in this table signifies the value of a course for the Branch wise cutoff calculation.
- Some of the courses have 0 weightage as they are found to be of lesser importance for all branches apart from the reason being conducted and evaluated totally online which may decrease the sanctity of the process. But getting good grades in them is a requirement as a cutoff of 8.5 CGPA is set as basic.
- Criteria for Branch Change. So in this way, these subjects won't be neglected by the students. This method of calculation will reduce the burden of Branch Change aspirants and also won't let them totally neglect some of the subjects. The division into offline, partially online and totally online courses will help in the better following of the covid protocols and decrease interaction

levels by huge margins in the physical classrooms.



The above figure displays the measures of epidemic severity for average household size of 10 for different average class sizes from 100 simulation runs at each class size. Boxplots of the peak (a,d,g) and total infected by day 180 (b,e,h) and the calculated R0 (c,f,i), where infection is low, $\beta = 0.2\gamma$ (a,b,c), high, $\beta = 0.5\gamma$ (d,e,f) and high at home but low in class (g,h,i). The orange lines denote the median, the boxes the 25th and 75th centiles, the whiskers to 1.5 the interquartile range and circles any outliers. The dashed lines mark the interquartile range (IQR) for the class of 5, and colouring of the boxes whether the IQRs of each class size do (blue) or do not (yellow) overlap the class of 5's IQR.

(Q21)

There will be instances wherein people might have to travel outside the campus due to various reasons like Internships, visiting home, personal emergencies, etc. How do you plan to accommodate such cases?

Solution-) One of the biggest risks for getting or spreading COVID-19 is caused by travelling. During travel it is often more difficult to maintain strict physical distancing for activities of daily living, especially if travel makes use of public transportation. Moreover, activities of daily living are also riskier during travel. Although travel poses risk, some travel may be essential for work, and individuals may feel it necessary to travel for personal reasons. Therefore, to ensure safe health and wellbeing of IIT KGP's campus and its surrounding community, students, staff and faculty, individuals must abide by the institute's **TRAVEL POLICY**.

Students residing in the campus during the Autumn Semester 2021 are expected to remain in the campus for the duration of the semester with no personal travel outside of the campus area. Student travel during this period will be strictly limited and subject to a very rigorous process of approval under extenuating circumstances.

For faculty and staff members, there is a strict restriction on non-essential business travel during the duration of the semester. Essential business travel requires approval by the Standing Committee and if granted they must follow existing campus policies governing travel. Personal travel is strongly disregarded. If faculty or staff do choose to travel, they are expected to comply with all state and centre travel guidelines.

NOTE – **All students, staff and faculty members are advised to kindly refer to Travel Policy for more details.**

STANDING COMMITTEE ON TRAVEL-
Any exceptions or extraordinary circumstances to the Travel Policy for any reason will be considered by sending a request for approval to travel to the Standing Committee on Travel. The requests are to be made from the COVID-19 campus' portal. Such requests must be made at least 48 hours prior to their travel. Their decision will be final and binding.
Committee members include:

- Dean UG
- Deputy Director
- Dean PG and RS
- Dean Student Affairs
- President Gymkhana

Travel Policy -

For students-

- Travel will generally not be permitted for the following reasons:
    - Religious observance
    - Family celebrations
    - Leisure travel/vacation
    - Routine medical care that can (and should) be scheduled outside the semester (e.g., dentist appointments, yearly physicals, etc.)
    - Social events
    - Non-academic trips to other universities
- Travel will generally be permitted under the following circumstances:
    - Death of an immediate family member
    - Medically required care for you or a family member
    - Commuting for graduate or professional students
    - Required academic and career-related travel
- Only under the above mentioned circumstances, the students are allowed to send their request for approval to travel to the Standing Committee via campus' COVID-19 portal.
- The Standing Committee's decision is final and binding and no further requests regarding the same are entertained.
- **If travel is denied and a student travels anyway, they will be liable to serious repercussions.(For eg- a year back, semester drop, Disciplinary Committee etc.)**

For staff and faculty members-

- Non-essential business travel is prohibited. Essential business travel requires approval by the standing committee of travel.
- Personal travel is strongly discouraged. If you choose to travel, you are expected to comply with all state and centre travel guidelines.
- Essential business travel should be limited to those situations where business cannot reasonably be conducted without face-to-face interaction or visits to specific locations.
- Any faculty or staff member returning from a state, or from any other region within West Bengal, is required to have a supplemental COVID-19 test on return to campus and will be subjected to quarantining for the designated period.

Note – All students, staff and faculty members who are given the approval to travel are required to take a COVID-19 test on return to campus. They will only be allowed to return to the campus if found negative.

(Q22)

If you give winter vacation, people are bound to travel back. If this is the case, you will need to do the complete exercise of testing again post their arrival (hopefully for Spring'22). Is it cost and time-worthy to give a vacation? Or do you plan to start the spring semester early and end it early?

- Vaccines have been made available for all above 45 years of age from 1 April 2021 by the Government of India. Additionally, a letter was written by Shri Prashant Agarwal, Director (IITs), Department of Higher Education to the Ministry of Health requesting a special vaccination programme for CFTIs (Centrally Funded Technical Institutes). These facts make the availability of vaccines to the Kgp community by Sept-Oct a real possibility. For logistical and planning purposes, **Oct 15** can be taken as a cutoff date for such an announcement by the Government of India. If the administration gets privy to the knowledge of such a programme and is confident in the ability to procure doses by the cutoff date then one can progress with the normal pre-COVID academic calendar. Life in Kgp will be back to near normal. Re-entry into the campus would be regulated and subject to the production of a vaccine certificate. Basic norms like social distancing, sanitisation and wearing of masks will still be enforced.
- In any other case -

1. No Student will be allowed to leave the campus except in case of unavoidable emergencies (medical reasons/ death or sickness in immediate family). In such cases the student is expected to take prior permission from DOSA (Dean of Student Affairs) by providing requisite proof for the reason of departure. Re-entry to the campus will be subject to the production of a negative COVID (RT-PCR/Antigen) test. Self-quarantining in case of a single room and institutional quarantine in case of a sharing room will have to be observed upon return.

2. The vacation will be truncated to 12-14 days. This period will be necessary to conduct Phase 1 placements for the final years. Many students, mainly third years, have been graded I for the incomplete laboratories which couldn't be conducted during the online semesters. These laboratory sessions (revised and shortened if necessary) will be conducted during the winter vacation. As the final years have a relatively free academic schedule in their final sem,

compensatory labs will be held then. Finally, GC events and winter workshops by various clubs can be accommodated in the winter vacation. This would primarily cater to the freshers and sophomores. Sports training, fitness camps & skills boot camps can be additionally organised by the Gymkhana for the student population whilst following the social distancing norms.

(Q23)

Keeping the health facilities at the campus and their capacity to cater to COVID +ve patients in mind, if for some reason, the case count of covid-19 patients increases dramatically inside the campus, what action plan do you suggest along with the threshold that will trigger those plans.

The action plan is based around Alert Levels namely Level I (Normal), Level II (Low to Medium Risk), Level III (Moderate Risk) and Level IV (High Risk). These Alert Levels are decided for individual halls and the whole campus. With each level, come different sets of rules to be followed by the Halls and Institute.

There are many factors to be considered while deciding which level the campus is in:

- Number of cases among students and employees.
- Quarantine/isolation capacity on campus.
- Local hospital capacity.

We now show that the number of Quarantine and isolation facilities is the bottleneck and why that should be considered as the measure to determine the Alert Level.

As all positive students will be sent to quarantine centres, the number of active positive cases is directly proportional to the number of beds occupied in isolation centres. Also, in the age group of the students (18-25 years), there will be fewer cases that will require hospitalization. Moreover, these will be spread out over time such that the local hospitals will be able to handle these cases. So, in brief, our case tolerance should be determined by the number of beds available in the Quarantine centres.

The criterion for Alert Levels is separate for individual Halls and the Institute. It may be such that a particular Hall is in a higher Alert Level than the institute and hence will follow separate rules. But always,

$$\text{Alert Level (Hall)} \geq \text{Alert Level (Institute)}$$

The criterion for deciding Alert Level:

Alert Level	**Criterion (Institute): Percentage of Quarantine centres filled**	**Criterion (Hall): Percentage of the hall infected**
Level I (Normal Operation)	<15%	<5%
Level II (Low to Moderate Risk)	15% - 40%	5% to 10%
Level III (Moderate Risk)	40% - 75%	10% to 20%

Level IV (Shut Down)	>75%	>20%

The rules for different alert levels are given by:

Level I (Normal Operation): Cases are rare and transmission controlled.
For halls and institute:

1. Practice everyday precautions: physical distancing, masks required, hand washing.
2. Combination of in-person/hybrid and online learning.
3. Capacity for on-campus public spaces at 50%.
4. Student gatherings of 10 people or fewer (physical distancing and masks required).
5. Visitors are not allowed on campus and travel outside campus is strongly discouraged.

For halls:

1. Regular operation of mess, hall sports facilities and other public facilities at 50%.
2. Students may go to other rooms but should follow basic safety norms.

Level II (Low to Moderate Risk): Incidence of the virus remains low, but indicators show potential for an increase in transmission.
For halls and institute:

1. Practice everyday precautions: physical distancing, masks required, hand washing.
2. Combination of in-person/hybrid and online learning.
3. Frequency of testing may be increased for some populations.
4. Student gatherings of 10 people or fewer (physical distancing and masks required)
5. Visitors are not allowed on campus and intra-hall movement is strongly discouraged.

For halls:

1. Regular operation of mess, hall sports facilities and other public facilities at 50%.
2. Students may go to other rooms but are discouraged to do so.
3. Students are only allowed to go to classes and for essential things.

Level III (Moderate Risk): Incidence has increased above baseline modelling and indicators show rates of infection are increasing.
For halls and institute:

1. Practice everyday precautions: physical distancing, masks required, hand washing.
2. The frequency of testing may be increased for some populations.
3. Additional steps will be taken to de-densify campus and may include:
    a. Moving all classes online and requiring students to stay in their rooms or apartments, except to get food or go for testing.
    b. Prohibiting gatherings of any size until transmission rates reduce.
4. Visitors are not allowed on campus and inter-hall travel is prohibited (inter section, as in Q3, for bigger halls: LBS, MMM, BRH).

For halls:

1. The only public space to function is a mess at reduced capacity. Other public spaces like sports facilities and common rooms are closed.
2. Testing is done for that hall every 7 days now.
3. Students are not allowed to leave the hall.
4. All shops in the hall open for 50% of the time.

Level IV (Shut Down): Significant increase in incidence with limited quarantine, isolation and/or local hospital capacity.

For halls and institute:

1. Practice everyday precautions: physical distancing, masks required, hand washing.
2. Frequency of testing may be increased for some populations.
3. Campus will be shut down:
4. Classes are online only.
5. Campus is restricted to essential operations.
6. Students must remain in their rooms (except to receive meals or for testing) .
7. No gatherings of any size are permitted
8. Visitors are not allowed on campus and travel is strongly discouraged.

For halls:

1. Hall is sealed off and declared as a containment zone.
2. Mess and all public spaces closed. Food will be delivered to the rooms of students.
3. Testing is done for that hall every 7 days now.
4. Students are discouraged from leaving their rooms. Inter room travel to different floors and blocks is not allowed.
5. All shops are closed and essentials.

(Q24)

Nominate your dream team (faculty + students + staff) to implement the exercise of opening the campus and keeping it open. Clearly define the hierarchy, assign job roles, responsibilities, powers, etc.

Here is our dream team required for the implementation and exercise of plans for opening the campus.

Faculty and their responsibilities:

1. Director -- Above all; Primary Decision Making Personnel of the Institute
2. Deputy Director -- Assist the director
3. Registrar -- Handling students' logistics issues
4. Gymkhana President -- Decision making of gymkhana related events
5. Dean SA -- Take vital decisions, manage admissions, ensure students' convenience.
6. Dean UG, PGS & R -- Take vital decisions for curricula, examinations, research
7. Dean, Infrastructure -- For new infrastructures like testing centres etc.
8. Faculty Advisors -- Communicate within the professors and assist to the problems of students, like rescheduling of exams, labs, classes
9. Prof-in-Charge, Student Counselling Services -- Or the working of counselling centres
10. Prof-in-Charge, Guest House -- For using guest houses for quarantining purposes
11. Chairman, ERP (Integrated Information Services) -- Fine imposing
12. Prof-in-Charge, Time Table -- Ensure the working of the proposed time table
13. Chairman, Hall Management Committee -- Proper functioning of halls, allotting budgets
14. Prof-in-Charge, Physically Disabled (PD) Students -- For Physically Disabled (PD) Students
15. Chairman, Canteen Management Committee -- To manage the sanitation and food at the canteen for professors and staff
16. Wardens & Asst Wardens -- Proper functioning of halls

Staff and their responsibilities

1. Asst. Registrar, Director & Deans Offices -- Ensuring Director's and Deans decisions get implemented
2. Assistant Registrar, UG Academic Section -- Assisting the registrar
3. Joint Registrar, Accounts -- Managing the accounts, fee, scholarships
4. Security Officer, Security -- Placing the guards and duty allocation
5. Senior Executive Officer Grade-I, Alumni affairs and IR -- For donations and support from alums
6. Supervisors and Managers, Halls -- Hall functioning
7. Senior Medical Officers (SG), BCRTH -- BC Roy facilities
8. Senior Executive Officer Grade-II, CDC -- Internships and placements during covid
9. Senior Scientific Officer, CRF -- Ensure proper working of research facilities
10. Chief Engineer, Civil Construction and Maintenance -- To construct testing and even quarantining centres if required
11. Chief System Manager, CIC -- For technology related logistics and online examinations
12. Senior Counsellor Grade-II, Counselling Center -- Managing counselling centres
13. Senior Technical Superintendent, Transport -- To transport the food which will be centrally cooked, and to carry the critical students, staff or faculty to Kolkata, if any.

Students and their work

1. Vice President, Gymkhana -- Leading the Students' Senate, proper functioning of Gymkhana related events and other stuff including placements
2. Hall Presidents -- Proper functioning of halls
3. Gymkhana General Secretaries & PR Chairperson - Communication with students and administration
4. Hall SSMs -- Proper functioning of halls
5. Hall General Secretaries -- Maintaining decorum in halls, assisting Wardens
6. Gymkhana Secretaries, Editors and Tech Head - Assist General Secretaries
7. Hall Secretaries -- Helping the Senior Hall Council
8. Heads of Societies/Cells affiliated with Gymkhana -- To work and coordinate with Gymkhana, organize online events for recreation
9. Group of Volunteers (nomination basis) -- To help and ensure the collective proper functioning, mainly in halls

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COST ESTIMATION AND FEASIBILITY

(Q1)

Estimate the total cost for your proposed plan. Total cost should include the expense at every step of the proposal i.e. Testing, quarantine services, surveillance, contact tracing, etc. Mention suitable assumptions for charges involved (like ward charges for quarantine) and any suitable covid related hospitalization expenses.

For Class Lecture Recording:

As the number of students attending the classes will be halved for some major subjects with strength greater than 60. The classes will be recorded and uploaded on some media.
Requirement of Cameras:

Department	Cameras required
CE	3
CH	3
CS	4
EC	4
EE + IE	4
GG + EX	3
IM	3
ME	4
MF	3
MI	3
MT	3
MA	3
1st Year - 20 Sections	10
TOTAL	**50**

15 cameras could be acquired from the CIC and the Centre for Continuing Education, which also manages for NPTEL.
Therefore, we need to acquire 35 cameras.

Cost of One Camera = ₹ 10,000
Cost of Stand = ₹ 400
Total Cost = ₹ 10400 x 35
= ₹ 3,64,000

Testing and Quarantining:

As described, the number of students entering various halls:

Hall	# Single	# Double	# Triple	# Quadruple	# Students	# Pools
NVH	35	43	1	2	132	25
GKH	10	0	44	0	142	24

BCR	162	0	0	0	162	33
HJB	163	0	0	0	163	33
SAM	0	92	0	0	184	31
RLB	250	0	0	0	250	50
JCB	262	0	0	0	262	53
SN/IG	213	16	20	0	305	59
LLR	334	0	0	0	334	67
VS	335	0	0	0	335	67
MS	397	0	0	0	397	80
PT	262	19	45	0	435	83
NH	263	21	45	2	448	85
MT	0	0	164	0	492	82
RK	302	23	96	0	636	117
AZ	260	21	143	0	731	131
RP	307	22	160	0	831	150
BRH	1390	0	0	0	1390	278
MMM	0	789	0	0	1578	263
LBS	0	0	650	0	1950	325
Sum	**4945**	**1046**	**1368**	**4**	**11,157**	**2036**

Total Number of Pools = 2036
As the students are required to get the negative RT-PCR report, we assume that they may get infected only while travelling to KGP.

According to the research by the Chinese Centre for Disease Control and Prevention, the probability of getting infected from close contact train travel is around 0.32% and for those in close contact, cab travel is around 0.15%.
We assume due to the covid, approximately 40% of the students will arrive from the cab and the rest 60% from the train.

Therefore, cases expected on arrival:
Cases = Cab + Train = 0.4 x 0.0015 x 11157 + 0.6 x 0.0032 x 11157 = 34 Cases

Assuming they happen to come from different pools

Total Number of Testing needed to done during 1st phase = 2036 + 34 x 5 = 2206
Assuming the testing is done right, the people with symptoms will also be needed to be tested before the next phase.
Assuming 150~160 people with symptoms:
Total number of testing = 2206 + 160 = 2312

The total cost of one RT-PCR test capped in West Bengal ₹ 950. Taking into account swabs and vials we place the cost of the test to be around 980.

Similarly for the 2nd Phase, apart from the total 2306 pool testing, we assume that approximately 80% of previously tested positives will become positive, i.e., 136, and the number of people with symptoms remains constant at 160.

Similarly for the 3rd Phase, apart from the total 2306 pool testing, we assume that approximately 80% of previously tested positives will become positive, i.e., 109, and the number of people with symptoms remains constant at 160.

Similarly for the 4th Phase, apart from the total 2306 pool testing. We assume that approximately 80% of previously tested positives will become positive, i.e., 93 and the number of people with symptoms remains constant at 160.

Similarly for the 5th Phase, apart from the total 2306 pool testing. We assume that approximately 80% of previously tested positives will become positive, i.e., 80 and the number of people with symptoms remains constant at 160.

Total testing requirement turns out to be 11568.

Staff RT-PCR Calculation:

The approximate number of Mess Workers per Hall - 20
Mess workers over the campus - 400
The approximate number of Sanitation per Hall - 15
Sanitation Workers over the campus - 300
The approximate number of Security Guards - 70

The total number of workers - 770. Therefore 154 pools of 5 each.

Assuming the testing in 5 phases for them too 14 days apart.

Now let us assume that 15 pools turn positive for phases 1 & 2, 12 for phases 3 & 4 and 10 for phase 5. Hence, total testing = 1090

Total Cost of RT-PCR Tests = ₹ (1090 + 11568) * 980
= ₹ 1,29,04,840

Sanitization:

Cost of Sanitizers:

1. Foot machine: We are planning to install foot Sanitizers in different parts of the campus to ensure proper sanitation. The distribution of these machines are as follows:
   Halls:
   Hall entrance: 2 machines
   Mess: 3 machines
   Wing: 60 machines with 1 machine at every wing. On an average assuming 60 wings in each hall.
   Miscellaneous machines: 5

   Total machines in each hall: 70
   Total number of halls: 21

   Total number of machines in the halls: 1470

   Nalanda:
   60 machines to be installed in the Nalanda Complex considering the number of classes and washrooms.

   Departments:
   15 machines to be installed in each department considering the number of classes and labs.
   Total number of departments: 19

   Total machines in departments: 285

   Main Building:
   15 machines to be installed in the main building, 4 on each floor and 3 at the entrances.

   Others:
   10 machines to be installed in the different regions of the campus. This includes 2.2, Tech Market etc.

   Total number of foot machines: 1920
   Cost per foot machine: ₹ 250.(Using economies of scale)

   Total cost of Foot machine: ₹ 4,80,000

2. Refilling:
   Every use of a sanitizer consumes approximately 3 ml of it, according to reports. Assuming every person using the foot sanitizer 10 times a day, 30 ml of sanitizer is consumed by each person per day. With 13,000 people inside the campus including students, staff and professors, 3,90,000 ml or 390 litres of sanitizer is being used every day.

   Cost of Sanitizer: ₹ 100 per litre (Using economies of scale)
   Total cost of Sanitizer per day: ₹ 39,000
   Total number of days: 160 days (6 months semester, assuming 20 holidays)

   Total cost of Sanitizers: ₹ 62,40,000

3. Disinfectants:
   Total number of rooms to be disinfected:
   Nalanda: 60 Rooms

   Departments: 285 rooms considering 19 departments and 15 rooms in each department.

   Main building: 30 rooms in the main building.

   25 miscellaneous rooms.

   Total Number of Rooms: 400
   Each room to be disinfected twice a day to ensure proper sanitation.

   Room Dimensions:
   1000 square feet for floor and ceiling = 2000 square feet
   300 square feet for all four walls = 1200 square feet

   Floor and ceiling needs to be disinfected only once in 5 days. So the effective area to be disinfected per day is 2000/5 = 400 square feet

   Surface area to be disinfected in a room = 1600 square feet

   Total Surface area for Sanitization = 6,40,000 square feet

   Each room to be disinfected twice a day. So the total surface area to be disinfected per day is 12,80,000 square feet.

   Use of bleach for sanitizing:
   106 gallons of concentrated bleach based on 48:1 dilution rate to be used per day for the sanitization of 1280000 square feet.

   Cost of bleach: ₹ 84 per gallon (Using economies of scale)

   Total cost of disinfectants per day: ₹ 8,840
   Total number of days: 160

   Total cost of disinfectants: ₹ 14,14,400

   Source: Food and Agriculture Organization of the United Nation.

4. Washroom Maintenance:
   15 ml of handwash is assumed to be used per day per student.

   Total number of students: 12000
   Total amount of handwash: 180 litres
   Cost of handwash: ₹ 15 per litre (Using economies of scale)

   Total cost of Handwash per day: ₹ 2,700
   Total number of days: 160

   Total cost of Handwash: ₹ 4,32,000

Half of the total cost is expected to come from the Hall Establishment Charges.

Extra expense on the hand wash: ₹ 2,16,000

5. Mess:

Approximate Size of Each Table = 5ft x 5ft
Length of Separators Required on the table = 10ft
Approximate number of table per mess hall = 14
Length of Separator Sheet required = 140ft
Cost of Separator per ft = ₹ 55
Total Cost required for separators = 20 x Cost
= ₹ 1,54,000

Assuming they need to be changed twice in the course of 6 months.
Total Cost = 154000 x 3
= ₹ 4,62,000

Cost of making the doors of the mess to be foot mounted = ₹ 40 per door
Total number of doors in all the messes = 2 x 20 = 40
Total Cost of doing the same = ₹ 1600

Transportation cost for mess operations per day = ₹ 500
Total Cost over the course of the semester = ₹ 90,000

The miscellaneous cost of rope separators also needs to be added.
Length of rope needed per hall = 50ft
Cost per ft = ₹ 3
Total Cost = 50 x 3 x 20
= ₹ 3,000

(Q2)

It would be rather inhumane to ask the current faculty, staff, and managers to do all this extra work for keeping the institute open.. You will need a team of additional workers/ contractual staff to do most of the jobs as identified in the questions & in your proposals.. List them and mention suitable agencies that can provide these services. Estimate how much extra amount would be needed for the same

We need contractual staff for sanitisation staff and guard. Below are the sanitation and guard agencies from whom we can hire the workers:

1. Room Building Hospital Office Go-Down WareHouse Sanitization
   Chirag Group of Companies, Kolkata
2. Home And Office Sanitization / Disinfection Services
   Right Solutions
   Near Lake Mall, Kolkata

3. Cleaning Service
   JFM Secure Solution
   Sonarpur, Kolkata

4. Crown Security & Placement Services
   Kharagpur, West Bengal

5. Security And Intelligence Services India Limited
   Kharagpur, West Bengal

6. BOFOR SECURITY SERVICE OFFICE
   Kharagpur, West Bengal

These agencies could be used for hiring workers for disinfecting and other services. We may need to pay them the minimum wage allotted for the workers as per the government rules. They could also be used for sufficiently training the staff.

Total number of sanitation workers required: 70 Workers - 10 for Nalanda, 20 for departments, 10 for roads, 20 for halls and 10 for other places

Daily wage of Sanitation Workers: Rs. 500

Total number of days : 160

Total cost of on sanitation workers: Rs 56,00,000

Total Number of Guards Required - 40 guards - 5 for Nalanda, 5 for roads, 10 for departments and 20 for halls

Daily wage of Guards: Rs. 550

Total number of days : 160

Total cost of on Guards: Rs 35,20,000

Total cost on Outside Workers: Rs 91,20,000

(Q3)

Assuming the Institute has a limited budget and may not be able to incur all these additional expenses (estimated by you in above 2 questions). Tell other ways to finance the same (like loans from banks) and how will KGP pay it back? Like a charge on students over some years or grants from alumni or in what ways?

Cost Cutting Methodologies
Total Cost can be funded from three major sources = **Cost saved from activities** that will not take place due to COVID + **from Investments of Institute** (we invest to use them in tough

situations) + Remaining amount can be charged from **students** in the name of **COVID safety fund**.

Amount of money saved from Hall Group Activities per hall:

Social & Cultural Budget: ₹ 1.35L
Team sports budget:

1. Athletics: ₹ 26k
2. Hockey: ₹ 52k
3. Volleyball: ₹ 29k
4. Basketball: ₹ 14k
5. Football: ₹ 32k
6. Swimming & Water Polo: ₹ 17k
7. Cricket: ₹ 66k

Total sports: ₹ 2,36,000

Illumination + rangoli budget = ₹ 3L

Total Sports + Social-cultural budget = ₹ 6,70,880

There are 21 Halls of Residences (16 for boys, 5 for girls) around campus
For some girls, the hall budget will be low and for some big halls like LBS the budget will be much more so on average it will compensate.

Total Sports+Social-Cultural = 6,70,880 x 21 = ₹ 1,40,88,480

Amount of money saved from Snacks in mess:
Snacks = ₹ 10 / person per day
Amount from snacks = 10 x 11,000 x 30 = ₹ 33,00,000/per month
Total amount from snacks = 6 x ₹ 33,00,000 = ₹ 1,98,00,000

Total amount saved = ₹ 3,38,88,970

Total Expenses from the above expenditure given in the question:
Camera Cost + Social Distancing Cost + Testing Cost + Sanitation Cost + Disinfectant Cost + Mess Cost + Workers hiring cost

And it amounts to **₹ 3,07,13,738** which is well in the limit of the amount saved.

EXTRA POINTS

Mental Health Considerations and Counselling

In order to reassure the students' community to avoid any kind of stress or panic in the prevailing situation vis-a-vis their studies, health and related issues, the institute should take the following measures for the mental health, psychological aspects and well-being of the students:

1. All the faculty members, students and staff should be made aware of the web page named "Manodarpan" – created on the Ministry of Education website to provide psychosocial support for Mental Health & Well-being during the COVID – 19 outbreak and beyond. The web page contains advisory, practical tips, posters, videos, do's and don'ts for Psychosocial support, FAQ and online query system. Also, a National Toll Free Helpline (8445440632) for country wide outreach to students from schools, colleges and universities has also been set up which will provide tele-counselling to address their mental health and psychosocial issues.

2. Conducting surveys via the Counselling Centre for every student at regular intervals where the students are encouraged to share their problems, seek help from experts and learn coping mechanisms. It is important that students are encouraged to share their problems without hesitation and without worrying about what others would think or say. Mental health problems have been on a rise during the COVID-19 situation, and need to be addressed at a larger level.

3. Set up provision for both online and offline counselling sessions. The online counselling sessions can be conducted in collaboration with YourDost (the institute already has a subscription). The counselling centre should also keep its online services continued throughout the semester, and offline services should only be availed for critical cases or emergency situations.

4. The institute should also ensure regular mentoring of students through interactions, and appeals/letters by the Faculty Advisors and Wardens to remain calm and stress-free. This can be achieved through telephones, e-mails, digital and social media platforms. These groups can also work with the student volunteers and the General Secretary Welfare of each hall to stay updated about the students' conditions.