

# National Student Design Competition 2017-18

A national level HVAC design competition is being organized by ISHRAE HQ, New Delhi. All the students of mechanical engineering who have ISHRAE membership are eligible for participating in this competition. Design guidelines are given below and the drawings can be downloaded from the link given below. Maximum number of students in a team will be limited to 3 and last date of registration is 30th September, 2017. Last date of submitting complete design report in pdf form is 30th November, 2017. First prize will be INR 30,000/- second prize INR 20,000/- and third prize INR 10,000/- in cash. Presentation will be held in February 2018 in Bangalore and travel fare and accommodation will be sponsored by ISHRAE.

Mr. Mohammad Faisal Khan, Assistant Professor and faculty coordinator ISHRAE student chapter, department of Mechanical Engineering, Integral University, will guide all the teams, participating in this competition.



ISHRAE

## TIME TO SHOW YOUR PASSION FOR HVAC DESIGN



**National Student Design Competition 2017-18**

**NSDC 2017-18**

**“Designing Air Conditioning System for a Three Screen Multiplex for Better Indoor Air Quality”**

**“Catching Up Diseases when you are Enjoying & Relaxing the Most”**

**Competition Open for ISHRAE Student Members**

### AWARD

Cash awards will be presented to the winners during ACREX 2018 at Bangalore.



**1<sup>st</sup> PRIZE**  
Rs. 30,000



**2<sup>nd</sup> PRIZE**  
Rs. 20,000



**Motivational Prize**  
Rs. 10,000

Also, travel and accommodation of Selected Entries shall be sponsored by ISHRAE

### JURY MEMBERS



**Dr. Nitin Deodhar,**  
Pune



**Mr. Diwakar Sawant,**  
Mumbai



**Mr. Amod Dixit,**  
Mumbai

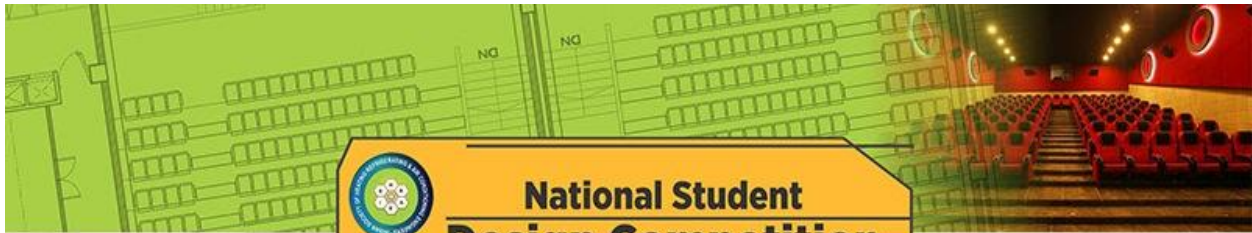


**Mr. Deepak Arzare,**  
Indore

**Preamble**  
Student Activity Programme of Indian Society for Heating Refrigerating & Air Conditioning Engineers [ISHRAE] has been framed to spread knowledge of HVAC science & Technology along with networking opportunities to young ignited minds, transforming them as future decision makers. Varieties of ISHRAE student programmes are being held throughout the year to inculcate their natural liking towards this lucrative core engineering & management job opportunities. ISHRAE supports these competitions to encourage students to become involved in a profession that is crucial to insuring a sustainable future for our Earth – the design of energy-efficient HVAC systems.

Extended hours occupancy in comfort air conditioned spaces has been a common work feature all around the world. Air conditioning for recreational environment in close premises as well as screening of movies in multiplexes has become a common weekend pleasure. All these keep us far from natural environment, goof ventilation & better indoor air quality. Designing HVAC systems with sufficient make up air has been a challenge for design engineers & most of the time concluded with a negotiation because fresh air is always considered a big load for areas having large human occupancies Various diseases have been reported to be caught during such extended hour stay majorly due to poor Indoor Air Quality (IAQ) maintained in such air conditioned spaces. Compromise in IAQ could lead to transmission of communicable diseases within the theatre during the show, across shows, and across theatres. Symptoms could take several hours or days to appear Headache, dizziness, nausea, eye, nose or throat irritation, Cough, chest pain, shortness of breath on mild exertion, difficulty in concentration, fatigue, nosebleeds, cancers, pregnancy problems a sensitivity to odours, hoarseness of voice, allergies, cold, flu-like symptoms appears among occupants in short as well as long run.

Swatch & Healthy BHARAT is the Nation Call..... Thus, Designing Swatch HVAC system for better IAQ & Energy Efficiencies when you are enjoying & relaxing the most, is the theme for this year National Student Design Competition.



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## SYNOPSIS

Optimising air-conditioning design of multi-screen theatres is a challenging task. Algebraic addition of the individual areas like designing other commercial spaces cannot be applied to multi-screen theatres. Adding peak cooling load of each theatre, lobby, projection room, ticketing area, offices and concession areas would lead to disproportionately high installed capacity. This would prove to be operationally uneconomical and difficult to maintain. Applying diversity factors to peak cooling load of the facility may lead to under designed systems during peak occupancies typically observed on week-ends. An under-designed system may necessitate compromising IAQ by throttling outdoor air (fresh air)

The National Student Design Competition (NSDC) for the year 2017-18 is, Designing Air Conditioning System for a 3 Screen Multiplex for Better Indoor Air Quality & Energy Efficiencies.

- 3 Screen Multiplex having total seating capacity of 300, 300 & 200 Each
- Standard Luxury Push Back Chairs having Back & Lumber Support

- Lobby having Ticketing area, Concession area, Toilets, Catering
- Moulded PU Foam with Fabric & standard Trims & finishes
- Rockwool-Dacron Acoustics Finally covered with Fabric Curtains on walls
- Suitable LED Lightings
- Carpeted Flooring & Acoustically Designed False Ceilings as per NC Criteria

The HVAC System Selection and Design for the Theatre shall address the following major design goals:

- Designing Complete energy efficient HVAC Systems with all important sub systems
- Assuring better IAQ measures undertaken to address risks of Diseases
- & optimising fresh air loads & energy efficiencies

(Student should assume suitable parameters with justifications)

## IMPORTANT DATES

**Due date for Registration** : 30 -09 - 2017

**Final Report submission** : 30 - 11 - 2017

Presentation & Award Ceremony during ACREX Bangalore on 23th Feb 2018 at BIEC Bangalore

### SUBMISSION

The duly filed registration form and the project report shall be submitted electronically to : v.thakur@ishraehq.in

## GUIDELINES

- Undergraduate Student Members of ISHRAE Student Chapters are eligible to Participate
- Maximum Number of Students per Team: 3
- Design shall be based on Indian Standards
- Submit the project report in PDF format
- Presentation should consist of Maximum 50 slides
- All the Submission & Designs shall be the property of ISHRAE

### Project Report Shall Include following :

1. Proposed System details of Multiplex design with plan & section of worked out design & drawings
2. Design Basis Report including Heat load Calculations, Duct designs etc
3. Uncertainties in Design due to large daily/ weekly variations in

lean and peak cooling loads

4. HVAC & IEC system selection based on energy efficiencies and other features
5. Air Flow Design and Distribution
6. Part Load Efficiencies & Life cycle cost analysis
7. Health Safety Features and Standards followed
8. Energy Balance Sheet with Loss/Savings
9. Detail Drawings with all systems & sub systems in place

**Note :** Evaluation of the project will be based on originality, innovation, practicality, special IAQ Features, Design qualifying Load Fluctuations, low resource depletion, affordability and most importantly undertaking Measures for Audience catching up Diseases caught due to poor Indoor Air Quality at a time when they are enjoying with their loved ones

## Thanks & Regards

**Mohammad Faisal Khan**  
**Assistant Professor (ME)**  
**Integral University, Lucknow**  
**Mob.- +91-9919506872**