Gujarat Technological University

Bulletin on

GTU Recommended MOOC Courses

For Undergraduate Students, Post-Graduate Students, and Faculty Members

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and

A Report on
A-VIEW based EC Project Training

as part of a GTU-MOOC Initiative for Final Year Electronics Students

GTU MOOC Committee
Gujarat Technological University
Nr.Vishwakarma Government Engineering College
Nr.Visat Three Roads, Visat - Gandhinagar Highway
Chandkheda, Ahmedabad – 382424 - Gujarat
Phone: 079-23267521/570 Web: http://www.gtu.ac.in/

ABOUT GTU-MOOC COMMITTEE:

In 2013, GTU was amongst a handful of leading Universities, globally, to recognize the potential of a newly emerging disruptive technology called Massive Open On-line Courses (MOOCs).

In India, many, particularly women, are deprived of quality higher education. In 2013, GTU was the first university to set up a working group in one of its Women's Engineering Institutes to tap the potential of MOOCs.

The 'GTU-MOOC Committee', offers guidance to the Faculty Members and students on how to be successful in harnessing the potential of MOOCs. Simultaneously, it is also laying out plans for expanding the scope of MOOCs so as to transform itself to a Life-Long Learning University. GTU wants to encourage its institutes with concepts such as 'Blended MOOCs', through which the cost of quality education can be reduced, while increasing the streams of revenue for educational institutions.

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For more information, you can contact:

Dr.Vithal N. Kamat
　　　　Director (Industries), GTU Innovation V.V.Nagar-1 Sankul,
　　　　E-mail: vk@kvah.in;
　　　　Mobile: +91 98240 74054; +91 94087 44787

Prof Margum Suthar
　　　　GTU Board for Skill Development & Up-skilling ,
　　　　E-mail: ap1_mcwt@gtu.edu.in

For help about technological issues, please contact:

Alpesh Vaghela
　　　　GTU Directorate of Information Technological Servicesl,
　　　　E-mail: alpesh@gtu.edu.in

INTRODUCTION:

As per circular GTU/Academic/2015/7681, dated 21/07/2015, every student admitted to the 4 years B.E. program from the academic year 2015-16 onwards, is required to earn 100 Activity Points in addition to the required academic grades for getting GTU's BE degree. A D2D student is required to earn 75 activity points. Those who register for MOOCs and get an Honour Certificate are entitled to 9 points

MOOCs also provides an elegant platform for post graduate students, alumni as well as Faculty Members. For instance, the course on Technical Communication is recommended, particularly for post graduate students, who wish to improve their communication skills, to be able to organize, write and present their technical work. Or the course on Education Technology is highly recommended for Engineering Teachers.

The following courses are offered by IIT Bombay and are strongly recommended by GTU. It is suggested that every individual should allocate adequate time every week for MOOCs. This exercise should quickly develop into a weekly habit and more importantly a constant Life-Long Learning factor, for a successful career.

GTU calls upon its Colleges to come forward to support most of the courses given below with A-VIEW based online mentoring so as to help its students.

RECOMMENDED COURSES FROM JANUARY 2016:

1. ## IIT BombayX course on Educational Technology for Engineering Teachers - ET601Tx

This course is aimed at engineering college faculty and post-graduate students of engineering who are planning for faculty careers. This course will provide an introduction to research-based and learner-centered pedagogy for effectively integrating ICT in engineering education. Participants of this course will apply these strategies during the course, to design materials and activities for topics in their own domain. This will help them to become informed teachers and tackle teaching-learning problems competently.

For learners who were a part of earlier Pedagogy Workshops through T10kT mode, this course is aimed to extend your learning by going in depth of core contents through carefully crafted learning dialogues

and activities. The course will also have a section of Voices from Field where Engineering college instructors are invited to share their experiences of use of innovative strategies and pedagogic practices. Also the MOOC platform will help them in pacing their learning experience as per their convenience.

Important Details to remember:

Course Instructors - Prof. Sahana Murthy, Prof. Sridhar Iyer
Course Facilitator - Jayakrishnan M

Course Enrolment Starts from - December 1, 2015
Course Enrolment ends on - January 15, 2016

Course Start Date - January 7, 2016
Course End Date - February 18, 2016
Expected Effort - 5 to 6 hours per week

Course Weblink - https://iitbombayx.in/courses/IITBombayX/ET601Tx/2015-16/about

Course email id - et601tx@gmail.com

2. IITBombayX course on Technical Communication for Scientists and Engineers - HS791X

PG students at IITB undergo a course on communication skills (mainly scientific communication), offered jointly by faculty from various departments. Recently IIT Bombay has developed an online version of this course through our platform IITBombayX (built on Open edX codebase).

Students can register for this free online course. On successful completion of this programme they will be able to organise, comprehend, write, and present, short and long forms of any technical work in the framework of the Scientific Method. They will also be able to communicate this content within the widely accepted current norms. Students completing the course with a minimum grade will also get an honour code certificate.

More details of the course are available here:

Course Weblink: https://iitbombayx.in/courses/IITBombayX/HS791xS16/2016_T1/about

3. IITBombayX course on Data Structures and Algorithms

IIT Bombay will be shortly announcing an online course on Data Structures and Algorithms, comprising 3 MOOCs, each of 6 weeks duration. Check the following link for the announcement

Web link: https://iitbombayx.in/

4. IITBombayX course on Introduction to Computer Programming

CS101.1xS16: **Introduction to Computer Programming**

This course provides students with a foundation in Computer Programming.
यह पाठ्यक्रम है जो कम्प्यूटर प्रोग्रामिंग की बुनियादी जानकारी छात्रों को देगा।

Registration will be open till Thursday, 28 January 2016.

- **STARTS:** Jan 04 2016
- **INSTRUCTOR:** Deepak Phatak
- **Web link:** https://iitbombayx.in/courses/IITBombayX/CS101.1xS16/2016_T1/about

5. IITBombayX course on Signals and Systems

EE210xS16: **Signals & Systems**

This course provides the basic toolkit for any signal processing application - the abstraction of signals and systems, from the point of view of analysis and characterization.

Registration will be open till Thursday, January 28, 2016, 12:00 IST.

- **STARTS:** Jan 07 2016
- **INSTRUCTOR:** Vikram Gadre
- https://iitbombayx.in/courses/IITBombayX/EE210xS16/2016_T1/about

6. IITBombayX course on Thermodynamics

ME209xS16: __Thermodynamics__

Introduction to basic concepts and applications of thermodynamics in mechanical engineering.
मैकेनिकल इंजीनियरिंग में ऊष्मा गतिकी के बुनियादी अवधारणाओं और प्रयोगो का परिचय।

Registration will be open till Thursday, January 28 , 2016

- **STARTS:** Jan 04 2016

- **INSTRUCTOR:** Uday N. Gaitonde

- **Web Link:** https://iitbombayx.in/courses/IITBombayX/ME209xS16/2016_T1/about

7. IITBombayX Demo Course

IITBombayX: __Demo Course__

This demo course shows how to take a course on IITBombayX.

- **STARTS:** Jan 26 2015

- **INSTRUCTOR:** IITBombayX

- https://iitbombayx.in/courses/IITBombayX/IITBombayX/2015_2016/about

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Director (Industries), GTU Innovation V.V.Nagar-1 Sankul,
E-mail: vk@kvah.in;
Mobile: +91 98240 74054; +91 94087 44787

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E-mail: ap1_mcwt@gtu.edu.in

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Gujarat Technological University

A Report on

A-VIEW BASED EC PROJECT TRAINING
as part of a GTU-MOOC Initiative for Final Year Electronics Students

The crazy ones ... who see things differently... you can't ignore them.
Because they change things!
- Excerpts from John Appleseed's letter to Kate

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Phone: 079-23267521/570
Web: http://www.gtu.ac.in/

GTU-MOOC POLICY:

GTU encourages its Faculty Members and students to take full advantage of the MOOC and NPTEL courses.

As per circular GTU/Academic/2015/7681, dated 21/07/2015, every student admitted to the 4 years B.E. program from the academic year 2015-16 onwards, is required to earn 100 Activity Points in addition to the required academic grades for getting GTU's BE degree. A D2D student is required to earn 75 activity points. Those who register for MOOCs and get an Honour Certificate are entitled to 9 points

Under GTU's ALVCOM[1] program, till 31st December 2015, 1045 lectures were telecast with the help of BISAG. The videos of the Videos of the lectures are available at YouTube at:-
https://www.youtube.com/channel/UChNAV4wMyIEu3QtV_QuKhig

As a part of the MOOC initiative, during the 1st semester of 2015-16, using A-VIEW, a series of lectures were offered for EC students. On the next few pages, a Report of these lectures is provided.

[1] Active Learning Video Lecture Communication Series (ALVCOM)
The Face book page for ALVCOM is at:
https://www.facebook.com/gtuactivelearning

ALVCOM and the GTU-MOOC Initiative are part of the Active Learning- Creating Excitement in the laboratories, workshops and classrooms (ALCE)

GTU-MOOC INITIATIVE

With an objective to help the institutes affiliated to GTU improve the quality of education, GTU has introduced the concept of blended –MOOC (Massively Open Online Courses) called GTU-MOOC. The objective is to strengthen the existing conventional teaching methodology adopted by the institutes by blending them with online MOOC courses.

It was observed that a large number of EC students face numerous difficulties while executing their projects. Rather than overcome them, many were seen to give up and opt for ready-made projects from the market. Since this amounts to plagiarism GTU has been taking numerous measures to discourage students from purchasing ready-made projects. One such measure that was initiated in July 2015 was to start online mentoring of the students to overcome their difficulties. The e-learning tool that was used for on-line interactive classes was 'A-VIEW', an acronym for Amrita Virtual Interactive e-Learning World' (see FIGURE 1).

FIGURE 1.SCREENSHOT OF 'A-VIEW' E-LEARNING PLATFORM

A-VIEW is a multi-modal, multimedia, e-learning platform indigenously developed by Amrita University as part of a 'Talk to a Teacher' program coordinated by IIT Bombay, and funded by the Ministry of Human

Resource Development (MHRD) under the Indian Government's National Mission for Education using Information and Communication Technology (NME-ICT). A-VIEW was developed to address one of the most critical issues of India's Higher Education System – millions of students wanting to learn but not fortunate enough to have well-qualified teachers to train them. With A-VIEW, one good teacher can teach, as though in person, tens of thousands of students simultaneously at different locations all over India.

Since the live interactive online classes were being attempted for the first time in GTU, there was a lot of apprehension in many of the institutes. This did not deter **Dr.Akshai Aggarwal,** Honorable Vice Chancellor, GTU, who was determined to make it a success. The successful use of A-VIEW, to broadcast the lectures delivered by eminent academicians and researchers who had gathered from around the globe, at GTU, during the Research Week held in February 2015, had given him the confidence that this initiative too would be a success.

By placing information on its web notice board, as well as through e-mail communication, GTU ensured that the A-VIEW was downloaded and deployed at most of the engineering institutes affiliated to it. Mr. Alpesh Vaghela and A-VIEW Tech. Co-coordinator, GTU, Prof. Mahesh Panchal, Dy. Director, GTU, and Mr. SibiBhaskaran, Sr.Manager, Amrita E-Learning Research Lab, Amrita University, Kollam helped the institutes that were facing difficulties in downloading A-VIEW and in the registration process. This effort led to more than 275 installations of A-VIEW from the various institutes under GTU.

The GTU course on EC Project Training was set up on the National Server by the A-VIEW co-coordinators at Amrita as follows:

Class Name:	GTU - EC Project Training
Course Name:	GTU Course
Institute Name:	Gujarat Technological University, Ahmadabad

The online interactive classes' commenced on 03rd August, 2015. To the electronics students who were interested in participating in the online sessions, the institutes offered a classroom or laboratory that had an internet facility with a minimum bandwidth of 512 kbps, multimedia projector, audio and video facility.

GTU nominated **Dr.Vithal N. Kamat, Director (Industries)**, GTU Innovation V. V. Nagar-1 Sankul, to take the online Project training classes for EC / ET/ EE students studying in their 5th Semester and 7th Semesters as per the schedule shown in Table 1.

TABLE 1: PROJECT TRAINING CLASS SCHEDULE

Relevant GTU Course Names		Days	Timing
170001 :	EC Project – I	Mondays, Wednesdays, Fridays	9:00 AM to 10:30 AM
171005 :	Department Elective – 1 – Embedded Systems		
2151001 :	Microcontroller and Interfacing		
2150907 :	Microprocessor and Microcontroller Architecture and Interfacing		

The online EC Project training classes were offered free of cost. No Fees were charged. These classes covered a wide range of topics such as building embedded solutions on an ARM Cortex- M0+ platform, understanding 'Inter-Integrated Circuit (I2C) bus', peripherals such as 'State Configurable Timers', 'Switch Matrix for reconfigurable I/O ports', 'Switch Mode Power Supplies (SMPS)', etc.

There were dedicated sessions on ARM controllers that focused on debugging tools, debugging concepts, programming concepts such as In-Application Programming in Flash memory. Case studies of embedded applications with 'Smart features' were also covered. Many of the topics were based on state-of-the-art technologies, to ensure that students have better job prospects.

Over the last semester more than 25 sessions were conducted. There were, on an average, 5 to 10 institutes logged in at any instant of time. The number of students participating at any institute varied from 3 to 40. Since many of the institutes had not enabled their webcams or camcorders, the presenter was unable to interact with the students directly face-to-face. Instead, the participants were observed to be extensively using the chat-box to ask questions. The 'Hand-raise' feature of A-VIEW was rarely used since it requires the participant to enable their webcam.

The presenter would conduct quizzes from time to time to check if the students are actively listening or sleeping at the other end. The quiz results have been satisfactory. No marks or credits were offered to the students attending this online session. The students who registered for this online session were also effectively mentored by their own guides / faculty members in their institute. Students were also required to attend their regular project laboratories and appear in the external end-semester examination conducted and evaluated by GTU in the regular manner. The institutes were given the freedom to adjust marks /credits towards the internal continuous evaluation component based on his/her performance in the A-VIEW sessions.

Many of the institutes initially had a number of internet and connectivity related problems. Thereafter, many started using Un-interrupted Power Supply (UPS). Most of the connectivity issues

were subsequently resolved by them. The A-VIEW live sessions were seen to become more stable and regular thereafter. The participation from these institutes also became more regular, thereafter.

From the student's feedback, it is learnt that they got a practical insight into the topics that were earlier understood by them only in theory. For example, students were taught about a Switched Mode Power Supply (SMPS) in their syllabus. But, almost all projects built by the students of the previous batches were seen to use an inefficient, linear, dissipative, high drop-out, bulky 50Hz transformer based power supply. When students observe all modern appliances and gadgets including mobile phones to be drawing their power from an SMPS, they felt handicapped as they lacked practical exposure earlier. Thanks to the A-VIEW based classes, GTU would now be able to see many projects that use an SMPS based EC project. The students have also expressed that this kind of practical exposure with the latest technologies have given them more confidence to face the industries and they expect to find better placements.

For most of the institutes, the A-VIEW based online sessions were a new experience. Since many did not wish to disclose the actual status of the lab or classroom setup, it was observed that they did not keep their webcams enabled. We believe this to be a passing phase and that over a period of time, the behavior will change and gradually more and more institutes would take measures to keep their A-VIEW classroom in a neat and well equipped state so as to facilitate their students to use the webcam for better interaction and for better learning.
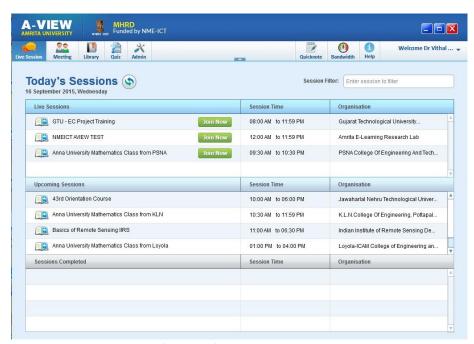

FIGURE 2: SCREENSHOT OF 'A-VIEW' SHOWING GTU – EC PROJECT TRAINING SESSION

> Glimpses of the Laboratory where EC Students of a GTU Institute are attending an 'A-VIEW' based session.

Other than the A-VIEW based training for EC Projects, in the year 2015, GTU-MOOC team has also been successful with other initiatives: such as associating with IIT Bombay to offer three of their MOOC courses in the GTU curriculum, namely, CS101.1x Introduction to Computer Science, ME209x Thermodynamics on 5th February 2015 and EE210.1x – Signals and Systems on 12th March 2015. GTU-MOOC team was also successful in the live broadcast during Research Week conducted in February 2015. This is consistent with the views expressed by Dr. Anil Sahasrabudhe, Chairman, AICTE, during the GTU – Start-Up India Seminar, that one MOOC course per Semester should be planned for all Institutes / Universities recognized by AICTE.

GTU-MOOC committee, thus, has been successful in harnessing the potential of the disruptive technology – MOOCs. It has also laid out the plans for expanding the scope of MOOCs so as to

transform itself to a Life-Long Learning University. This would open new avenues for its institutes where cost of education would reduce and the revenue streams would increase. One of the initiatives is setting up its own MOOC platform by porting the new Cypress release of the "Open edX" platform.

For more information contact:

Dr.Vithal N. Kamat
Director (Industries), GTU Innovation V.V.Nagar-1 Sankul,
E-mail: vk@kvah.in;
Mobile: +91 98240 74054; +91 94087 44787,

Mr. AlpeshVaghela,
Programmer and A-VIEW Tech. Co-ordinator, GTU,
E-mail: alpesh@gtu.edu.in.
Mobile: +91 9913607999;

Mr. SibiBhaskaran,
Sr.Manager, Amrita E-Learning Research Lab, Amrita University, Kollam,
Kerala,
E-mail: sibib@am.amrita.edu; sibi91011@gmail.com;
Website: www.aview.in;www.amrita.edu;
Mobile: +919446482900(Mobile); +914762804405 (Land-Line).

MOOC project at GTU is a part of the ALCE project.

Under this project, GTU has done the following:

1. Continuous Faculty Development Programs with a special emphasis on new ways of learning of Mathematics
2. Active Learning Video Lecture Communication Series (ALVCOM): GTU started the live Video Lecture Telecasting series known as **ALVCOM** from Saturday, 1st September 2012, with the help of technical facility from BISAG – Bhaskaracharya Institute for Space Applications and Geo-Informatics situated at Gandhinagar. After conducting a research on the results of four years, GTU selected four subjects from the Degree course and four from the Diploma course of engineering for ALVCOM.