

# *Signals and Systems*

Open Education Resource:

Fourier transform and Z transform with  
flipping the classroom using Moodle

Work done as part of AICTE approved FDP on “Use of ICT in Education for Online and Blended Learning”

RC1065\_006

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Signals and Systems

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## 1. Open Education Resource:

### Fourier transform and Z transform with flipping the classroom using Moodle

#### About the OER:

There are two lessons of “signals and systems” divided in 8 week activity as part of this OER, and each deals with an aspect related to *Fourier transform introduction, its applications and properties and Z transform introduction, its applications, properties and importance of ROC with solved examples.*

- OER is downloadable from <https://atulkulkarnisite.wordpress.com/ggh/> or [https://atulkulkarnisite.files.wordpress.com/2016/07/oer\\_rc1065\\_atul\\_hemant\\_ravindra7.pdf](https://atulkulkarnisite.files.wordpress.com/2016/07/oer_rc1065_atul_hemant_ravindra7.pdf)
- Target Audience: Third year Diploma Engineering Students (Electronics domain)
- Tags: Fourier transform, Z transform, convolutional theorem, Region of convergence, inverse Z transform
- OER developed using screen-cast o Matic, moodlecloud.com, wordpress.com.
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#### Learning Objectives:

After using this OER, learner will be able to:

- Mention application areas of Fourier and Z Transform
- List down the properties of Fourier transforms
- Explain the relation between Fourier and Z Transform
- Convert simple function in time domain to frequency domain
- Solve examples of Fourier transform and inverse z transform

#### Tools Used for creation of OER:

[1] Screencast O-Matic (Version 2.0) for creation of screen-cast (an Open Source Tool)

[2] moodlecloud.com (Quiz and material (TPS activity details) posted under the course name Signals and Systems)

[3] atulkulkarnisite.wordpress.com.

## 2. Design Decisions

### Nature of Decisions taken:

The design decisions involved in the creation of this OER were of broadly three types:

1. Content Decisions
2. Pedagogic Decisions
3. Technology Decisions

### Content Decisions:

The content decisions related to:

- a. Basic introductory content on Fourier and Z Transform –What, Why and How?
- b. Books used for material are
  1. Allan V.Oppenheim, S.Wilsky and S.H.Nawab, Signals and Systems, Pearson Education, 2007.,
  2. S.Salivahanan, A. Vallavaraj, C. Gnanapriya, Digital Signal Processing, McGraw Hill International/TMH, 2007.
  3. Signals and systems by P Ramkrishna Rao Pub. McGraw Hill
  4. Signals and systems by S. Palani Pub. Ane Books pvt.ltd.

### Pedagogic Decisions:

We have used flipped classroom strategy, there are two segments – Out-of-class segment and In-Class segment. The out-of-class has given material is 4 screen-casts and form an understanding about the concepts that are relevant. to Fourier and Z Transform. And in class segment TPS activity is utilized.

- Out-of-class segment Quiz is included after watching screencast which includes Cognitive Levels of Questions Mostly Recall to Apply level.
- Assessment Strategies used multiple choice questions for out of class, Think-Pair-Share strategy for in-class.

### Technology Decisions:

For developing the Out-of-Class and In-class activities, the major technology used as mentioned below:

1. **Tool to be used for creating screencast** – screencast o-matic ver 2.0
2. **OER Material (Screen-cast, Quiz)** - Screen cast are made available on resources folder of week1,3,5,7 on moodle site. Moodlecloud.com used to create Moodle site ([atulworld.moodlecloud.com](http://atulworld.moodlecloud.com)) where 8 week course on “**signals and systems**” developed and for out of class activity **Quiz** for week 1,3,5,7 (Multiple choice questions), and for in-class **Think-Pair-Share strategy** details mentioned on week 2,4,6,8.
3. Login details for ([atulworld.moodlecloud.com](http://atulworld.moodlecloud.com)) are **Username admin and password 8805501811**
4. OER report is made available on <https://atulkulkarnisite.wordpress.com/ggh/>

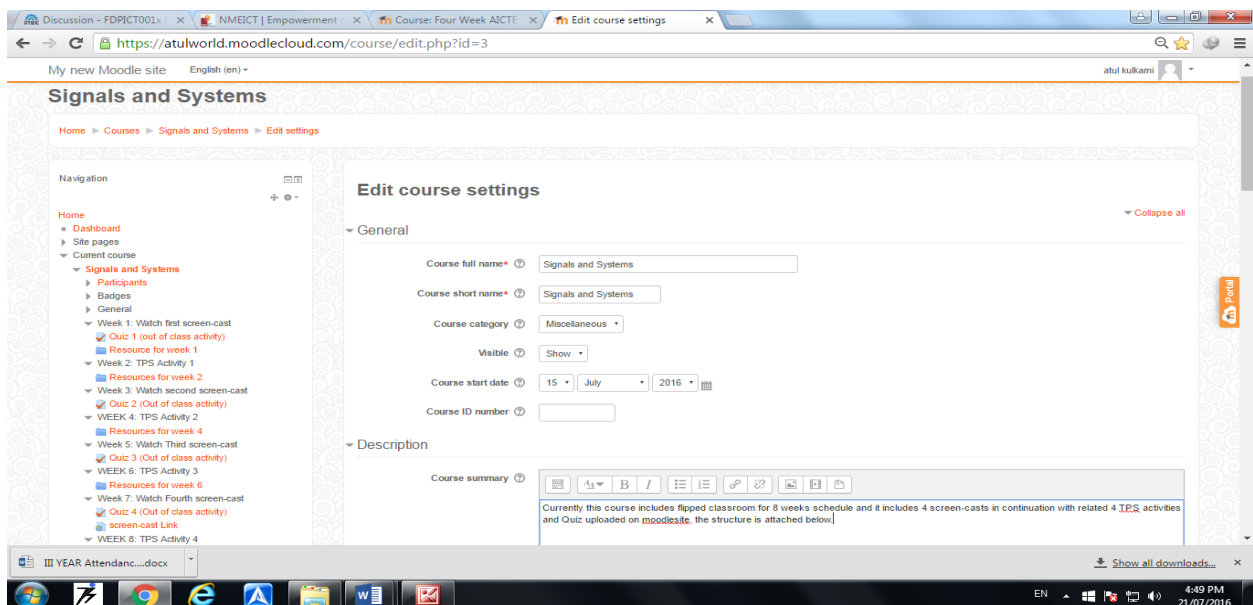
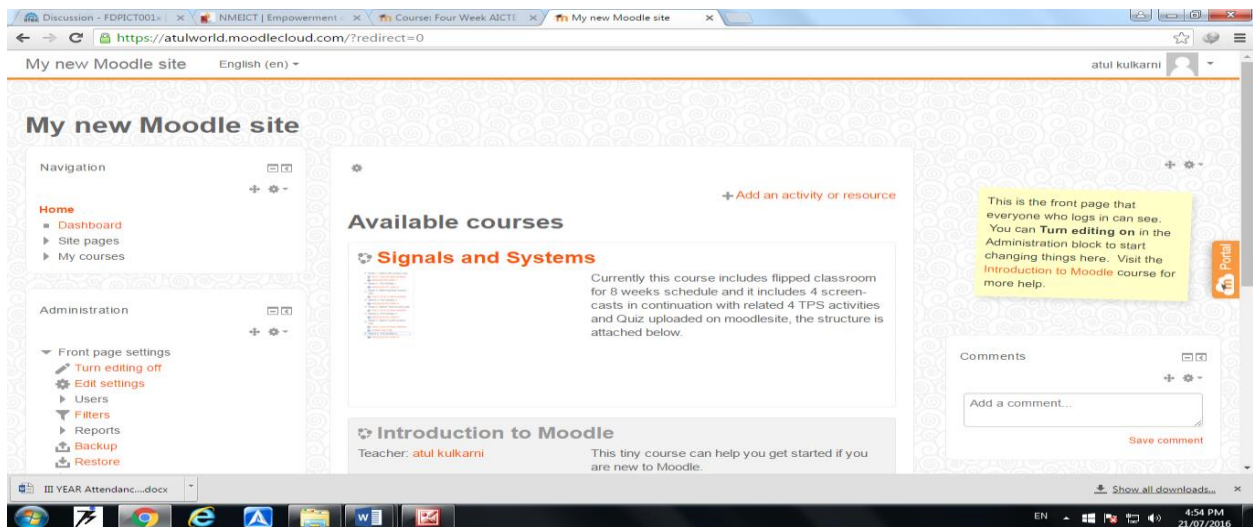
### 3. OER Description

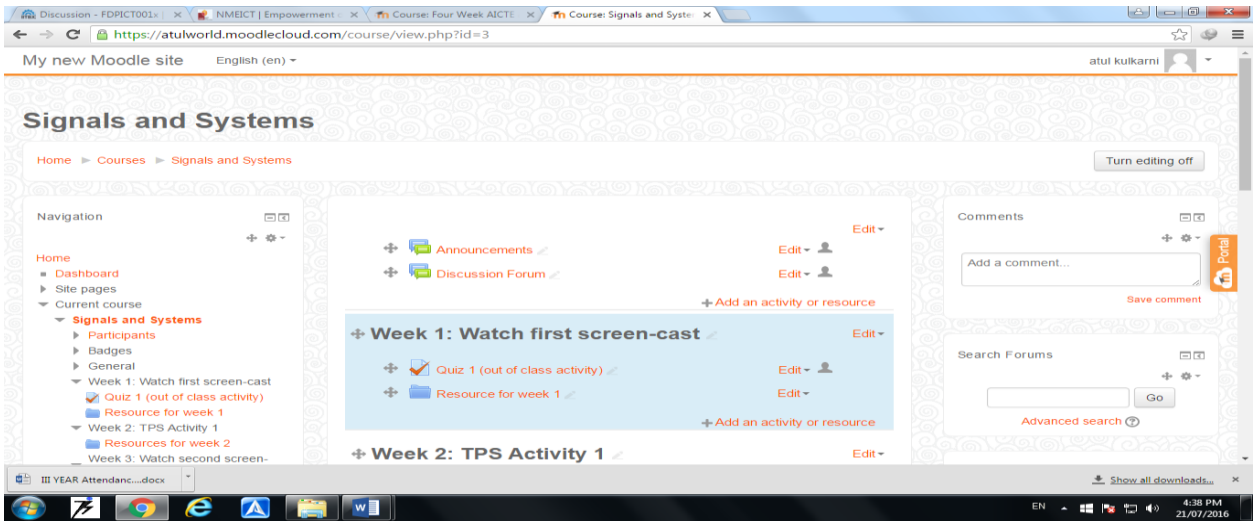
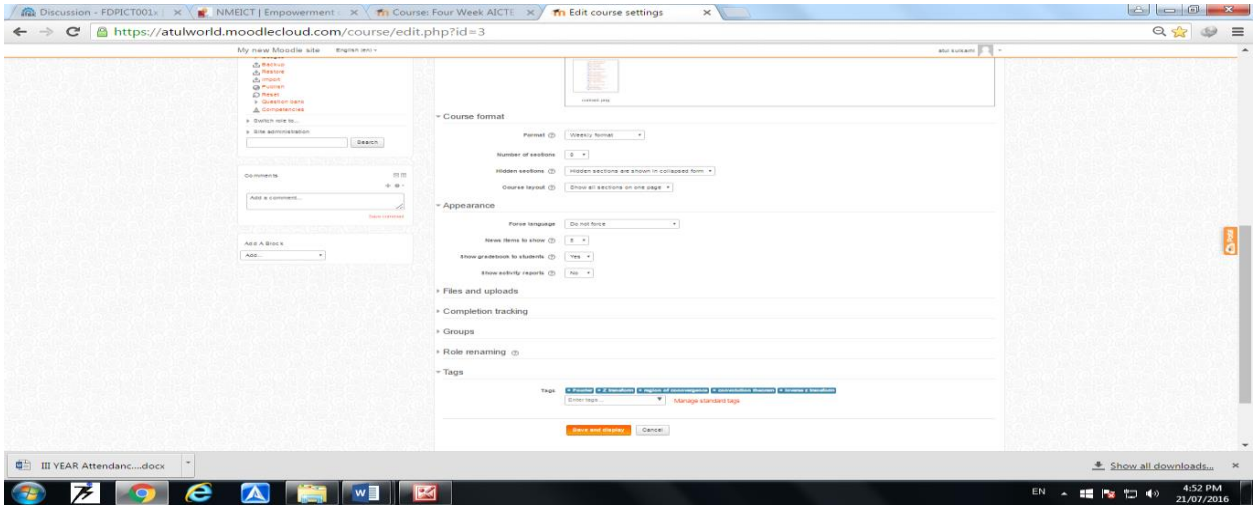
#### Active OER:

1. For checking the active OER, you may access the Course – “**signals and systems**” on [atulworld.moodlecloud.com](https://atulworld.moodlecloud.com) . The password required for exploring the activity Username **admin** and password **8805501811**
2. OER report is made available on <https://atulkulkarnisite.wordpress.com/ggh/>

**Moodle setting and appearance:** Moodlesite created for the course is briefly shown below through screenshots.

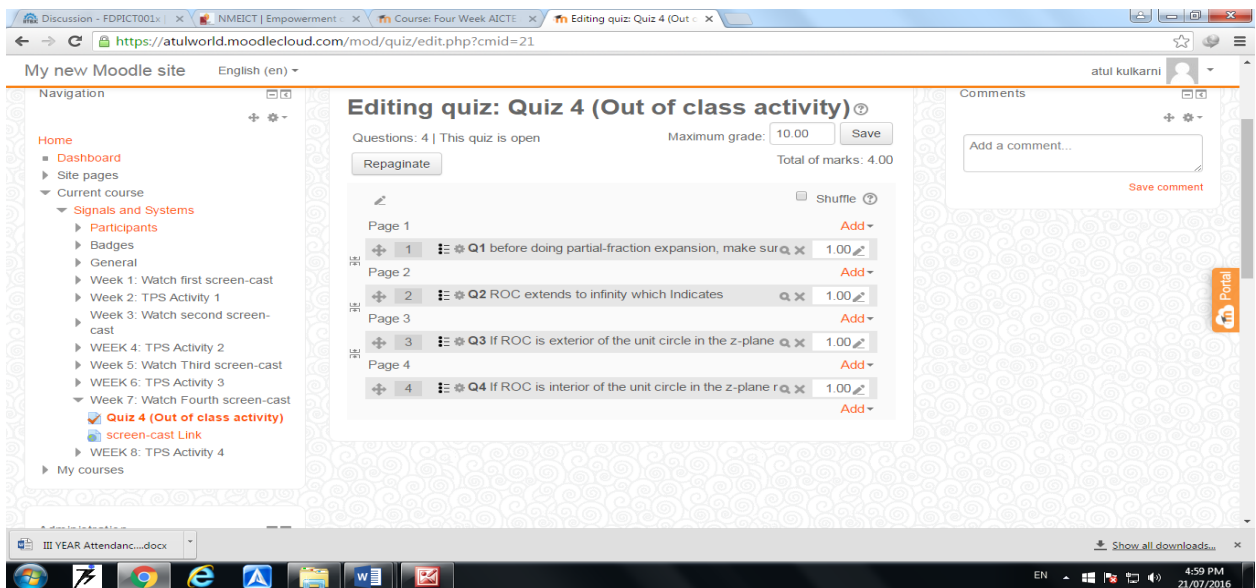
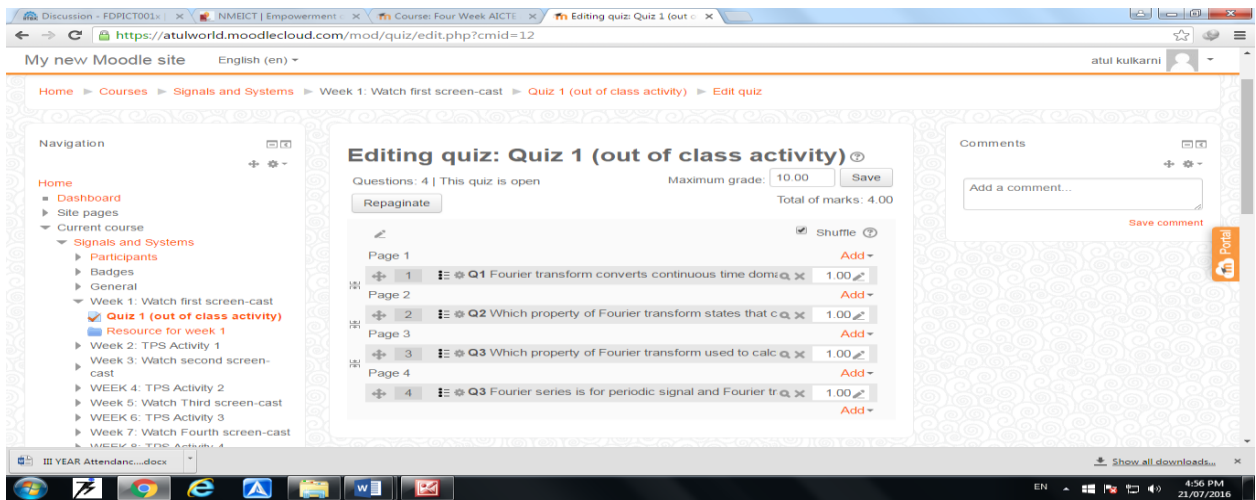
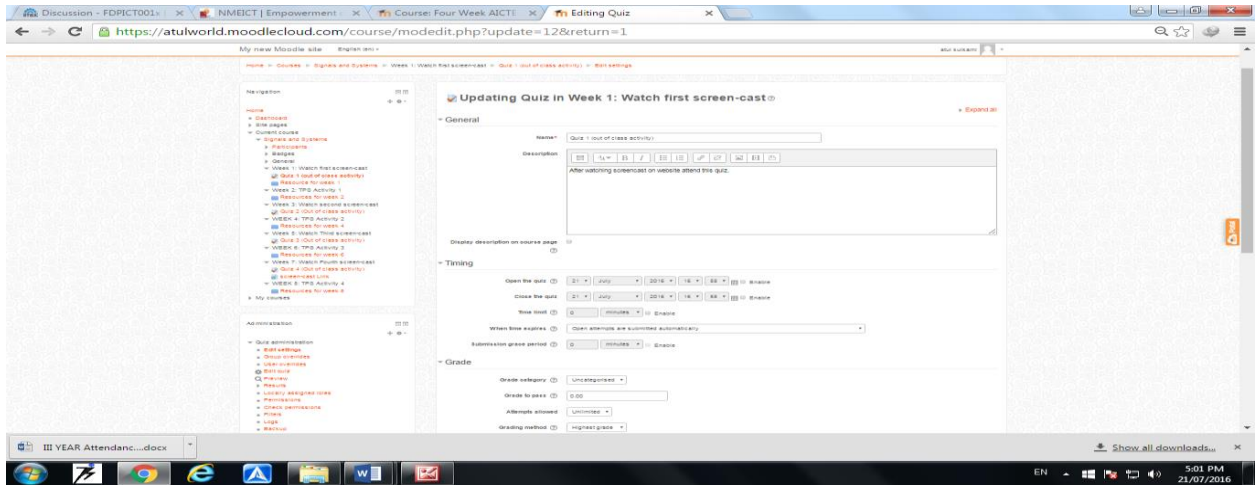
**Screenshot 1-5:** available course page and course setting and course structure in moodle







Screen shot 6-8: Flow of Control and Grading Updating Quiz in moodle:



## Screen shot 9: student view of MCQ:

The screenshot shows a student's view of a Moodle quiz titled "Signals and Systems". The browser address bar shows the URL: <https://atulworld.moodlecloud.com/mod/quiz/attempt.php?attempt=5>. The page header includes "My new Moodle site" and "English (en)". The main content area is titled "Signals and Systems" and shows a breadcrumb trail: Home > Courses > Signals and Systems > Week 1: Watch first screen-cast > Quiz 1 (out of class activity) > Preview. On the left, there is a "Quiz Navigation" panel with four question indicators (1, 2, 3, 4), a "Finish attempt ..." button, and a "Start a new preview" button. Below that is a "Navigation" panel with a tree view showing "Home", "Dashboard", "Site pages", "Current course", "Signals and Systems", "Participants", and "Badges". The main question area displays "Question 1" with the text "Which property of Fourier transform used to calculate energy of signal?". Below the question, there are four radio button options: a. convolution, b. time shifting, c. parseval's theorem, and d. modulation. A "Next page" button is located at the bottom right of the question area. On the right side, there is a "Comments" section with a text input field and a "Save comment" button. The Windows taskbar at the bottom shows the system clock as 1:46 PM on 23/07/2016.

## How to use this OER:

1. For using this OER, please visit [atulkulkarnisite.wordpress.com](http://atulkulkarnisite.wordpress.com) for steps to follow and for course structure, screen-cast, TPS activity material and Quiz visit <https://atulworld.moodlecloud.com> (Username **admin** and password **8805501811**).

Step1: Download the OER report (OER\_RC1065\_atul\_hemant\_ravindra.pdf) from [https://atulkulkarnisite.files.wordpress.com/2016/07/oyer\\_rc1065\\_atul\\_hemant\\_ravindra7.pdf](https://atulkulkarnisite.files.wordpress.com/2016/07/oyer_rc1065_atul_hemant_ravindra7.pdf)

Step 2: Go to the <https://atulworld.moodlecloud.com> to visit course details

Step 3: Download the set of 1<sup>st</sup> screen casts from <https://atulworld.moodlecloud.com> and attempt Quiz 1 then related TPS activity structure from moodlesite.

Step 4: Download the 2<sup>nd</sup> screen cast from <https://atulworld.moodlecloud.com> and attempt Quiz 2 then related TPS activity structure from moodlesite.

Like step 3 and 4 follow similarly for screen cast 3 and 4 and related Quiz and TPS activity.

## 4: Evaluating Effectiveness of OER:

The OER effectiveness can be assessed at two levels:

1. At the student level
2. At the consumer level

Effectiveness at the student level: This can be analyzed by Moodlesite from the total no. of students attempted



Quiz, and their marks based on their answers to MCQs. Also some quiz contents answer of quiz are essay based which helps for analysis.

Effectiveness at consumer level:

OER consumers are typically teachers for them TPS activity structure will help to use OER effectively.

Implementing Survey

Thus every user who downloads this resource will be asked for feedback about the resource.

## 5: Consolidated Log of Team Work

The consolidated log of team work is as shown below:

Activity	Team Member	Amount of Time	Additional Logs if any
Discussion	Team Leader	**3 hrs	
	Team Member 1		
	Team Member 2		
Tool Exploration	Team Leader	**10 hrs	Planning steps uploaded on Wiki
	Team Member 1		
	Team Member 2		
OER Creation	Team Leader	**8 hrs	Uploaded on moodle and website as mentioned section 3
	Team Member 1		
	Team Member 2		
OER Documentation	Team Leader	**3 hrs	Uploaded on website as mentioned section 3
	Team Member 1		
	Team Member 2		
Individual reflection diary logging	Team Leader	**3 hrs	uploaded on individuals Wiki
	Team Member 1		
	Team Member 2		
OER Evaluation	Team Leader	Pending, in process	
	Team Member 1		
	Team Member 2		

\*\*Note we all team members are from same institute , we have done all team work activities related to OER together.

## 6: Building a Community of MOODLE and Flipped Classroom Adopters

### Possible Sources for Community Building:

Some of the viable sources for building a community are:

- Teachers who are preparing material for the course “signals and systems” using other technology.
- Teachers who prepared Flipped Classroom Strategies for the course “signals and systems” for other lessons.

**Plans for Community Building:**

Our material is already available on Wordpress and Moodle website. We will search other teams which working on same topic and contact to develop a full course material. All the interested users can then be connected using a Wordpress or Moodle website.

**7. Works Cited**

[1] Screen-Cast [Online]. on <https://atulworld.moodlecloud.com>