

Tender document for developing animations for specified content in Bioscience and Engineering for Undergraduate and Post graduate levels.

1) Introduction

Project OSCAR (Open Source Courseware Animations Repository) is creating a large repository of web-based, interactive animations for teaching various scientific concepts and technologies in undergraduate & post graduate levels. These animations will be dealing with concepts which may be better understood when animated, many of which will be interactive. Our aim is to develop a large number of animations for which the content will be given in the form of a PowerPoint presentation, which is termed as “Instructional Design Document” (IDD). Currently we are looking for,

A company which:

- (a) Has expertise in Bioscience Domain.
- (b) Preferably has technical expertise in creating at least 45 animations in Molecular and Cell Biology at the tertiary level (UG/PG)) with voice over.
- (c) Can employ experts in this domain for reviewing the animations developed at vendor end.

The contract will be for delivering **fifty** animations with their source codes. This project is undertaken by Dept. Of Computer Science & Engineering (Project OSCAR), IIT Bombay and sponsored by MHRD. The estimated cost of the present tender is approx.

6.5 to 7 lakhs.

2) Animation Development Procedure (with voiceover)

The tenderer will be given a set of IDD's and a sample visual design template. The IDD list is attached with the Tender document. Each of the IDD's in this list will translate into an animation following the standard guidelines. These will be content rich files, in a templated form, approved by IITB professors. An example of such an IDD and a sample of visual design template is given with the Tender Document.

The visual design template and sample IDD is available on, <http://www.cse.iitb.ac.in/~sri/tenders/>

The explanation of the IDD template is given below.

2.1 Explanation of the IDD Template

The IDD's have been created by IITB Professors and their students to aid in teaching the concepts in Undergraduate/Post graduate Levels. We are aiming to create self-study units. Hence the IDD will contain the animation + content for other wrappers.

The meaning of the IDD slides are given below and the content, unless otherwise specified, should be part of the animation and its wrappers:

(a) Introduction slides:

First 2 slides: It contains the title of the animation, a brief description of the concept & author name and also Learning objectives. Except author name, these are contents for the Home tab in visual design layout.

(b) Master Layout

The content of these slides is not to be animated. It is just to help the designer to plan should not show up as such in the final animation.

(c) Definitions of Components

The content in these slides will function as content for the Glossary tab in the visual design layout.

(d) Step y:

These slides give what is to be animated in a stepwise manner.

Content for each part is broken down into steps. Each Step y slide contains:

(i) The image to be displayed [to be seen as slideshow]

(ii) The instruction for the animator, given in the column “Description of the Action”.

If there is an accompanying audio narration, it is given in the column “Audio Narration”

(e) Interactivity Option x : Step no. : y

The Interactivity, if present, for each step is given separately in a stepwise manner in slides titled “Interactivity option”.

x = the number of the interactivity for that particular Part.

y = the step number for the interactivity portion.

(f) Analogy

If there is any analogy to be animated, the content will be given in a slide titled “Analogy”.

(g) Questionnaire

A set of multiple choice questions will be given with their answer key in this slide.

This is for the self-assessment of the student and will serve as content for Quiz tab of visual design.

(h) Links for further Reading

The content of this slide gives references to Books, Research papers & Websites that the student can consult for further reading. These will serve as Content for References tab in visual design template.

(i) Print

The final animation should have a provision for downloading a PDF file of the animation frames as they appear in the final animation.

(j) Audio Transcript

There should also be provision to display the audio transcript as specified in the visual design layout.

2.2 Technical Review

2.2.1 Storyboard submission:

Given an approved IDD, vendor should create a frame-by-frame storyboard for submission to Project OSCAR.

The submitted storyboard will be reviewed by OSCAR identified experts from graphic design/ visual communication field as well as Subject matter expert (SME).

The following aspects of the storyboard will be evaluated during design review:

- (a) Colour scheme: Colours used for type, images and background
- (b) Layout: Graphic design aspects of placing the components
- (c) Navigation: Moving within the animation using the interactivity
- (d) Look and feel: Aspects of Colour and design to give a combined effect
- (e) Objective: Combined effect of all the aspects above for a cumulative effect.

The following aspects of the storyboard will be evaluated during content review:

- (a) The content consistency compared to given IDD
- (b) Factual correctness

2.2.2 Final Animation Submission:

Once the storyboard is approved, vendor is required to take up animation development in batches of IDD's as will be specified by IITB SME. The list of IDD's is given in Annexure- A. Each batch of IDD is to be sent together for review to the IITB SME. There will be around 3-4 reviews of animation from content perspective by IITB SME. The SME at the vendor end may contact the IITB SME prior to and during development for around 4 times.

2.3 Technical specifications for development of animation for e-learning

- A) Duration : The demo version with default values should run a minimum duration of 3 minutes.
- B) Target Audience : UG and PG Bioscience students and faculty of Universities and colleges.
- C) Format : SCORM compliant, Web 2.0 compatible file, e.g. Flash movie, Java applets, etc. The source code should be submitted for the master and other files used for creating animations, e.g. .java, .fla, .blend, .3ds, .psd, .wav, .mp3, .avi, etc.
- D) Media to be used : DVD with the index of the contents provided.
- E) Previous Knowledge : Basic Computer literacy is expected.
Required on the part of audience
- F) Objectives : After viewing the animation the users should be able to,
 - a) Understand the topic well.
 - b) Explore the topic through user interaction
 - c) Change parameters and view the changes.

(3) Scope of Work: Deliverables

Animation Development Stage

- (a) Storyboard developed on the given IDD.
- (b) SCORM compliant final Animations with voice over developed using the approved Instructional Design Documents.

(c) Source code/ file of the animation.

(d) The System documentation related to the animation development.

- If Object Oriented Technology is used, the (UML) class diagrams should be given.
- If Flash is being used, the files should be well labeled and documented.

(e) Pdf version of the animation.

The storyboards, source codes, animations and documentations are expected to be delivered within four months from the award of work.

(4) Financial proposal:

Total price for creating 50 Bioscience animations inclusive of taxes is required to be quoted.

(5) Terms and Conditions

Delivery of the source codes & finished animations and the performance of the services shall be made by the supplier in accordance with the agreement to be signed between Project OSCAR and the party to which the contract would be awarded.

I) Payment shall be done in the following basis:

On delivery of the prelive-level approved animations (i.e. where only fine tuning is due) with the design review reports and storyboard to Project OSCAR, 40% payment shall be done.

50% payment shall be done on the delivery of the final animation with source code.

10% payment shall be done after the defect liability period of one month.

If at any time during the performance of the contract, the supplier or its sub-contract(s) should encounter conditions impeding timely delivery of the animations, the supplier shall promptly notify Project OSCAR in writing of the fact of the delay, its likely duration and its cause(s). As soon as practicable after receipt of the suppliers notice, Project OSCAR shall evaluate the situation and may, at its discretion, extend the supplier's time for performance with or without liquidated damages, in which case the extension shall be ratified by the parties by amendment of the contract.

II) Liquidated Damages

If the supplier fails to deliver any or all the animations within the period(s) specified in the contract, Project OSCAR shall, without prejudice to its other remedies under the contract, deduct from the contract price, as liquidated damages, a sum equivalent to 0.5% of the contract price of the delayed animations or unperformed services for each week or part thereof of delay until actual delivery or performance, up to a maximum deduction of 10% of the contract price. Once the maximum is reached, Project OSCAR may consider termination of the contract without any further notice.

III) Eligibility Criteria:

(i) Bidder should have access to strong expertise in the domain/ subject & animation development.

(ii) Sound knowledge in English

IV) Governing Language

The agreement shall be written in English. All correspondence and other documents pertaining to the contract which are exchanged by the parties shall be written in the same language.

V) Taxes and Duties

Suppliers shall be entirely responsible for all taxes, duties, license fees etc., incurred until delivery of the source codes & finished animations to Project OSCAR.

VI) Upon delivery of source codes & finished animations to Project OSCAR, sole ownership of all these passes onto Project OSCAR.

VII) The price quoted shall remain valid for a period of six months from the date of opening the

tender or till the completion of the work, whichever is later.

VIII) The tenderer to whom the Work Order is issued will have to pay a Security Deposit @ 10% of the cost quoted in the form of Bank Guarantee within ten days from the date of release of the Work Order.

IX) No Travel Expenses on any context shall be reimbursed by the Project OSCAR to the members of the party developing the animations.

X) Fall Clause: In case of reduction in taxes/levies by the Government during the period, the benefit of the same shall be passed onto Project OSCAR.

XI) Risk Purchase Clause: If the tenderer fails to complete the work as per the requirements, Project OSCAR shall have the right of not to make any payment to the tenderer, and get it completed from the open market at a higher cost, in case of which the difference in this higher cost and the quoted cost shall be recovered from the tenderer.

XII) Shortcomings, in the tender submitted, if any, will not be informed to the tenderers.

XIII) The work order will be placed in the name mentioned in Income tax, Sales Tax statement and for any reason the change in name of tenderer will not be made.

XIV) The contract agreement for this work is liable to be terminated at any time later, in case any of the information furnished by the tenderer is found to be untrue.

(a) Project OSCAR reserves the right to relax one or more condition(s) based on the prevailing circumstances.

(b) Project OSCAR also reserves the right to reject any or all the tenders without assigning any reason.

XV) The tenders not in accordance with the above mentioned instructions and not complying for the asked documents shall be summarily rejected. All conditions mentioned in this document must be concurrently fulfilled.

6. Particulars to be submitted along with the technical bid:

a) Sample prototype animation on “MALDI-TOF instrumentation“without voiceover [Slides: 8 - 20] from Bioscience Domain using the visual design template given.

b) Start & End of the project

(i) Mention when the tenderer is going to start the work

(ii) By what time will they finish the work & deliver the design review forms, storyboards, source codes & finished animations to Project OSCAR.

(iii) How many source codes & animations thereof will they be able to deliver.

c) Enclosures:

1. Details of Experience of handling previous animation creating contract (if any)

2. Any other pertinent information.

3. Two References.

4. Xerox copy of the following documents:

a) Bank solvency certificate

b) Income tax clearance certificate -last three years

c) Municipal license

d) Registration Certificate

e) PF/ESIC information

- f) Balance Sheet - last 3 years
- g) Partnership deed
- h) Sales Tax certificate
- i) Shop & Establishment Registration
- j) Work orders from other organizations

7) Deadline for submission for proposal

Date: 21 December 2011

Time: 12:00 p.m.

8) How and Where the proposal is to be submitted:

How to Submit: By filling up the Tender Form

How to be packed: The envelope should be sealed properly failing which, tender will be rejected summarily.

The bids for each domain are requested to be submitted in two parts

- a) Technical Bid
- b) Commercial Bid

Note: That the two parts should be enclosed in separate sealed envelope and marked accordingly. All the envelopes should be placed in a big envelope which should be duly sealed and super scribed as “Tender document for developing animations for specified content in Bioscience and Engineering for Undergraduate and Post graduate levels”. It should be received on or before the date and time as specified above.

The Technical Bids will be opened on **22 December 2011 at 11:00 a.m.** The Commercial Bids of the parties shortlisted on the basis of the Technical Bid shall be opened on **23 December 2011 at 11:00 a.m.** The authorized representatives of shortlisted parties may attend the opening of Commercial Bids if they desire so.

Where to submit:

Project OSCAR Group
Affordable Solutions Lab (ASL)
Kanwal Rekhi Building (KReSIT),
Dept of Computer Sci. and Engg.,
IIT- Bombay,
Powai, Mumbai - 400076,
Maharashtra, INDIA.

Technical Offer

1. Sender's name and address:

2. Profile of the company:

3.

Item	Description
The details of the software proposed to be used	

4. Language in which the animation shall be developed:

5. Estimated schedule for completion of work:

Submission of Storyboard: ----- days

Submission of animation with source code: ----- days.

6. Prototype animation: Sample prototype animation on “MALDI-TOF instrumentation” without voiceover [Slides: 8 - 20].

7. Checklist for the list of Enclosures:

1. Details of Experience of handling previous animation creating contract (if any)

2. Any other pertinent information.

3. Two References.

4. Xerox copy of the following documents:

- a) Bank solvency certificate
- b) Income tax clearance certificate -last three years
- c) Municipal license
- d) Registration Certificate
- e) PF/ESIC information,
- f) Balance Sheet - last 3 years
- g) Partnership deed
- h) Sales Tax certificate
- i) Shop & Establishment Registration
- j) Work orders from other organizations

8. I/We hereby give our unconditional consent, that the source codes and the subsequently developed animations can be released under open source.

Commercial Offer

From:

Date:

To

Dean, R& D

Indian Institute of Technology, Bombay

Powai, Mumbai-400 076

Sub: Creating Educational Animations

With reference to your inquiry the following information is provided for our consideration:

1. Name of the Proprietor:
2. Contact Address:

Signature of the Proprietor

3. Contact Phone, Fax, emails and Cell phone:

Authorized persons

Stamp:

Our quotation for the animations along with the source code is: Rs. _____ (in words)

The above quotation includes all applicable taxes. Justification of taxes and prices should be given.

We have read and agree to

1. Terms and conditions of **“Developing animations for specified content in Bioscience and Engineering for Undergraduate and Post graduate levels”**.

ANNEXURE – A

Sr. No.	IDD Topic/Concept Name	Brief Description of the part	Animation-Interactivity Category
1	Extraction of bacterial protein	<ul style="list-style-type: none"> ➤ Description - Methodology for the extraction of Bacterial protein. Extraction of the entire protein from the sample requires a optimized protocol to increase the protein amount in the extract. The protein extraction from the cell requires suitable reagents and technique that can yield a better and efficient result. ➤ Interactivity – Instructions to User. User Control on screen items like ethanol bottle, tissue, hand, bench etc. Buttons for user at every step 	Intermediate-Medium
2	Extraction of plant protein	<ul style="list-style-type: none"> ➤ Description - Methodology for the extraction of Plant protein. Extraction of the entire protein from the sample requires optimized protocol and many protocols have been developed to increase the protein amount in the extract from different samples. The method explained here mainly focuses on the effective method of extracting protein from the plant tissue ➤ Interactivity - Instructions to User. User Control on screen items like weighing scale, vortex bottle, forceps, etc. Buttons for user at every step 	Simple – Basic
3	Extraction of plasmodium protein	<ul style="list-style-type: none"> ➤ Description - Methodology for the extraction of Plasmodium protein. Extraction of the entire protein from the sample requires optimized protocol and many protocols have been developed to increase the protein amount in the extract ➤ Interactivity - Instructions to User. User Control on screen items like syringe, CPDA bag, centrifuge etc. Buttons for user at every step 	Simple – Basic
4	Protein extraction from human brain tissue	<ul style="list-style-type: none"> ➤ Description - Methodology for the extraction of Brain tissue protein. Extraction of the entire protein from the sample requires optimized protocol and many protocols have been developed to increase the protein amount in the extract from 	Intermediate-Medium

		<p>different samples. The method explained here mainly focuses on the effective method of extracting protein from the brain tissue</p> <ul style="list-style-type: none"> ➤ Interactivity - Instructions to User. User Control on screen items like weighing scale, vortex bottle, forceps, etc. Buttons for user at every step 	
5	Extraction of cerebrospinal fluid protein	<ul style="list-style-type: none"> ➤ Description - Extraction of protein from Cerebrospinal fluid. Protein extraction from the cerebrospinal fluid requires a well optimized protocol to get the maximum yield of proteins for taking it for clinical analysis. The method explained here mainly focuses on the effective method of extracting protein from the cerebrospinal fluid ➤ Interactivity - Instructions to User. User Control on screen items like Fridge, freezer, CSF tube etc. Buttons for user at every step 	Simple – Basic
6	Extraction of serum protein	<ul style="list-style-type: none"> ➤ Description - Extraction of the entire protein from the complex biological samples like serum requires a multi-step robust protocol, where various sample processing steps have been introduced to increase efficacy of the extraction procedure ➤ Interactivity - Instructions will be provided to User. Accordingly learner has to interact. Clickable & drag able objects like various bottles, instruments, etc will be provided to user. 	Intermediate-Medium
7	Effect of sonication on serum and bacterial protein	<ul style="list-style-type: none"> ➤ Description - Sonication is the process by which the high energy sound waves causing cell lyses rupture of cell wall, causes release of contents from the cell. The method is more effective in cell disruption. Due to its high efficiency the method is highly suitable for the protein extraction from the cell and the serum samples. ➤ Interactivity - Instructions will be provided to User. Accordingly learner has to interact. Clickable & drag able objects like pipette, vortex tube, etc will be provided to user. 	Simple – Basic
8	Sub-cellular	<ul style="list-style-type: none"> ➤ Description - The experiment 	Simple – Basic

	fractionation	<p>focuses on the separation of different organelles like chloroplast, mitochondria, Golgi bodies so as to analyse their proteome content separately from a single sample</p> <ul style="list-style-type: none"> ➤ Interactivity - Lerner will be instructed to interact with the interface provided. As per the instructions given by animator (for example clicking on the lid to open the apparatus, etc) learner should interact & as per learner interaction, animation will proceed. 	
9	Removal of abundant proteins in serum	<ul style="list-style-type: none"> ➤ Description - complex biological samples like serum requires a multistep robust protocol to remove the interfering compounds and other highly abundant proteins. Such proteins interfere in the separation and hindering the separation of low abundant proteins. ➤ Interactivity - Lerner will be instructed to interact with the interface provided. As per the instructions given by animator learner should interact & as per learner interaction, animation will proceed. 	Intermediate-Medium
10	Removal of salt by desalting	<ul style="list-style-type: none"> ➤ Description - The protocol focuses on removal of impurities like metal ions, salts, phenol and carbohydrates compounds that interrupt the separation of protein during IEF and SDS-PAGE. Proteins present in the sample get special treatment to get precipitate by combined action of precipitate and co-precipitate, while leaving behind most of the impurities into the solution as supernatant ➤ Interactivity - Lerner will be instructed to interact with the interface provided. As per the instructions given by animator learner should interact & as per learner interaction, animation will proceed. 	Simple – Basic
11	Protein quantification	<ul style="list-style-type: none"> ➤ Description - Protein quantity varies based on the type of tissues, mode of extraction, handling techniques and the content of the cell. Proteins have to be quantified after extraction, to 	Simple – Basic

		<p>look for any other impurities that are present and to have knowledge about the quantity of protein to be used for further experiments. In some cases it helps to determine whether the protocol used for extraction is efficient one or not</p> <ul style="list-style-type: none"> ➤ Interactivity - Lerner will be instructed to interact with the interface provided. As per the instructions given by animator learner should interact & as per learner interaction, animation will proceed. 	
12	Passive and active rehydration	<ul style="list-style-type: none"> ➤ Description - Proteins from the rehydration buffer has to be loaded into the strips, such that the strips take up the proteins into the gel for protein separation during IEF. The process can be carried out in presence and absence of current ➤ Interactivity - Lerner will be instructed to interact with the interface provided. As per the instructions given by animator learner should interact & as per learner interaction, animation will proceed. 	Intermediate-Medium
13	Cyanine dye labeling	<ul style="list-style-type: none"> ➤ Description - Cyanine labeling enables accurate analysis of differential expression of proteins between the samples. It is possible to label three different samples within the same 2-D gel, enabling accurate analysis of differences in protein abundance between samples by preventing gel to gel variation. ➤ Interactivity - Lerner will be instructed to interact with the interface provided. As per the instructions given by animator learner should interact & as per learner interaction, animation will proceed. 	Simple – Basic
14	Isoelectric focusing	<ul style="list-style-type: none"> ➤ Description - Proteins exhibit unique iso-electric property, such unique property of the proteins are exploited in the separation of individual proteins in a pool of proteome. Each protein can be separated from one another by iso-electric property ➤ Interactivity - Lerner will be 	Intermediate-Medium

		<p>instructed to interact with the interface provided. As per the instructions given by animator learner should interact & as per learner interaction, animation will proceed.</p>	
15	Liquid phase isoelectric focusing	<ul style="list-style-type: none"> ➤ Description - Proteins exhibit unique isoelectric property for a particular pH, at which the net charge on protein is zero. The isoelectric property of the proteins are exploited in the first dimension separation by off gel fractionators ➤ Interactivity - Lerner will be instructed to interact with the interface provided. As per the instructions given by animator learner should interact & as per learner interaction, animation will proceed. 	Simple – Basic
16	Equilibration of IPG strips	<ul style="list-style-type: none"> ➤ Description - Separated proteins in the strip has to undergo equilibration step so that the multi-subunit proteins can be separated and prevention of reunion of the separated proteins, stabilization of the separated protein in the gel ➤ Interactivity - Lerner will be instructed to interact with the interface provided. As per the instructions given by animator learner should interact & as per learner interaction, animation will proceed. 	Simple – Basic
17	SDS-PAGE	<ul style="list-style-type: none"> ➤ Description - Proteins exhibit different molecular weight depending on the amino acid composition, this property is exploited to separate proteins using SDS-PAGE. The electrophoresis method used to separate proteins based on their molecular weight. ➤ Interactivity - Lerner will be instructed to interact with the interface provided. As per the instructions given by animator learner should interact & as per learner interaction, animation will proceed. 	Intermediate-Medium
18	Second dimension separation of proteins	<ul style="list-style-type: none"> ➤ Description - Proteins exhibit different molecular weight depending on the amino acid 	Simple – Basic

		<p>composition. This property is exploited to separate proteins in second dimensions on SDS-PAGE gels. 2-D separation begins with 1-D separation but again separates the molecules by a second property in a direction 90 degree from the first.</p> <ul style="list-style-type: none"> ➤ Interactivity - As the demo starts, animation will proceed. (For example animation of learner doing the experiment) 	
19	Coomassie staining	<ul style="list-style-type: none"> ➤ Description - Proteins that are separated by the 2-DE has to be stained by the staining solution for visualization. Many staining methods are available for visualization of proteome, choosing appropriate method to detect low concentration of protein is essential for the analysis ➤ Interactivity - Firstly learner will be provided 4 cylinders as radio buttons. Learner has to select one of them for usage. Depending on the interaction of the learner, animation will proceed. 	Intermediate-Medium
20	Silver staining	<ul style="list-style-type: none"> ➤ Description - Proteins that are separated by the 2-DE has to be stained by the staining solution for visualization. Many staining methods are available for visualization of proteome, choosing appropriate for the detection of low concentration protein is essential for the analyses. ➤ Interactivity- Learner will be instructed to interact with the interface provided. As per the instructions given by animator learner should interact & as per learner interaction, animation will proceed. 	Simple – Intermediate
21	Phospho Staining	<ul style="list-style-type: none"> ➤ Description: Staining of proteins which are phosphorylated during the post translational modification. ➤ Interactivity: Learner will be provided by various drag able bottles (Buttons). He/she will be instructed to add some amount from them and make a solution. As the instructions given to the learner, he/she has to interact with the various objectives 	Intermediate-Medium

		of the animation and animation continues.	
22	2D-gel scanning and image analysis	<ul style="list-style-type: none"> ➤ Description: The proteome obtained by the 2-DE process must be analyzed to identify the significant spots by comparing the control and the patient or treated sample. It offers a flexible solution for the comprehensive visualization, exploration and analysis of 2D gel data. ➤ Interactivity: Starting with letting the learner click on the scanner image provided (Opening the scanner lid), putting stained gel into the scanner by dragging, allow him/her to scan the gel. After this learner will be allowed to interact with various options on the screen and follow the instructions. 	Intermediate-Medium
23	DIGE gel scanning	<ul style="list-style-type: none"> ➤ Description: After running 2D-DIGE, the scanner exploits the property of dye used for labeling the sample to produce a protein profile image. The dye when exposed to different wavelength, due to excitation and emission property of the dyes the images can be captured. ➤ Interactivity: Let the learner click on the scanner image provided (Starting the scanner). After this learner will be allowed to interact with various options on the screen and follow the instructions. Learner has to follow the instructions and do accordingly. (Dragging the instruments, selecting & putting values, etc.) 	Intermediate-Medium
24	DIGE gel analysis	<ul style="list-style-type: none"> ➤ Description: After running 2D-DIGE the protein profile obtained need to be analyzed for the protein spot of interest, showing significant fold change and appearing in most of the samples. Decyder software helps to minimize system variation and enables to come up with significant spot of biological importance. ➤ Interactivity: Let the learner click or drag or change the value given on screen (i.e. let him/her interact with the interface), according to the instructions. 	Intermediate-Medium
25	SDS-PAGE gel analysis	<ul style="list-style-type: none"> ➤ Description: SDS-PAGE analysis is 	Intermediate-Medium

		<p>done to study the expression of a protein from the control and the sample, to detect the molecular weight of the protein using the molecular weight marker and to detect the quantity by the intensity of the protein. For this purpose IMAGE QUANT TL (IQTL) software is used.</p> <ul style="list-style-type: none"> ➤ Interactivity: User will be instructed to interact with the interface created by animator. 	
26	Spot picking	<ul style="list-style-type: none"> ➤ Description: Once the significant spots of interest are identified from the 2D-analysis software, spots can be picked either manually or by robotic arm for protein identification by MALDI-MS. Spot picking can be carried out on normal DIGE-gels or stained gels soon after 2D run. ➤ Interactivity: Learner will be instructed to interact with the interface provided. (for example : Clicking on the ethanol bottle and tissue to clean the bench, click on scalpel & drag it over gel, etc) 	Intermediate-Medium
27	In gel digestion	<ul style="list-style-type: none"> ➤ Description: The proteins separated by 2D are analyzed and significant spots are excised, processed and taken for mass spectrometric analysis. Prior to the Mass spectrometry analysis it is important to cleave the protein in the gel by trypsin to make them smaller peptides for easy analysis by Mass spectrometry ➤ Interactivity: As the demo starts, animation will proceed. (For example animation of learner doing the experiment) 	Basic-Simple
28	In solution digestion	<ul style="list-style-type: none"> ➤ Description: In solution digestion is performed in order to analyze all the proteins that are present in the sample. The method usually doesn't require any protein separation. The experiment is performed in whole proteome which is to be analyzed ➤ Interactivity: Lerner will be instructed to interact with the interface provided. As per the instructions given by animator, learner should interact & as per 	Intermediate-Medium

		learner interaction, animation will proceed.	
29.	Matrix preparation for MALDI analysis	<ul style="list-style-type: none"> ➤ Description: The initial step for MS analysis is the selection of matrix for processed sample. Selecting the best matrix is based on different trials and depends on the molecular weight of the sample target to be analyzed ➤ Interactivity: Lerner will be instructed to interact with the interface provided like clicking on the start button of the instrument to start it, click on the matrix, TCA, acetone bottles to prepare reagent, etc. 	Intermediate-Medium
30	MALDI-TOF instrumentation	<ul style="list-style-type: none"> ➤ Description: In the presence of laser energy, matrix help the analyze molecules to get ionized to enters the mass analyzer to yield the mass spectrum. The whole process of ionization and separation of ions depending upon the mass, takes place in high energy vacuum. ➤ Interactivity: Lerner will be instructed to interact with the interface provided. As per the instructions given by animator, learner should click on various components & as per learner interaction, animation will proceed. 	Advance-Medium
31	MALDI-TOF data analysis	<ul style="list-style-type: none"> ➤ Description: Once the peptide mass data of individual protein is obtained from MALDI-TOF, the next step is for identification of protein through database search. The database matching for query sequence depends on lot of parameters, which need to optimize to come up with the best fit. ➤ Interactivity: Lerner will be instructed to interact with the interface provided. As per the instructions given by animator, learner should click on various components & as per learner interaction, animation will proceed. 	Intermediate-Medium
32	Buffer preparation for Western Blot analysis	<ul style="list-style-type: none"> ➤ Description: Buffers are the important reagents which play a vital role in maintaining the integrity, stringency and efficiency of the experiment. These buffer 	Intermediate-Medium

		<p>preparations require at most care to be successful in an experiment.</p> <ul style="list-style-type: none"> ➤ Interactivity: Lerner will be instructed to interact with the interface provided. As per the instructions given by animator, learner should interact & as per learner interaction, animation will proceed. 	
33	Western blot assay	<ul style="list-style-type: none"> ➤ Description: The experiment mainly focuses on the steps involved in transferring the separated samples from gel to the membrane and detects the desired protein by using the fluorescent/enzyme tagged antibodies. ➤ Interactivity: Lerner will be instructed to interact with the interface provided. As per the instructions given by animator, learner should interact & as per learner interaction, animation will proceed. 	Intermediate-Medium
34	Liquid chromatography - Ion exchange	<ul style="list-style-type: none"> ➤ Description: Ion exchange chromatography is the purification technique, which involves the separation of the proteins based on the ions exchange property between the proteins and the column. ➤ Interactivity: Firstly learner will be provided 4 cylinders as radio buttons. Learner has to select one of them for usage. Depending on the interaction of the learner, animation will proceed. 	Intermediate-Medium
35	Immunohistochemistry	<ul style="list-style-type: none"> ➤ Description: A staining process for identifying the proteins location in cells, tissues by using antigen-antibody property. Immuno means antibodies which are used to bind the histo means tissue sample for detection. ➤ Interactivity: Lerner will be instructed to interact with the interface provided. As per the instructions given by animator, learner should interact or 'next' radio button & as per learner interaction, animation will proceed. 	Intermediate-Medium
36	Isobaric tag for relative and absolute quantitation (iTRAQ)	<ul style="list-style-type: none"> ➤ Description: The identification and quantitation of complex protein mixtures have been facilitated by 	Intermediate-Medium

		<p>MS-based quantitative proteomic techniques. Isobaric tag for relative and absolute quantification (iTRAQ) consists of amine-specific, stable isotope reagents that can label peptides of up to four to eight different biological samples.</p> <p>➤ Interactivity: Learner will be instructed to interact with the interface provided. As per the instructions given by animator, learner should interact & as per learner interaction, animation will proceed.</p>	
37	ICAT	<p>➤ Description: Isotope coded affinity tag commonly known as ICAT is one of the advancement in the proteomics to quantify the peptides and to identify the simultaneously by mass spectrometry analysis.</p> <p>➤ Interactivity: Learner will be instructed to interact with the interface provided. (for example : Clicking on the ethanol bottle and tissue to clean the bench, click on lid to open the lid of centrifuge and drum, etc)</p>	Intermediate-Medium
38	Stable isotope labeling using amino acids in cell culture (SILAC)	<p>➤ Description: The quantitation and identification of complex protein within the mixtures have been helped by mass spectrometric methods based on differential stable isotope labeling. These tags, which can be recognized by MS, provide a basis for quantification. Stable Isotope Labeling by Amino acids in Cell culture (SILAC) incorporates specific labeled amino acids into proteins for differential analysis.</p> <p>➤ Interactivity: Learner will be instructed to interact with the interface provided. (for example : Clicking on the ethanol bottle and tissue to clean the bench, click on conical flask to take out conical flask from autoclave, etc)</p>	Intermediate-Medium
39	LC-MSMS data analysis	<p>➤ Description: Once the peptide spectrum mass data of individual protein is obtained from LC-MS/MS, the next step is for identification of protein through database. Before identification lot of</p>	Advance-Medium

		<p>time is spent on processing the peaks, running algorithms for peak processing to optimize signal to noise ratio.</p> <ul style="list-style-type: none"> ➤ Interactivity: Lerner will be instructed to interact with the interface provided. As per the instructions given by animator, learner should interact & as per learner interaction, animation will proceed. 	
40	Immunoprecipitation	<ul style="list-style-type: none"> ➤ Description: The experiment involves the precipitation of protein of interest using the specific antibody against the protein followed by addition of Protein A tagged beads that can aid in the precipitation. The method is mostly specific to purify our protein of interest. ➤ Interactivity: Learner will be instructed to interact with the interface provided. (for example : Clicking on 'ON' button available on instrument image, clicking on bottles to take them out of racks, etc) 	Intermediate-Medium
41	Gel Filtration Chromatography	<ul style="list-style-type: none"> ➤ The method mostly involves the separation of the proteins based on its molecular size. This method is also known as Size exclusion chromatography ➤ Interactivity: As soon as the learner starts with the LO, 3 button will be opened. Learner will be given 3 input boxes to enter the values then action will start. 	Medium-Basic
42	Affinity Chromatography	<ul style="list-style-type: none"> ➤ Description: Affinity chromatography is based on the principle of specific interaction between the protein or antigen and antibody for separation of biomolecules ➤ Interactivity: As soon as the learner starts with the LO, 3 button will be opened. Learner will be given 3 input boxes to enter the values Then action will start 	Simple-Basic
43	Methodology for Molecular weight determination by MALDI instrumentation	<ul style="list-style-type: none"> ➤ Description: One of the application of MALDI is for the determination of the molecular weight of the peptide and protein, which can be done from the peptide mass 	Simple-Intermediate

		<p>fingerprint or from the spectrum</p> <ul style="list-style-type: none"> ➤ Interactivity: As soon as the learner starts with the LO, 3 button will be opened. Learner will be given 3 input boxes to enter the values Then action will start 	
44	Methodology for MALDI PTM application	<ul style="list-style-type: none"> ➤ Description: One of the application of MALDI is for the determination of the post translation modification of the protein, which can be done by interpretation of cn ions signals in the mass spectrum ➤ Interactivity: As soon as the learner starts with the LO, 3 button will be opened. Learner will be given 3 input boxes to enter the values Then action will start 	Simple-Basic
45	Application of 2D in global profiling of the E.coli Proteome	<ul style="list-style-type: none"> ➤ Description: Two dimensional electrophoresis can be used to study the entire protein present in the cell which can be used to identify the specific function of each protein. ➤ Interactivity: As soon as the learner starts with the LO, 3 button will be opened. Learner will be given 3 input boxes to enter the values Then action will start 	Simple-Intermediate
46	Quantitative estimation of DNA and RNA	<ul style="list-style-type: none"> ➤ Description: Estimation of nucleotides is the very important step after sample isolation to find out the amount of the nucleotide present and to check for the suitability of the sample for the further analysis. ➤ Interactivity: As soon as the learner starts with the LO, 3 button will be opened. Learner will be given 3 input boxes to enter the values Then action will start 	Intermediate-Simple
47	Quantitative and qualitative estimation of amino acids-Ninhydrin test	<ul style="list-style-type: none"> ➤ Description: Amino acid determination is required for the quantitative and qualitative determination of the specific amino acid or all the amino acid. Specific reagents have been used for such experimental analysis and this amino acid reaction forms the basics behind the protein sequencing studies. ➤ Interactivity: As soon as the learner starts with the LO, 3 button will be opened. Learner will be given 3 input boxes to enter the values Then action will start 	Intermediate-Simple

48	Mechanism of buffer action and buffer preparation	<ul style="list-style-type: none"> ➤ Description: Maintaining the optimum pH during the biological sample processing is to maintain the proper functional and structural aspects of the sample. It is important to understand the theory behind the buffering action ➤ Interactivity: As soon as the learner starts with the LO, 3 button will be opened. Learner will be given 3 input boxes to enter the values Then action will start 	Simple-Basic
49	Enzyme Assay	<ul style="list-style-type: none"> ➤ Description: Enzyme assays are done to study the kinetics of the particular enzyme from any source and the factors that affect its activity like substrate concentration, pH and temperature ➤ Interactivity: As soon as the learner starts with the LO, 3 button will be opened. Learner will be given 3 input boxes to enter the values then action will start. 	Simple-Basic
50	Basic Instrumentation	<ul style="list-style-type: none"> ➤ Description: Handling the instruments form the basis of the practical knowledge and learning its mechanism of working ensures the proper handling and significance of its usage. ➤ Interactivity: As soon as the learner starts with the LO, 3 button will be opened. Learner will be given 3 input boxes to enter the values then action will start. 	Medium-Intermediate