PROVINCE OF THE EASTERN CAPE EDUCATION

DIRECTORATE:
CURRICULUM FET PROGRAMMES
LESSON PLANS

TERM 4
MATHEMATICAL LITERACY
GRADE 10

FOREWORD

The following Grade 10, 11 and 12 Lesson Plans were developed by Subject Advisors during May 2009. Teachers are requested to look at them, modify them where necessary to suit their contexts and resources. It must be remembered that Lesson Plans are working documents, and any comments to improve the lesson plans in this document will be appreciated. Teachers are urged to use this document with the following departmental policy documents: Subject Statement; LPG 2008; SAG 2008; Examination Guidelines 2009 and Provincial CASS Policy / Guidelines.

Lesson planning is the duty of each and every individual teacher but it helps when teachers sometimes plan together as a group. This interaction not only helps teachers to understand how to apply the Learning Outcomes (LOs) and Assessment Standards (ASs) but also builds up the confidence of the teachers in handling the content using new teaching strategies.

It must please be noted that in order to help teachers who teach across grades and subjects, an attempt has been made to **standardise lesson plan templates** and thus the new template might not resemble the templates used in each subject during the NCS training. However, all the essential elements of a lesson plan have been retained. This change has been made to assist teachers and lighten their administrative load.

Please note that these lesson plans are to be used only as a guide to complete the requirements of the Curriculum Statements and the work schedules and teachers are encouraged to develop their own learner activities to supplement and /or substitute some of the activities given here (depending on the school environment, number and type of learners in your class, the resources available to your learners, etc).
Do not forget to build in the tasks for the Programme of Assessment into your Lesson Plans.

Strengthen your efforts by supporting each other in clusters and share ideas. Good Luck with your endeavours to improve Teaching, Learning and Assessment.

SUBJECT: MATHEMATICAL LITERACY.	GRADE 10.	LESSON PLAN 1.	TERM 4.	TIME: 9.00 HOURS.

Content: Data Handling	Context: Business, Finance, Health, Sports.

Link with previous lesson: Number operations and Graphs.

KNOWLEDGE (K): Organizing, representing and interpreting statistical data. Mean median and mode.
SKILLS: Collecting, organizing, representing, interpreting, predicting and making decisions.
VALUES (V): Self-confidence derived from the ability to understand and interpret data and make conclusions.

LO 1. Numbers and operations in context. The learner is able to use knowledge of numbers and their relationships to investigate a range of different contexts which include financial aspects of personal, business and national issues.		LO 2: Functional Relationships. The learner is able to recognize, interpret, describe and represent various functional relationships to solve problems in real and simulated contexts.		LO 3: Space, Shape & Measurement. The learner is able to measure, estimate and calculate physical quantities and to interpret, describe and represent properties and relationships between 2- and 3- Dimensional objects.		LO 4: Data Handling. The learner is able to collect, summarise, display and analyse data and apply knowledge of statistics and probability to communicate, justify & predict findings and draw conclusions.	
AS; 10.1 1. Solve problems in various contexts by estimating and calculating accurately – arithmetical operations, ratio, rate, proportion and percentage. Calculations with very small and very large numbers.		AS; 10.2.1. Work with numerical data and formulae in a variety of real-life situations to - finding dependent and independent variables and describe rates of change.	√	AS: 10.3.1. Solve problems in 2- and 3-dimensional contexts by estimating, measuring and calculating – lengths, distances, areas, perimeter, volumes and surface areas of plane figures and solids.		AS: 10.4.1. Investigate situations in own life on issues related to social, environmental and political factors using appropriate statistical methods (eg. Collecting data by questionnaire, interviews, etc.	√
AS; 10.1.2 Relate calculated answers correctly and appropriately to problem situations.		AS: 10.2.2. Draw graphs in a variety of real-life situations by: Point-by-point plotting of data, and work with formulae to establish points to plot.		AS: 10.3.2. Convert units of measurement within the metric system.		AS: 10.4.2. Select and use a variety of methods to summarise and display data in statistical charts and graphs – tallies, tables, pie charts, simple and compound bar graphs, histograms and line graphs.	√
AS: 10.1.3. Apply mathematical knowledge and skills to plan personal finances. Manage income and expenditure; Simple and		AS: 10.2.3. Critically interpret tables and graphs of relationships between two variables in a variety of real-life situations; find values of		AS: 10.3.3. Draw and interpret scale drawings of plans to represent and identify views. Draw and interpret top, front		AS: 10.4.3. Compare data using measures of central tendencies and spread – mean median, mode and range.	√

compound interest, compounded monthly, quarterly, yearly, etc.	variables, describe overall trends, find maximum and minimum points, and describe trends.	and side views (elevations) of a plan.		
		AS: 10.3.4. Solve real-life problems in 2- and 3-dimensional situations using geometric diagrams. E.g. Floor plans of buildings.	AS: 10.4.4. Critically interpret a single set of data to draw conclusions on problems investigated and make predictions.	√
		AS: 10.3.5. Recognise, visualize, describe and compare properties of geometrical figures.	AS: 10.4.5. Work with probability concepts to comparative frequency of an outcome. Express probability as a fraction, ratio or percentage	
			AS: 10.4.6 Effectively communicate conclusion and predictions using appropriate probability terminologies.	

Teacher Activity	Learner Activity	Assessment	Resources	Date completed
ACTIVITY 1. Collecting and sorting data. Teacher collects a variety of data (with the help of learners) e.g. sports magazines, data from education and health depts., Stats SA, etc. to demonstrate and explain to learners how data can be organized, arranged and displayed in different ways.	Learners work in groups to sort, arrange and display data given to them in a number of different ways such as: Tally tables, Tables/ charts, Pie-charts, Simple and compound bar graphs, Histograms and line graphs.	Class work, Home work, Class test. Tools: memo.	Sports magazines, School exam. results, Stats data from news papers and institutions, Maths. Instruments, Graph paper,	

ACTIVITY 2. Statistical Averages. Teacher explains the meaning of statistical averages such as mean, median and mode And explains how to calculate each from a given data.	Learners work both in groups and individually to determine the mean, median and mode of data given to them and those that they have collected. They also compare the values of these three statistical averages as measures of central tendencies.	Class work, Home work, Class test. Tools: Memo.	Statistical data, Text book, Calculator.	
ACTIVITY 3. Analyse and Interpret Statistical data. Teacher explains and demonstrates how to derive information from data represented in a table, pie-chart, graph or histogram.	Learners use a variety of statistical data (From newspapers and business magazines) and derive required data from those. They use the data to make conclusions and future predictions.	Class work, Home work, Class test. Tools: Memos.	Newspapers, sports and business magazines, Text books, calculator.	

Home work	
Expanded opportunities	Learners will do more challenging tasks and extra work from text books, study guides and DOE resources. Learners to use the information to analyze their test scores and projects or investigation.
Teacher reflections	

Signature: Teacher: ....   HOD : ....

            Date: ……………………………………………….   Date: …………………………………………….

SUBJECT: MATHEMATICAL LITERACY.	GRADE 10.	LESSON PLAN 2.	TERM 4.	TIME: 4½ HOURS.

Content: Probability	Context : Finance and real life application of statistics eg lotto etc

Link with previous lesson : Number systems and data handling

KNOWLEDGE (K): Calculations of probability of events to happen.
SKILLS: Estimating, reasoning, predicting and making future provisions.
VALUES (V): Appreciation of probability as applied in statistics and in order to make informed decisions.
        Understand the dangers of gabling as from probability values.

LO 1. Numbers and operations in context. The learner is able to use knowledge of numbers and their relationships to investigate a range of different contexts which include financial aspects of personal, business and national issues.		LO 2: Functional Relationships. The learner is able to recognise, interpret, describe and represent various functional relationships to solve problems in real and simulated contexts.		LO 3: Space, Shape & Measurement. The learner is able to measure, estimate and calculate physical quantities and to interpret, describe and represent properties and relationships between 2- and 3- dimensional objects.		LO 4: Data Handling. The learner is able to collect, summarise, display and analyse data and apply knowledge of statistics and probability to communicate, justify & predict findings and draw conclusions.	
AS; 10.1 1. Solve problems in various contexts by estimating and calculating accurately – arithmetical operations, ratio, rate, proportion and percentage. Calculations with very small and very large numbers.		AS; 10.2.1. Work with numerical data and formulae in a variety of real-life situations to - finding dependent and independent variables and describe rates of change.		AS: 10.3.1. Solve problems in 2- and 3-dimensional contexts by estimating, measuring and calculating – lengths, distances, areas, perimeter, volumes and surface areas of plane figures and solids.		AS: 10.4.1. Investigate situations in own life on issues related to social, environmental and political factors using appropriate statistical methods (eg. Collecting data by questionnaire, interviews, etc.	
AS; 10.1.2 Relate calculated answers correctly and appropriately to problem situations.	√	AS: 10.2.2. Draw graphs in a variety of real-life situations by: point-by-point plotting of data, and work with formulae to establish points to plot.		AS: 10.3.2. Convert units of measurement within the metric system.		AS: 10.4.2. Select and use a variety of methods to summarise and display data in statistical charts and graphs – tallies, tables, pie charts, simple and compound bar graphs, histograms and line graphs.	
AS:10.1.3. Apply mathematical knowledge and skills to plan personal finances. Manage income and expenditure;Simple and		AS: 10.2.3. Critically interpret tables and graphs of relationships between two variables in a variety of real-life situations; find values of		AS: 10.3.3. Draw and interpret scale drawings of plans to represent and identify views. Draw and interpret top, front		AS: 10.4.3. Compare data using measures of central tendencies and spread – mean, median, mode and range.	

compound interest, compounded monthly, quarterly, yearly, etc.	variables, describe overall trends, find maximum and minimum points, describe trends.	and side views (elevations) of a plan.		
		AS: 10.3.4. Solve real-life problems in 2- and 3-dimensional situations using geometric diagrams. Eg. Floor plans of buildings.	AS: 10.4.4. Critically interpret a single set of data to draw conclusions on problems investigated and make predictions.	
		AS: 10.3.5. Recognise, visualize, describe and compare properties of geometrical figures.	AS: 10.4.5. Work with probability concepts to comparative frequency of an outcome. Express probability as a fraction, ratio or percentage	√
			AS: 10.4.6 Effectively communicate conclusion and predictions using appropriate probability terminologies.	√

Teacher Activity	Learner Activity	Assessment	Resources	Date completed
ACTIVITY 1. Collection of resources Teacher provides learners with dice and coins. The teacher demonstrates the experiment and recording of outcomes to learners.	Learners work in groups to spin and roll dice in turn and record outcomes taking between 10 and 20 readings. They determine the probability of the events and hence predict future outcomes.	Class work, Home work, Project or Investigation Tools: memo and rubrics.	Calculators Fair coins Dices	
ACTIVITY 2. Selection and Drawing chances.	Learners do the experiments in groups to	Class work,	Marbles of	

Teacher provide learners with marbles of different colours and containers	record the probability of picking a marble of desired colour, with and without replacement , repeating the experiment and number of times.	Home work, Class test. Tools: Memo.	different colours Calculators	
ACTIVITY 3. Gambling[playing poker] The teacher provides each group of learners with a pack of cards. The teacher demonstrate how to group 1 pack of cards in sets according to numbers, pictures, diamonds, clubs, spades and hearts. .	Learners work in groups to group pack of cards according to sets of numbers, pictures, diamonds, clubs, spades and hearts and record the number of elements in each set. Learners shuffle the pack of cards in turns and draw from the pack a number of times, record results and calculate probabilities.	Class work, Home work, Class test. Tools: Memos.	Pack of cards Textbooks, calculator.	

Home work	
Expanded opportunities	Learners represent and express probability as percentage and hence draw pie charts. Learners do more examples from weather reports, study guides, textbooks, and DOE resources.
Teacher reflections	

Signature: Teacher :…………………………………………   HOD : ……………………………………

              Date: …………………………………………….   Date : ……………………………………..

SUBJECT: MATHEMATICAL LITERACY.	GRADE 10.	LESSON PLAN 3.	TERM 4.	TIME: 9 HOURS.

Content:2D and 3D geometric figures　　　　**Context :** Patterns and making designs

Link with previous lesson: Numbers systems, ratios, conversion of units and measurements.

KNOWLEDGE (K): Measuring dimensions and angles and calculating areas and volumes.
SKILLS: Identification of different geometric shapes.
VALUES (V): Appreciation of 2D and 3D views.

LO 1. Numbers and operations in context. *The learner is able to use knowledge of numbers and their relationships to investigate a range of different contexts which include financial aspects of personal, business and national issues.*	*LO 2: Functional Relationships.* *The learner is able to recognise, interpret, describe and represent various functional relationships to solve problems in real and simulated contexts.*	*LO 3: Space, Shape & Measurement.* *The learner is able to measure, estimate and calculate physical quantities and to interpret, describe and represent properties and relationships between 2- and 3- dimensional objects.*		*LO 4: Data Handling.* *The learner is able to collect, summarise, display and analyse data and apply knowledge of statistics and probability to communicate, justify & predict findings and draw conclusions.*	
AS; 10.1 1. Solve problems in various contexts by estimating and calculating accurately – arithmetical operations, ratio, rate, proportion and percentage. Calculations with very small and very large numbers.	AS; 10.2.1. Work with numerical data and formulae in a variety of real-life situations to - finding dependent and independent variables and describe rates of change.	AS: 10.3.1. Solve problems in 2- and 3-dimensional contexts by estimating, measuring and calculating – lengths, distances, areas, perimeter, volumes and surface areas of plane figures and solids.	√	AS: 10.4.1. Investigate situations in own life on issues related to social, environmental and political factors using appropriate statistical methods (eg. Collecting data by questionnaire, interviews, etc.	
AS; 10.1.2 Relate calculated answers correctly and appropriately to problem situations.	AS: 10.2.2. Draw graphs in a variety of real-life situations by: point-by-point plotting of data, and work with formulae to establish points to plot.	AS: 10.3.2. Convert units of measurement within the metric system.	√	AS: 10.4.2. Select and use a variety of methods to summarise and display data in statistical charts and graphs – tallies, tables, pie charts, simple and compound bar graphs, histograms and line graphs.	
AS:10.1.3. Apply mathematical knowledge and skills to plan personal finances. Manage income and expenditure; Simple and compound interest,	AS: 10.2.3. Critically interpret tables and graphs of relationships between two variables in a variety of real-life situations; find values of variables, describe overall	AS: 10.3.3. Draw and interpret scale drawings of plans to represent and identify views. Draw and interpret top, front and side views (elevations)	√	AS: 10.4.3. Compare data using measures of central tendencies and spread – mean, median, mode and range.	

compounded monthly, quarterly, yearly, etc.	trends, find maximum and minimum points, describe trends.	of a plan.			
		AS: 10.3.4. Solve real-life problems in 2- and 3-dimensional situations using geometric diagrams. Eg. Floor plans of buildings.	√	AS: 10.4.4. Critically interpret a single set of data to draw conclusions on problems investigated and make predictions.	
		AS: 10.3.5. Recognise, visualize, describe and compare properties of geometrical figures.	√	AS: 10.4.5. Work with probability concepts to comparative frequency of an outcome. Express probability as a fraction, ratio or percentage	
				AS: 10.4.6 Effectively communicate conclusion and predictions using appropriate probability terminologies.	

Teacher Activity	Learner Activity	Assessment	Resources	Date completed
Activity 1. Collecting different geometrical shapes. The teacher provides 2D polygons and 3D solids and explains the development from 1D to 2D and thus from 2D to 3D	The learners group polygons into similar shapes and as either 2D or 3D shapes	Class work Home work Class Test Tools: Memos	Different 2D and 3D geometric polygons Mathematical sets Calculators Conversion tables	
Activity 2: Measurements. Teacher demonstrates how to measure length, width(breath), height, angles and radii.	Learners work in groups to measure length, breath, heights, radii and angles of geometric figures and express results in different units. Learners use these measurements to calculate areas and volumes of these different shapes.	Class work Home work Class test Tools: Memos	2D and 3D geometric polygons Mathematical sets Calculators Conversion tables	

Teacher explains the conversion of units using conversion tables. Teacher explains to learners how to use formulae to calculate areas and volumes of different geometric figures.	Learners do exercises in converting units.			

Home work:	
Expanded opportunities	Learners will measure dimensions and calculate areas and volumes of bigger objects such as buildings in constructions, gardens, sport fields and containers.
Teachers reflections	

Signature: Teacher :……………………………………………   HOD : ……………………………………………

              Date: …………………………………………….   Date : …………………………………………….

SUBJECT: MATHEMATICAL LITERACY.	GRADE 10.	LESSON PLAN 4. [Revision]	TERM 4.	TIME: 4½ HOURS.

Content: Number systems and Graphs.		Context: Personal finances, Business services, travel and tourism.		

Link with previous lesson: Revision of work covered in LO$_1$ and LO$_2$

KNOWLEDGE (K): Calculations and drawing of graphs.
SKILLS: Relating fractions, ratios, percentages and probability to each other
VALUES (V): Financial management, reading and interpreting graphical information.

LO 1. Numbers and operations in context. The learner is able to use knowledge of numbers and their relationships to investigate a range of different contexts which include financial aspects of personal, business and national issues.		LO 2: Functional Relationships. The learner is able to recognise, interpret, describe and represent various functional relationships to solve problems in real and simulated contexts.		LO 3: Space, Shape & Measurement. The learner is able to measure, estimate and calculate physical quantities and to interpret, describe and represent properties and relationships between 2- and 3- dimensional objects.	LO 4: Data Handling. The learner is able to collect, summarise, display and analyse data and apply knowledge of statistics and probability to communicate, justify & predict findings and draw conclusions.	
AS; 10.1 1. Solve problems in various contexts by estimating and calculating accurately – arithmetical operations, ratio, rate, proportion and percentage. Calculations with very small and very large numbers.	√	AS; 10.2.1. Work with numerical data and formulae in a variety of real-life situations to - finding dependent and independent variables and describe rates of change.	√	AS: 10.3.1. Solve problems in 2- and 3-dimensional contexts by estimating, measuring and calculating – lengths, distances, areas, perimeter, volumes and surface areas of plane figures and solids.	AS: 10.4.1. Investigate situations in own life on issues related to social, environmental and political factors using appropriate statistical methods (eg. Collecting data by questionnaire, interviews, etc.	
AS; 10.1.2 Relate calculated answers correctly and appropriately to problem situations.	√	AS: 10.2.2. Draw graphs in a variety of real-life situations by: point-by-point plotting of data, and work with formulae to establish points to plot.	√	AS: 10.3.2. Convert units of measurement within the metric system.	AS: 10.4.2. Select and use a variety of methods to summarise and display data in statistical charts and graphs – tallies, tables, pie charts, simple and compound bar graphs, histograms and line graphs.	
AS:10.1.3. Apply mathematical knowledge and skills to plan personal finances. Manage income and expenditure;Simple and compound interest,	√	AS: 10.2.3. Critically interpret tables and graphs of relationships between two variables in a variety of real-life situations; find values of variables, describe overall	√	AS: 10.3.3. Draw and interpret scale drawings of plans to represent and identify views. Draw and interpret top, front and side views (elevations)	AS: 10.4.3. Compare data using measures of central tendencies and spread – mean, median, mode and range.	

compounded monthly, quarterly, yearly, etc.	trends, find maximum and minimum points, describe trends.	of a plan.			
		AS: 10.3.4. Solve real-life problems in 2- and 3-dimensional situations using geometric diagrams. Eg. Floor plans of buildings.		AS: 10.4.4. Critically interpret a single set of data to draw conclusions on problems investigated and make predictions.	
		AS: 10.3.5. Recognise, visualize, describe and compare properties of geometrical figures.		AS: 10.4.5. Work with probability concepts to comparative frequency of an outcome. Express probability as a fraction, ratio or percentage	
				AS: 10.4.6 Effectively communicate conclusion and predictions using appropriate probability terminologies.	

Teacher Activity	Learner Activity	Assessment	Resources	Date completed
Activity 1: Remedial work Teachers will prepare remedial revision worksheets on LO 1 and LO 2	Learners answer worksheets individually. Learners discuss and compare their solutions and mark according to memos.	Informal tests Peer assessment	Study guides	
Activity 2: Examination techniques Teacher provides learners with selected examination exemplars, study guides and DOE resources.	Learners answer questions from exemplars and previous question papers either individually or in groups Learners discuss and compare their solutions and mark according to memos.	Informal tests Peer assessment	Examination exemplars Calculators Graph papers Trial exam, study guides and DOE resources.	

Remedial exercises	
Expanded opportunities	Give more challenging tasks to above average learners to solve.
Teacher reflections.	

Signature: Teacher :……………………………………………   HOD : ……………………………………….…

               Date: …………………………………………….   Date : …………………………………………..

SUBJECT: MATHEMATICAL LITERACY.	GRADE 10.	LESSON PLAN 5. [Revision]	TERM 4.	TIME: 4½ HOURS.

Content: Measurement and Data handling.	Context: Building plans , patterns, designs predictions and finance Management.

Link with previous lesson: Revision on work covered in LO₃ and LO₄

KNOWLEDGE (K): Calculations, drawing graphs
SKILLS: Measuring, estimating, predicting organizing and sorting data.
VALUES (V): Appreciation of shapes, gaining confidence in making conclusions and sound decisions.

LO 1. Numbers and operations in context. The learner is able to use knowledge of numbers and their relationships to investigate a range of different contexts which include financial aspects of personal, business and national issues.		LO 2: Functional Relationships. The learner is able to recognize, interpret, describe and represent various functional relationships to solve problems in real and simulated contexts.		LO 3: Space, Shape & Measurement. The learner is able to measure, estimate and calculate physical quantities and to interpret, describe and represent properties and relationships between 2- and 3- Dimensional objects.		LO 4: Data Handling. The learner is able to collect, summarise, display and analyse data and apply knowledge of statistics and probability to communicate, justify & predict findings and draw conclusions.	
AS; 10.1 1. Solve problems in various contexts by estimating and calculating accurately – arithmetical operations, ratio, rate, proportion and percentage. Calculations with very small and very large numbers.		AS; 10.2.1. Work with numerical data and formulae in a variety of real-life situations to - finding dependent and independent variables and describe rates of change.		AS: 10.3.1. Solve problems in 2- and 3-dimensional contexts by estimating, measuring and calculating – lengths, distances, areas, perimeter, volumes and surface areas of plane figures and solids.	√	AS: 10.4.1. Investigate situations in own life on issues related to social, environmental and political factors using appropriate statistical methods (e.g. Collecting data by questionnaire, interviews, etc.	√
AS; 10.1.2 Relate calculated answers correctly and appropriately to problem situations.		AS: 10.2.2. Draw graphs in a variety of real-life situations by: Point-by-point plotting of data, and work with formulae to establish points to plot.		AS: 10.3.2. Convert units of measurement within the metric system.	√	AS: 10.4.2. Select and use a variety of methods to summarise and display data in statistical charts and graphs – tallies, tables, pie charts, simple and compound bar graphs, histograms and line graphs.	√
AS: 10.1.3. Apply mathematical knowledge and skills to plan personal finances. Manage income		AS: 10.2.3. Critically interpret tables and graphs of relationships between two variables in a variety of real-		AS: 10.3.3. Draw and interpret scale drawings of plans to represent and identify views.	√	AS: 10.4.3. Compare data using measures of central tendencies and spread – mean median, mode and	√

and expenditure; Simple and compound interest, compounded monthly, quarterly, yearly, etc.	life situations; find values of variables, describe overall trends, find maximum and minimum points, and describe trends.		Draw and interpret top, front and side views (elevations) of a plan.		range.		
			AS: 10.3.4. Solve real-life problems in 2- and 3-dimensional situations using geometric diagrams. E.g. Floor plans of buildings.	√	AS: 10.4.4. Critically interpret a single set of data to draw conclusions on problems investigated and make predictions.	√	
			AS: 10.3.5. Recognise, visualize, describe and compare properties of geometrical figures.	√	AS: 10.4.5. Work with probability concepts to comparative frequency of an outcome. Express probability as a fraction, ratio or percentage	√	
					AS: 10.4.6 Effectively communicate conclusion and predictions using appropriate probability terminologies.		

Teacher Activity	Learner Activity	Assessment	Resources	Date completed
Activity 1. Remedial work. Teacher provides remedial worksheets and exercises with memos.	Learners answer questions and do calculations on the worksheets. Learners discuss and compare their options of answers with memos and allocate marks to their peers.	Informal tests Peer assessment	Worksheets Calculators Mathematical sets Graph papers and grids	
Activity 2. Examination techniques. Teacher provides learners with examination exemplars from study guides	Learners answer questions and compare	Trial exam.	Calculators	

and previous exam questions from DOE resources.	their answers with memos and discuss allocation of marks.		Exam pads Mathematical sets	
Remedial exercises				
Expanded opportunities	More challenging exercises from study guides and exemplar questions.			
Teacher reflections.				

Signature: Teacher :……………………………………………   HOD : ……………………………………………

              Date: …………………………………………….   Date : …………………………………………….