



PROVINCE OF THE  
EASTERN CAPE  
EDUCATION

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DIRECTORATE:  
CURRICULUM FET PROGRAMMES  
**ENGINEERING GRAPHICS & DESIGN**  
LESSON PLANS  
**GRADE 12**  
TERM 4

## FOREWORD

The following Grade 12 Lesson Plans were developed by Subject Advisors during August 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.

**CORE CONTENT:** VISUALISATION / COGNITIVE / PERCEPTUAL skills related to Civil / Electrical / Mechanical Drawings.

**INTEGRATION:** Mechanical, Engineering, Technology, Mathematics, CAT & IT, Physical Sciences.

LEARNING OUTCOME 1: Technology, Society and the environment		LEARNING OUTCOME 2: Design Process		LEARNING OUTCOME 3: Knowledge and Understanding		LEARNING OUTCOME 4: Application of Knowledge	
12.1.1 Evaluate the contributions of Engineering Graphics and Design to technological development and suggest possible future contributions.		12.2.1 Identify a problem, need or opportunity by performing a needs analysis, interpreting information and formulating a design brief.		12.3.1 Drawing principles as contained in SANS code of Practice as related to complex Electrical, Civil and Mechanical drawings.	X	12.4.1 Drawing principles as contained in SANS code of Practice as related to complex Electrical, Civil and Mechanical drawings.	
12.1.2 Formulate strategies that show sensitivity to pertinent human rights issues.		12.2.1 Conduct relevant research/case studies and generate a number of ideas/concepts analytically and graphically.		12.3.2 Single and multi-view drawing principles: <ul style="list-style-type: none"> <li>• 1st and 3rd angle orthographic projection,</li> <li>• interpenetrations,</li> <li>• development,</li> <li>• wiring and circuit diagrams,</li> <li>• complex assemblies,</li> <li>• detail drawings,</li> <li>• dwellings and</li> <li>• components of steel structures</li> </ul>	X	12.4.2 Single and multi-view drawing principles: <ul style="list-style-type: none"> <li>• 1st and 3rd angle orthographic projection,</li> <li>• interpenetrations,</li> <li>• developments,</li> <li>• wiring and circuit diagrams,</li> <li>• complex assemblies,</li> <li>• detail drawings,</li> <li>• limits &amp; fits, tolerances, measurement and surface textures,</li> <li>• dwellings and</li> <li>• Components of steel structures.</li> </ul>	
12.1.3 Analyse contributions that Engineering Graphics and Design has made to the campaigns against. HIV/AIDS		12.2.3 Select the most relevant possibility giving reasons for choice that are based on sound design principles citing references where possible, analyse it, and synthesise it into a final solution.		12.3.3 Principles of pictorial drawings: <ul style="list-style-type: none"> <li>• isometric and</li> <li>• Perspective.</li> </ul>	X	12.4.3 Pictorial drawings principles: <ul style="list-style-type: none"> <li>• isometric and</li> <li>• Perspective.</li> </ul>	
12.1.4 Analyse contributions made by Global Cultures to graphical communication.		12.2.4 Present the final solution using graphics including visual, symbolic, and language skills in appropriate modes.		12.3.4 Principles of sectioning: <ul style="list-style-type: none"> <li>• pictorial drawings and</li> <li>• multi-view drawings</li> </ul>	X	12.4.4. Principles of sectioning: <ul style="list-style-type: none"> <li>• pictorial drawings and</li> <li>• multi-view drawings</li> </ul>	
12.1.5 Identify and investigate possible entrepreneurial opportunities.		12.2.5 Show evidence of evaluation at each stage of the design process.		12.3.5 Loci of points on the components of mechanisms.	X	12.4.5 Loci of points.	
				12.3.6 Principles of design.	X	12.4.6 The design process	
				12.3.7 Visualisation, cognitive and perception skills related to the analysis and interpretation of: <ul style="list-style-type: none"> <li>• data and information and</li> <li>• Multi-view drawing.</li> </ul>	X	12.4.7 Visualisation, cognitive and perception skills related to the analysis and interpretation of: <ul style="list-style-type: none"> <li>• data and information and</li> <li>• Multi-view drawing.</li> </ul>	
				12.3.8 Terminology, concepts and functions of CAD as related to hardware and software.	X	12.4.8 Terminology, concepts and functions of CAD as related to hardware and software:	

					<ul style="list-style-type: none"> <li>• setting up of drawing environment: drawing and printing templates,</li> <li>• file management and</li> <li>• transferring drawings to and from hardcopy</li> </ul>
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TEACHER ACTIVITIES	LEARNER ACTIVITIES	RESOURCES	ASSESSMENT	DATE COMPLETED
Explain the integration of SANS in EGD.	Visualisation, cognitive and perceptual exercises.			
Show, demonstrate and explain analysis of Civil / Electrical / Mechanical Drawings. <ul style="list-style-type: none"> <li>• Single view,</li> <li>• multi-view and</li> <li>• Pictorial views.</li> </ul>	Analyse drawings and answer questions based on civil, electrical and mechanical drawings.	Models, CAD software, Audio-visual, Worksheets, Drawing instruments, Transparencies, Chalkboard & posters	<b>Tools:</b> <ul style="list-style-type: none"> <li>• Memo's</li> <li>• Task lists,</li> <li>• rubrics</li> </ul> <b>Method:</b> <ul style="list-style-type: none"> <li>• Teacher</li> </ul> <b>Evidence:</b> <ul style="list-style-type: none"> <li>• Test-based</li> <li>• Task-based</li> </ul>	
PAT	Finalisation and submission of PAT done from term 1 to 3 on a continuous basis.	Models, CAD software, Audio-visual media, Worksheets, Drawing instruments, Transparencies, Chalkboard & posters	<b>Presentation portfolio for performance evaluation.</b>	
Homework: Teacher to enter the homework exercises here.				
Enrichment/Expanded Opportunities: Teacher to set enrichment and expanded opportunities according to local conditions.				
Teacher Reflections: After teaching the lesson, teacher to reflect on the lesson.				

**SIGNATURES:**

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TEACHER

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**CORE CONTENT: REVISION/REMEDICATION/CAD of Civil / Electrical / Mechanical Drawings.**

**INTERGRATION: Mechanical, Engineering, Technology, Mathematics, CAT & IT, Physical Sciences**

<b>LEARNING OUTCOME 1: Technology, Society and the environment</b>		<b>LEARNING OUTCOME 2: Design Process</b>		<b>LEARNING OUTCOME 3: Knowledge and Understanding</b>		<b>LEARNING OUTCOME 4: Application of Knowledge</b>	
12.1.1 Evaluate the contributions of Engineering Graphics and Design to technological development and suggest possible future contributions.		12.2.1 Identify a problem, need or opportunity by performing a needs analysis, interpreting information and formulating a design brief.		12.3.1 Drawing principles as contained in SANS code of Practice as related to complex Electrical, Civil and Mechanical drawings.		12.4.1 Drawing principles as contained in SANS code of Practice as related to complex Electrical, Civil and Mechanical drawings.	<b>X</b>
12.1.2 Formulate strategies that show sensitivity to pertinent human rights issues.		12.2.1 Conduct relevant research/case studies and generate a number of ideas/concepts analytically and graphically.		12.3.2 Single and multi-view drawing principles: <ul style="list-style-type: none"> <li>• 1st and 3rd angle orthographic projection,</li> <li>• interpenetrations,</li> <li>• development,</li> <li>• wiring and circuit diagrams,</li> <li>• complex assemblies,</li> <li>• detail drawings,</li> <li>• dwellings and</li> <li>• components of steel structures</li> </ul>		12.4.2 Single and multi-view drawing principles: <ul style="list-style-type: none"> <li>• 1st and 3rd angle orthographic projection,</li> <li>• interpenetrations,</li> <li>• developments,</li> <li>• wiring and circuit diagrams,</li> <li>• complex assemblies,</li> <li>• detail drawings,</li> <li>• limits &amp; fits, tolerances, measurement and surface textures,</li> <li>• dwellings and</li> <li>• Components of steel structures.</li> </ul>	<b>X</b>
12.1.3 Analyse contributions that Engineering Graphics and Design has made to the campaigns against. HIV/AIDS		12.2.3 Select the most relevant possibility giving reasons for choice that are based on sound design principles citing references where possible, analyse it, and synthesise it into a final solution.		12.3.3 Principles of pictorial drawings: <ul style="list-style-type: none"> <li>• isometric and</li> <li>• Perspective.</li> </ul>		12.4.3 Pictorial drawings principles: <ul style="list-style-type: none"> <li>• isometric and</li> <li>• Perspective.</li> </ul>	
12.1.4 Analyse contributions made by Global Cultures to graphical communication.		12.2.4 Present the final solution using graphics including visual, symbolic, and language skills in appropriate modes.		12.3.4 Principles of sectioning: <ul style="list-style-type: none"> <li>• pictorial drawings and</li> <li>• multi-view drawings</li> </ul>		12.4.4. Principles of sectioning: <ul style="list-style-type: none"> <li>• pictorial drawings and</li> <li>• multi-view drawings</li> </ul>	
12.1.5 Identify and investigate possible entrepreneurial opportunities.		12.2.5 Show evidence of evaluation at each stage of the design process.		12.3.5 Loci of points on the components of mechanisms.		12.4.5 Loci of points.	
				12.3.6 Principles of design.		12.4.6 The design process	
				12.3.7 visualisation, cognitive and perception skills related to the analysis and interpretation of: <ul style="list-style-type: none"> <li>• data and information and</li> <li>• Multi-view drawing.</li> </ul>		12.4.7 Visualisation, cognitive and perception skills related to the analysis and interpretation of: <ul style="list-style-type: none"> <li>• data and information and</li> <li>• Multi-view drawing.</li> </ul>	<b>X</b>
				12.3.8 Terminology, concepts and functions of CAD as related to hardware and software.		12.4.8 Terminology, concepts and functions of CAD as related to hardware and software:	<b>X</b>

					<ul style="list-style-type: none"> <li>• setting up of drawing environment: drawing and printing templates,</li> <li>• file management and</li> <li>• transferring drawings to and from hardcopy</li> </ul>
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TEACHER ACTIVITIES	LEARNER ACTIVITIES	RESOURCES	ASSESSMENT	DATE COMPLETED
Revision: Revise and remediate concepts and content that still present a challenge.	Revise and remediate concepts and content that still present a challenge.	Models, CAD software, Audio-visual, Worksheets, Drawing instruments, Transparencies, Chalkboard & posters	<b>Tools:</b> <ul style="list-style-type: none"> <li>• Memo's</li> <li>• Task lists,</li> <li>• rubrics</li> </ul> <b>Method:</b> <ul style="list-style-type: none"> <li>• Teacher</li> </ul> <b>Evidence:</b> <ul style="list-style-type: none"> <li>• Test-based</li> <li>• Task-based</li> </ul>	
Show, demonstrate and explain terminology, concepts and functions of CAD as related to hardware and software: <ul style="list-style-type: none"> <li>• setting up of drawing environment: drawing and printing templates</li> <li>• file management and transferring drawings to and from hardcopy</li> </ul>	<ul style="list-style-type: none"> <li>• setting up of drawing environment: drawing and printing templates</li> <li>• File management and transferring drawings to and from hardcopy.</li> </ul>	CAD software, Audio-visual media, Worksheets.	<b>Tools:</b> <ul style="list-style-type: none"> <li>• Memo's</li> <li>• Task lists,</li> <li>• rubrics</li> </ul> <b>Method:</b> <ul style="list-style-type: none"> <li>• Teacher</li> </ul> <b>Evidence:</b> <ul style="list-style-type: none"> <li>• Test-based</li> <li>• Task-based</li> </ul>	
Homework:				
Enrichment/Expanded Opportunities:				
Teacher Reflections:				

**SIGNATURES:**

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TEACHER

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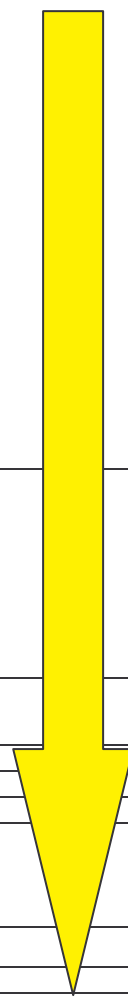
**CORE CONTENT: PAT. (Practical Assessment Task)****INTERGRATION:** Mechanical, Engineering, Technology, Mathematics, CAT & IT

<b>LEARNING OUTCOME 1: Technology, Society and the environment</b>		<b>LEARNING OUTCOME 2: Design Process</b>		<b>LEARNING OUTCOME 3: Knowledge and Understanding</b>		<b>LEARNING OUTCOME 4: Application of Knowledge</b>	
12.1.1 Evaluate the contributions of Engineering Graphics and Design to technological development and suggest possible future contributions.	X	12.2.1 Identify a problem, need or opportunity by performing a needs analysis, interpreting information and formulating a design brief.	X	12.3.1 Drawing principles as contained in SANS code of Practice as related to complex Electrical, Civil and Mechanical drawings.	X	12.4.1 Drawing principles as contained in SANS code of Practice as related to complex Electrical, Civil and Mechanical drawings.	X
12.1.2 Formulate strategies that show sensitivity to pertinent human rights issues.	X	12.2.1 Conduct relevant research/case studies and generate a number of ideas/concepts analytically and graphically.	X	12.3.2 Single and multi-view drawing principles: • 1st and 3rd angle orthographic projection, • interpenetrations, • development, • wiring and circuit diagrams, • complex assemblies, • detail drawings, • dwellings and • components of steel structures	X	12.4.2 Single and multi-view drawing principles: • 1st and 3rd angle orthographic projection, • interpenetrations, • developments, • wiring and circuit diagrams, • complex assemblies, • detail drawings, • limits & fits, tolerances, measurement and surface textures, • dwellings and • Components of steel structures.	X
12.1.3 Analyse contributions that Engineering Graphics and Design has made to the campaigns against. HIV/AIDS	X	12.2.3 Select the most relevant possibility giving reasons for choice that are based on sound design principles citing references where possible, analyse it, and synthesise it into a final solution.	X	12.3.3 Principles of pictorial drawings: • isometric and • Perspective.	X	12.4.3 Pictorial drawings principles: • isometric and • Perspective.	X
12.1.4 Analyse contributions made by Global Cultures to graphical communication.	X	12.2.4 Present the final solution using graphics including visual, symbolic, and language skills in appropriate modes.	X	12.3.4 Principles of sectioning: • pictorial drawings and • multi-view drawings		12.4.4. Principles of sectioning: • pictorial drawings and • multi-view drawings	
12.1.5 Identify and investigate possible entrepreneurial opportunities.	X	12.2.5 Show evidence of evaluation at each stage of the design process.	X	12.3.5 Loci of points on the components of mechanisms.		12.4.5 Loci of points.	
				12.3.6 Principles of design.	X	12.4.6 The design process	X
				12.3.7 Visualisation, cognitive and perception skills related to the analysis and interpretation of: • data and information and • multi-view drawing.	X	12.4.7 Visualisation, cognitive and perception skills related to the analysis and interpretation of: • data and information and • multi-view drawing.	X
				12.3.8 Terminology, concepts and functions of CAD as related to hardware and software.	X	12.4.8 Terminology, concepts and functions of CAD as related to hardware and software:	X

					<ul style="list-style-type: none"><li>• setting up of drawing environment: drawing and printing templates,</li><li>• file management and</li><li>• transferring drawings to and from hardcopy</li></ul>	
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TEACHER ACTIVITIES	LEARNER ACTIVITIES	RESOURCES	ASSESSMENT	DATE COMPLETED
Design Process:  <b>Review of Design process:</b>  1. Identification of a problem, need or opportunity and formulate a design brief. 2. Conduct relevant research; generate a number of ideas/concepts analytically and graphically. 3. select the most relevant possibility giving reasons for choice that are based on sound design principles citing references where possible, analyse it, and synthesize it into a final solution. 4. Present the final solution using graphics including visual, symbolic, and language skills in appropriate modes. 5. Show evidence of evaluation at each stage of the design process.  <b>Teacher provides guidance in planning and execution of the chosen PAT topic</b>	<b>Learners apply the following principles</b>  1. Identify the problem, need or opportunity formulates a design brief. 2. Conduct research/case studies and generate a number of ideas/concepts analytically and graphically. 3. select the most relevant possibility giving reasons for choice that are based on sound design principles citing references where possible, analyse it, and synthesize it into a final solution. 4. Present the final solution using graphics including visual, symbolic, and language skills in appropriate modes. 5. show evidence of evaluation at each stage of the design process  <b>and then</b> <ul style="list-style-type: none"> <li>• Presents the final solution with <b>working/layout drawings</b></li> <li>• Presents the final solution, or parts thereof, with a <b>3D pictorial drawing(s)</b>, and optionally, making a model where possible</li> <li>• <b>Evaluates</b> the whole process</li> </ul>	Models, CAD software, Audio-visual media, Worksheets, Drawing instruments, catalogues, internet.	<b>Tools:</b> <ul style="list-style-type: none"> <li>• Memo's</li> <li>• Task lists,</li> <li>• rubrics</li> </ul> <b>Method:</b> <ul style="list-style-type: none"> <li>• Teacher</li> </ul> <b>Evidence:</b> <ul style="list-style-type: none"> <li>• Task-based</li> </ul>	
Cost Factors Guide learners in costing the PAT	<b>Learners research and compile costing lists.</b>		<b>Presentation portfolio for performance evaluation</b>	
Civil	<b>Scenarios should be chosen from these topics, ie. Civil, Electrical or Mechanical</b>			
Electrical				
Mechanical				
Entrepreneurial opportunities	<b>Research and present <i>Entrepreneurial Opportunities</i> for the scenario in a portfolio of evidence.</b>			
Models (Shoebox Size)	<b>Model is optional.</b>			
Homework:				
Enrichment/Expanded Opportunities:				
Teacher Reflections:				



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