Xi'an Jiaotong-Liverpool University
西交利物浦大学

CPT205

Computer Graphics
Department of Computing Stage 3 | Level 2

SECTION A: Basic Information

Brief Introduction to the Module

This module introduces a wide range of topics in computer graphics and applications. It aims to provide the students with both fundamental theory and hands-on experience through lab-based practice and assessment. It follows a standard textbook with additional materials used for contemporary developments and applications.

Key Module Information

Module name	Module code	Credit value	Semester in which the module is taught	Pre-requisites needed for the module
Computer Graphics	CPT205	5	SEM1	MTH007 OR MTH015 OR MTH017 AND CPT105 OR CPT111
Programmes on which the module is shared	BEng Digital Media Technology BSc Information and Computing Science			

Module Leader and Contact Details

Module Leader:

Name	Email address	Office telephone number	Room number	Office hours	Preferred means of contact
Yong Yue	Yong.Yue@xjtlu.edu.cn	88161503	SD523(SIP Campus-Science Building)	17:00-18:00 Monday and 16:00-17:00 Tuesday	Email
Brief Biography	Professor Yong Yue has experience in both industry and academia. His current research interests include virtual reality, robot applications, computer vision and operations research, and has taught subjects in these areas. He has led a considerable number of research and professional projects supported by major funding bodies and industry with collaborative links in China and overseas. He has over 250 peer reviewed international publications. He has supervised 27 PhD students to successful completion, and is currently supervising 21 PhD projects. He is currently Associate Editor for International Journal of Distributed Systems and Technologies and on the Editorial Board for International Journal of Computer Applications in Technology.				

Additional Teaching Staff and Contact Details:

Role	Name	Email address	Office telephone number	Room number	Office hours	Preferred means of contact
Co-lecturer	NAN XIANG	Nan.Xiang@xjtlu.edu.cn	89165342	SD441(SIP Campus-Science Building)	13:00-14:00 Monday and 13:00-14:00 Tuesday	Email
TA	QIZHONG GAO	qizhong.gao22@student.xjtlu.edu.cn	/	/	/	/
TA	XIAOYU HUANG	xiaoyu.huang20@student.xjtlu.edu.cn	/	/	/	/

TA	YIJIE CHU	yijie.chu16@student.xjtlu.edu.cn	/	/	/	/
TA	YUHAO JIN	yuhao.jin22@student.xjtlu.edu.cn	/	/	/	/
TA	ZIHAN YE	zihan.ye22@student.xjtlu.edu.cn	/	/	/	/
TA	ZITIAN PENG	zitian.peng20@student.xjtlu.edu.cn	/	/	/	/

SECTION B: What You Can Expect from the Module

Educational Aims of the Module

This module introduces a wide range of topics in computer graphics and applications. It aims to provide the students with both fundamental theory and hands-on experience through lab-based practice and assessment. It follows a standard textbook with additional materials used for contemporary developments and applications.

Learning Outcomes

Students completing the module should be able to:

At the end of this module the student should be able to:

A. demonstrate a good understanding of topics and applications in computer graphics covered in the module;

B. demonstrate an in-depth knowledge of geometric creation and transformation, projection, clipping and hidden geometry removal, lighting and materials, and texture mapping;

C. apply relevant techniques / algorithms covered in the module to specific scenarios;

D. write programming code in conjunction with a popular graphics platform (e.g. OpenGL).

Methods of Learning and Teaching

The students will have a two-hour formal lecture followed by a two-hour lab weekly. It assumes that students will have knowledge and previous experience of practical programming in a high-level procedural language. Sample programs will be provided during the lab sessions.

Syllabus & Teaching Plan

Week Number	Mode of Delivery(Lecture/Tutorial/Seminar/Field Trip/Other)	Topic	Pre-reading and others
W1	Lecture and Lab	Lecture 01 - Introduction and hardware/software Lecture 02- Mathematics for computer graphics Lab 01 - MS Visual Studio and OpenGL set-up Lab 02 - Mathematics for computer graphics	Lecture slides and lab sheets plus relevant sections of recommended/reference books.
W2	Lecture and Lab	Lecture 03 - Geometric primitives Lab 03 - OpenGL exercise and graphic primitives C/C++ tutorial for computer graphics (Part I)	Lecture slides and lab sheets plus relevant sections of recommended/reference books.

W3	Lecture and Lab	Lecture 04 - Geometric transformations Lab 04 - OpenGL exercise (interactions using mouse and keyboard) and geometric transformations **Coursework 1 given (23 September 2024)**	Lecture slides and lab sheets plus relevant sections of recommended/reference books.
W4	Lecture and Lab	Lecture 05 - Viewing and projection Lab 05 - Viewing and projection, text, and further geometric creation and transformations C/C++ tutorial for computer graphics (Part II)	Lecture slides and lab sheets plus relevant sections of recommended/reference books.
W5	Lecture and Lab	Lecture 06 - Parametric curves and surfaces Lab 06 - Bezier curves and surfaces, further exercise on viewing and projection (zoom and pan)	Lecture slides and lab sheets plus relevant sections of recommended/reference books.
W6	Lecture and Lab	Lecture 07 - 3D modelling Lab 07 - 3D modelling, representation schemes and Boolean operations	Lecture slides and lab sheets plus relevant sections of recommended/reference books.
W7	Office hours / email	Supporting week without new coverage **Coursework 1 due (3 November 2024)**	All materials given to date
W8	Lecture and Lab	Lecture 08 - Hierarchical modelling Lab 08 - Hierarchical modelling (two sample scenarios) **Coursework 2 given (4 November 2024)**	Lecture slides and lab sheets plus relevant sections of recommended/reference books.
W9	Lecture and Lab	Lecture 09 - Lighting and materials Lab 09 - Lighting and materials (sample programs)	Lecture slides and lab sheets plus relevant sections of recommended/reference books.
W10	Lecture and Lab	Lecture 10 - Texture mapping Lab 10 - Texture mapping (procedural texture, mipmapping and further samples)	Lecture slides and lab sheets plus relevant sections of recommended/reference books.
W11	Lecture and Lab	Lecture 11 - Clipping Lab 11 - Clipping (manual work and Cohen-Sutherland 2D line clipping)	Lecture slides and lab sheets plus relevant sections of recommended/reference books.
W12	Lecture and Lab	Lecture 12 - Hidden surface removal Lab 12 - Hidden surface removal (manual work and further work on Cohen-Sutherland 2D line clipping) **Coursework 2 due (8 December 2024)**	Lecture slides and lab sheets plus relevant sections of recommended/reference books.
W13	Revision and support (office hours / email)	Lecture 13 - Summary and highlights of topics covered / Past exam paper.	All materials given to date

Assessment Details

Initial Assessment

Coursework (15% of the module mark)

Assessment Type: *CW*
Learning outcomes assessed: *BCD*
Duration: *N/A*
Resit opportunity: *S*

Assessment Task	Learning Outcomes	Weighting	Release Date	Due Date	Need Submission?
coursework	BCD	15%	23/Sep/2024	03/Nov/2024	YES
Generative AI Permissions		No			
Requirement and Guideline of the Assessment Task					
A two-dimensional (2D) artefact will be created using the methods and techniques covered in the module with guidance and support during the la b sessions. In addition to the artefact, a brief written report will be required for submission along with the source code. The assignment brief will be given around Week 3 with a deadline around Week 7. Detailed description and a marking scheme will be given in Week 3.					

Coursework (15% of the module mark)

Assessment Type: *CW*
Learning outcomes assessed: *BCD*
Duration: *N/A*
Resit opportunity: *S*

Assessment Task	Learning Outcomes	Weighting	Release Date	Due Date	Need Submission?
coursework	BCD	15%	04/Nov/2024	08/Dec/2024	YES
Generative AI Permissions		No			
Requirement and Guideline of the Assessment Task					
A three-dimensional (3D) artefact will be created using the methods and techniques covered in the module with guidance and support during the l ab sessions. In addition to the artefact, a brief written report will be required for submission along with the source code. The assignment brief will be given around Week 8 with a deadline around Week 12. Detailed description and a marking scheme will be given in Week 8.					

Exam (70% of the module mark)

Assessment Type: *EXAM*
Learning outcomes assessed: *ALL*
Duration: *2 hours*
Resit opportunity: *S*

Assessment Task	Learning Outcomes	Weighting	Release Date	Due Date	Need Submission?
exam	ALL	70%	/	/	/
Generative AI Permissions		/			
Requirements and Guidelines for the Exam					
Revision (summarizing the topics covered and highlight key aspects) and support (e.g. study of a past exam and Q&As) will be given during Wee k 13. The final exam will take place in early January 2025.					

Resit Assessment

Summer resits are not applicable for Undergraduate Stage 4 students.

Exam (100% of the module mark)

Assessment Type: *EXAM*
Learning outcomes assessed: *ALL*
Duration: *2 hours*

Assessment Task	Learning Outcomes	Weighting	Release Date	Due Date	Need Submission?
Exam	ALL	100%	/	/	/
Generative AI Permissions		/			
Requirements and Guidelines for the Exam					
No resit is available for assessments 1 and 2. If a student does not obtain an overall grade of 40% or higher for Assessments 1-3, she /he will be required to take the resit exam which will have a weighting of 100% for the module (regardless of grades of assessments 1 and 2). The resit exam will take place in late July / early August 2025.					

Reading Materials

Type	Title	Author	ISBN/Publisher
Mandatory Textbooks	N/A		
Optional Textbooks	INTERACTIVE COMPUTER GRAPHICS: A TOP-DOWN APPROACH WITH SHADER-BASED OPENGL, EIGHTH EDITION	EDWARD ANGEL AND DAVE SHREINER	9787121393983/ELECTRONIC INDUSTRY PRESS, CHINA
Reference Textbooks	OPENGL PROGRAMMING GUIDE: THE OFFICIAL GUIDE TO LEARNING OPENGL, VERSION 4.5 WITH SPIR-V, 9TH EDITION, 2017	JOHN KESSENICH, GRAHAM SELLERS, DAVE SHREINER	9780134495491/ADDISON WESLEY
Additional Materials			

SECTION C: Additional Information

This section provides students with essential information and resources pertaining to their academic studies to ensure a successful academic journey and engagement with the module.

Student Feedback:

The University is committed to receiving and responding to student feedback in order to improve the quality of the student experience within the institution. It is University policy that the preferred way of doing this is by using the Online Student Module Feedback Questionnaire Survey. Students are encouraged to complete the questionnaire survey for this module at the end of the semester.

Attendance:

The University expects students to attend all timetabled learning sessions associated with this module, and to engage with the relevant learning and support resources. Student attendance will be recorded using the Attendance Management System (AMS). Please follow your teacher's instructions for recording your attendance at each session. Students are responsible for managing their attendance, and should take prompt action to inform the Module Leader in case circumstances beyond their control affect their class attendance. You are advised to read the University's 'Student Attendance Policy' for more information.

Rules of Submission for Assessed Coursework:

The University has detailed rules and procedures governing the submission of assessed coursework. You need to be familiar with the rules and procedures as detailed in the University's 'Code of Practice on Assessment'.

Late Submission of Assessed Coursework:

The University attaches penalties to the late submission of assessed coursework. You need to be familiar with the rules as detailed in the University's 'Code of Practice on Assessment'.

Mitigating Circumstances:

The University is able to take into account mitigating circumstances, such as illness or personal circumstances, that may have adversely affected student performance on a module. Students who believe that their performance on an examination or item of assessed coursework may have been impaired by illness or other exceptional circumstances should follow the procedures set out in the University's 'Mitigating Circumstances Policy'. Such students are also advised to contact their Development Advisor for further guidance and support.

Academic Integrity:

Offences of plagiarism, collusion, copying, submission of commissioned or procured work, and/or the falsification and fabrication of data can resul

t in investigations and penalties being imposed. You need to be familiar with the University's 'Academic Integrity Policy'. For more information on Academic Integrity, please refer to the Understanding Academic Integrity page of the Learning Mall Core. To learn about XJTLU Referencing, pl ease refer to the XJTLU Referencing LibGuides.

Examination Misconduct:

The University values academic integrity in both coursework submission and examination conduct. Any examination misconduct will not be tolerat ed and will result in penalties in accordance with University procedures and regulations as detailed in the 'Regulations for Conduct of Examination s' policy.

Generative AI:

Information on whether the use of Generative AI is permitted or not for each assessed coursework is indicated in the Assessment Details section of this module handbook.

For more information and resources on Generative AI and your learning and assessment, please consult the 'XJTLU AI for Learning' pages of th e Learning Mall Core.

Learning Mall Core:

Copies of lecture notes and other materials are available electronically through the Learning Mall Core, the University's virtual learning environme nt, at learningmall@xjtlu.edu.cn.

Communication:

All official communication concerning module-related matters will be conducted via e-mail and/or as Learning Mall Core announcements. Other m odes of electronic communication are treated as informal.

Further Support:

You are advised to contact your Module Leader in the first instance if you experience any issues with your learning on this module. You may also contact your Academic Advisor or Programme Director. Further information on the kinds of support that the University provides to students can be found in the XJTLU Student Handbook.

You are strongly advised to read the policies mentioned above very carefully, because this will help you perform better in your acad emic studies. You can find all the policies and regulations related to your academic study on the e-Bridge → 'Quick Reference' → ' Policies and Regulations' page.

Generated from e-Bridge

Cut-off Date: 12/Oct/2024