OFFICE USE ONLY	
Date of validation event:	26 April 2018
Date of approval by Academic Board:	28 November 2018
Approved Validation Period:	*5 years from September 2019*
Date and type of revision:	*23/9/20 AB approval of Advanced Practice route* *April 2021 Partner approval appendix added for Global Pathways Academy*

PART TWO PROGRAMME SPECIFICATON

MSc Computer Game Development
MSc Computer Game Development with Advanced Practice

1	**Awarding body**
	Glyndŵr University
2	**Programme delivered by**
	Glyndŵr University
3	**Location of delivery**
	Plas Coch Campus, Wrexham Global Pathways Academy (please refer to Partner Appendix)
4	**Award title**
	MSc Computer Game Development MSc Computer Game Development with Advanced Practice
5	**Exit awards available**
	Pg Dip Computer Game Development Pg Dip Computer Game Development with Advanced Practice Pg Cert Computer Game Development
6	**Professional, Statutory or Regulatory Body (PSRB) accreditation**
	The programme has been designed to align with the requirements of the British Computer Society (BCS) and accreditation will be requested post approval. **The information above is correct at the point of programme validation, refer to university PSRB register and university website for current details of programme accreditation.**
7	**Accreditation available**
	See above.
8	**Please add details of any conditions that may affect accreditation (eg is it dependent on choices made by a student?)**
	Students must have studied all years at the Wrexham Glyndŵr University campus.
9	JACS3 **code**
	I600 : Computer Games

10	**UCAS code**
	N/A
11	**Relevant QAA subject benchmark statement/s**
	Computing (2016) Master's degree characteristics (2015) Master's degrees in Computing (2011) Business and Management (2015)
12	**Other external and internal reference points used to inform the programme outcomes**
	BCS: Additional requirements for CITP BCS: Additional requirements for CEng/CSci
13	**Mode of study**
	Full & part time, Part time available to Home/EU students only
14	**Normal length of study**
	Standard route: Full-time: 1 year, Part-time: 2 years Advanced Practice route: Full-time: 20 months, Part-time: 40 months
15	**Language of study**
	English

16 Criteria for admission to the programme

Standard entry criteria

Entry requirements are in accordance with the University's admissions policy https://www.glyndwr.ac.uk/en/media/FINAL%20ADMISSIONS%20POLICY%202017.pdf

The University's entry requirements are set out at http://www.glyndwr.ac.uk/en/Undergraduatecourses/UCAStariffchange2017/

International entry qualifications are outlined on the National Academic Recognition and Information Centre (NARIC) as equivalent to the relevant UK entry qualification.

In addition to the academic entry requirements, all applicants whose first language is not English or Welsh must demonstrate English language proficiency.

European students are able to provide this evidence in a number of ways (please see http://www.glyndwr.ac.uk/en/Europeanstudents/entryrequirements/ for details), including IELTS.

International students require a UKVI Approved Secure English Language Test (SELT) (please see http://www.glyndwr.ac.uk/en/Internationalstudents/EntryandEnglishLanguageRequirements/ for details).

DBS Requirements

N/A

Non-standard entry criteria and programme specific requirements

N/A

17 Recognition of Prior (Experiential) Learning

Programme specific requirements

Applicants may enter the programme at various levels with Recognition of Prior Learning (RPL) or Recognition of Prior Experiential learning (RPEL) in accordance with the University General Regulations. Any programme specific restrictions are outlined below

Programme specific restrictions

N/A

18 Aims of the programme

The MSc Computer Game Development is intended to provide students with the opportunity to build upon, and expand, their existing knowledge and skills in the field of game design, development and associated tools and methodologies. The programme also demonstrates a unique blend of technical development and professional optimisation of assets and mechanics with strong business start-up, management and entrepreneurial skills.

In doing so, students will be able to develop innovative, high-level game applications or assets and encapsulate them within a credible and sustainable business strategy. Such a model has the potential to grow and support the local and regional games and media industry through the creation of new businesses and sustainable business practice.

Specifically, the programme aims to provide students with the following:

- Specialist knowledge and understanding of game development, including 3D modelling and optimisation of topology, artificial intelligence, flow theory and affective computing (specifically game audio), and mobile content development and publication;
- Technical expertise in the design, implementation and evaluation of game development tools, technologies and methodologies;
- Specialist knowledge and understanding of business planning, start-up and sustainable management;
- The ability to critically appraise and disseminate research results;
- A sound basis for further research and / or professional development.

The module diet of the programme provides a vehicle for these aims and intentions to be met and will equip students with a mixture of theoretical and practical abilities that will allow them to enhance their current skillset within the field. In addition to the specialist content, students will develop transferable skills in working consistently at a professional level and in handling, and responding to, complex, large-scale, information that is focused upon current research and industry developments in computing.

The Advanced Practice route enables students to advance their knowledge and skills in terms of professional and personal development in the workplace from a practitioner's perspective.

19 Distinctive features of the programme

The computer games industry is now worth an estimated £4.33bn in the UK (UKIE 2017a) with 2,175 active games companies operating at all scales and sizes. An estimated 32.4 million people play computer games in the UK, which is the 5th largest global market. The Entertainment Retail Association (ERA 2017) (UKIE 2017b) states that UK game sales in 2016 generated more revenue than either video or music, making the games market (£2.96bn) 1.3 times the size of the video market (£2.25bn) and 2.6 times the size of music (£1.1bn). Worldwide, the number of players is estimated to be somewhere around 2.5 billion (UKIE 2017b), and is worth over $100bn and rising. The opportunities for the UK games industry have never been greater and the prospects for our students are encouraging.

In Wales the creative industry is one of the fastest growing sectors, it has been identified as a priority sector by the Welsh government. Around 84,000 people work in the 'creative economy' in Wales. Of these, nearly 53,000 work in the creative industries, and around 31,000 work in creative occupations outside the creative industries.
http://gov.wales/topics/businessandeconomy/our-priority-sectors/creative-industries/?lang=en

The proposed programme is designed to build upon the strong foundation of the successful BSc Computer Game Development programme based within the department of Computing, which enjoys the benefits of close industry links with regular visits and guest speakers as part of an integrated programme of presentations, discussion groups and social events. The programme has an excellent track record for graduate employment is the only games programme in the UK to have a final year student prize sponsored by BAFTA Cymru.

The programme team work with organisations such as Games Wales, BAFTA Cymru and the British Computing Society to ensure that our students always have access to cutting edge industry related training and knowledge. This knowledge, expertise and industry partnerships will be featured heavily in the newly proposed programme.

Regular internal events along with external events and field trips are made available and as when they are appropriate and practicable, although attendance at internal activities will be expected. These modes of contact provide students with the ability to develop and practice the range of learning outcomes associated with the programme, ranging from the theoretical to the practical. Some example activities include:

Global Game Jam 2018
The Global Game Jam (GGJ) is the world's largest game jam event (game creation) taking place around the world simultaneously at physical locations. It is effectively a time constrained hackathon focused on game development. The GGJ philosophy is the growth of an idea that in today's heavily connected world, people can come together, be creative, share experiences and express themselves in a multitude of ways using game technology. Glyndŵr University registered with the GGJ as an official event site in 2011 as part of extra-curricular activities within the games development course. In doing so, we became the first (and only) Welsh representative, and that would continue to be the case for a further 3 years. In 2018, the GGJ had 803 sites around the world, spread across 108 different countries. There were 42,800 registered participants. At our own event site in 2018, a team of 60 participants were able to design and develop 11 individual games within the 48 hour period. We remain the oldest, and largest Welsh representatives in GGJ.

Games Wales
Games Wales is a non-profit industry group made up of Welsh games developers, educational institutions, media partners and industry bodies with a shared interest in growing and promoting the games industry in Wales. It is responsible for organising and running the annual Wales Games Development Show based in Cardiff and the promotion of games related activities across the country.

Games Wales North (GWN) was formed in 2013 by a group of industry professionals based in the region along with the Glyndŵr University game development programme leader (Richard Hebblewhite). Since that time GWN has been delivering a series of regular social and educational events on the 11th of each calendar month, and programme team have been instrumental in establishing the GWN group's core principles:

- to champion Wales as a place to make games
- to grow the North Wales and wider Welsh games industry
- to represent the industry's interests, and act as an advocate on behalf of the Welsh industry
- to introduce students and aspiring entrepreneurs to industry experience and best practice

The GWN now forms a critical part of the student experience and allows them to engage professionally and socially with experienced members of the industry on a regular basis.

InitGame(); Conference
Devised by the Glyndŵr University game development programme leader, and running for the first time in October 2014, the conference is part of our continuing strategy to energise the games and creative industry in North Wales, along with helping students and young people to learn more about the career opportunities and technologies available to them. The event provides a series of inspirational and technical talks designed to give some insight as to the workings of small, medium and large game studios and the challenges and opportunities they embrace.

The third annual conference took place on Saturday October 22nd, 2016 and was supported by Games Wales North, BAFTA Cymru and the British Computing Society. Thanks to the BAFTA partnership, the keynote speech featured the winner of the 2016 BAFTA award for Best Game, Rantmedia Games. Some notable speakers over the last three years are:

Colin Macdonald – Head of Games Commissioning at Channel 4 (All4 Games)
Ian Thomas – Programmer and Writer at Frictional Games
Anton Faulconbridge – Director of Rantmedia Games
Rick Vanner - Development Director at The Game Creators
Chris Payne – CEO of Quantum Soup Studios
Ralph Ferneyhough – Lead Engine Programmer at TT Games
Steffen Gronning - CEO of BetaDwarf
Dan Harris – Media Manage at Atticus Digital
Llio Wyn - Event Manager at BAFTA Cymru
Claire Heat – Awards and Events Manager at BAFTA Cymru
Murty Schofield – Freelance Artist and Writer on the Tomb Raider franchise
Carl Dalton – CEO at Brain In A Jar
Ella Romanos – Commercial Director at Strike Game Labs

The proposed MSc programme brings together a range of modules that will equip students to deepen and integrate their skills to develop innovative game applications and assets, facilitated by the acquisition and application of theory through practical sessions and problem-based learning. Utilising industry standard techniques, such as the 3D topology optimisation, game analysis, mobile app development, publisher compliancy and agile management techniques, the course combines theory and practice, as it prepares students to seize the opportunity to create innovative games that are responsive to their target audience needs, whilst being sensitive to societal and ethical concerns such as game addiction, privacy and security.

A key element of the course is its emphasis on blending advanced technical development with strong management and sustainable business skills. The Games Enterprise and Management module aims to focus on the practical application of business management theory relating to a start-up enterprise where students will produce a formal plan to support a business launch in conjunction with work produced in other modules on the programme. In addition, the programme itself will be supported by our unique Business Accelerator initiative, which will allow students to gain valuable experience of business planning and finance along with the management of a game studio.

The Accelerator programme was introduced in 16/17 and has been integrated into the undergraduate programme at levels 5 and 6 respectively. The scheme is a joint initiative between the department of computing and the North Wales Business School. It is designed to combine business and computer game development students together to encapsulate the technical development work in projects with a professional business strategy.

The proposed programme will also feature this initiative with a view to further increasing the number of successful start-up companies within the university incubation centre called the Enterprise Lounge (there are 3 active undergraduate Accelerator groups this year). The spin out studios are also supported by the university Zone enterprise centre with a view to seeking and applying for potential investment, business mentoring and a range of other facilities.

Masters level students will have the opportunity to start and manage their own studio, along with access to a range of pre-existing companies that may form the basis of study for dissertation in terms of data analytics and modelling.

It is widely recognised that many start-up companies fail within the first year due to a lack of management, business and financial stability. This scheme aims to fill that gap by addressing these such issues and exposing students to real world problems and development issues.

The programme team believe that this particular blend of creative technical skills and entrepreneurship at masters level is unique within the context of UK related games courses and will further help to grow the local industry by way of spin out projects and social enterprise.

Critically, due to the lack of local and regional competition, we have an opportunity to gain a foothold as the market leaders in our region with respect to postgraduate games enterprise.

It is anticipated the graduates will go into careers in the games and media sectors, but also within mainstream computing and technology fields of: interaction design, user experience evaluation, software development, academic study at doctoral (MPhil/PhD) level. Additionally, it is expected that the programme will lead to the creation of local SMEs within the field of game development, software and media design.

The Advanced Practice component will provide students with the opportunity to enhance personal and professional development so that they learn *through* work, learn *for* work and learn *at* work. In addition to practical and professional skills gained during their work placement, students will also be able to engage in the process of critical self-reflection and thereby build up more self-awareness, flexibility and resilience to better prepare themselves for the challenges at the workplace. Furthermore, twelve weeks of work experience will guarantee students a surer footing in the job market and give them an edge over graduates who have not undertaken any work placement as part of their degree.

20 Programme structure narrative

For the standard route without Advanced Practice, the programme consists of two parts: part one, which consists of the 120 credits of taught modules; and part two, which is the 60 credit Dissertation. The Dissertation pursued will complement the prior taught modules by focussing upon a theme or topic from the games and media development discipline. Overall, 4 of the programme's 7 modules (including the Dissertation) are shared modules between this programme and the University's other postgraduate Computing programmes, which makes the delivery more efficient and provides students with the opportunity to engage with a wider, more diverse, peer group.

The programme has two intake points: September Intake and January/February Intake, and is offered in full-time and part-time modes of attendance. Students will typically be expected to attend the University for two or three days a week, full-time, and for one or two days a week, when studying part-time, in addition to studying in their own time.

An exit award from MSc Computer Game Development is PGCert Computer Game Development and is available to students who successfully complete 60 credits, but who find they are unable or choose not to continue with the programme. The PGDip exit award is PGDip Computer Game Development and this is available to students who successfully complete 120 credits of Part One, and they are unable or choose not to continue with the programme.

Full-time students will pursue the programme over one calendar year. In the first and second semesters, they will study effectively 60 credits of taught modules by way of 3 modules per semester. Full time students, having successfully completed the taught components, will then progress to the dissertation phase.

In part-time mode, students will engage with the programme for a period of approximately two-and-a-half years. The first year will consist of two taught semesters, where students will study effectively 40 credits per semester by way of 2 modules. At the end of this period, students will have the ability to exit the programme and receive a PGCert Computer Game Development award, if they have successfully completed all modules to this point. In the second year, students will study 20 credits per semester. At the end of this period, students have the ability to exit the programme with the PGDip Computer Game Development award, if they have successfully completed all modules to this point. Those continuing will, during the subsequent summer and first semester period, pursue the 60 credit Dissertation, normally submitting this in February of the following calendar year to obtain the MSc Computer Game Development.

A second part-time mode allows students a longer period of time by studying 20 credits per semester for a period of 3 years, with the dissertation running over the fourth year.

For the Advanced Practice route, students will complete 240 credits in total, which consists of the 120 credits taught modules in part one, and the 60 credits advanced practice module and the 60 credits dissertation module in part two.

If students on the Advanced Practice route are not able to secure a placement by the end of their second taught semester, they will revert back to the standard programme without AP and continue with their dissertation modules in their final semester.

21 Programme structure diagram

Full-time Mode, standard route without Advanced Practice

	Level 7					
Semester 1	Mod title	Postgraduate Study and Research Methods	Mod title	3D Design and Optimisation	Mod Title	Advanced Artificial Intelligence
	Mod code	COM742	Mod code	COM728	Mod code	COM722
	New/Existing	New	New/Existing	New	New/Existing	Existing
	Credit value	20	Credit value	20	Credit value	20
	Core/Option	Core	Core/Option	Core	Core/Option	Core
	Mod leader	Prof. Vic Grout	Mod leader	Nathan Roberts	Mod leader	Rich Hebblewhite
Semester 2	Mod title	Game Analysis and Player Interaction	Mod title	Game Enterprise and Management	Mod title	Media Development and Distribution
	Mod code	COM729	Mod code	COM730	Mod code	COM731
	New/Existing	New	New/Existing	New	New/Existing	New
	Credit value	20	Credit value	20	Credit value	20
	Core/Option	Core	Core/Option	Core	Core/Option	Core
	Mod leader	Rich Hebblewhite	Mod leader	Dr. Jan Green	Mod leader	Rich Hebblewhite

	Level 7	
Summer period	Mod title	Dissertation
	Mod code	COM738
	New/Existing	New
	Credit value	60
	Core/Option	Core
	Mod leader	Prof. Richard Picking

Full-time Mode, Advanced Practice route

	Level 7					
Semester 1(Year 1)	Mod title	Postgraduate Study and Research Methods	Mod title	3D Design and Optimisation	Mod Title	Advanced Artificial Intelligence
	Mod code	COM742	Mod code	COM728	Mod code	COM722
	New/Existing	New	New/Existing	New	New/Existing	Existing
	Credit value	20	Credit value	20	Credit value	20
	Core/Option	Core	Core/Option	Core	Core/Option	Core
	Mod leader	Prof. Vic Grout	Mod leader	Nathan Roberts	Mod leader	Rich Hebblewhite
Semester 2 (Year1)	Mod title	Game Analysis and Player Interaction	Mod title	Game Enterprise and Management	Mod title	Media Development and Distribution
	Mod code	COM729	Mod code	COM730	Mod code	COM731
	New/Existing	New	New/Existing	New	New/Existing	New
	Credit value	20	Credit value	20	Credit value	20
	Core/Option	Core	Core/Option	Core	Core/Option	Core
	Mod leader	Rich Hebblewhite	Mod leader	Dr. Jan Green	Mod leader	Rich Hebblewhite

	Level 7	
Semester 1 (Year 2)	Mod title	Advanced Practice: Work-based Learning
	Mod code	ADP701
	New/Existing	New
	Credit value	60
	Core/Option	Core
	Mod leader	Tom Rozario
	Level 7	
Semester 2 (Year 2)	Mod title	Dissertation
	Mod code	COM738
	New/Existing	New
	Credit value	60
	Core/Option	Core
	Mod leader	Prof. Richard Picking

Part-time Mode 1, Standard route without Advanced Practice

	Level 7			
Semester 1 (Year 1)	Mod title	Postgraduate Study and Research Methods	Mod title	3D Design and Optimisation
	Mod code	COM742	Mod code	COM728
	New/Existing	New	New/Existing	New
	Credit value	20	Credit value	20
	Core/Option	Core	Core/Option	Core
	Mod leader	Prof. Vic Grout	Mod leader	Nathan Roberts

Semester 2 (Year 1)	Mod title	Game Analysis and Player Interaction	Mod title	Game Enterprise and Management
	Mod code	COM729	Mod code	COM730
	New/Existing	New	New/Existing	New
	Credit value	20	Credit value	20
	Core/Option	Core	Core/Option	Core
	Mod leader	Rich Hebblewhite	Mod leader	Dr. Jan Green

	Level 7	
Semester 1 (Year 2)	Mod title	Advanced Artificial Intelligence
	Mod code	COM722
	New/Existing	Existing
	Credit value	20
	Core/Option	Core
	Mod leader	Rich Hebblewhite

	Level 7	
Semester 2 (Year 2)	Mod title	Media Development and Distribution
	Mod code	COM731
	New/Existing	New
	Credit value	20
	Core/Option	Core
	Mod leader	Rich Hebblewhite

	Level 7	
Summer (Year 2) and Semester 1 (Year 3)	Mod title	Dissertation
	Mod code	COM738
	New/Existing	New
	Credit value	60
	Core/Option	Core
	Mod leader	Prof. Richard Picking

Part-time Mode 2, standard route without Advanced Practice

	Level 7	
Semester 1 (Year 1)	Mod title	Postgraduate Study and Research Methods
	Mod code	COM742
	New/Existing	New
	Credit value	20
	Core/Option	Core
	Mod leader	Prof. Vic Grout

Semester 2 (Year 1)	Mod title	Game Analysis and Player Interaction
	Mod code	COM729
	New/Existing	New
	Credit value	20
	Core/Option	Core
	Mod leader	Rich Hebblewhite

	Level 7	
Semester 1 (Year 2)	Mod title	3D Design and Optimisation
	Mod code	COM728
	New/Existing	New
	Credit value	20
	Core/Option	Core
	Mod leader	Nathan Roberts

Semester 2 (Year 2)	Mod title	Games Enterprise and Management
	Mod code	COM730
	New/Existing	New
	Credit value	20
	Core/Option	Core
	Mod leader	Dr. Jan Green

	Level 7	
Semester 1 (Year 3)	Mod title	Advanced Artificial Intelligence
	Mod code	COM722
	New/Existing	Existing
	Credit value	20
	Core/Option	Core
	Mod leader	Rich Hebblewhite

Semester 2 (Year 3)	Mod title	Media Development and Distribution
	Mod code	COM731
	New/Existing	New
	Credit value	20
	Core/Option	Core
	Mod leader	Rich Hebblewhite

	Level 7	
Semester 1 + 2 (Year 4)	Mod title	Dissertation
	Mod code	COM738
	New/Existing	New
	Credit value	60
	Core/Option	Core
	Mod leader	Prof. Richard Picking

For Part-time mode, Advanced Practice route, students will follow the above delivery schedule for taught modules, undertake the placement after completion of all taught modules, and then progress to the dissertation.

22 Intended learning outcomes of the programme

Knowledge and understanding	
PG Cert / PG Dip Computer Game Development	
A1	*Display a mastery of the multifaceted theories underpinning computer game design and development, how these are applied in devising game mechanics and assets, and the relation between game development the broader domain of computer science*
A2	*Make professional judgements in the selection of technologies or processes for complex and dynamic scenarios*
A3	*Compare and contrast the theories behind various complex game systems*
A4	*Engage in creative and innovative developments involving design tools and technology*
A5	*Comprehensive understanding of relevant management and business practices, and evaluation of commercial risks*
A6	*Evidence deep comprehension of specialist applications for game systems and recognise the boundaries of knowledge in this domain*
MSc Computer Game Development	
A7	*Demonstrate a sufficiently detailed knowledge of research methods appropriate specifically to their advanced independent-study dissertation/project, together with detailed knowledge of the particular area in which the project is carried out*

Intellectual skills	
PG Cert / PG Dip / MSc Computer Game Development	
B1	*Carry out confident and accurate selection and application of principles and procedures appropriate to the resolution of a range of situations and professional problems associated within the specialist area of computer game development*
B2	*Identify and classify principles, ideas in contemporary information sources, and situations to professional standards; analyse rigorously, effectively, critically and creatively; cope with complexity*
B3	*Synthesise and predict the future development of current and emerging technologies in the field of computer game development, being mindful of external factors*
B4	*Devise and optimise game systems and content in response to a range of technological and practical constraints*
B5	*Design and appraise a range of user-centred investigations to model and evaluate interactive game in response to a business need*
B6	*Utilise complex, often contradictory, resources and demonstrate how to access these to obtain state-of-the-art knowledge of current computer game development systems*
B7	*Evaluate methods, and plan for, a complex, self-led, investigation in response to a recognised problem or gap in knowledge*

Subject Skills	
PG Cert / PG Dip / MSc Computer Game Development	
C1	*Work with a range of computer hardware, software, and peripheral devices to implement a game system*
C2	*Be effective in the acquisition and analysis of data, from a range of sources*
C3	*Make effective use of a range of theories and techniques applicable to game development scenarios*
C4	*Assimilate and integrate emerging developments in game design and business practice into their own work*
C5	*Specify, design, implement, test and document a game application*
C6	*Undertake a significant game development related thesis or product which involves an analytical, rigorous and critical approach to problem identification, solution and evaluation*
C7	*Synthesise the knowledge, skills and theories from the computing areas covered by the programme in order to solve a complex problem that may require the integration of different game development techniques and / or technologies*

Practical, professional and employability skills	
PG Cert / PG Dip Computer Game Development	
D1	*Display a mastery of working with a range of information sources and be able to objectively arrange these in a holistic manner*
D2	*Professionally and efficiently operate a range of IT software, specialist computing applications, and configure a range of hardware devices*
D3	*Effectively and proficiently work with stakeholders in designing IT and computer systems in response to their needs and demands*
D4	*Make critical decisions regarding technology adoption and success, based upon technological, societal, ethical, and market information*
D5	*Model and apply computational solutions in response to large scale problems*
MSc Computer Game Development	
D6	*Conduct and control a piece of research or investigation and professionally present the outcomes in a succinct and reflexive manner*
D7	*Carry out a large-scale, independent project and provide detailed and reflective analysis of its efficacy and value*
D8	*Advanced Practice route: Demonstrate knowledge and understanding of operating in a business or employer environment(s), and articulate the deployment of higher level skills within this context.*

23 Curriculum matrix

For successful completion of PG Cert Computer Game Development, students will achieve 60 credits by completing any three of the modules listed below:

	Module Title	Core or option?	A1	A2	A3	A4	A5	A6	A7	B1	B2	B3	B4	B5	B6	B7
Level 7	Postgraduate Study and Research Methods	Core	☐	■	☐	☐	☐	☐	☐	☐	■	☐	☐	☐	☐	☐
	3D Design and Optimisation	Core	■	■	☐	■	☐	■	☐	■	■	■	■	■	☐	☐
	Game Analysis and Player Interaction	Core	☐	■	■	■	☐	■	☐	■	■	☐	■	■	■	☐
	Advanced Artificial Intelligence	Core	☐	■	■	☐	☐	☐	☐	☐	☐	☐	■	☐	☐	☐
	Games Enterprise and Management	Core	☐	■	☐	☐	■	☐	☐	☐	■	■	☐	☐	☐	■
	Media Development and Distribution	Core	☐	☐	☐	☐	☐	■	☐	☐	☐	☐	☐	☐	■	☐

	Module Title	Core or option?	C1	C2	C3	C4	C5	C6	C7	D1	D2	D3	D4	D5	D6	D7
Level 7	Postgraduate Study and Research Methods	Core	☐	■	☐	☐	☐	☐	☐	■	☐	☐	☐	☐	☐	☐
	3D Design and Optimisation	Core	■	■	■	■	☐	☐	■	■	■	☐	■	☐	☐	☐
	Game Analysis and Player Interaction	Core	☐	■	■	■	■	☐	■	☐	■	■	☐	■	☐	☐
	Advanced Artificial Intelligence	Core	☐	■	■	☐	☐	☐	☐	☐	■	☐	☐	■	☐	☐
	Games Enterprise and Management	Core	☐	■	☐	■	☐	☐	☐	■	☐	☐	■	☐	☐	☐
	Media Development and Distribution	Core	☐	☐	☐	☐	☐	■	☐	☐	☐	☐	☐	☐	☐	☐

For successful completion of PG Dip Computer Game Development, students will achieve the following learning outcomes:

	Module Title	Core or option?	A1	A2	A3	A4	A5	A6	A7	B1	B2	B3	B4	B5	B6	B7
Level 7	Postgraduate Study and Research Methods	Core	☐	■	☐	☐	☐	☐	☐	☐	■	☐	☐	☐	☐	☐
	3D Design and Optimisation	Core	■	■	☐	■	☐	■	☐	■	■	■	■	■	☐	☐
	Game Analysis and Player Interaction	Core	☐	■	■	■	☐	■	☐	■	■	☐	■	■	■	☐
	Advanced Artificial Intelligence	Core	☐	■	■	☐	☐	☐	☐	☐	☐	☐	■	☐	☐	☐
	Games Enterprise and Management	Core	☐	■	☐	☐	■	☐	☐	☐	■	■	☐	☐	☐	■
	Media Development and Distribution	Core	☐	☐	☐	☐	☐	■	☐	☐	☐	☐	☐	☐	■	☐

	Module Title	Core or option?	C1	C2	C3	C4	C5	C6	C7	D1	D2	D3	D4	D5	D6	D7
Level 7	Postgraduate Study and Research Methods	Core	☐	■	☐	☐	☐	☐	☐	■	☐	☐	☐	☐	☐	☐
	3D Design and Optimisation	Core	■	■	■	■	☐	☐	■	■	■	☐	■	☐	☐	☐
	Game Analysis and Player Interaction	Core	☐	■	■	■	■	☐	■	☐	■	■	☐	■	☐	☐
	Advanced Artificial Intelligence	Core	☐	■	■	☐	☐	☐	☐	☐	■	☐	☐	■	☐	☐
	Games Enterprise and Management	Core	☐	■	☐	■	☐	☐	☐	■	☐	☐	■	☐	☐	☐
	Media Development and Distribution	Core	☐	☐	☐	☐	☐	■	☐	☐	☐	☐	☐	☐	☐	☐

For successful completion of MSc Computer Game Development, students will achieve the following learning outcomes:

	Module Title	Core or option?	A1	A2	A3	A4	A5	A6	A7	B1	B2	B3	B4	B5	B6	B7
Level 7	Postgraduate Study and Research Methods	Core	☐	■	☐	☐	☐	☐	☐	☐	■	☐	☐	☐	☐	☐
	3D Design and Optimisation	Core	■	■	☐	■	☐	■	☐	■	■	■	■	■	☐	☐
	Game Analysis and Player Interaction	Core	☐	■	■	■	☐	■	☐	■	■	☐	■	■	■	☐
	Advanced Artificial Intelligence	Core	☐	■	■	☐	☐	☐	☐	☐	☐	☐	■	☐	☐	☐
	Games Enterprise and Management	Core	☐	■	☐	☐	■	☐	☐	☐	■	■	☐	☐	☐	■
	Media Development and Distribution	Core	☐	☐	☐	☐	☐	■	☐	☐	☐	☐	☐	☐	■	☐
	Dissertation	Core	■	■	☐	■	■	■	■	■	■	■	☐	☐	■	■

	Module Title	Core or option?	C1	C2	C3	C4	C5	C6	C7	D1	D2	D3	D4	D5	D6	D7
Level 7	Postgraduate Study and Research Methods	Core	☐	■	☐	☐	☐	☐	☐	■	☐	☐	☐	☐	☐	☐
	3D Design and Optimisation	Core	■	■	■	■	☐	☐	■	■	■	☐	■	☐	☐	☐
	Game Analysis and Player Interaction	Core	☐	■	■	■	■	☐	■	☐	■	■	☐	■	☐	☐
	Advanced Artificial Intelligence	Core	☐	■	■	☐	☐	☐	☐	☐	■	☐	☐	■	☐	☐
	Games Enterprise and Management	Core	☐	■	☐	■	☐	☐	☐	■	☐	☐	■	☐	☐	☐
	Media Development and Distribution	Core	☐	☐	☐	☐	☐	■	☐	☐	☐	☐	☐	☐	☐	☐
	Dissertation	Core	☐	■	■	■	☐	■	■	■	■	☐	■	☐	■	■

For successful completion of the Advanced Practice route, students will achieve the learning outcomes highlighted in the tables above as well as Learning Outcomes D8.

24 Learning and teaching strategy

The MSc Computer Game Development will adopt the Computing subject area Learning, Teaching and Assessment strategy. It seeks to assist the student to become an independent learner while still supporting the students in their transition to postgraduate education. The curriculum is designed to encourage an appreciation for learning. Learning is enriched by appropriate underpinnings, current research, industrial applications and the development of transferable skills.

Students on the programme will gain theoretical and practical experience of working with a range of game development tools and environments in building and analysing optimised game applications and assets. Students will also learn about the fast-evolving fields of digital content distribution, marketing and artificial intelligence.

The majority of scheduled learning and teaching activities is through attendance at lectures, guest talks, tutorials, and labs.

The course provides students with immersion in several distinct subject disciplines that support the design, development, and evaluation of computer game applications and assets. The course modules cover the practical skills of computing, necessary to build and optimise game systems, supported by learning the theories, investigation techniques, and research skills that allow them to work successfully with leading edge, emerging technologies and devise solutions that are fit for purpose, and encapsulated within a feasible business strategy.

The majority of Computing provision is located on the Wrexham campus, including teaching rooms, lecture theatres, staff offices, and specialist labs. There are a number of specialist computer labs on the Wrexham campus, including general purpose computing laboratories that support the teaching. These specialist labs offer access to a range of software that is utilised within the modules defined in the programme. Staff in Computing operate an Open Door policy in relation to students, ensuring flexibility and responsiveness in dealing with queries and questions that occur outside of the scheduled teaching hours.

The pace of delivery and range of syllabus content to be covered at the taught stage (part one) requires a combination of teaching and learning strategies to be adopted in most areas of study. Modules are in the main divided into 2 types: technical and general. Technical modules cover the specialised subject areas and expertise pertaining to game development, while the more general modules cover other areas of business management, professional development and research methodology.

Technical modules in part one total 80 credits of the programme and are 3D Design and Optimisation, Advanced Artificial Intelligence, Game Analysis and Player Interaction and Media Development and Distribution. These modules provide students with the theoretical and practical skills to design, build and evaluate game applications and assets.

General modules in part one total 40 credits of the programme and are Postgraduate Study and Research Methods and Games Enterprise and Management. These modules aim to develop postgraduate level thinking skills, research capability, information handling, ethical awareness, and business planning and strategy in students, by focusing their study of these modules on the field of computer game development.

In the early stages of each module, problems will be well defined and limited in scope and scale. At later stages, problems will become less structured (to encourage reflection on problem issues) and open-ended (to give scope to propose and evaluate alternative solution strategies). Case studies are used when appropriate to integrate study topics and to underline vocational relevance. Coursework assignments are important throughout.

Students coming from less technical undergraduate subjects will be offered optional, extra boot camp sessions for technical modules on the programme (typically Media Development and Distribution, 3D Design and Optimisation and Game Analysis and Player Interaction). These sessions will appear as an additional, optional timetabled slot for each module and will be comprised of additional training designed to support students as they engage with complex technical subjects). The sessions will be offered at no additional cost to the student, and no penalties will be incurred by students who fail to attend the extra boot camp sessions as they are optional, and designed to provide additional training and support for students who choose to participate.

As the programme progresses, students are expected to demonstrate increasing proficiency in use of IT tools and techniques to support production of technical documentation, to enhance oral and written presentations, and to aid organisation of personal study material.

Part two of the programme is the Dissertation and is an area that has been given special consideration since it is such a significant piece of work undertaken by the student. While students study the taught part of the course they are given a 1 hour a week special lecture to inform them of the requirements of the Dissertation. This module is run so that it coincides with the end of the taught part of the course, which means that on completion of part one students can start immediately on producing the proposal for the dissertation. On submission of the proposal it is assessed and passed to an appropriate supervisor with expertise in the area that the student wishes to carry out the work. It is the supervisor's task to work with the student to improve the proposal to a level that is acceptable and achievable for a master's level within the time constraints. Students work independently on the dissertation having regular meetings with the supervisor. It is important that the student identifies at the proposal stage the various requirements needed to complete the dissertation e.g. equipment, software, space.

Extensive use is made of the University's Virtual Learning Environment (VLE), Moodle, to provide students with access to a range of delivery, and supporting, materials related to each of the modules featured on the programme. In addition to the materials used during the taught sessions, the VLE is used to provide students with additional content such as quizzes, videos, audio recordings, external links, technical reports, research papers, and so forth. The VLE also provides students with the ability to communicate using discussion forums and is the platform primarily used in the issuing, submission, marking, and feedback of student assessment.

25 Work based/placement learning statement

For programmes without the Advanced Practice option, students are encouraged to use their current or previous work experience to reflect on.

Programmes on the Advanced Practice route offer substantive work-based learning via the advanced practice module. Advanced practice module is worth 60 academic credits

and takes place after the completion of taught module and before the dissertation semester. The placement will normally be carried out over a period of twelve weeks and the student is expected to complete 240 hours in total.

While advice can be sought from the Work-related Learning Unit(WRLU) during the process, students are ultimately responsible for securing a placement using the protocol described in the Advanced Practice module handbook. If students fail to secure a placement, they will be transferred out of the AP route and onto the standard programme, where they start their dissertation/research modules a semester earlier and Tier 4 visas for international students will be modified accordingly.

Students on Advanced Practice route are required to submit a Placement Proposal and a Placement Specification form to the WRLU before the placement can be approved. The Placement Specification should be signed by WRLU, Placement Provider and student. Placement hours are to be recorded by students in a log and signed off by a manager at their workplace at the end of the placement. Any cause of concerns, either from students or from placement providers shall be referred to the Work-related Learning Unit who will follow the procedures outlined in the Advanced Practice handbook for remedy actions.

26 Welsh medium provision

The programmes will be delivered through the medium of English. Students are entitled to submit assessments in the medium of Welsh.

27 Assessment strategy

The methods of assessment used on the programme are designed to prepare students for entry into the industry and as such, primarily revolve around coursework and portfolio development.

In the rare circumstances of modules that include group work, there are strict controls in place to guide students in terms of assessment requirements and management of personal workloads. In addition, online tracking tools play a critical role in ascertaining a student's individual contribution to the collective effort due to the accurate logging of work hours and supporting evidence. This helps to ensure that students are assessed in a fair and transparent way.

Assessment is co-ordinated between modules to ensure diversity and a range of assessment submission dates where possible. This coordination effort also includes staff members from the North Wales Business School to ensure consistency of the student experience. Specific assessment tasks are incorporated into each module guide and relate to specific learning outcomes across all areas of programme assessment.

The number of module assessment elements and their individual assessment word counts are consistent with other programmes across both the department and the Faculty at the same level.

Module code and title	Assessment type and weighting	Assessment loading	Indicative submission date
Postgraduate Study and Research Methods	50% Coursework 50% Coursework	2,000 words 1,500 words	Middle Tri 1 End of Tri 1
3D Design and Optimisation	100% Coursework	4000 words	End or Tri 1

Advanced Artificial Intelligence	50% Coursework 50% Coursework	2,000 words 2,000 words	Middle Tri 1 End of Tri 1
Game Analysis and Player Interaction	60% Coursework 40% Coursework	2200 words 1800 words	End of Tri 2
Games Enterprise and Management	50% Coursework 50% Coursework	2000 words 2000 words	Middle Tri 2 End of Tri 2
Media Development and Distribution	100% Portfolio	4000 words	End of Tri 2
Dissertation	10% Research proposal 90% Dissertation	2,000 words either 15,000 – 20,000 words **OR** 17 page journal paper	Start of Tri 3
Advanced Practice: Work-based Learning	Report 20% (pass/fail basis) Report 30% (pass/fail basis) Portfolio 50% (pass/fail basis)	750 words 1,250 words 2, 000 words	Dependant on intake and delivery mode

28 Assessment regulations

Regulations for Taught Master's Degrees.

For students on the Advanced Practice route, please note that the Advanced Practice module will not be used towards the degree classification and will show as pass/fail only on the transcript. Please consult the Taught Masters Regulations available on the Student Administration web pages.

Derogations

None.

Non-credit bearing assessment

None.

Restrictions for trailing modules (for taught masters programmes only)

All modules except for Post Graduate Study and Research Methods would be eligible for trailing.

29 Programme Management

Programme leader

Richard Hebblewhite

Programme team

Prof. Richard Picking
Prof. Vic Grout
Nathan Roberts
Jason Matthews
Dr Jan Green

Supporting team

John Worden
Bindu Jose
Julie Mayers

30 Quality management

The designated MSc Programme Leader for Computer Game Development who will be responsible for the day-to-day running of the programme, including the following:

- The management and development of curriculum and the course portfolio
- Student tracking and student records
- Collation of assessment data and presentation of data at assessment boards
- Management/co-ordination of overall assessment activities across the programme
- Liaison with external bodies and agencies,
- Quality assurance and annual monitoring, including compilation of the Annual Monitoring Report
- Co-ordination of admissions activities and other recruitment activities, including relevant publicity activities

At module level there is devolved responsibility for the following:

- The maintenance and development of teaching and learning materials for all students enrolled on the module,
- The publishing and updating of module timetables, which shall include a weekly schedule of module sessions and required reading, to be distributed to students at the start of all modules
- The setting, marking and collation of marks for all module assessments and examination papers, including resit assessments, and submission of student results to the Programme Leader
- Tutorial support for students taking the module which they are responsible
- Quality monitoring, including processing of annual student feedback questionnaires and, where appropriate, feedback for individual modules
- Liaison with part-time members of staff involved in module teaching

Student Feedback

The University has procedures for the regular review of its educational provision, including the annual review of modules and programmes, which draw on feedback from such sources as external examiner reports, student evaluation, student achievement, and progression data. In addition, programmes are subject to a programme periodic review (PPR) and re-validation in year 5 that includes external input.

Feedback from students plays a critical part in informing the Faculty's strategic thinking. It also allows the Faculty to evaluate how its service provision is viewed by its most important group of stakeholders, its students.

Students can provide feedback in a number of ways:

Student Voice Forum (SVF): Chaired by a member of academic staff from outside the programme, will be held at least once per trimester. The Chair will minute student feedback for action/response by the Programme Leader. Minutes of the SVFs and the response from the Programme Leader will be posted on the programme pages of Moodle. The MSc Computer Game Development will have a representative on the Computing Student Voice Forum.

Student Evaluation of Modules (SEM): Module Leaders will distribute SEMs at the end of each module. A summary of the analysis of the SEMs, along with any other feedback (e.g. from the student suggestion box), will be passed to the Programme Leader for action/response.

Students submit work in a number of different ways depending on the module being studied. Wherever possible Moodle is used for electronic submission and Turnitin to check the similarity score and tutors give feedback via this interface within 3 weeks.

Practical work is developed and assessed by having students to demonstrate their work and take part in a form interview process, again immediate feedback is given. At the end of a module, overall feedback is provided along with a clear indication of what area the student needs, if necessary, to resubmit or particular areas were of good quality or be improved upon.

31 Research and scholarship activity

The programme is taught and assessed by active researchers in the field, who all belong to the University's ARClab (http://arclabnet.weebly.com/) group. In the 2014 Research Excellence Framework (REF 2014), the submission to the Computer Science and Informatics category received a grade point average of 2.04, with over two-thirds of all research scoring 2* or higher. In particular, the taught modules within the programme are drawn from the research specialisms and significant industry engagement of each member of the programme team.

ARClab's research encompasses the broader Computing subject and is concentrated in the following areas:

- IOT, Networking and Cybersercurity
- Audio and Affective Computing
- Health and Assisted LivingTechnologies
- HCI, Augmented and Virtual Reality
- CAD/Engineering software
- MIS/Business
- Ethics/professionalism
- Robotics/AI

ARClab has taken over from the previous Computing research groups of Creative and Applied Research for the Digital Society (CARDS) and the Centre for Applied Internet Research (CAIR), which built up their activities very impressively over the past ten years. The commitment and enthusiasm of the staff is very evident and significant outputs have been achieved over a whole range of activities, covering publications, grant winning, conference organisation, industrial engagement etc.

Significant achievements during the recent past include the very professional organisation of a conference to the highest international standards; the development of a large-scale EU-funded research project, the steady production of conference publications, in addition

to a sound proportion of academic journal publications; the setting up of a usability laboratory - a relatively unique facility in Wales; the importing of a substantial new base of specialism in wireless technologies and a success in a radio frequency identification tagging (RFID) project, which is intended to be rapidly grown into an additional research theme.

For their dissertations, students will be expected to investigate cutting-edge technologies, implement and test novel / innovative science or commercial solutions or develop or analyse original computer science applications / techniques. A series of lectures are provided to introduce students to the process and students are encouraged to select their own topic with help from a supervisor. Though not compulsory, students are encouraged to draw upon the expertise and specialisms of the programme team's research activities when devising a topic of investigation for their dissertation.

In previous years students graduating from Computing's existing MSc programmes have produced some excellent publishable work. In particular, in the last 3 years in excess of 10 papers have been published based on the dissertation work.

32 Learning support

Institutional level support for students

The University has a range of departments that offer the support for students as:

- Zone Enterprise hub
- Enterprise Lounge (Start-up incubation centre)
- Principles House (post-start-up incubation centre)
- Library and IT Resources
- The Assessment Centre
- DisAbility Support Team
- Irlen Centre
- Careers Centre and Job Shop
- Chaplaincy
- Counselling and Wellbeing
- Student Funding and Welfare
- International Welfare
- Student Programmes Centre
- Glyndŵr Students' Union
- Work-related Learning Unit

Faculty support for students

Every student is allocated a personal tutor in the first weeks of the programme. The personal tutor is someone students can contact to discuss any problems of a non-academic nature. These may relate to special needs or personal problems that may affect the student's academic performance. In Computing, the academic staff have been successfully piloting the use of a virtual personal tutoring space, enabled using the Moodle VLE, to provide students with the opportunity for peer support and for less urgent issues.

Another forum for discussion is the Student Voice Forum. Student representatives, who are elected by the students, meet lecturing staff on the programme once a trimester to exchange ideas about the programme. This allows students to communicate their shared concerns and for the staff to react and respond speedily to address their concerns.

Programme specific support for students

Students on the programme will receive the following forms of student support and guidance:

- Admissions. All students on the programme will have the opportunity to discuss their application with staff, and receive appropriate advice and guidance prior to admission. This will include a review of expectations of the programme and clarification of workload and requirements.
- Induction. New students on the programme will undergo an induction programme that will provide them with a full introduction to the programme, and will include elements of work on study skills and professional development.
- Student Handbook. All students on the programme will receive a Student Handbook which will contain details and guidance on all aspects of the programme and forms of student support and guidance, programme-based, and Faculty-based.

- Open Door Policy. Computing operates an Open Door policy, meaning that academic staff are readily and easily accessible and approachable for students outside of scheduled learning and teaching hours. Staff can be approached without the need for a formal appointment to be made.
- Progress Review and Attendance Monitoring. Student attendance will be subject to regular monitoring through registers, and this will be a means of addressing issues of student support. There will also be regular reviews for each student with personal tutors.

Additional support for International students:

There is network of support that is available at many different levels within the University and these combine to provide a supportive framework for the international students.

Specifically, this includes two main activities:

- The University offers English language classes alongside studies that improve not only spoken and written English but also academic English. Classes take place weekly and are delivered by the University's English language tutors. They also help students to integrate into the life of the local community as well as helping them develop transferable skills such as practical, research and report-writing skills.
- An induction / orientation course that precedes the start of formal teaching and that allows the international students to become familiar with the University and studying at the University while at the same time outlining some of the cultural differences that exist between their country of origin and the UK.

33 Equality and Diversity

Glyndŵr University is committed to providing access to all students and promotes equal opportunities in compliance with the Equality Act 2010 legislation. This programme complies fully with the University's Equal Opportunities Policy (http://www.glyndwr.ac.uk/en/AboutGlyndwrUniversity/Governance/TheFile,64499,en.pdf), ensuring that everyone who has the potential to achieve in higher education is given the chance to do so.

DATE OF APPROVAL	
Date of programme delivery approval event:	*21 January 2021*
Date of approval by Academic Board:	12 April 2021

APPENDIX 1 – PARTNER PROVIDER SUPPLEMENT TO PROGRAMME SPECIFICATION

When printed this becomes an uncontrolled document. Please check the Programme Directory for the most up to date version by clicking here.

Programme Title(s):
MSc Computer Game Development

This is the intended award title from the definitive Programme Specification and what will be printed on the award certificate.

1	***Awarding body***
	Glyndŵr University
2	**Partner Provider**
	Global Pathways Academy
3	**Location of delivery**
	Global Pathways Academy, #806, Souravya, 10th A Main Road, Indiranagar 1st Stage, Bangalore – 560 038 Western International College (WINC) #22/1, Siddedahalli ,off Hesarghatta Main Rd, behind Siddineya Temple, Nagasandra Post, Bengaluru, 560073 Western International College (WINC) FZE, PO Box 16038, Ras Al Khaimah Free Trade Zone, Ras Al Khaimah, UAE and/or other sites as approved by Glyndwr in writing.
4	**Faculty/Department**
	Faculty of Arts, Science and Technology
5	**Mode of study**
	Part time - PG PT
6	**Frequency / timing of intake/s**
	3 intake points per academic year (July, September and January)
7	**Language of study**
	English
8	**Name of academic link (correct at the point of programme approval)**
	Computing – John Worden

9 GU Approved Partner Programme Delivery Schedule(s)

MSc Computer Game Development

July intake – p/t

Year 1		
Semester 3 **Jul to Aug**	COM722 Advanced Artificial Intelligence (20 credits) CORE	COM731 Media Development and Distribution (20 credits) CORE
Semester 1 **Sep to Jan**	COM742 Postgraduate Study and Research Methods (20 credits) CORE	COM728 3D Design and Optimisation (20 credits) CORE
Semester 2 **Feb to May**	COM729 Game Analysis and Player Interaction (20 credits) CORE	COM730 Game Enterprise and Management (20 credits) CORE

Year 2	
Semester 3/1 **Jun to Jan**	COM738 Dissertation (60 credits) CORE

September intake – p/t

Year 1		
Semester 1 **Sep to Jan**	COM742 Postgraduate Study and Research Methods (20 credits) CORE	COM728 3D Design and Optimisation (20 credits) CORE
Semester 2 **Feb to May**	COM729 Game Analysis and Player Interaction (20 credits) CORE	COM730 Game Enterprise and Management (20 credits) CORE
Semester 3 **Jun to Aug**	COM722 Advanced Artificial Intelligence (20 credits) CORE	COM731 Media Development and Distribution (20 credits) CORE

Year 2	
Semester 1/2 **Sep to May**	COM738 Dissertation (60 credits) CORE

February intake – p/t

Year 1		
Semester 2	COM729	COM730

Feb to May	Game Analysis and Player Interaction (20 credits) CORE	Game Enterprise and Management (20 credits) CORE
Semester 3 **Jun to Aug**	COM722 Advanced Artificial Intelligence (20 credits) CORE	COM731 Media Development and Distribution (20 credits) CORE
Semester 1 **Sep to Jan**	COM742 Postgraduate Study and Research Methods (20 credits) CORE	COM728 3D Design and Optimisation (20 credits) CORE

Year 2	
Semester 2/3 **Feb to Aug**	COM738 Dissertation (60 credits) CORE