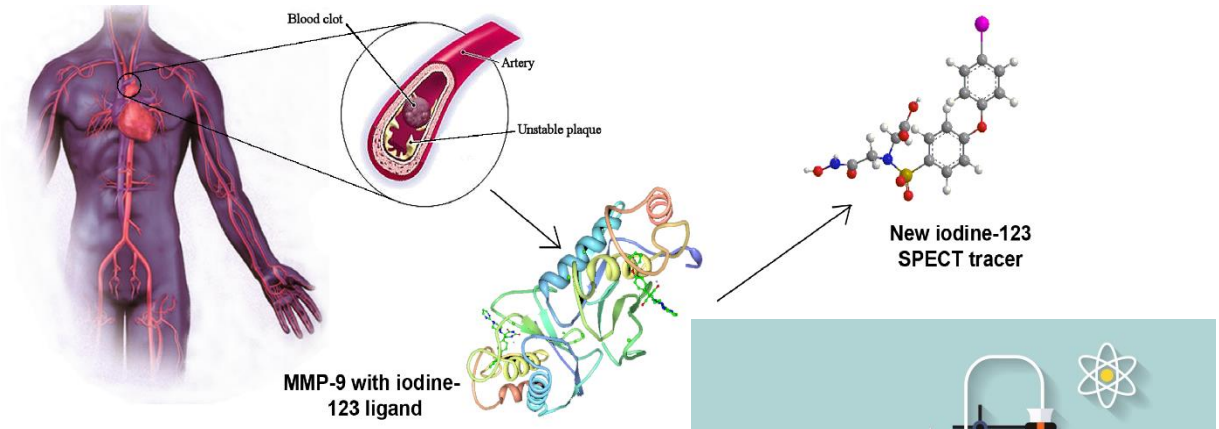
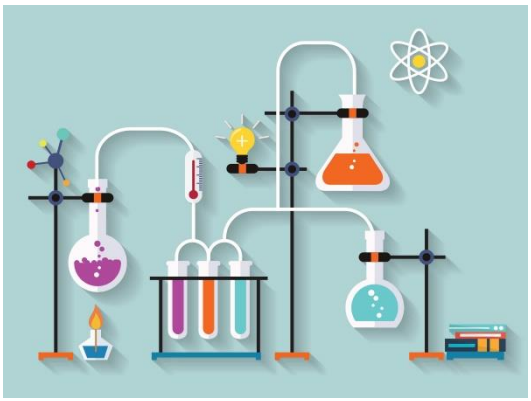
Anton de Kom Universiteit van Suriname

Institute for Graduate Studies and Research



Master chemical sciences



Studiegids 2021

Woord vooraf

Beste student,

Van harte welkom bij het Faculty for Graduate Studies and Research (IGSR). Wij zijn vereerd door jouw keuze voor een opleiding bij onze faculteit. Deze studiegids geeft algemene informatie over de eenjarige pre-masteropleiding chemical sciences.

De huidige ontwikkelingen in ons land en internationaal vraagt om innovatieve creatieve mensen die kunnen bijdragen aan ons land en daarbuiten. De vraag in de wereld van exportproducten zoals, agrarische producten en ook vlees en vis en natuurgeneesmiddelen is groot. Daarnaast wordt er verwacht dat alle producten aan internationale kwaliteitsnormen voldoen. Om de kwaliteitsnormen te behalen maar ook om deze aan te geven op alle exportproducten is het noodzakelijk dat er gekwalificeerd personeel aanwezig is op de verschillende laboratoria.

Tijdens de studie zal je de kennis en vaardigheden meekrijgen die nodig zijn om een wezenlijke bijdrage te leveren aan het verder tot ontwikkeling brengen van ons land dwars door alle sectoren.

De studierichting chemical sciences biedt een driejarige wetenschappelijke masteropleiding die zodanig is opgezet dat je voldoende technische kennis opdoet om allerlei producten te analyseren en te optimaliseren. Daarbij leer je gedurende deze periode zelfstandig onderzoek te doen.

De opleiding is breed van opzet en bevat elementen die van belang zijn voor een wetenschappelijke chemische opleiding. De focus van de master chemical sciences is een uitgebreide basis leggen voor het goed kunnen inzetten in het maatschappij en of verder doorstromen naar het zelfstandig opzetten en uitvoeren van onderzoek.

Wij wensen u veel succes toe met de studie.

Victorine Pinas

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General information of the Institute	
1. Naam	Institute for Graduate Studies and Research
2.Adres	Leysweg 86, Paramaribo, Suriname
3. Legale Status	Stichting
General information of the program	
1. Naam van het programma	Master Chemical Sciences
2. Oriëntatie	Academisch Master
3. Aantal ECTS	120
4. Specialisaties (afrondingsproject)	Verschillende afrondingsprojecten
5. Locatie	IGSR, Paramaribo, Suriname
6. Type(s)	Deeltijd
7. Graad na afronding	Academische Master
8. Begindatum	April 2021
Informatie contactpersonen	
1. Programmacoördinator	Victorine Pinas
2. Telefoonnummer	490900 or 434080 #118

1. De Anton de Kom Universiteit en het Institute for Graduate Studies and Research

1.1 Organisatie

1.1.1. Bestuur AdeKUS

Het hoogste Bestuurlijke Orgaan van de AdeKUS is het Bestuur van de Universiteit (BvU). Het BvU bestaat uit 9 leden waarvan 6 worden benoemd en 3 gekozen door de geledingen van de Universiteitsgemeenschap.

Het BvU is belast met de algehele leiding van de Universiteit, zowel naar haar geheel als naar haar onderdelen. De Voorzitter van het BvU vertegenwoordigt de Universiteit in en buiten rechte. Het Bestuur van de Anton de Kom Universiteit van Suriname (BvU) is het, bij wet voorgeschreven, toezichthoudend orgaan van de stichting "Institute for Graduate Studies and Research" (IGSR).

1.1.2. Het Institute for Graduate Studies and Research (IGSR)

Het Institute for Graduate Studies & Research (IGSR) is sedert 13 december 2007 gehuisvest in het Staatoliegebouw op het Universiteitscomplex. Het oorspronkelijk idee was een Graduate Faculty op te zetten, maar om diverse redenen werd besloten om alvast als Stichting te beginnen, derhalve werd op 10 maart 2006 werd door het AdeKUS- bestuur de Stichting IGSR opgericht. De Statuten zijn algemeen bepalend en richtinggevend. Het instituut is actief rondom zowel de academische als wetenschappelijke master- en postdoctorale studies van de universiteit. Ook richt het zich op de versterking en uitbreiding van het wetenschappelijke kader, onderzoekingen, publicaties en dienstverleningen zowel nationaal als internationaal.

De stichting IGSR heeft een zelfstandig bestuur. Het IGSR-bestuur is het hoogste bestuursorgaan van het IGSR en bestaat uit ten minste drie en ten hoogste vijf leden. De voorzitter van het IGSR-bestuur vertegenwoordigt de stichting in en buiten rechte. De samenstelling van het IGSR-bestuur in het academisch jaar 2020-2021 is als volgt: Dr. Robert Power (Voorzitter), Mr. Nailah van Dijk en Dr. John Codrington

Binnen het IGSR is het Directieteam belast met de dagelijkse leiding van de Stichting. De dagelijkse leiding omvat o.m. het verrichten van alle beheersdaden welke vallen binnen het kader van de goedgekeurde begroting van de Stichting e.e.a. overeenkomstig de richtlijnen van het Bestuur van de Stichting. De directie werd sinds het ontstaan van het IGSR gevormd door een directeur en twee onderdirecteuren (onderwijs en onderzoek). Voor het academisch jaar 2020-2021 bestaat het directieteam uit: Dr. Anthony Druiventak (directeur) en drs. Jasmattie Khemraj LLB (onderdirecteur onderwijs).

De Administratie van het IGSR is gevestigd in het:

Staatsolie gebouw Universiteitscomplex

Leysweg 86, telefoonnummer: 490900 ext. 100

e-mail: info@igsr.com

1.2 Commissies

1.2.1 De Examencommissie

De examencommissie bestaat uit de volgende leden:

Dr. A. Caffe (Voorzitter)

Dr J. Kartopawiro (Secretaris)

Dr. J. Terborg

De taken en bevoegdheden van de examencommissie staan beschreven in het examenreglement, dit betreft:

- het bekrachtigen van de vastgestelde examenuitslag;
- het borgen van de kwaliteit van de tentamens en examens;
- het borgen van de kwaliteit van de organisatie en de procedures rondom tentamens en examens via de Tentamen Instructie en het proces-verbaal;
- het verlenen van vrijstelling voor het afleggen van één of meer tentamens;
- indien een student/extraneus fraudeert, het opleggen van een sanctie;
- het besluiten op een verzoek van een student tot her-correctie of een derde kans;
- voorstellen doen aan de IGSR-directie met betrekking tot aanwijzingen te geven voor het ordelijk doen verlopen van tentamens;
- het evalueren van het examenreglement;
- Het vaststellen van richtlijnen en aanwijzingen binnen het kader van het examenreglement, om de uitslag van tentamens en examens te beoordelen en vast te stellen.

De administratie van de examencommissie is te bereiken in staatsoliegebouw tel.nr. 490900. Ext 118. Email: info@igsr.com

1.2.2 De Opleidingscommissie

Een belangrijk orgaan dat zorgt voor de kwaliteitsborging van onderwijs en organisatie van een opleiding is de opleidingscommissie (Op*Cie*), zoals vervat in Standaard 14 van het NOVA-accreditatiekader.

De OpCie bestaat uit studenten en docenten die gevraagd en ongevraagd, advies uitbrengen aan het bestuur van het IGSR over de kwaliteit van het onderwijs en de organisatie van de opleidingen. De hoofdtaak van de OpCie is het uit brengen van adviezen aan het bestuur IGSR die de kwaliteit van de opleidingen bevorderen en waarborgen.

Hierbij vloeien vijf kerntaken uit voort.

- het uitbrengen van advies over reglementen en handleidingen m.b.t. het onderwijs zoals onderwijs-en examenreglementen (OER), thesisreglement en stagereglement;
- advies uitbrengen over de planning en voorbereiding van het onderwijs;

- adviseren over de uitvoering van het onderwijs;
- adviezen uitbrengen naar aanleiding van studievoortgangsgevens;
- gevraagd en ongevraagd advies uitbrengen over onderwerpen die met het onderwijs samenhangen.

Het IGSR hanteert het document Regeling Opleidingscommissie van de Universiteit van Suriname. De OpCie bestaat per studierichting/opleiding uit tenminste één docerend lid (voltijds of deeltijds) en één student. Werkwijze en tijdsbesteding van de Opcie staat uitgebreid vermeld in het document regeling opleidingscommissie van de Universiteit van Suriname. De OpCie is nog niet benoemd, maar de leden zijn al geïdentificeerd en zullen kort na aanvang van de opleiding benoemd worden.

1.2.3 Studentencommissie

De Studentencommissie wordt door de studenten gekozen en heeft de volgende taken en bevoegdheden:

- Het onderhouden van contacten met studenten van de IGSR
- Het evalueren van de studentenproblematiek en het doen van voorstellen aan de decaan en/of het Universiteitsbestuur.
- Het onderhouden van contacten met organen binnen de universiteit die zich bezighouden met de studentenproblematiek.
- Het onderhouden van regelmatige contacten met andere studentencommissies i.v.m. uitwisseling van informatie en afstemming van werkzaamheden gericht op het bewerkstelligen van uniforme regelingen.

De studentenvertegenwoordiging zijn Michel Daniels en Vacant

Recentelijk is het Surinaams Chemisch Dispuut (SCD) opgericht het bestuur en de leden zullen binnenkort aan de universiteit gemeenschap voorgesteld worden. De taak van dit dispuut heeft tot doel activiteiten te ontplooien voor studenten binnen en buiten de studie (Borrels, lezingen, excursies, uitwisseling met andere studentverenigingen, beschikbaar stellen van studenthandleidingen etc). Het SCD werkt nauw samen met het Amsterdams chemisch dispuut (ACD). De vertegenwoordiger van de totale studenten gemeenschap AdeKUS wordt op 15 Januari 2021 gekozen en zal via het prikbord bekend gemaakt worden.

In samenwerking met de Koninklijke Nederlandse chemische Vereniging (KNCV) zijn studenten van de opleiding chemical Sciences ook aangesloten bij deze beroepsvereniging. Deze heeft tot taak dat student en docent uitwisseling plaats vindt. Het uiteindelijk doel is dat onze studenten (inter)nationaal bekendheid kunnen werven en hun studieresultaten onder de paraplu van de KNCV kunnen publiceren en samen met andere chemici van gedachten kunnen wisselen in het chemisch veld. Voorts biedt de KNCV het forum voor docenten om zich ook te verdiepen in research in de tropen (Tropichem).

De leden zijn bij de vergadering van 7-08-2020 gekozen en bestaat uit

- Voorzitter: Mitchel Daniels

- Secretaris: Angela Riedewald
- Lid: Vacant
- Lid: Vacant
- Lid: Natasja Tewarie

1.2.4 Toetscommissie

De toetscommissie voert taken uit die gemandateerd zijn door de Examencommissie d.w.z. dat de toetscommissie uit hoofde van de examencommissie controle uitoefent inzake het bewaken van de kwaliteit van de toetsen. De toetscommissie heeft een adviserende en controlerende taak. De examencommissie blijft eindverantwoordelijk.

De toetscoördinator coördineert de activiteiten die betrekking hebben op de kwaliteit van toetsen vooraf (preventief) en indien nodig achteraf (bijvoorbeeld bij gebleken verstoringen of bij nieuwe docenten/nieuwe vakken) binnen de opleiding. De toetscommissie doet onderzoek naar de kwaliteit van de toetsen achteraf (curatief). In voorkomende gevallen kan de examencommissie aan de toetscommissie vragen om specifieke gevallen te onderzoeken advies uit te brengen en/of om tussentijds te rapporteren. De toetscoördinator blijft zijdens de opleiding het eerste aanspreekpunt van de toetscommissie.

1.2.5 Overige organen

Studentendecanaat

De Studentendecaan biedt begeleiding aan studenten voor een vlot en succesvol verloop van hun studie carrière. Zij dient als klankbord, wegwijzer en inspiratiebron. Wanneer u voor uitdagingen komt te staan die de voortgang van uw studie kunnen belemmeren kunt u terecht bij de Studentendecaan. Op dit moment is deze functie bij het IGSR nog vacant.

Kwaliteitszorg

Het IGSR beschikt over een kwaliteitszorgmedewerker, die onder meer als taak heeft het ondersteunen van de opleidingen bij alle activiteiten op het gebied van onderwijsbeleid en kwaliteitszorg. De kwaliteitszorgmedewerker voor het IGSR is mw. Manushka Sedney-Omanette MSc. Zij is bereikbaar via e-mail: manushka.omanette@uvs.edu.

2. De Opleiding Chemical Sciences

2.1 Missie en Visie Institute for Graduate Studies and Research

Het doel is het vormen van topkader op hoger universitair niveau, dat de ontwikkeling van Suriname kan ondersteunen.

Visie en Missie IGSR - Het IGSR wil een dynamisch onderdeel zijn van de Anton de Kom Universiteit van Suriname om Graduate – en post-graduate opleidingen en onderzoek aan te bieden en om de kwaliteit en het niveau van het hoger onderwijs te bewaken en te verhogen. De volgende onderdelen staan hierbij centraal, nl.

- Het bewaken van de kwaliteit en het niveau van de aangeboden Masters en andere post-graduate opleidingen aan de AdeKUS
- Het aanbieden van relevante Masters' en post-graduate programma's
- Het versterken en vergroten van het wetenschappelijk kader van de AdeKUS middels stimulering van promoties, wetenschappelijk onderzoek en publicaties.

2.1.1. Missie Visie en doelstellingen opleiding Chemical Sciences

Onze missie

Chemical Sciences verbindt mensen en kennis om innovaties te creëren die de concurrentiekracht van bedrijven en het welzijn van de samenleving duurzaam versterken.

De opleiding chemical Sciences streeft naar op niveau specialiseren en blijvend stimuleren van chemische en chemisch technische kennis.

Onze Visie

Het bieden van een brede en verdiepende basis in de chemie die wetenschappelijk redeneren en analytisch oplossen van problemen met een moleculair perspectief benadrukt.

Om studenten te voorzien van de vaardigheden die nodig zijn om te slagen in een vervolgtraject (PhD), de chemische industrie of professionele school of als entrepreneur.

Doelstellingen van het MSc-CS-programma

- Het bieden van een brede basis in de chemie die wetenschappelijk redeneren en analytisch oplossen van problemen met een moleculair perspectief benadrukt.
- Om studenten te voorzien van de vaardigheden die nodig zijn om te slagen in vervolgtraject (PhD), de chemische industrie of professionele school.
- Om de studenten bloot te stellen aan een breed scala aan experimentele technieken met behulp van moderne instrumentatie.

Afgestudeerden van de opleiding kunnen buiten de kaders van kennis en denken binnen de wetenschappelijke omgeving van de opleiding. Daarmee wordt voldaan aan de huidige eisen die gesteld worden in de chemische technologie en industrie. Dit sluit ook aan bij de visie en missie en het strategisch plan van het IGSR. Dit houdt in dat binnen de opleiding zowel

aandacht besteed wordt aan de eisen vanuit de academische benadering alsook aan de eisen vanuit de beroepspraktijk.

2.2. Instroomeisen en eindkwalificaties masteropleiding-CS

2.2.1. Toelatingseisen

Het masterprogramma Chemical Sciences van de Anton de Kom Universiteit is direct toegankelijk voor studenten in het bezit van een universitaire BSc in de volgende vakgebieden: Chemie/Scheikunde, Chemical Sciences, Biomedische wetenschappen, Biochemie. Studenten worden ook toegelaten met een certificaat premaster Chemical Sciences van de Anton de Kom Universiteit van Suriname (AdeKUS), Institute for Graduate Studies and Research (IGSR).

Afgestudeerden van de BSc-opleidingen Milieuwetenschappen, Agrarische Productie en Geowetenschappen van de Faculteit der Technologische Wetenschappen (FTeW) van de AdeKUS zijn voorwaardelijk toelaatbaar. Zij dienen in het eerste studiejaar de volgende deficiëntievakken succesvol af te ronden:

- Analytical Chemistry & Laboratory
- ICT & chemistry 20-Sim program Chemdraw, Matlab
- Introduction organic chemistry & laboratory
- Introduction inorganic chemistry & laboratory

Zie het pre-masterprogramma voor de vakomschrijving van bovengenoemde vakken.

2.2.2. Eindkwalificaties

De eindkwalificaties van de MSc-CS sluiten aan bij de beschrijving van de Master eindkwalificaties die vastgelegd zijn in de Dublin disriptoren.
De afgestudeerde:

Kennis en inzicht

1. Heeft diepgaande wetenschappelijke kennis en inzicht in de (bio)-chemische processen van zowel biologische systemen, maar ook binnen chemische procestechnologieën en engineering
2. Heeft kennis en begrip in de achtergrond van organische reactiemechanismen, complexe chemische structuren, instrumentele methode voor het scheiden van werkzame stoffen en moleculaire herschikkingen en hun toepasbaarheid in de industrie en binnen de industrieel processen
3. Heeft kennis van verschillende elementen die aanwezig zijn in levende systemen, coördinatiechemie en structuur van systemen, eigenschappen van verbindingen, structurele bepaling van complexen met behulp van theorieën en instrumenten en de toepasbaarheid bij biologische systemen. Deze theorieën kunnen omzetten in industrieel toepassingen en processen"
4. Heeft specialistische kennis op het afstudeerrichtingsgebied van zowel de theorie als ook de laboratorium handelingen op het specifiek gebied

Toepassen kennis en inzicht

5. Kan onderzoek op het gebied van Chemie ontwerpen en uitvoeren (gebuikmakend van normaal laboratoriumapparatuur zoals GC, HPLC, UHPLC, AAS, NMR), de gepaste methodes en technieken selecteren voor het uitvoeren van bepaalde chemische/biologische analyses.
6. Kan complexe bekende en onbekende chemische problemen autonoom en planmatig oplossen die zich tijdens een experiment kunnen voordoen, nauwgezet volgens de veiligheid, -gezondheids- en milieuvoorschriften.
7. Kan bijdragen aan praktische ideeën voor nieuwe chemische processen en concepten in de industrie, innoveren en implementeren
8. Werkt zowel onafhankelijk als in teamverband, kan met technische en wetenschappelijke problemen van hoge complexiteit omgaan om het werk in een bredere industriële en maatschappelijke context te plaatsen

Oordeelsvorming

9. Werkt zowel onafhankelijk als in teamverband, kan met technische en wetenschappelijke problemen van hoge complexiteit omgaan om het werk in een bredere industriële en maatschappelijke context te plaatsen
10. Is in staat om een verantwoordde keuze te maken uit verschillende bronnen voor data, analyse en rapportage
11. Heeft ethische normen, een academische en professionele houding, is zich bewust van de sociale en economische gevolgen van zijn/haar acties en is in staat om verantwoordelijkheid te nemen voor de resultaten van zijn/haar werk

Communicatie

12. Kan ideeën en resultaten over een complex chemisch probleem zowel mondeling als schriftelijk aan het publiek communiceren, presenteren en verdedigen middels goed gestructureerde rapporten, wetenschappelijke bijdragen voor publicaties, mondelinge presentaties en posters
13. Werkt flexibel, luistert actief en reageert passend op ideeën van anderen en op veranderingen, debatteert met anderen en doet concessies om overeenstemming te bereiken
14. Bezit de leervaardigheid die hem of haar in staat stellen een vervolgstudie aan te gaan met een zelfstandige kritische houding

2.3. Het programma

2.3.1. Curriculum

Hieronder staat het curriculum van de opleiding Chemical Sciences weergegeven. Hier staat beschreven welke vakken gedurende de gehele opleiding in welk blok verzorgd zullen worden. Ook is aangegeven in welke tijdsvakken dit voldaan zal worden.

		Afstudeerrichtingen					
		Analytical Chemistry	Medicinal Chemistry	Chemical & Process Engineering	SP		
Jaar 1	Blok 1	Environmental Chemistry	Environmental Chemistry	Environmental Chemistry	3		Gezamenlijke vakken
		Biochemistry	Biochemistry	Biochemistry	3		
		Process Technology	Process Technology	Process Technology	3		
		Chemical Thermodynamics	Chemical Thermodynamics	Chemical Thermodynamics	3		
		Analytical Chemistry I	Analytical Chemistry I	Analytical Chemistry I	3		
		Spectroscopic Techniques	Spectroscopic Techniques	Spectroscopic Techniques	3	18	
	Blok 2	Pharmacognosy I	Pharmacognosy I	Pharmacognosy I	5		
		Chemical Engineering	Chemical Engineering	Chemical Engineering	4		
		Petroleum Chemistry & biofuels	Petroleum Chemistry & biofuels	Petroleum Chemistry & biofuels	3		
		Waste water treatment technology	Waste water treatment technology	Waste water treatment technology	4		
		Enzymatic Catalysis	Enzymatic Catalysis	Enzymatic Catalysis	3		
		Project management I	Project management I	Project management I	3	22	
						40	
Jaar 2	Blok 3	Reservoir Technology	Reservoir Technology	Reservoir Technology	4		
		Water Purification systems	Water Purification systems	Water Purification systems	4		
		Forensic Sciences	Forensic Sciences	Forensic Sciences	3		
		Principles of Biodiagnostics	Principles of Biodiagnostics	Principles of Biodiagnostics	3		
		Research Philosophy & Ethics	Research Philosophy & Ethics	Research Philosophy & Ethics	3	17	
	Blok 4	Design & Synthesis of Organic Compou	Design & Synthesis of Organic Compounds	Design & Synthesis of Organic Compounds	4		
		Chemometrics	Chemometrics	Chemometrics	4		
		Project Management II	Project Management II	Project Management II	3		68
		Pharmacognosy II	Pharmacognosy II	Petrol & Gas Processing Technology /Explosion & Ignition Calcu	6		Afstudeer richtings vakken
		Analytical Chemistry II	Industrial and Supramolecular Chemistry	Petrol & Gas Engeneering/Biorefinery Technolgy and Applicatio	6	23	
						40	
Jaar 3	Blok 5	Bio-diagnostics	Medicinal Chemistry	Alternative Energy Sources Technology	5		
		Waterpurification technology	(Bio) molecular Design & synthesis & model	Process & Chemical Engineering	5		
		Research project en Master thesis	Research project en Master thesis	Research project en Master thesis	30		52
						40	

2.3.2. Leerlijnen

De master Chemical Sciences kent 3 inhoudelijke leerlijnen, namelijk Analytical Chemistry, Chemical and Process Engineering, en Medicinal Chemistry (herkenbaar aan de kleuren in het programma) en een leerlijn waar de algemene academische vaardigheden onder vallen. In onderstaande tabel staan de vakken binnen iedere leerlijn en de leerlijncoördinatoren vermeld.

Leerlijnen

Leerlijn Analytical Chemistry (leerlijn AC)	Code
Environmental Chemistry	AC-ENC1
Analytical Chemistry I	AC-ANC I1
Spectroscopic Techniques	AC-SPT1
Waste Water Treatment Technology	AC-WAWTT2
Enzymatic Catalysis	AC-ENC2
Water Purification systems	AC-WAPS3
Forensic Sciences	AC-FOS3
Chemometrics	AC-CH4
Analytical Chemistry II	AC-ANC5 II
Bio-diagnostics	AC-BID5-K
Advanced Water Technology	AC-ADWT-K
Leerlijn coordinator: drs S. Algoe	

Leerlijn Chemical and Process Enigneering (Leerlijn CPE)	Code
Process Technology	CPE-PRT1
Chemical Engineering	CPE-CHE2
Petroleum Chemistry and biofuels	CPE-PECBT1
Reservoir Technology	CPE-RET3
Petrol & Gas Processing Technology /Explosion & Ignition Calculations	CPE-PEGPT2
Petrol & Gas Engeneering/Biorefinery Technolgy and Applications	CPE-PEGE4
Alternative Energy Sources Technology	CPE-ALEST5-K
Process & Chemical Engineering	CPE-PRCE5-K
Leerlijn coordinator: dr. V. Pinas	

LEGENDA
AC = leerlijn Analytisch Chemie leerlijn
ENC = afkorting vak
1 = Blok 1
K = keuzevak

Leerlijn coordinator 1: S. Algoe
Leerlijn coordinator 2: L Rietveld
Leerlijn coordinator 3: W. Dehaen
Leerlijn coordinator 4: E. Schinaia
Toetscoordinator V.Pinas

TEAM

Leerlijn Medicinal Chemistry (leerlijn MC)	Code
Biochemistry	MC-BI1
Chemical Thermodynamics	MC-CHT1
Pharmacognosy I	MC-PH12
Principles of Biodiagnostics	MC-PRB3
Design & Synthesis of Organic Compounds	MC-DESOC4
Pharmacognosy II	MC-PHI14
Industrial and Supramolecular Chemistry	MC-INSC5
Medicinal Chemistry	MC-MEC5-K
(Bio)Molecular Design & Sysnthesis & Modelling	MC-BIMDSM5-K
Leerlijn coordinator: Professor. W. Dehaen	

Leerlijn Academische Vaardigheden (leerlijn AV)	Code
Project Management I	AV-PRM1
Research Philosophy & Ethics	AV-REPE3
Project Management II	AV-PRM114
Research Project & Master Thesis	AV-REPMT5-K
Environmental Chemistry & Academic skills / writing	
Biochemistry & Academic skills / writing	
Process Technology I & Academic skills / writing	
Principles of Biodiagnostics and academic skills	
Process Technology II and academic skills	
Leerlijn coordinator drs. E. Schinaia	

2.3.3. Jaarkalender

In het gezamenlijke deel van de Masteropleiding (t/m de eerste twee vakken van blok 4) worden steeds twee vakken parallel aangeboden. Beide vakken worden afgerond voor de volgende twee vakken van start gaan. De afstudeervakken worden achter elkaar ingepland; ook hier geldt dat het vak wordt afgerond voor het volgende vak van start gaat. Hieronder volgt de in detail uitgewerkte jaarkalender voor jaar 1 en de globale planning voor jaar 2 en 3.

JAARPROGRAMMA MASTER CHEMICAL SCIENCES 2022 - 2025			
Periode	**Code**	**Vak**	**ECTS**
Master Jaar 1, Blok 1			
	Startweek 02-05 t/m 06-05-2022		
09-05 t/m 27-05-2022	**AC-ENC1**	**Environmental Chemistry**	**3**
09-05 t/m 27-05-2022	**MC-B11**	**Biochemistry**	**3**
	Studieweken 30-05 t/m 10-06-2022		
	Deficiëntievak Lineaire Algebra 30-05 t/m 03-06-2022		
	Toetsweek 13-06 t/m 17-06-2022		
20-06 t/m 08-07-2022	**CE-PRT1**	**Process Technology**	**3**
20-06 t/m 08-07-2022	**MC-CHT1**	**Chemical Thermodynamics**	**3**
	Studieweken 11-07 t/m 22-07-2022		
	Deficiëntievak Physics for Chemists 11-07 t/m 15-07-2022		
	Toetsweek 25-07 t/m 29-07-2022		
01-08 t/m 19-08-2022	**AC-ANC I-1**	**Analytical Chemistry I**	**3**
01-08 t/m 19-08-2022	**AC-SPT1**	**Spectroscopic Techniques**	**3**
	Studieweken 22-08 t/m 02-09-2022		
	Deficiëntievak Quantum Mechanics 22-08 t/m 26-08-2022		
	Toetsweek 05-09 t/m 09-09-2022		
	VAKANTIE/STUDIEVRIJ: 12-09 t/m 30-09-2022		
	HERKANSINGEN Blok 1: 03-10 t/m 21-10-2022 (incl. deficiëntievakken)		
Master Jaar 1, Blok 2			
24-10 t/m 11-11-2022	**MC-PHI-2**	**Pharmacognosy I**	**5**
24-10 t/m 11-11-2022	**CE-CHE2**	**Chemical Engineering**	**4**
	Projectweken 14-11 t/m 16-12-2022		
	Toetsweek 19-12 t/m 23-12-2022		
	KERSTVAKANTIE: 26-12-2022 t/m 06-01-2023		
09-01 t/m 27-01-2023	**AC-WAWTT2**	**Waste Water Treatment Thechnology**	**4**
09-01 t/m 27-01-2023	**CPE-PECB2**	**Petroleum Chemistry and Biofluels**	**3**
	Projectweken 30-01 t/m 17-02-2023		
	Toetsweek 20-02 t/m 24-02-2023		
27-02 t/m 17-03-2023	**AC- ENC 2**	**Enzymatic Catalysis**	**3**
27-02 t/m 17-03-2023	**AC-PM12**	**Project management I**	**3**
	Projectweken 20-03 t/m 31-03-2023		
	Toetsweek 03-04 t/m 07-04-2023		
	STUDIEVRIJ: 10-04 t/m 14-04-2023		
	HERKANSINGEN BLOK 2: 17-04 t/m 28-04-2023		
	Totaal ECTS Jaar 1 :		**40**

Master Jaar 2, Blok 4			
01-05 t/m 23-06-2023	**CE-RET 3**	**Reservoir Technology**	**4**
01-05 t/m 23-06-2023	**AC-WAPS3**	**Water Purification Sytems**	**4**
25-06 t/m 04-08-2023	**MC-PRB3**	**Principles of Biodiagnostics**	**3**
25-06 t/m 04-08-2023	**AV-REPE3**	**Research Philosophy & Ethics**	**3**
07-08 t/m 15-09-2023	**AC-FOS3**	**Forensic Sciences**	**3**
07-08 t/m 15-09-2023	**AV-PRM11-4**	**Project Management II**	**3**
	VAKANTIE/STUDIEVRIJ: 18-09 t/m 06-10-2023		
	HERKANSINGEN BLOK 3: 09-10 t/m 20-10-2023		
Master Jaar 2, Blok 4			
23-10 t/m 15-12-2023	**MC-DESOC4**	**Design & Synthesis of Organic Compounds**	**4**
23-10 t/m 15-12-2023	**AC-CH4**	**Chemometrics**	**4**
	KERSTVAKANTIE 18-12-2023 t/m 05-01-2024		**of**
	Afstudeerrichtingen		
08-01 t/m 16-02-2024	**AC-ANC4-II**	**Analytical chemistry II**	**6**
19-02 t/m 29-03-2024	**MC-PHII-4**	**Pharmacognosy II**	**6**
			of
08-01 t/m 16-02-2024	**MC-INSC4**	**Industrial and Supramolecular Chemistry**	**6**
19-02 t/m 29-03-2024	**MC-PH11-4**	**Pharmacognosy II**	**6**
			of
08-01 t/m 16-02-2024	**CPE-PEGPT/EIC4**	**Petrol & Gas Processing Technology /Explosion & Ignition Calculations**	**6**
19-02 t/m 29-03-2024	**CPE-PEGE/BTA4**	**Petrol & Gas Engeneering/Biorefinery Technolgy and Applications**	**6**
	STUDIEVRIJ: 01-04 t/m 12-04-2024		
	HERKANSINGEN BLOK 4: 15-04 t/m 26-04-2024		
	Totaal ECTS Jaar 2 :		**40**

Master Jaar 3, Blok 5			
	Afstudeerrichtingen		
06-05 t/m 07-06-2024	AC-BID5-K	Bio-diagnostic	5
10-06 t/m 12-07-2024	AC-WAT5-K	Waterpurification Technology	5
			of
06-05 t/m 07-06-2024	MC-MEC 5 K	Medicinal Chemistry	5
10-06 t/m 12-07-2024	MC-BIMDSM 5 K	(Bio)molecular design, synthesis & modelling	5
			of
06-05 t/m 07-06-2024	CPE-ALEST5- K	Alternative Energy Source Technology	5
10-06 t/m 12-07-2024	CPE-PRCE5- K	Process & Chemical Engineering	5
Master Jaar 3, Blok 6			
15-07-2024 t/m 28-03-2025	AV-REPMT 5 K	Research project en Master thesis	30
	Incl. STUDIEVRIJ: 26-08 t/m 30-08-2024		
	Incl. HERKANSINGEN BLOK 5: 02-09 t/m 06-09-2024		
	Incl. VAKANTIEPERIODES: 09-09 t/m 27-09-2024 & 23-12-2024 t/m 03-01-2025		
31-03 t/m 30-04-2025	AFSTUDEERPERIODE		
	Totaal ECTS Jaar 3 :		40

2.4. Toetsing

Er wordt op verschillende manieren schriftelijk getoetst en het praktische werk wordt beoordeeld door middel van het ingediend verslag en verzorgde presentatie. Bij elke vakomschrijving staat vermeld hoe er wordt getoetst en hoe het cijfer bepaald zal worden.

2.5. Voorzieningen, personeel, kwaliteitszorg

2.5.1. Voorzieningen

Het IGSR heeft verschillende zalen voor zowel grote als kleine groepen. Naast de gewone AdeKUS bibliotheek is er een fysieke en digitale chemische bibliotheek aanwezig. In samenwerking met actoren in het veld binnen Suriname en daarbuiten zijn er voor de studenten goed uitgeruste laboratoria met moderne apparatuur aanwezig.

2.5.2. Personeel en kwaliteitszorg

Het docentenkorps van de opleiding Chemical Sciences is bemand door vakspecialisten uit binnen- en buitenland. Hieronder staat het docentenkorps van het eerste jaar vermeld met de contactgegevens van iedere docent. De namen van de overige docenten zijn te vinden in de vakomschrijvingen.

Docent	Vakken	Emailadres
S. Debipersad	Project Management I	stevendebipersad@hotmail.com
W. Dehaen	Spectroscopic Techniques	wim.dehaen@kuleuven.be
E. van Dijk-Schinnia	Biochemistry Enzymatic Catalysis	elenadis@hotmail.com
JP Polanen	Chemical Engineering Process Technology	jppolanen@yahoo.com
J. van Lier	Petroleum chemistry & biofuels Waste water treatment technology	J.B.vanLier@tudelft.nl
V. Pinas	Chemical Thermodynamics Analytical Chemistry I	victorine1830@gmail.com
S. Algoe	Pharmacognosy I Environmental Chemistry	soereshalgoe@yahoo.es

Naast de vakdocenten beschikt het IGSR over een uitgebreid ervaren team aan administratie personeel met aan de leiding een "chef de Bureau", die het directieteam en het bestuur ondersteunt. Ook is er een kwaliteitsmedewerker toegewezen aan het IGSR. De opleidingen van het IGSR worden gemonitord via continue evaluatie.

2.6. Onderwijsvormen

2.6.1. Hoorcollege en e-colleges

Naast het traditionele klassikale systeem waarbij de docent informatie verschaft over het college aan de student wordt zeer veel gebruik gemaakt moderne alternatieve vormen van kennisoverdracht. (Interactief, rollenspel, brainstorm). Ook wordt er via *e*-leren colleges aangeboden. Tijdens het college is er ruimte voor discussie. De docent heeft de bevoegdheid om van de student te eisen dat die een bepaald percentage van de colleges heeft gevolgd alvorens die wordt toegelaten tot het tentamen. Zulks is in de studiegids toegevoegd en wordt aan de studenten bij het eerste college kenbaar te worden gemaakt; voor de exacte regels wordt naar de examencommissie verwezen.

2.6.2. Laboratorium practica

De laboratorium practica zijn bedoeld om aan de studenten de laboratoriumvaardigheden bij te brengen die nodig zijn voor een aantal vakken die verzorgd worden binnen de studie en om het inzicht van studenten m.b.t. de bij de colleges behandelde leerstof te vergroten. Deelname is verplicht en de aanschaf van een laboratoriumjas en gesloten schoeisel is noodzakelijk.

Het dragen van sieraden is verboden. De vakdocent of een gekwalificeerde laboratorium assistent is altijd aanwezig. Van de uitgevoerde laboratoriumpractica resultaten moeten verwoord in een individueel en/of groepsverslag en worden al dan niet ondersteund door een presentatie.

2.7. Moodle

Moodle is de digitale leeromgeving van AdeKUS en vele docenten bieden hun vakken aan via dit systeem. Voornamelijk collegemateriaal, inlevering van opdrachten, wijzigingen in colleges worden hierop aangegeven. Het Universitair Centrum voor Informatie Technologie (UCIT) is verantwoordelijk voor de aanmaak van de Moodle accounts en stelt de studenten in kennis van hun inloggegevens via hun prive-emailadres die zij bij de inschrijving hebben doorgegeven. Indien je problemen hebt met inloggen of jouw password wilt resetten dan zal je in contact moeten treden met het UCIT. Het UCIT is gehuisvest in gebouw 7. Je uvs-email adres gebruiken voor communicatie met docenten e.d. is verplicht. De intekenlijsten voor het maken van een tentamen worden ook op Moodle geplaatst.

2.8. Praktische zaken

2.8.1. Studenten administratie

De algemene studentenzaken worden allemaal via de administratie van het IGSR onderhouden. Hier wordt het algeheel studentengebeuren op het IGSR uitgevoerd. Voor het afleggen van een tentamen moet een studentenpas getoond worden.

2.8.2. De bibliotheek

In de centrale bibliotheek die is gevestigd op het universiteitscomplex is er een scala aan wetenschappelijke informatie te vinden. De bibliotheek biedt de volgende diensten aan: uitleen van boeken; diverse studieruimten; computerfaciliteit; kopieerfaciliteit. Ook is het mogelijk om boeken online te zoeken via de website http://ub.uvs.edu/. Om van de bibliotheek faciliteiten gebruik te maken zal je lid moeten zijn. Op het IGSR is er zowel een digitale als ook een fysiek specialistisch e kleine bibliotheek aanwezig. De boeken van de fysieke bibliotheek kunnen niet uitgeleend worden, en zijn alleen beschikbaar voor gebruik op het IGSR.

2.8.3. Computerfaciliteiten

Er zijn verschillende computerfaciliteiten op de universiteit zoals het Universitair Centrum voor Informatie Technologie (UCIT) en de Bibliotheek. Ook is het mogelijk gebruik te maken van de IGSR-computerruimte mits deze beschikbaar is

2.8.4. Kopieerfaciliteiten

Kopiëren kan behalve in de bibliotheek ook geschieden bij Office World die is gevestigd bij de ingang van de campus. Ook scannen, printen, inbinden en de aankoop van kantoormaterialen etc. is hier mogelijk.

2.8.5. Ziektekosten en persoonlijke ongevallenverzekering

Studenten die ingeschreven staan aan de Anton De Kom Universiteit zijn automatisch verzekerd tegen (bedrijf)ongevallen. De verzekering is geldig bij aanwezigheid op de campus, op stage, excursies en bij vertrek van huis, enkel vanaf 1 uur voor het begin van een college en enkel tot 1 uur na beëindiging van het college aankomend thuis en wel via de kortste route. Het Bureau Studentenzaken verschaft nadere informatie hieromtrent.

2.8.6. Voeding en drank

Alle gebouwen op de campus zijn voorzien van een pantry, waar broodjes, bol, drankjes enz. verkocht worden. De IOL-kantine biedt ook een ruime keus aan hapjes en warme gerechten. Ook bij de poort van AdeKUS kun je terecht voor snacks en warme gerechten.

2.8.7. Prikborden

Informatie over onderwijs, examens, excursies, lezingen, onderzoek, ed. verschijnen op het mededelingenbord van het IGSR beneden in de hal rechts.

3. Vakomschrijvingen

Course	**Environmental chemistry**
Contact hours	48 Lectures and practical session
Study phase	1, M1
ECTS	3
Name lecturer	S. Algoe, Drs
Learning goals After completing the course, the student will be able to:	**The student will be able to** 1. Understand the discipline and other sub-disciplines and will apply them to environmental issues 2. Apply analytical and technical skills to understand the effects of xenobiotics in environmental systems (water, air, soil and biotic systems) quantify the data of his research 3. Identify the relations between chemical influence and effects of it on the physiological systems 4. Design strategies for research regarding doses-response relations. 5. Perform laboratory experiments related to the field of environmental chemistry 6. Use scientific literature about environmental chemistry and turn the information into work protocols which can be adjusted towards an own experiment 7. Write in scientific English 8. Identify what strategy to use to design an experimental process 9. Set up a research project and follow their own protocol in the laboratory 10. Assemble data and present the data to the scientific community
Course content	An examination of the chemistry of environmental systems. The aim is to identify and evaluate fundamental principles of chemistry in relation to environmental systems. Discussion covers the nature of atoms, types of bonding, functional groups, chemical reactivity, and chemical interactions. Topics also include migration of chemicals through the environment, the role of basic chemistry in biogeochemical cycles, and human impact on biogeochemical cycles through the use of technology.
Teaching methods	Interactive lectures Seminar Discussions Practical session Exercises will include practice in calculations and discussions of topics addressed in the lectures.
Required previous knowledge	-
Conditions for taking exam	-
Exam/Grading	Written exams (50%) Written report (25%) Short presentation (25%)
Course Materials	IGSR dictaat en hand out

Course name	**Biochemistry**
Contact hours	24 hoorcollege/werk college en practicum
Study phase	1, M1
ECTS	3
Name lecturer	E. Schinaia, Drs

Learning goals After completing the course, the student will be able to:	**The student will be able to** 1. Describe the synthesis of proteins, lipids, nucleic acids, and carbohydrates 2. Explain the role in metabolic pathways along with their regulation 3. Describe the folding, modification, and degradation of protein 4. Analyse structural-functional relationships of genes and proteins from bacteria to eukaryotes using genomic methods theory as well as laboratory experiments 5. Use biochemical and molecular laboratory techniques to plan and carry out laboratory experiments 6. Create an experimental design and use experimental techniques within a team 7. Present experimental data in a scientific sound manner
Course content	Introduction lesson about Biochemistry and cyclus van Krebs. Protein composition and structure, purification of proteins. Mass spectrometry and identifications of peptides and proteins. Nucleic acids (structure, trasmission of herditary information, DNA replication, gene expression. Hemoglobin and myoglobin. Enzymes, the Michaelis – Menten Model, enzymes inibition. Carbohydrates. Lipids. Membrane channels and pumps. Glycolyses and gluconeogenesis. The citric acid cycles. Oxydative phosphorylation. Forensic biochemistry. Southern and Northern Blotting techniques. Electronforesis. PCR techique
Teaching methods	Online lessons & 1 week practical experiment
Required previous knowledge	
Conditions for taking exam	Mandatory presence at the first lecture to keep/get place at the labouratory course. Mandatory presence at lecturers/workshop including writing laboratory report Approval of the online questionary to be admitted to written exams
Exam/Grading	Written exams (50%) Written report (25%) Short presentation (25%)
Course Materials	Boek: ***Biochemistry 9th edition*** (9781319114671) by Jeremy M. Berg, John L. Tymoczko, Gregory J. Gatto and Lubert ***Stryer*** Labo dictaat: IGSR Dictaat

Course	**Chemical thermodynamics**
Contact hours	24/block
Study phase	1, Master year 1
ECTS	3
Name lecturer	Victorine. Pinas
Learning goals After completing the course, student will have the following:	**The student is able to** 1. Explain thermodynamic laws, variables and functions and their practical significance 2. Derive important thermodynamic relations 3. Perform numerical calculations of thermodynamic variables 4. Apply thermodynamic principles to analyse practical problems 5. Derive rate laws for simple reactions and evaluate the validity of reaction mechanisms 6. Use special software to manage experimental measurements and present them in graphs 7. Document virtual computer modelling experiments 8. Disseminate and evaluate results from chemistry experiments in the computer modelling experiments
Content	The course gives a thorough description of the laws of thermodynamics, as well as

	chosen subjects within reaction kinetics. The course builds on fundamental concepts in thermodynamics and kinetics that were introduced in. Topics covered include chemical equilibrium, phase equilibria, phase diagrams and transitions, and properties of liquid mixtures and solutions. The course also contains a laboratory part where some parts of the theoretical syllabus is illustrated. In addition, the laboratory course provides the students with hands-on experience with assessing the uncertainty of qualitative measurement data.
Teaching methods	Interactive lecture Tutorial Discussion
Required previous knowledge	None
Conditions for taking an exam	Attendance is recorded at every lecture and there is an attendance requirement. The student must have attended at least 80% of the lectures
Exam/Grading	Written examination 80% Short report 20%
Course material	IGSR dictation and handout

Course	**Process Technology**
Contact hours	24/block
Study phase	1, Master year 1
ECTS	3 ECTS
Name lecturer	JP Polanen
Learning goals On completion of the course, the student should be able to:	**The student is able to:** 1. Formulate macro models using micro-processes that occur in process equipment involving several phases 2. Determine complex problems that exist in the process industry today 3. Set up experiments and present the data, discuss precision and accuracy using programming tools to analyse and process data 4. Analyse problems in multiphase systems and discuss ways to explore these with the aid of theory and experimental methods 5. Analyse and critically evaluate scientific sources of information and apply these to structure and formulate reasoning and new ideas within multiphase systems 6. Present scientific problems, analyses and conclusions within multiphase systems
Content	Process technology focuses on transport phenomena in multiphase systems, (flow and heat and mass transport in such systems) - Gives insight into the micro-processes that occur in process equipment involving several phases, and that you will be able to use this insight in the formulation of macroeconomic models - Candidates will be able to analyse the complex problems that occur in the process industry today - As advanced software takes over the more traditional and routine process-technological tasks, the industrial process technology focuses increasingly on the complex tasks that are involved in systems that contain more than one phase, tasks that often requires knowledge of a variety of disciplines - Program focused on building knowledge-based macro models for multiphase system by examining the sub-processes at the micro level - Tasks normally has a strong interdisciplinary character within IGSR lecturers specialisations (mathematics, physics or chemistry) and are thus collaborative work between theorists on the one hand and the processing industry on the other. A broad spectrum of experimental, numerical and theoretical tools is used

	- A broad basic understanding of current challenges in the field - Get experience with oral presentation of results and theories, and training to read and evaluate relevant scientific literature
Teaching methods	Interactive lecture tutorial Discussion Exercises will include practice in calculations and discussions of topics addressed in the lectures.
Required Previous Knowledge	None
Conditions for taking an exam	Mandatory presence at lecturers/workshop for 80%
Exam/ Final grade	Written exam (50%) Presentation (50%) All above 5.5
Course material	Will be provided by the lecturer

Course	**Analytical Chemistry I**
Contact hours	24 Lectures and practical session
Study phase	1, M1
ECTS	3
Name lecturer	V. Pinas
Learning goals After completing the course, the student will be able to:	**The student is able to** **1**. Analyse experimental mixtures and their components 2. Use basic purification methods to purify experimental mixtures 3. Characterise purified components using basic laboratory apparatus 4. Perform independently detailed analysis of unknown reaction mixtures, characterise it and determine the molecule structure using several laboratory equipment 5. Use laboratory software to perform statistical analysis 6. Uses analytical apparatus to determine the purity 7. Use and report results written as well as orally 8. Communicate results to a selected audience
Course content	Introduction to separation processes, flash distillation, colums, multicomponent and back distillation.Absorbtion and stripping. Liquid-liquid extraction,Washing, Leaching, and Supercritical Extraction. Diffusion and Mass Transfer. Introduction to Membrane Separation Processes Introduction to Adsorption, Chromatography, and Ion Exchange
Teaching methods	Interactive lectures Seminar Discussions Practical session
Required Previous Knowledge	None
Conditions for taking exam	Mandatory presence at lecturers/workshop for 80%
Exam/Grading	Written exam (50%) Written report (25%) Short presentation (25%)

Course Materials	1. Separation process engineering PC Wankat – 2006 2. Science and Technology of Separation Membranes. Tadashi Uragami.- 2017 3. Solid-Liquid Separation: Chemical Engineering Series Paperback – October 3, 2013. by. Ladislav Svarovsky

Course	**Spectroscopic Methods**
Contact hours	24 Lectures and practical session
Study phase	1, M1
ECTS	3
Name lecturer	Wim Dehaen
Learning goals After completing the course, the student will be able to:	The students will be able to: 1. Recognise molecules symmetric models 2. Identify the active molecular movements 3. Use the theoretical knowledge to determine, rotation, vibration, Raman and electronic spectrum of molecules 4. Understand the interactions at molecular level by the use of spectrometry. 5. Use theoretical data to define vibrational and rotational spectroscopic data 6. Predict spectroscopic proprieties of a compounds on the basis of its symmetrical proprieties 7. Interpret data from spectroscopic investigations and methodologies which has been theoretically discussed 8. Solve problems about structure, purification and concentration of compounds 9. Interpret experimental data and present this data to a selected audience
Course content	Collection of a Representative Sample. Statistics of Sampling Sampling. Preparation of Samples for Analysis. Solid Samples. Sample Preparation for Inorganic Analysis.Decomposition of Organics. Liquid Samples Extraction/Separation and Preconcentration Chromatographic Separation
Teaching methods	Interactive lectures Seminar Discussions Practical session
Required Previous Knowledge	None
Conditions for taking exam	Mandatory presence at lecturers/workshop for 80%
Exam/Grading	Written examination (50%) Short written report (25%) Presentation (25%)
Course materials	Book: **Handbook of Spectroscopy:** Second, Enlarged Edition. Editor(s):. Prof. Dr. Günter Gauglitz; Dr. David S. Moore. First published:2 April 2014 **Molecular spectroscopy**, JL. McHale, ISBN 9781466586581, Published May 16, 2017 by CRC Press, 457 Pages 187 B/W Illustrations

Course	**Pharmacognosy I**
Contact hours	40 hoorcollege/werk college en practicum
Study phase	2, M1
ECTS	5
Name lecturer	S. Algoe, Drs

Learning goals After completing the course, the student will be able to:	**The student is able to** 1. Define the history of botany pharmaceuticals and recognise natural origin of the medicine 2. Classify crude drugs by its structure, chemical differences in terms of therapeutic efficiency 3. Define secondary metabolites as active components of medicinal plants 4. Determine endogenous/ exogenous factors which affect their production in plants 5. Identify plants as source of chemicals for semi-synthesis reactions 6. Present results of novel plant experiments for (bio-)technological applications 7. Define plant most common diseases in specific Surinamese plants 8. Determine plants active components on several medical systems 9. Write new protocols for novel medicinal plants elucidation and determination of its new structure
Course content	Basic principles of pharmacology, the dynamics of drug absorption, distribution, metabolism and excretion (ADME), the routes of drug administration, drug receptors and drug- receptor interactions, the mechanisms of drug action, drug interactions, and adverse/side effects, basic and clinical evaluation of new drugs, drugs affecting autonomic nervous system, autacoids Moreover, the student will have a knowledge of: Algae of medicinal interest: Rhodophyta, Pheophyta, Chlorophyta, and their practical uses. Plants as source of chemicals for semi-synthesis reactions. Use of plants for biotechnological applications. Laxative and purgative plants: cascara buckthorn, alder buckthorn, rhubarb, senna, aloe, castor bean. Plants active on the CNS: valerian, California poppy, lemon balm, passionflower, St. John's wort, rauwolfia, coffee, ginkgo biloba, calabar bean. Plants active on the heart and circulatory system: purpe and woolly foxglove, climbing oleander, hawthorn, horse chestnut, sweet clover and warfarin. Plants with anti-inflammatory and analgesic activity: opium poppy, devil's claw, autumn crocus, coca, hemp. Plants for the digestive system: nightshade, henbane, thorn apple, licorice, mint, ginger, milk thistle. Antitumor plants: Indian and American mayapple, Madagascar periwinkle, Pacific yew, camptoteca acuminata. Antimalarial plants: cinchona, artemisia annua. Plants for the immune system and for cough: echinacea, ginseng, star anise. The student has also a knowledge of the procedures to cultivate medical plants and to keep their properties during the chain of crude drugs productiong.
Teaching methods	Interactive lectures Seminar Discussions Practical field and laboratory work
Required Previous Knowledge	None
Conditions for taking exam	Mandatory presence at lecturers/workshop for 80%
Exam/Grading	Written exam (40%) Short guided written report (40%) Presentation (20%)
Course materials	Handbook of Spectroscopy: Second, Enlarged Edition. Editor (s):. Prof. Dr. Günter Gauglitz; Dr. David S. Moore. First published:2 April 2014

Course	**Chemical engineering**
Contact hours	24/block
Study phase	2, Master year 1
ECTS	4
Name lecturer	V. Pinas
Learning goals On completion of the course, the student is able to:	**The student is able to:** 1. Explain the principles of radiogenic and stable isotope chemistry 2. Formulate and evaluate the geological problems that can be addressed with radiogenic and stable isotope chemistry 3. Explain the principles of mass, electromagnetic spectroscopy and chromatography 4. Review the quality of chemical data and assess errors associated with instrumental methods 5. Use basic laboratory and engineer systems to production systems 6. Prepare sample and perform analytical measurements and data reduction in radiogenic isotope and stable isotope chemistry 7. Keep an organised record of their analytical work in a lab book 8. Work independently as well as in a team in a laboratory in compliance with International health and safety regulations 9. Use a precise scientific language
Content	This course gives a theoretical and practical introduction to the chemical toolbox of radiogenic and stable isotope chemistry. It discusses how these tools can be used to address research questions related to time, sources and processes, and provides hands-on knowledge about the most important analytical techniques in chemistry The course consists of two parts: 1. Theoretical concepts, analytical methods and data reduction, and application of the chemical toolbox. The first part discusses important concepts in isotope chemistry and how the toolbox can be used to increase our understanding of geological time, sources of elements and processes affecting the distribution of elements in Earth's reservoirs. 2. Second part covers the generation and processing of chemical data and involves a student-based laboratory research project in a self-chosen research topic of interest (traditional stable isotope chemistry, non-traditional stable isotope chemistry, radiogenic isotope chemistry).
Teaching methods	Interactive lecture Tutorial Discussion
Required Previous Knowledge	None
Conditions for taking exam	Mandatory handing in of report on laboratory research project
Exam/ final grade	Written exam (80%) Short report (20%)
Course material	Literature will be provided by the lecturer

Course	**Petroleum Chemistry and Biofuels**
Contact hours	32 Lectures and practical session
Study phase	2, M1
ECTS	3
Name lecturer	Vacant

Learning goals After completing the course, the student will be able to:	1. Give an overview of the chemical composition and physical properties of petroleum, petroleum products and renewable motor fuels 2. Specify quality criteria for petroleum products and renewable motor fuels 3. Describe the chemistry behind the most important refinery processes 4. Give an overview of the resource base for petroleum and renewable alternatives 5. Perform individual evaluations of questions pertaining to production and use of petroleum from different sources and renewable motor fuels
Course content	The composition of carbon fuels and physical properties determination compared with renewable resources. Determined quality criteria for carbon fuels and compare this with renewable resources. The chemistry behind refinery processes. Alternative energy resources.
Teaching methods	Interactive lectures Seminar Discussions Practical session
Required Previous Knowledge	None
Conditions for taking exam Requirements	Mandatory presence at lecturers/workshop for 80%
Exam/grading	Written examination (100%)
Course materials	Book: Applied Soil and Aquatic Chemistry, E. Smolders Part II – Soil Chemistry

Course	**Water Waste Treatment Technology**
Contact hours	32 Lectures and practical session
Study phase	2, M1
ECTS	4
Name lecturer	Jules Van Lier Prof. Dr.
Learning goals After completing the course, the student will be able to:	**The student will be able to:** 1. Understand the chemistry in the processes involving the soil, water and atmosphere 2. Describe the chemical composition and equilibrium specification of the water phase according to the system Soil-Water-Atmosphere 3. Explain the processes about dissolving and forming of minerals 4. Interpret these processes and the graphic expression of these processes 5. Understand and interpret the adsorption and the behaviour of smaller components of the system Soil-Water-Atmosphere 6. Understand chemistry of natural waters-redox chemistry, acid-base chemistry, water quality parameters, pollution and purification of water, emerging contaminants 7. Understand the atmospheric chemistry- stratospheric chemistry, chemistry of ground level air pollution 8. Describe soil chemistry- solution-solid phase equilibrium, sorption, ion-exchange processes acidity 9. Use results to quantify the number of pollutants in the different matrices 10. Present data to a select group of scientists
Course content	Extensive section that details the sources, speciation, and the general behaviour of elements in soils Expanded section on crystal structure, updated phyllosilicates classifications scheme, inclusion of sepiolite-palygorskite group, and expanded x-ray diffraction section. Discussion of surface runoff losses of phosphorus from soil and description of the inductivity coupled argon plasma-mass spectroscopy (ICP-MS) analytical technique

	for determining elemental concentrations in soil solution Coverage of the influence of redox processes on the soil chemistry of non-electroactive elements. Description of the electrokinetic phenomenon and investigation of the influence of temperature on adsorption Expanded discussion on the application of chemical thermodynamics to soil system
Teaching methods	Interactive lectures Seminar Discussions Practical session
Required Previous Knowledge	None
Conditions for taking exam	Mandatory presence at lecturers/workshop for 80%
Exam/grading	Written exam (50%) Short report (50%)
Course materials	Book: Applied Soil and Aquatic Chemistry, E. Smolders Part I – Aquatic Chemistry

Naam cursus	**Enzymatic Catalysis**
Contact hours	28 Lectures and practical session
Study phase	2, M1
ECTS	3
Name lecturer	E. Dijkstra, Drs
Learning goals After completing the course, the student will be able to:	**The student will be able to:** 1. Classify the properties of catalysators 2. Relate the principles and mechanisms of catalysation processes 3. Independently make calculations about the catalysation processes 4. Design heterogeneous catalytic reactor, fixed bed reactor, slurry reactor, trickle bed reactor and fluidized bed reactor 5. Analyse experimental data from heterogenous reactions 6. Create a design of reactors meeting real-live situations 7. Present designs to specialists and non-specialists
Course content	Descriptions of: 1. Proton Transfer 2. Catalysis by Fields (Salts and Solvents) 3. Catalysis by Hydronium and Hydroxide Ions 4. Catalysis of Organic Reactions by General Acids and Bases and Catalysis by Nucleophiles and ElectrophilesThroughout The Bioorganic Chemistry of Enzymatic Catalysis. Intramolecular catalysis, multiple catalysis, and catalysis by evidence of the strong ties that bind organic chemical catalysis and enzymatic catalysis. Adsorption kinetics, kinetics of catalytic reaction, External diffusion effects on heterogeneous reactions, reaction and diffusion in porous catalysts, catalyst deactivation, design for deactivating catalysts, Kinetics and reactor design of fluid-fluid and Fluid-particle system, Design of heterogeneous catalytic reactor: fixed bed reactor, slurry reactor, trickle bed reactor and fluidized bed reactor. Analyse experimental data from heterogeneus reactions in order tob e able to design a reactor. Reactor developing
Teaching methods	Interactive lectures Seminar

	Discussions Practical session
Required Previous Knowledge	None
Conditions for taking exam	Mandatory presence at lecturers/workshop for 80%
Exam/grading	Written report (50%) Presentation (50%)
Course materials	Dictaat IGSR

Name	**Project management I**
Contact hours	28 Lectures and practical session
Study phase	2, M1
ECTS	3
Name lecturer	S. Debipersad, Drs
Learning goals After completing the course, the student will be able to:	**The student is able to** 1. Engage and organise a scientific project thorough enough to gain the support of stakeholders/instructors 2. Outline the scope, goals, and deliverables of a project, and its essentials for keeping a project on track 3. Explain the rationale and organise a project based on the most recent literature 4. Analyse results, summarise key learnings, and plan next steps
Course content	Organisation of scientific project. Through roleplay students will gain knowledge about getting support from stakeholders. Writing a thorough project proposal with a track record of activities.
Teaching methods	Interactive lectures Discussions Workshops The student should keep trace of the progresses in his work.
Required Previous Knowledge	-
Teaching methods	Lectures/seminars
Conditions for taking exam	
Exam/grading	Written report (50%), Presentation (50%)
Course materials	Dictaat IGSR en handout

Course	**Reservoir Technology**
Contact hours	32
Study phase	3, Master year 2
ECTS	4 ECTS
Name lecturer	Prof. dr. L Rietveld
Learning goals After completing the course, the student will be able to	The student will be able to: 1. Describe characteristics of the petroleum fields on the Suriname/ Guiana shelf regarding reservoir properties and fluid properties 2. Describe critical parameters that affect the recovery of petroleum 3. Apply analytical models (dynamic and static) to understand the physical/chemical processes that are relevant for the recovery performance 4. Carry out reservoir engineering calculations

Content	The course gives a basic introduction to recovery methods that are used for recovery of petroleum on the Suriname/Guyana continental shelf. Also, the course gives an introduction to unconventional methods that could have a potential of improving the recovery from the petroleum fields. Topics includes properties of reservoir rock and petroleum fluids, PVT-analysis, phase equilibrium, transport equations, material balance, microscopic displacement, volumetric sweep, decline analysis, fractured reservoirs, and Enhanced Oil Recovery (EOR) with an emphasis on fractional flow analysis.
Teaching methods	Lectures Tutorial Discussion
Required Previous Knowledge	None
Conditions for taking exam	-
Exam/Grading	Written exam (100%)
Course material	Books will be announced in advance by the lecturer

Course	**Water purification Systems**
Contact hours	32
Study phase	3, Master year 2
ECTS	4 ECTS
Naam lecturer	Prof. Dr. L Rietveld
Learning goals After completing the course, the student will be able to	**The student is able to** 1. Describe the chemical and biological concepts, reactions, material balance, flow models and reactors, & wastewater characteristics 2. Screen the concepts of shredding, grit removal, flow equalisation, coagulation, flocculation, sedimentation 3. Perform aerobic suspended growth processes, aerobic attached growth processes, anaerobic processes 4. Perform, independently or with a team, advanced wastewater treatment, disinfection processes, effluent reuse/disposal, sludge processing and land application of biosolids 5. Explain how the problem about nitrates, organic traces, heavy metals will be treated in the water purification process 6. Report and discuss data with experts and non-experts
Content	Insight to the human need for water. The classifications of water pollution. Identify sources of water pollution. Define herbicide, pesticide and organic chemical contaminant. Identify/define/describe industrial, agricultural and contamination. Knowledge related to water contaminants removal methods The effectiveness of different types of filtration systems. The role of engineers in water treatment systems. Screening and shredding, grit removal, flow equalization, coagulation, flocculation, sedimentation. Aerobic suspended growth processes, aerobic attached growth processes, anaerobic processes. Advanced wastewater treatment, disinfection processes, effluent reuse/disposal, sludge processing and land application of biosolids.
Teaching methods	Lectures Tutorial Discussion
Required Previous	None

Knowledge	
Conditions for taking exam	Mandatory presence at lecturers/workshop for 80%
Exam/Grading	Written exam (50%) Written report (25%) Presentation (25%)
Course material	Will be announced in advance by the lecturer

Course	**Principles of Bio-diagnostic**
Contact hours	32
Study phase	3, Master year 2
ECTS	3 ECTS
Name lecturer	Vacant
Learning goals After completing the course, the student will be able to	**The student is able to** 1. Apply ethnic norms to detect the origin, age and physiological context about referential cadre of an organism 2. Interpret laboratory results of different patients who are in clinical situation out of the boundaries of the frame of reference 3. Underline the differences between the referential frame and the therapeutical frame 4. Describe variables which can led to a clinical interpretation of a test during de sampling and the interpretation of results from these samples 5. design the sampling in a correct way so that the identification of a sample with a patient is a match 6. Use statistical methods to determine errors margins for sampling 7. Define test sensitivity and test specificity tests, test precision and accuracy, false positive and false negative tests, difference between "screening test" and "confirming test" 8. Apply epidemiological data on intoxications available in various countries and regional legislation concerning prevention of poisoning 9. Detect parameters that modify the toxicity
Content	Protein purification techniques: Ion-exchange chromatography; Gel-filtration; Affinity chromatography; FPLC; HPLC. Proteomics: 2-D Gel Electrophoresis, Mass spectrometry, Protein microarrays. Protein characterization: Fluorescence Spectrometry Epidemiological data on intoxications available in various countries and regional legislation concerning prevention of poisoning. The student knows the main parameters that modify the toxicity. Toxics: Organophosphoric, Organoclorurated, Metals, Strychnine, Metaldehyde, Anticoagulant and Non-Anticoagulant Rodenticide. General characteristics of snake venom. Description of the symptoms of snake poisoning and viper bite treatments. The student will also have an understanding of a practical methodology: brief overview about Chromatography and HPLC. Extraction of a toxic compound from a biological matrix. Calibration curve. Analysis of unknown samples
Teaching methods	Lectures Tutorial Discussion
Required Previous Knowledge	None
Conditions for taking an exam	-
Exam/Grading	Written exam (100%)

Course material	Will be announced in advance by the lecturer

Course	**Research Philosophy and Ethics**
Contact hours per block	32
Study phase	3, Master year 2
ECTS	3 ECTS
Name lecturer	Drs. M. Nankoe
Learning goals After completing the course, the student will be able to	**The student is able to** 1. Describe philosophy and some background issues in ethics 2. Define four main branches of philosophy 3. Describe science and technology in an ethic and philosophical view 4. Integrate philosophy and ethics into scientific work 5. Define moral facts (moral nihilism, moral realism, and moral scepticism and moral relativism, moral subjectivism, and moral objectivism) 6. Understand scientific problematics from different ethical and philosophical perspectives 7. Develop a helicopter view to understand problems and to synthesize texts into a logical sequence
Content	History of philosophy. Ontology and epistemology, objectivism and subjectivism Rationalism and empiricism. Axiology. Positivism and realism, interpretivism and pragmatism. Constructivism and social constructivism. Phenomenology
Teaching methods	Lectures Tutorial Discussion
Required Previous Knowledge	None
Conditions for taking an exam	Mandatory presence at lecturers/workshop for 80%
Exam/Grading	Written exam (100%)
Course material	Will be announced in advance by the lecturer

Course	**Forensic Science**
Contact hours	32
Study phase	3, Master year 2
ECTS	3 ECTS
Name lecturer	S. Dijkstra, Drs/V. Pinas
Learning goals After completing the course, the student will be able to	**Student will be able to:** 1. Explain the role of a forensic scientist and the physical evidence in the penal law system 2. Recognise forensic evidence on a crime scene 3. Collect, analyse and evaluate crime science evidence 4. Use advanced laboratory and field equipment for investigation 5. Report, using ethical norms, investigative findings into a scientific report and be able to discuss it orally
Content	This module is designed to take you from the architecture of DNA through to the creation of a forensic DNA profile. Understanding the makeup of the genome is essential for the understanding of how and why profiles are created. The cause and effect of point mutations, recombination and DNA polymerase slippage in the generation of variation is also covered. In order for this information to be useful in forensic science it is essential that you acquire a good ‘in-depth’ knowledge of

	population genetics and this topic is covered in lectures and workshops. Discussion of the ethics surrounding the use of DNA in forensic science will be in the form of a student debate. Forensic toxicology deals with a number of related topic areas. For the interpretation of results of toxicological analysis, an understanding of drug metabolism and pharmacology is required, as is an understanding of the process of drug re-distribution in the body after death and an understanding of analytical chemistry. Drugs of abuse are included they often contribute to deaths encountered in forensic toxicology and the identification of controlled drugs is a core business for forensic laboratories. Also a great focus is on bulk and trace detection of explosive compounds. The chemistry of explosives materials will be discussed with respect to their different energetic properties as well as the design and effect of current explosives devices. Many of the lectures given in this module rely on knowledge of analytical techniques such as TLC, HPLC, GC, GC-MS and LC-MS – topics which have been covered.
Teaching methods	Lectures Tutorial Discussion Practical session (Sampling on a Crime Scene)
Required Previous Knowledge	None
Conditions for taking an exam	Mandatory presence at lecturers/workshop for 80%
Exam/Grading	Written exam (50%) Written report (25%) Presentation (25%)
Course material	Will be announced in advance by the lecturer

Course	**Project Management II**
Contact hours	32
Study phase	3, Master year 2
ECTS	4 ECTS
Name lecturer	S. Debispersad, Drs
Learning goals After completing the course, student will be able to:	**The student is able to independently** 1. Design and propose a scientific proposal 2. Independently make a work protocol based on the designed scientific principles and known literature 3. Use previous knowledge to rationalise and organise the proposed work using up to date literature 4. Analyse and summarise the results and evaluate the work at the main phases of the project 5. Present its product/results in a clear and understandable manner to the audience
Content	Design and propose a scientific proposal with clear scope, deliverables and with a clear budget list. Discuss the project with stakeholders based on trackable literature and controllable. Analyse results, report, evaluate and present the project proposal to variable audience.
Teaching methods	Interactive lecture Tutorial Discussion
Required Previous Knowledge	-
Conditions for taking	Mandatory presence at lecturers/workshop for 80%

exam	
Exam/Grading	Written report (50 %) Presentation (50%)
Course material	Will be provided by the lecturer

Course	**Design & Synthesis of Organic Compounds**
Contact hours	32
Study phase	4, Master year 2
ECTS	4 ECTS
Name lecturer	W. Dehaen
Learning goals After completing the course, student will be able to:	**The student is able to:** 1. Ethically design, synthesise and elucidate independently novel molecular structure 2. Use molecular modelling to define structure-relation activity 3. Propose a synthetic route and perform the synthesis using all advanced apparatus on a laboratory (chemical & medical) 4. Apply modern molecular-level software on presented problems 5. Assess computational results and perform statistical knowledge to your results 6. Present results to experts and non-experts (orally and written) 7. Report data organised to scientific standards
Content	The course gives an in depth inside to fundamental methods and procedures used in the synthesis of organic compounds at micro and semi-micro scale Synthetic work will demonstrate how organic reactions provide a basis for different industries such as the pharmaceutical industry, the food industry, animal health, electronics, flavour and fragrance and other industries based on organic fine chemicals The course will also give an in depth inside to analytical organic chemistry through the use of qualitative analyses and infrared spectroscopy for structural analysis (functional groups) of organic compounds The principles of structural analysis of organic compounds will be discussed Experimental laboratory work with modern synthetic reactions will illustrate the importance of organic chemistry for our society Methods and principles within green chemistry will be discussed
Teaching methods	Interactive lecture Tutorial Discussion
Required Previous Knowledge	-
Conditions for taking an exam	Mandatory presence at lecturers/workshop for 80%
Exam/Grading	Written exam (50%), written report (25%), presentation (25%)
Course material	Will be provided by the lecturer

Course	**Chemometrics**
Contact hours	32
Study phase	4, Master year 2
ECTS	4 ECTS
Name lecturer	J. Verstegen
Learning goals After completing the course, student will be	**The student will be able to:** 1. Apply practical and theoretical knowledge of chemometrics concepts 2. Interpret complex data and processes

able to:	3. Govern equations: equations of continuity and motion, applications to steady, unidirectional flows; Energy transport - Thermal conductivity, mechanisms of energy transport; shell energy balances; equations of change for non-isothermal systems; Mass transport 4. Evaluate chemical experimental data using multiple variables 5. Apply its knowledge of the above-mentioned concepts in the industrial system or in de research fields
Content	Momentum transport - Viscosity, stress tensor, mechanisms of momentum transport; shell momentum balances, boundary conditions. Energy transport - Thermal conductivity, mechanisms of energy transport; shell energy balances; equations of change for non-isothermal systems; Mass transport
Teaching methods	Interactive lecture Tutorial Discussion
Required Previous Knowledge	-
Conditions for taking exam	Mandatory presence at lecturers/workshop for 80%
Exam/Grading	Written exam (100%)
Course material	Will be provided by the lecturer

Course	**Analytical Chemistry II (Afstudeerrichting: Analytical Chemistry)**
Contact hours	32
Study phase	4, Master year 2
ECTS	6 ECTS
Name lecturer	V. Pinas
Learning goals After completing the course, student will be able to:	**The student is able to independently** 1. Use separation science, spectroscopy, physical characterisation, and method development, together with physical and chemical background of these methods 2. Judge the accuracy and precision of experimental data and show how these judgments can be sharpened by the application of statistical methods 3. Communicate with industry representatives and use statistics, and business principles. 4. Use advanced spectroscopic apparatus and know how to trouble shoot most problems
Content	Super critical fluids, Electrophoresis- theory and applications. Chromatography, Identification of trace elements: DCP and ICP, Flame Emission and Atomic Absorption. Neutron diffraction methods. Electrode-electrolyte interface phenomena (kinetics of electrode reactions), the Helmholtz-Perrin, Guoy-Chapman and Stern models, Butler-Volmer Equation, Electroanalytical methods: Controlled Potential Sweep Methods, Controlled Potential Step Methods, Polarography, Pulse Voltammetry, Electrochemical Impedance Spectroscopy, Controlled Current Methods and Bulk Electrolysis Methods, Application to Electroactive layers and other coupled characterization methods. Moreover, the student has an understanding of rotational spectroscopy, Vibrational Spectroscopy, Selection rules, Vibrational-Rotational spectra, Morse Potential. Raman spectroscopy, electrical and magnetic properties of molecules, NMR, FT-NMR, Relaxation processes in NMR, ESR spectroscopy, Kramers degeneracy, Mossbauer spectroscopy.
Teaching methods	Practical work, combined with tutorials
Required Previous	None

Knowledge	
Conditions for taking an exam	Mandatory presence at lecturers/workshop for 80%
Exam/Grading	Written exam (50%) Presentation (25%) Written report (25%)
Course material	Will be provided by the lecturer

Course	**Pharmacognosy II (Afstudeerrichtingen: Analytical Chemistry & Medicinal Chemistry)**
Contact hours	32
Study phase	4, Master year 2
ECTS	6 ECTS
Name lecturer	W. Dehaen
Learning goals After completing the course, student will be able to:	**The student is able to independently:** 1. Design a molecular proposal using unknown methods to establish novel synthetic route 2. Apply spectroscopic methods to elucidate unknown compounds from novel synthesise compounds or natural alkaloid 3. Apply organic chemistry knowledge to defend a synthetic route and discuss this with colleagues 4. Present the performed research
Content	Momentum transport - Viscosity, stress tensor, mechanisms of momentum transport; shell momentum balances, boundary conditions. Energy transport - Thermal conductivity, mechanisms of energy transport; shell energy balances; equations of change for non-isothermal systems; Mass transport
Teaching methods	Practical work, combined with tutorials
Required Previous Knowledge	None
Conditions for taking an exam	Mandatory presence at lecturers/workshop for 80%
Exam/Grading	Presentation (50%) Written report (50%)
Course material	Will be provided by the lecturer

Course	**Industrial and Supramolecular Chemistry (Afstudeerrichting: Medicinal Chemistry)**
Contact hours	32
Study phase	5, Master year 3
ECTS	6
Name lecturer	W. Dehaen
Learning goals At the completion of this course, students should be able to	The student is able to independently 1. Apply principles of diffusion & mass transfer to basic engineering systems 2. Analyse various mass transfer systems 3. Use several standard lab equipments used in distillation, extraction, leaching, drying, absorption and filtration 4. Analyse and design plate & packed columns for distillation, mixer settlers and RDC for extraction, packed column absorber, batch & continuous driers, constant rate & constant pressure filters 5. Understand the basic concepts and laws of various management concepts 6. Managerial skill development

	7. Understand marketing skill and policy document preparation 8. Understand balance sheet, cost statement and profit and loss 9. Capable to manage human resources in industry 10. Understand human psychology at work 11. Understand attitude, moral and stress limit of employee
Content	- The course provides the skills and knowledge of industrial processes in supramolecular chemistry - Gives an introduction to management practices in industry - Provides important information regarding financial management, Marketing management, Operational management and Human resource management. Managerial function is also supported by Industrial psychology - Industrial psychology course provides information of psychological fundamental like stress, attitude, organisational behaviour, moral, motivation & fatigue
Teaching methods	Self-study, seminars and a mandatory literature survey
Required Previous Knowledge	None
Conditions for taking exam	-
Exam/ final grade	Presentation (50%) Written report (50%)
Course material	Will be provided by the lecturer

Course	**Petrol & Gas Processing Technology/Explosion & ignition calculations (Afstudeerrichting: Chemical & Process Engineering)**
Contact hours	32
Study phase	4, Master year 2
ECTS	6 ECTS
Name lecturer	J. v. Lier
Learning goals At the completion of this course, students should be able to	Student is able to: 1. Describe the formation of flammable dust clouds 2. Discuss physical phenomena related to the particle-laden flow in dust clouds 3. Describe ignition and combustion phenomena in dust layers and clouds 4. Discuss the mechanisms for flame propagation for various types of dust 5. Explain and apply the principles for risk analysis, risk assessment and risk management for industrial facilities where dust explosions represent a hazard 6. Explain methods for testing ignition, combustion and explosion properties of dust samples 7. Discuss relevant means of explosion protection for a given industrial facility 8. Conduct a literature survey on selected aspects of dust explosions 9. Give an oral presentation of a literature survey 10. Identify relevant dust explosions hazards for a given system 11. Propose suitable risk-reducing measures for a given system 12. Combine various principles for explosion protection for a given system
Content	The course describes ignition and combustion properties of powders and dusts, methods for prevention and control of dust explosions, lessons learnt from accidental dust explosions as well as methods for testing the ignition, combustion and explosion properties of dust layers and dust clouds.
Teaching methods	Self-study, seminars and a mandatory literature survey
Required Previous	None

Knowledge	
Conditions for taking an exam	-
Exam/ final grade	Presentation (50%) Written report (50%)
Course material	Literature and hand outs are provided by the lecturer

Course	**Petrol & Gas Engineering/ Biorefinery technology and applications (Afstudeerrichting: Chemical & Process Engineering)**
Contact hours	32
Study phase	4, Master year 2
ECTS	6
Name lecturer	J. Van Lier
Learning goals After reading the course, the student should be able to	**The student is able to** 1. Evaluate the aspects of feedstocks, products, technology and processes of different biorefinery concepts 2. Discuss the potential of biofuels in a future energy system, including 1G and 2G 3. Discuss the major components of lignocellulosic raw materials 4. Explain the conversion pathways for biofuels, platform chemicals, 5. Identify strengths and limitations for the different processes and products 6. Present scientific knowledge in an oral presentation 7. Perform standard QC to processes
Content	To introduce the students to the idea of biorefining which is the sustainable processing of biomass into a spectrum of bio-based products (food, feed, chemicals, materials) and bioenergy (biofuels, power and/or heat through, 1. History of biorefinery and comparison with conventional petroleum refinery 2. Basics of a biorefinery technology 3. Classification and definition of biorefineries 4. Industrial aspects 5. Co-production of industrial platform chemicals and innovative energy carriers from biomass 6. Validation criteria of sustainability of a biorefinery 7. Selected examples
Teaching methods	self-study, seminars and a mandatory literature survey
Required Previous Knowledge	none
Conditions for taking exam	none
Exam/ final grade	Project report (50%), paper (25%) & presentation (25%)
Course material	Will be provided by the lecturer

Course	**(Bio)molecular Design & synthesis & modelling (Afstudeerrichting: Medicinal Chemistry)**
Contact hours	32
Study phase	5, Master year 3
ECTS	5
Name lecturer	W. Dehaen
Learning goals At the completion of this course, students should be	**The student is able to independently** 1. Provide an overview of the field of natural product chemistry 2. Identify different types of natural products, their occurrence, structure, biosynthesis and properties

able to	3. Discuss the use of natural products as starting materials for medicines 4. Carry out investigations of plant materials and natural products 5. Present the results of an investigation to a wide technical audience.
Content	- The course gives an overview of the various molecular-level computational models used in the investigation of a wide range of chemical properties - The students are first introduced to models based on classical physics (Molecular mechanics and dynamics) where atom represents the smallest part of the system and which are well suited for the study of large molecules - Next, the focus will be on models in which the electron represents the smallest part, and which are based on quantum mechanics. The students are given a brief introduction to molecular orbital-based methods (Hückel, Hartree-Fock, and DFT) and use these to describe and discuss chemical bonding, structure and reactivity - The students will use existing software to carry out their own calculations of molecular properties.
Teaching methods	Independent work combined with tutorial Discussion/Presentations/Reports
Required Previous Knowledge	None
Conditions for taking exam	-
Exam/ final grade	Presentation (50%) Written report (50%)
Course material	Literature will be provided by the lecturer

Course	**Bio-diagnostics (Afstudeerrichting Analytische chemie)**
Contact hours	32
Study phase	5, Master year 3
ECTS	5
Name lecturer	S. Algoe, Drs
Learning goals At the completion of this course, students should be able to	The student is be able to independently 1. apply a scientific approach in the assessment of research and science-related statements 2. search for, evaluate, and in written form summarise scientific texts of a project area. 3. plan and accomplish research projects, and critically evaluate methods and results. 4. present results from completed projects orally and in writing in scientifically correct manners. 5. apply ethical rules and standards for conduct and reporting of research projects, and evaluate impact of results from an ethical perspective
Content	- the student will gain deepened practical research training through an individual project in bio-diagnostics aspects and topics - Student participates in a biostatistics training during processing data from the laboratory results - The projects are presented at joint presentations where students discuss each other's research findings, choice of research methods and experience from the various internships. - the student also compiles a review article on the project's research area. The

	project results are presented in writing and is presented orally
Teaching methods	Independent work combined with tutorial Discussion/Presentations/Reports
Required Previous Knowledge	Principle of bio-diagnostics
Conditions for taking exam	
Exam/ final grade	Presentation (50%) Written report (50%)
Course material	Literature will be provided by the lecturer

Course	**Waterpurification technology (Afstudeerrichting Analytische chemie)**
Contact hours	32
Study phase	5, Master year 3
ECTS	5
Name lecturer	S. Algoe, Drs
Learning goals At the completion of this course, students are able to	1. Use relevant theories and techniques regarding waterpurification, 2. Solve water purification problems 3. Use equipment and tools independently for the design and development of practical water treatment applications 4. Use novel water treatment technologies, covering conventional water purification, advanced oxidation, and various separation methods 5. Use sustainable water treatment and water reuse techniques as well as recovering valuable compounds from treated water (wastewater, seawater)
Content	- the course includes a few of contact teaching days (seminars, laboratory work, etc.) - The course includes core, advanced specialisation in water treatments - Advanced specialisation in conventional and advanced water treatment technologies, analytics, sustainable water use, and project work
Teaching methods	Independent work combined with tutorial Discussion/Presentations/Reports
Required Previous Knowledge	Analytical chemistry I and II
Conditions for taking exam	-
Exam/ final grade	Presentation (50%) Written report (50%)
Course material	Literature will be provided by the lecturer

Course	**Medicinal Chemistry (Afstudeerrichting: Medicinal Chemistry)**
Contact hours	32
Study phase	5, Master year 3
ECTS	5 ECTS
V. Pinas	Tutor: V. Pinas

Learning goals After completing the course student will be able to:	**The student is able to** 1. Conduct research to provide an overview of the field of natural product chemistry 2. Identify different types of natural products, their occurrence, structure, biosynthesis and properties by applying laboratory spectroscopic methods 3. Discuss the use of natural products as starting materials for medicines 4. Carry out investigations of plant materials and natural products
Content	- The course provides a brief introduction to plant systematics - Significant poisonous and medicinal plants, together with natural medicines, will be discussed - Important classes of compounds (secondary metabolites) in and from nature will be emphasised, and stress will be put on classification, nomenclature, structure, biosynthesis, occurrence, analysis and pharmaceutical perspectives - Practical exercises demonstrate different techniques within natural product chemistry
Teaching methods	Self-study, seminars and a mandatory literature survey
Required Previous Knowledge	None
Conditions for taking exam	-
Exam/ final grade	Presentation (50%) Written report (50%)
Course material	Will be provided by the lecturer

Course	**Alternative Energy Sources Technology (Afstudeerrichting: Chemical & Process Engineering)**
Contact hours	32
Study phase	5, Master year 3
ECTS	5 ECTS
Name lecturer	Tutor Prof. Dr. W. Dehaen
Learning goals After completing the course, student will be able to:	**The student is able to** 1. Explain the various energy resources and their relative importance in the national and global energy supply 2. Explain how energy is applied and the corresponding requirements to the energy supply 3. Evaluate possible future use of various energy resources 4. Make estimates on available energy from various resources 5. Do estimates on cost of energy 6. Discuss basic challenges related to the global energy consumption 7. Discuss concepts as sustainability and life cycle analysis in relation to energy conversion and use
Content	- The course gives students an overview over various energy resources with emphasis on renewable resources. - The course shall also provide an overview over national and international energy use and production, including projections forward in time. Key terms as life cycle analysis, sustainability and cost of energy should be mastered. - The course gives an overview over renewable energy resources such as solar energy, wind energy, hydropower, tidal and wave energy, bioenergy and geothermal energy. - Further, nuclear power and fossil energy resources are briefly discussed together with CO2 capture and storage. - Key principles for utilisation of the various energy resources will be discussed.

	- Present energy production and usage, nationally as well as internationally is discussed together with projections forward in time. - Concept of life cycle analysis, sustainability and cost of energy are introduced and discussed.
Teaching methods	Independent work combined with tutorial Discussion/Presentations/Reports
Required Previous Knowledge	None
Conditions for taking an exam	-
Exam/ final grade	Presentation (50%) Written report (50%)
Course material	Will be provided by the lecturer

Course	**Process & Chemical Engineering (Afstudeerrichting: Chemical & Process Engineering)**
Contact hours	32
Study phase	5, Master year 3
ECTS	5 ECTS
Name lecturer	W. Dehaen
Learning goals After completing the course, student will be able to:	**The students is able to:** 1. Work with technical and scientific problems of high complexity, and to place the work in a broader industrial and societal context using computer software (matlab, sigmaplot, S16 Montecarlo software) 2. Communicate their work to the general public effectively and precisely, writing well-structured reports and giving oral presentations 3. Apply broad fundamental knowledge in mathematics, science, technology and computer science, as a basis for understanding a variety of methods and applications 4. Perform a process-feasibility study through calculations of mass and energy balances, equipment sizing, investment analyses and other techno-economic considerations 5. Contribute, within their area of specialisation, in order to innovate and implement practical ideas for new chemical processes and concepts in research and industry 6. Assess the need to implement changes in processing plants by improving unit operations in terms of product quality, environmental impacts and increased production.
Content	Computer programming is a core skill. The overall goal of this course is to provide the students with a good understanding of computational geodynamics. A first goal of this course is to provide the students with a good understanding and programming skills in computational geodynamics. A second goal of this course is for the students to learn how to implement and use finite element techniques to solve problems in lithosphere dynamics. In this course the students will learn a number of tools from numerical mathematics, including interpolation, integration, and solving simple partial differential equations using finite element techniques and write computer programs (in Matlab) that apply these methods on topics in geodynamics. These topics include thermal diffusion, elasticity and computational fluid dynamics applied to lithosphere deformation. The student will write a short report including a description of the model, the code implementation and with figures visualising their results.
Teaching methods	Independent work combined with tutorial

	Discussion/Presentations/Reports
Required Previous Knowledge	None
Conditions for taking an exam	-
Exam/grading	Presentation (50%) Written report (50%)
Course material	Will be provided by the lecturer

Course	**Research project & Thesis**
Contact hours	In consultation with supervisor
Study phase	6, Master year 3
ECTS	30 ECTS
Name lecturer	
Learning goals After completing the course, student will be able to:	**The student is able to** 1. The systematic process of collecting and analysing information (data) in order to increase our understanding of the chemical phenomenon with which he/she is concerned or interested 2. Define the problem in one (or more) chemical disciplines and evaluate advanced methods and techniques which could help to solve this problem 3. States succinctly what the study proposes to investigate on basis of previous literature research 4. Underline general objective and specific objectives. Specific objectives should systematically address the various aspects of the problem and the key factors that are assumed to influence or cause the problem 5. Make new hypothesis on the basis of literature compilation and of the supervisor, the relevance of the argument, according also to the University strategy and School/Institute/Section plans 6. Put research objectives clearly phrased in operational terms, together with a realistic consider of the local conditions 7. Be able to interpretate the results from the research program and analyse them using proving critical skills in this process 8. Report his results in a well formulated in a scientific report 9. Understand and apply the security and healthy and environmental norms involved with her/his research program, being aware of the risks linked to chemical research and being able to reflect about his own achievements and the ones of other people involved into this research 10. Prove his knowledge of theoretical and experimental insight and from this point of view will develop a argument position being able to discuss this position also in a social context 11. Be able to communicate his results and his achievements in a written product but also as a oral presentation proving his skills in communicating about complex chemical problems. This skill should be visible also using English language 12. Will prove he is able to work as an individual but also in a team context. His behaviour will be professional constructive and flexible 13. Will prove to be aware of ethical and social implication of chemistry and chemical technology 14. The student has to prove in his thesis he has followed international and innovative developments in chemistry, building up a network in the international context in which he had formed his professional backbone.
Content	Project

Teaching methods	Independent work supported by supervisor
Required Previous Knowledge	Meet requirements to start thesis project
Conditions for taking an exam	
Exam/Grading	Report thesis (90%)/ presentation (10%)
Course material	Will be provided by the lecturer