

O‘ZBEKISTON RESPUBLIKASI
OLIV TA‘LIM, FAN VA INNOVATSIYALAR VAZIRLIGI
SAMARQAND DAVLAT ARHITEKTURA – QURILISH UNIVERSITETI

“KELISHILGAN”
o‘quv ishlari bo‘yicha
prorektor
M.T.Shodmonqulov
Ro‘yxatga olindi: № 204/a
«30» avgust 2024 yil



KIMYOVIY BIRLIK OPERATSIYALARI
FAN DASTURI

Bilim sohasi: 700 000 – Muhandislik, ishlov berish va qurilish sohalari

Ta‘lim sohasi: 710 000 – Muhandislik ishi

Ta‘lim yo‘nalishi: 60710400 – Ekologiya va atrof-muhit muhandisligi
(tarmoqlar va sohalar bo‘yicha)

Samarqand – 2024

Kurs ma'lumotlari
Course Information Form

Modul kodi Code ATM 3040	O'quv yili 2024-2025	Semestr 5	ECTS – Kreditlar 5-semestr -5		
Modul turi Majburiy	Ta'lim tili O'zbek/rus		Auditoriya soatlari		Mustaqil ta'lim (soat/hafta) Independent Education (hour/week)
Fan nomi Title	Jami yuklama	Ma'ruza (soat/hafta) Lecture (hour/week)	Amaliy (soat/hafta) Practical (hour/week)	Laboratoriya (soat/hafta) Laboratory (hour/week)	
Kimyoviy birlik operatsiyalari	5-semestr -150	5-semestr -3	-	-	5-semestr -7

Dastlabki shart Prerequisite	Yo'q None
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Semestr Semestr	Kuzgi Autum
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Kurs tili Course language	O'zbek, Rus Uzbek, Russian
O'quv kursi Level of Course	Uchinchi kurs Third Cycle
Ta'lim yo'nalishlari Course type	60710400 – Ekologiya va atrof-muhit muhandisligi (tarmoqlar va sohalar bo'yicha) 60710400 – Ecology and environmental engineering (by sectors and fields)
Kurs toifasi Course Category	Asosiy Core Courses
Dars shakli Mode of Delivery	An'anaviy (Yuzma – yuz muloqot) Face – to - face

Ma'sul kafedra Owner academic unit	Atrof-muhit muhandisligi
Kursga ma'sul Cours Coordinator	B.O. Xushvaktov
O'qituvchilar Instructor(s)	B.O. Xushvaktov
Yordamchilar Asistant(s)	B.O. Xushvaktov

Fanni o'qitishdan maqsad Course objectives	<p>bakalavrlarda shahar oqova suvlarini tozalashda hosil bo'ladigan oqova suvlarni oqizish, tozalash usullari, ishlatiladigan inshootlarning tuzilishi, turlari, ishlatilish ko'lami, hisoblash asoslari va ularni muayyan sharoitlarga mos holda tanlash usullari bo'yicha yo'nalish profiliga mos bilim, ko'nikma va malaka shakllantirishdir.</p> <p>in Bachelors, it is the formation of knowledge, skills and competencies corresponding to the orientation profile on the drainage of wastewater generated in urban wastewater treatment, methods of treatment, the structure, types of structures used, the scope of use, the basics of calculation and methods of selecting them in accordance with certain conditions.</p>
Fanning mazmuni Course content	oqova suvning tarkibi va xossalari, oqova suvlarni oqizish, tozalash va cho'kmalarga ishlov berish usullari, tozalash inshootlarning tuzilishi, turlari, ishlash nazariyasi, hamda ma'lum tozalash tizim sharoitlar uchun ulardan munosiblarini tanlab hisoblashga o'rgatishdan iborat, uning kelgusida ishlab-chiqarish faoliyatida, ilmiy-texnikaviy taraqqiyot jarayonida uchraydigan turli masalalar va yangiliklarni mustaqil ravishda hal qilishida asosiy omillarni hayotga tadbiiq etishdan iboratdir.

	<p>the composition and properties of wastewater, methods of wastewater discharge, treatment and sediment treatment, structure, types, theory of operation of treatment facilities, as well as a certain treatment system consists in teaching to selectively calculate the appropriate of them for conditions, bringing to life the main factors in its independent solution of various issues and innovations found in further production activities, in the process of scientific and technical.</p>
<p>Tavsiya qilingan yoki talab qilinadigan adabiyotlar ro'yxati Recommended Or Required Reading</p>	<p>Asosiy adabiyotlar:</p> <ol style="list-style-type: none"> 1.«Suv va suvdan foydalanish to'g'risida»gi O'zbekiston Respublikasi Qonuni. – T.: O'zbekiston, 1993. 2.Oqova suvlarni tozalash texnologiyasi:texnika oliy yurtlari uchun darslik / S.M.Turobjonov,T.Tursunov, X.Pulatov.-Tóshkent, Musiqa, 2010.- 256 b. 3.Kanalizatsiya / S.V.Yakovlev,YA.A.Karelin, A.N.Jukov, S.K.Kolobanov. Uchb.dlya vuzov.Izd.5-e pererab.i dop.M.:Stroyizdat.-1984.680 s. 4.Vodootvedenie / YU.V.Voronov, E.V.Alekseev, V.P.Salomeev, E.A.Pugachyov. Uchebnik.-M.:Infra-M,2008-415 s. 5.Ochistka proizvodstvennyx stochnyx vod: Uchebn.pos. /S.V.Yakovlev, YU.M.Laskov,YU.V.Voronov.-M.:Stroyizdat,1979.-320 s. 6.Bo'riev E.S., Yakubov K.A.Oqova suvlarni oqizish tarmoqlari. Bakalavriat ta'lim yo'nalishi uchun ta'lim yo'nalishi uchun O'quv qo'llanma.Toshkent, IQBOL. 2014 y. 220 b. 7.Suv ta'minoti va kanalizatsiya tizimlari ishini tashkil etish va ulardan foydalanish. Oliy o'quv yurtlari uchun darslik./K.A.Yakubov, A.B.Mirzayev, E.S.Bo'riyev, -Toshkent, 2016 y.-212 b. 8.Oqova suvlarni tozalash. Oliy o'quv yurtlari uchun darslik./K.A.Yakubov, E.S.Bo'riyev, -Toshkent, 2020 y.-220 b. <p>Qo'shimcha adabiyotlar:</p> <ol style="list-style-type: none"> 9. QMQ 2.04.03-97. Suv oqova. Tashqi tarmoqlar va inshootlar. O'zdavrxurqum, Toshkent. 1997 . 10. A.A.Lukinix,N.A.Lukinix.Tablitsy dlya gidravlicheskogo rascheta kanalizatsionnyx setey po formule akad.N.N.Pavlovskogo.Izd.4-edopyuM.,Stroyizdat,1974.-156 s. 11. Yakubov Q.A., Bo'riyev E.S. "Oqova suvlarni tozalash". Darslik. –T.: Innovasion rivojlanish nashriyot-matbaa uyi, 2020 yil. -220 b. 12. Водоснабжение и очистка сточных вод: учеб. для вузов [Текст] / С. В. Яковлев, Ю. В. Воронов. – М.: АСВ, 2002. – 707 с. 13. QM Q 2.04.03-97. Kanalizatsiya. Tashqi tarmoqlar va inshootlar. o'zb. Resp. davlat arx. qurilish qo'mitasi. Toshkent. 1997. 148 bet l. <p>Axborot manbalari:</p> <ol style="list-style-type: none"> 1. http://www.politerm.com.ru/arctis/engineer.htm 2. http://www.cadmater.ru/articles/19_fluidflow.cfm 3. http://www.stroing.ru/128 4. http://www.dataplus.ru/Industries/3PIPE/16_hidro.htm 5. http://www.citycom.ru/publications/jul-1998.html 6. http://www.kbsu.ru/Research/sapr.htm 7. http://www.politerm.com.ru/zuluhydro/index.htm. 8. http://www.politerm.com.ru/zuluhydro/wh/waterhammer.htm 9. http://aquart.ru/production/doc.asp?article=gidrrasch&doc=doc&new=yes
<p>Tavsiya etilgan qo'shimcha dastur komponentlari Recommended Optional Program Components</p>	<p>Yo'q\ (bor bo'lsa yoziladi)</p> <p>None</p>

Kursni o'rganish natijalari

Course learning outcomes

1	<p>oqova suvlarning turlari, ularning hosil bo'lish sharoitlari, tarkibi va xossalari; aholi yashash joylari va sanoat korxonalarini oqova suvlarini oqizish tarmoqlarining tizimlari, sxemalari va ularga oqova suvlarni qabul qilish shartlarini; oqova suvlarini oqizish tarmoqlarini loyihalash va ularni gidravlik hisobini; maishiy va ishlab chiqarish oqova suvlarini oqizish tarmoqlarini; maishiy va ishlab chiqarish oqova suvlarini oqizish tarmoqlarining hisobiy sarflarini aniqlashni; oqova suvlarini oqizish tarmoqlarining bo'ylama profillarini; oqova suvlarni havzalarga qo'shish shartlarini; oqova suvlarni tozalash usullari va inshootlarini <i>bilishi</i></p>
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	<i>kerak;</i> Types of wastewater, the conditions, composition and properties of their formation; systems, schemes of wastewater drainage networks of settlements and industrial enterprises and the conditions for receiving wastewater into them; design of wastewater drainage networks and hydraulic accounting for them; discharge networks of household and production; determination of accounting costs of household and production wastewater drainage networks; longitudinal profiles of wastewater drainage networks; conditions for must know;
2	O'zbekiston iqlim sharoitida oqova suvlarni tozalash inshootlarini loyihalash, qurish, rekonstruksiya va ekspluatatsiya qilishning o'ziga hos xususiyatlari; Features of the design, construction, reconstruction and operation of wastewater treatment facilities in the climatic conditions of Uzbekistan;
3	bozor iqtisodiyoti sharoitida oqova suvlarni tozalash tizimlarida yangi, raqobatbardosh, texnologiyalar sxemalarini ishlab chiqish bo'yicha <i>ko'nikma va tajribaga ega bo'lishi</i> ; To have skills and experience in developing new, competitive, technology schemes in wastewater treatment systems in a market economy;
4	oqova suvlarni tozalash inshootlarini gidravlik hisoblashda zamonaviy axborot kommunikatsiya vositalari, xususan kompyuter texnikasi va xalqaro internet tizimidan foydalanish usullarini <i>bilishi va ulardan foydalana olishi kerak</i> ; In the hydraulic calculation of sewage treatment facilities, modern information communication tools, in particular computer equipment and the international internet system, should be able to know and use
5	oqova suvlarni tozalash inshootlaridagi oqovasuv sarflarini aniqlash va gidravlik hisoblash; inshootlar tanlash; yomg'ir suvlari jadalligi va sarfini hisoblash; maishiy, yomg'ir va umumoqizuv oqova suvlarini oqizish tarmoqlarini loyihalash va hisoblash; oqova suvlarni havzalarga oqizish uchun shartli tozalashni aniqlash; oqova suvlarni tozalashda hosil bo'ladigan cho'kmalarga ishlov berish uchun inshootlar tanlash malakalariga <i>ega bo'lishi kerak</i> ; Determination and hydraulic calculation of wastewater consumption in sewage treatment facilities; selection of structures; calculation of the intensity and consumption of stormwater; design and calculation of household, rain and general sewage drainage networks; determination of conditional treatment for sewage discharge into basins; selection of structures for treatment of sediments formed in wastewater treatment should have the qualifications;

Haftalik mavzular va tegishli tayyorgarlik ishlari

Weekly Subjects and Related Preparation Studies

Hafta Week	Mavzular Themes	Resurslar Related preparation
1.	Kirish. Reaksiya kinetikasi.	2 - adabiyot
2.	Reaktor dinamikasi.	1,4,7-adabiyotlar
3.	Neytrallashtirish jarayonlari.	1,6,7-adabiyotlar
4.	Redoksga asoslangan jarayonlar I.	1, 5, 7, 9 - adabiyotlar
5.	Redoksga asoslangan jarayonlar II.	1, 5, 7, 9 - adabiyotlar
6.	Aeratsiya-havoni tozalash (Fe-Mn, ammiak, uchuvchi kislotalarni olib tashlash).	1, 7, 9 – adabiyotlar
7.	Dezinfektsiya.	7, 9 – adabiyotlar
8.	Oqova suvlarni fil'trlash.	7, 9 – adabiyotlar
9.	Koagulyatsiya - flokulyatsiya	1,7,8,9 – adabiyotlar
10.	Qattqlikni yo'qotish jarayonlari / Suvni barqarorlashtirish	3,7,8,9 – adabiyotlar
11.	Ion almashinuvi.	5,7,8,9 – adabiyotlar
12.	Adsorbsion jarayonlar.	2, 7,8,9 - adabiyotlar
13.	Kengaytirilgan oksidlanish usullari (Ozon, UV, Fenton, ultratovush).	1,7,8 - adabiyotlar
14.	Elektrokimyoviy usullar (elektrokoagulyatsiya/flotatsiya, elektrooksidlanish, elektrofenton, elektrodializ).	7,8,11 - adabiyotlar
15.	Tozalash shahobchalarini joylarda joylashtirish.	7,8,12 – adabiyotlar

Baholash jarayoni

Evaluation System

Mashg'ulot turi Activities	Soni Number	Baholash Percentage of Grade
Darsga qatnashish	30	15

Attendance / participation		
Laboratoriya ishi Laboratory		
Amaliy ish (qo'shimcha vazifa) Application		
Kurs ishi Field work		
Maxsus kurs amalyoti (ish joyida) Special course internship (work placement)		
Testlar Quizzes / studio critics		
Uyga vazifani baholash Homework assignments	5	10
Ijodiy ish (taqdimot) Presentations / jury	5	5
Loyiha ishi Project		
Seminar Seminar / workshop		
Oraliq nazorat Mid -Terms	2	20
Yakuniy nazorat Final	1	50
O'zlashtirish ko'rsatgichi Percentage of in – term studies		50
Yakuniy imtihon bahosi Percentage of final examination		50
Jami Total		100

ECTS taqsimoti ECTS workload table			
Topshiriqlar Activities	Soni Number	Davomiyligi (soat) Duration (hour)	Umumiy yuklama Total workload
Mashg'ulot soati Course hours	30	5	150
Laboratoriya ishi Laboratory			
Amaliy ish (qo'shimcha vazifa) application			
Kurs ishi Field work			
Mustaqil ta'lim (maslahat) Study hours out of class	5	2	10
Maxsus kurs amalyoti (ish joyida) Special course internship (work placement)			
Uyga vazifani baholash Homework assignments	5	2	10
Testlar / Viktorina Quizzes / studio critics			
Loyiha ishi Project			
Ijodiy ish (taqdimot) Presentations / seminar	5	1	5
Oraliq nazorat Mid – terms (Examination +Examination prep. Duration)	2	10	20
Yakuniy nazorat (nazorat va nazoratga tayyorlanish soati) Final (examination +examination prep.Duration)	1	15	15
Jami yuklama			150

	Total workload	
	Jami yuklama / 30 (soat) Total workload / 30(h)	150/30=5
	Kredit ECTS credit	5

Qo'shimcha eslatmalar Extra Notes	Yo'q\ (bor bolsa yoziladi) None
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Fan dasturi Mirozo Ulug'bek nomidagi Samarqand davlat Arxitektura-qurilish universiteti Kengashning 2024 yil 30-avgustdagi 1-sonli bayonnomasi bilan ma'qullangan.

Kafedra mudiri:  Norqulov B.M.

Tuzuvchi:  Xushvaktov B.O.